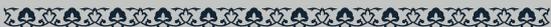




# 1<sup>st</sup> INTERNATIONAL CANADIAN SCIENTIFIC RESEARCH CONGRESS

May 1-3, 2024  
Toronto, Canada



## PROCEEDINGS BOOK

**EDITORS:**  
**Dr. Firuz FEVZI**  
**Ananda MAJUMDAR**

**ISBN: 978-625-367-712-1**

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UNIVERSIDAD JUÁREZ  
AUTÓNOMA DE TABASCO  
"ESTUDIO EN LA DUDA. ACCIÓN EN LA FE"



# 1st INTERNATIONAL CANADIAN SCIENTIFIC RESEARCH CONGRESS

May 1-3, 2024  
Toronto, Canada

## Editors

Dr. Firuz FEVZI  
Ananda MAJUMDAR

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# CONGRESS ID

## TITLE OF CONGRESS

1st INTERNATIONAL CANADIAN SCIENTIFIC RESEARCH CONGRESS

## PARTICIPATION

Keynote & Invited

## DATE - PLACE

May 1-3, 2024

Toronto, Canada

## ORGANIZING COMMITTEE MEMBER

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Managing Director of Khazar Educational Center, Azerbaijan

## **COORDINATOR**

Alina AMANZHLOVA-Gazi University

## **PARTICIPATING COUNTRIES (26)**

Türkiye, Azerbaijan, Mexico, Lebanon, Poland, Colombia, Pakistan, USA, Italy, Nigeria, India, Kosovo, Albania, Japan, Portugal, Algeria, Malaysia, Romania, Georgia, Serbia, Uzbekistan, Turkish Republic of Northern Cyprus, Tunisia, Russia, Morocco, Bulgaria

## **TOTAL PAPERS: 153**

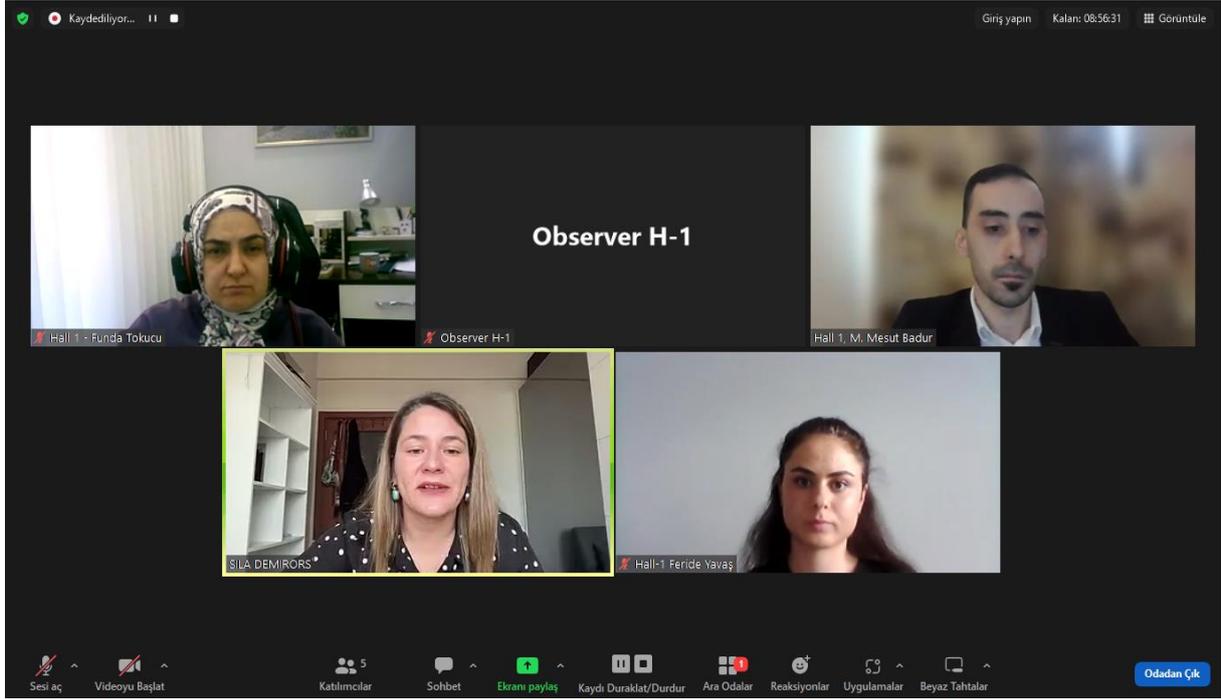
The number of abstracts from foreign countries: **104**

The number of abstracts from Türkiye: **49**

## **LANGUAGES**

Turkish, English, Spanish

# PHOTO GALLERY



Muzisyenler için Orijinal Ses: Kapatılıp Kaydediliyor... Giriş yapın Kalan: 09:57:12 Görüntüle

**Hall 6- Observer**

Hall-6 Şenay Görücü Yılmaz

Hall - 6 Silvi Bozo

Hall-6, Sedanur KILINÇ

Hall-6 Chiara Bramucci

Hall-6, Jonas Silva de Oliveira

Felicia Andrei H6

Hall-6, Burbuçe Kurtaj

Amanda Ferro (Observer)

**Hall-6,Ines Makni**

Hall-6,Ines Makni

Sesi aç Videoyu Başlat Katılımcılar Sohbet Ekranı paylaş Reaksiyonlar Uygulamalar Beyaz Tahtalar Daha fazla Odadan Çık

**Katılımcılar (10)**

Q Katılımcı bul

- H6 H... (Ortak oturum sahibi, ben)
- F Felicia Andrei H6
- AF Amanda Ferro (Observer)
- H Hall - 6 Silvi Bozo
- HC Hall-6 Chiara Bramucci
- HŞ Hall-6 Şenay Görücü Yılmaz
- HB Hall-6, Burbuçe Kurtaj
- HJ Hall-6, Jonas Silva de Oliveira
- HS Hall-6, Sedanur KILINÇ
- HM Hall-6,Ines Makni

Tümünü Sessize Al

Zoom Toplantı - Hall-2

Hall 2 GUETTIOUI Merouane ekranını görüntüyorsunuz Seçenekleri Görüntüle

IKSAD Institute of Econo... Hall-2, Svetozar Mijus... Hall-2 GUETTIOUI Mero... Hall-2, AGUERCHI KH... Hall-2,Hasnaa Talimi

Kaydediliyor... Kalan: 09:37:59

**1st International Canadian Scientific Research Congress**

May 1-3, 2024, Toronto, Canada

**CONCRETE STRENGTH ASSESSMENT: USING ANN FOR PREDICTIVE MODELING**

Presenting author: Merouane GUETTIOUI  
Email: guettioui.merouane@univ-chlef.dz

Authors: Merouane GUETTIOUI, Yasmina KELLOUCHE and Abdelkader BOUGARA

Sessize al Videoyu Başlat Katılımcılar Sohbet Ekranı paylaş Reaksiyonlar Uygulamalar Beyaz Tahtalar Daha fazla Odadan Çık

Ara 18°C Çok bulutlu TUR 16:42 3.05.2024

**Katılımcılar (6)**

- IKSAD I... (Oturum Sahibi, ben)
- HG Hall-2 GUETTIOUI Merouane
- HA Hall-2, AGUERCHI KHADJIA
- S Hall-2, Svetozar Mijuskovic
- HT Hall-2,Hasnaa Talimi
- JK JRAIDA KAOUTAR Hall-2

Tümünü Sessize Al

Zoom Konferensiya - Hall-3

Запись... | Вход | Осталось: 09:11:21 | Вид

**Участники (10)**

Найти участника

- OH Observer ... (Соорганизатор, я)
- G Hall-3, Gülşen Akgül
- DS Dr. Sema SAMATYA YILMAZ
- E Ecem Özdilek
- HA H3-Ayşe Aytaç
- HE Hall-3, Elif Umay EKİNCİOĞLU
- hall-3, Esra Erdoğan
- HN Hall-3, Naz Doğa Dölger
- M Meltem YILDIZ
- SM Session-1/Hall-3, Mehriban Alma...

Включить звук | Начать видео | Участники | Чат | Демонстрация экрана | Реакции | Приложения | Доска сообщений | Дополнительно | Выйти из зала | Выключить звук для всех

Поиск | 18°C Mostly cloudy | 17:44 03.05.2024

Zoom Toplantısı

Kaydediliyor... | Kalan: 09:54:27

**Katılımcılar (11)**

Ara

- H4 Hall 4... (Ortak oturum sahibi, ben)
- H4 Hall 4 - Aytül Kuleli
- H-4 H-4 - Leyla DILEK
- H Hall-4 / Zeyneb Hacemova
- hl hall-4 lale Kara
- HO Hall-4, Oğuzhan DOĞAN
- H Hall-4, Özgür Kivınc
- S Samuel
- PM Ph.D Mujkan Memmedzade
- S- Section - 1 / Hall-4 Zeyneb Hacemova
- Z ZM

Sese bağlanıyor ...

Hall-4, Oğuzhan... | ZM

Tümünü Sessize Al | Daha fazla

Zoom Toplantısı

Kaydediliyor...

Sesi açmak için (O#A) tuşuna basın veya sesi geçici olarak açmak için boşluk çubuğuna basılı tutun.

Kalan: 09:56:54

Katılımcılar (9)

Q Ara

H4 (Ortak oturum sahibi...)

Hall 4 - Norsurianna Teh (...)

A Moderator: Ardita Todri

SA S-1/H-4 Akira Shimada

S Samuel

HD Hall-4 Dorina Gjipali

HE Hall-4 Enkelejda Malaj

HS Hall-4 Sonja Memoçi, Ela...

İkin Namazli

Tümünü Sessize Al Daha fazla

Hall 4- Observer

Hall-4 Sonja Memoçi,...

Müzyenler için Orijinal Ses: Kapalı Kaydediliyor...

Giriş yapın Kalan: 09:25:22 Görüntüle

Katılımcılar (9)

Q Katılımcı bul

H6 H... (Ortak oturum sahibi, ben)

Hall-6 moderator Irina Ana Drobot

AL Amiran Lazarashvili (GTU) Hall-6

HP H6 Pranvera Beqiraj

H6 HALL 6 BOUFENARA KARIMA

Hall 6 Oljana Hoxhaj

Hall-6 Hilal Demirci

Rezo Tedoradze

TE Tuncay Ercan Sepetcioglu

H6 Pranvera Beqiraj

Tuncay Ercan Se...

Hall 6- Observer

HALL 6 BOUFENARA KARIMA

Hall-6 Hilal Demirci

Amiran Lazarash...

Hall 6 Oljana Hoxhaj

Rezo Tedoradze

Amiran Lazarashvili (GTU) Hall-6

Sesi aç Videoyu Başlat Katılımcılar Sohbet Ekranı paylaş Reaksiyonlar Uygulamalar Beyaz Tahtalar Daha fazla Odadan Çık

Tümünü Sessize Al



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# 1st International Canadian Scientific Research Congress

May 1-3, 2024  
Toronto, Canada

## PROGRAM

<https://us02web.zoom.us/j/85177853338?pwd=d0NaUUZhQWVtRXJQeGpYVUwE2dnQ5Zz09>

**Meeting ID: 851 7785 3338**  
**Passcode: 010203**

### PARTICIPANT COUNTRIES (26):

**Türkiye, Azerbaijan, Mexico, Lebanon, Poland, Colombia,  
Pakistan, USA, Italy, Nigeria, India, Kosovo, Albania, Japan,  
Portugal, Algeria, Malaysia, Romania, Georgia, Serbia, Uzbekistan,  
Turkish Republic of Northern Cyprus, Tunisia, Russia, Morocco,  
Bulgaria**

**ÖNEMLİ, DİKKATLE OKUYUNUZ LÜTFEN / IMPORTANT, PLEASE READ CAREFULLY****Önemli, Dikkatle Okuyunuz Lütfen**

- ✓ Kongremizde Yazım Kurallarına uygun gönderilmiş ve bilim kurulundan geçen bildirimler için online (video konferans sistemi üzerinden) sunum imkanı sağlanmıştır.
- ✓ Online sunum yapabilmek için <https://zoom.us/join> sitesi üzerinden giriş yaparak "Meeting ID or Personal Link Name" yerine ID numarasını girerek oturuma katılabilirsiniz.
- ✓ Zoom uygulaması ücretsizdir ve hesap oluşturmaya gerek yoktur.
- ✓ Zoom uygulaması kaydolmadan kullanılabilir.
- ✓ Uygulama tablet, telefon ve PC'lerde çalışıyor.
- ✓ Her oturumdaki sunucular, sunum saatinden 15 dk öncesinde oturuma bağlanmış olmaları gerekmektedir.
- ✓ Tüm kongre katılımcıları canlı bağlanarak tüm oturumları dinleyebilir.
- ✓ Moderatör - oturumdaki sunum ve bilimsel tartışma (soru-cevap) kısmından sorumludur.

**Dikkat Edilmesi Gerekenler- TEKNİK BİLGİLER**

- ✓ Bilgisayarınızda mikrofon olduğuna ve çalıştığına emin olun.
- ✓ Zoom'da ekran paylaşma özelliğine kullanabilmelisiniz.
- ✓ Kabul edilen bildiri sahiplerinin mail adreslerine Zoom uygulamasında oluşturduğumuz oturuma ait ID numarası gönderilecektir.
- ✓ Katılım belgeleri kongre sonunda tarafınıza pdf olarak gönderilecektir
- ✓ Kongre programında yer ve saat değişikliği gibi talepler dikkate alınmayacaktır

**IMPORTANT, PLEASE READ CAREFULLY**

- ✓ To be able to attend a meeting online, login via <https://zoom.us/join> site, enter ID "Meeting ID or Personal Link Name" and solidify the session.
- ✓ The Zoom application is free and no need to create an account.
- ✓ The Zoom application can be used without registration.
- ✓ The application works on tablets, phones and PCs.
- ✓ The participant must be connected to the session 15 minutes before the presentation time.
- ✓ All congress participants can connect live and listen to all sessions.
- ✓ Moderator is responsible for the presentation and scientific discussion (question-answer) section of the session.

**Points to Take into Consideration - TECHNICAL INFORMATION**

- ✓ Make sure your computer has a microphone and is working.
- ✓ You should be able to use screen sharing feature in Zoom.
- ✓ Attendance certificates will be sent to you as pdf at the end of the congress.
- ✓ Requests such as change of place and time will not be taken into consideration in the congress program.

**Before you login to Zoom please indicate your name\_surname and HALL number,  
exp. Hall-1, Awais Khan**

**Meeting ID: 851 7785 3338**

**Passcode: 010203**

**Session -1 / Hall-1****01.05.2024****Moderator: Alina Amanzholova****Meeting ID: 851 7785 3338 / Passcode: 010203****Toronto Local Time: 09:30-11:30****Ankara Local Time: 16:30-18:30**

TITLE	AUTHOR(S)	AFFILIATION
LITERATURE REVIEW OF RESEARCH ON SOCIAL MEDIA IN THE CONTEXT OF CONSUMER BEHAVIOR	Hasan Selçuk ETİ Feride YAVAŞ	Tekirdağ Namık Kemal University, Türkiye
REASONS THAT LEAD CONSUMERS TO UNPLANNED BUYING BEHAVIOR	Hasan Selçuk ETİ Feride YAVAŞ	Tekirdağ Namık Kemal University, Türkiye
THE STICKY FLOOR PROBLEM AS A CAREER BARRIER	Funda TOKUCU	Kafkas University, Türkiye
FINANCIALIZATION OF ECONOMIC AND SOCIAL REPRODUCTION IN TURKIYE	Sıla DEMİRÖRS	Ankara Yıldırım Beyazıt University, Türkiye
THE IMPACT OF TRADE GLOBALIZATION, FACTOR INCOME TAXATION ON INCOME INEQUALITY: EVIDENCE FROM POST-SOVIET COUNTRIES	M. Mesut BADUR	Ural Federal University (UrFU), Russia

All participants must join the conference 10 minutes before the session time.

Every presentation should last not longer than 10-12 minutes.

Kindly keep your cameras on till the end of the session.

**Session -1 / Hall-2****01.05.2024****Moderator: Assist. Prof. Dr. Aslı KASAR****Meeting ID: 851 7785 3338 / Passcode: 010203****Toronto Local Time: 09:30-11:30****Ankara Local Time: 16:30-18:30**

TITLE	AUTHOR(S)	AFFILIATION
FROM THE HISTORY OF THE STUDY OF SOCIO-CULTURAL PROCESSES IN THE NAKHCHIVAN AUTONOMOUS REPUBLIC DURING THE PERIOD OF INDEPENDENCE	Nuray Javid Hajiyeva	Nakhchivan State University
ARMENIAN CLAIMS TO NAKHCHIVAN AND ITS IMPACT TO THE HISTORICAL GEOGRAPHY OF THE REGION (1918-1924s years)	Nurlana ALIYEVA	Nakhchivan Branch of ANAS
HISTORICAL DEVELOPMENT OF HOLIDAY REGIONS IN THE CASPIAN SURROUNDING PROVINCES OF AZERBAIJAN	Rahiba Shankhay Aliyeva Sevinc Tangudur	ANAS
AS AN EXAMPLE OF REWRITING, BOĞAÇ HAN IN ADNAN BINYAZAR'S WORK TITLED STORIES FROM DEDEM KORKUT	Didem BÜLBÜL	Kırşehir Ahi Evran University, Türkiye
QATAR CRISIS AND QATAR'S POLICIES: AN ANALYSIS WITHIN THE FRAMEWORK OF RESOURCE CURSE/BLESSING	Ceren ÖCALAN Senanur UYSAL	Eskisehir Osmangazi University, Türkiye
TURKEY'S APPROACH TO SOMALIA AND SOMALILAND: ANALYSES OF STRATEGIC OBJECTIVES AND POLITICAL DYNAMICS	Murat Özay TAŞKIN Sümer Esin ŞENYURT	University of Wroclaw, Wroclaw, Poland
USE OF CROSS COMMUNICATION IN INTERNAL COMMUNICATION: A QUALITATIVE RESEARCH FOR THE SERVICE SECTOR	Aslı KASAR	İstanbul Gelişim University, Türkiye

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**Session -1 / Hall-3****01.05.2024****Moderator: Dr. Sheeba Irfan****Meeting ID: 851 7785 3338 / Passcode: 010203****Toronto Local Time: 09:30-11:30****Ankara Local Time: 16:30-18:30**

TITLE	AUTHOR(S)	AFFILIATION
BUD PRODUCTIVITY, BUDBURST and ROOTING FEATURES of SOME GRAPEVINE CUTTINGS	Assist. Prof. Dr. Turhan Yilmaz, Seyfullah Boyalı	Kahramanmaraş Sutcu Imam University, Faculty of Agriculture, Department of Horticulture, 46040, Kahramanmaras, Türkiye
ECOTOXICOLOGICAL IMPACT OF BENZOPHENONE-TYPE UV FILTER AS A SUNSCREEN INGREDIENT ON CIRRHINUS MRIGALA	Sana Aziz, Mina Jamil, Muhammad Sarfraz Ali, Sajid Abdullah	University of Jhang, Jhang, Pakistan University of Agriculture, Faisalabad, Pakistan. COMSATS University Islamabad (CUI), Pakistan University of Virginia (UVA) Charlottesville, USA
THE ROLE OF AGRICULTURE IN THE ECONOMY OF A COUNTRY	Khwaja Walid SHIRPOR Saeid TAKARLI Doç. Dr. Ertuğrul GÜREŞÇİ KHWAJA OMID SHIRZAD	Kırşehir Ahi Evran Üniversitesi
LONG TERM IMPACTS OF GLOBAL WARMING ON COSTAL POLLUTION AND MARITIME CRIMINALITY; COASTAL ADAPTATION STRATEGIES	Dr. Sheeba Irfan	GIFT University Punjab, Gujranwala. Pakistan
PREVALENCE OF DIPYLIDIUM CANINUM IN PET CATS IN BELGRADE AREA IN PERIOD 2020-2023	Academician pro.Dr.Ivan PAVLOVIC DVM Vlada ANTIC DVM Dragana PETKOVIC	Scientific Institute of Veterinary Medicine of Serbia, Belgrade, Serbia. Veterinary Ambulance Djole and Prle, Belgrade, Serbia
FIRST EVIDENCE OF MICROPLASTIC CONTAMINATION IN THE FRESHWATER AND SEDIMENTS OF ISHMI RIVER, ALBANIA	PhD(c). Alda Osmeni, Prof.Dr. Ardian Maci, Prof.Dr Petraq Papajorgji	European University of Tirana Agriculture University of Tirana

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**Session -1 / Hall-4****01.05.2024****Moderator: Mujkan MEMMEDZADE****Meeting ID: 851 7785 3338 / Passcode: 010203****Toronto Local Time: 09:30-11:30****Ankara Local Time: 16:30-18:30**

TITLE	AUTHOR(S)	AFFILIATION
THE INFLUENCE OF ARTIFICIAL INTELLIGENCE IN EDUCATIONAL SCIENCES : CURRENT STATUS AND FUTURE PERSPECTIVES. TEACHER - EDUCATIONAL INSPECTION AND MANAGEMENT	Aytül KULELİ	Dokuz Eylül University
SEMANTIC ANALYSIS OF THE ART OF ISTIKAK ON THE AXIS OF GAGAUZ POETRY	Leyla DİLEK	Siirt University, Türkiye
CURRENT APPROACH TO ADULT EDUCATION WITHIN THE SCOPE OF OCCUPATIONAL HEALTH AND SAFETY	Oğuzhan DOĞAN Aslı Ece ACAR FİLİZCİ Dilek ÖZTAŞ Ergün ERASLAN	Ankara Yıldırım Beyazıt Üniversitesi
THE EFFECT OF OBJECTS RELATED TO WAR EQUIPMENT ON THE HERO IN TUVA EPICS	Lale KARA	Kırşehir Ahi Evran Universty
AN ANALYSIS OF THE "BEING HUMAN" UNIT OF THE 4TH GRADE HUMAN RIGHTS, CITIZENSHIP AND DEMOCRACY TEXTBOOK WITHIN THE FRAMEWORK OF CRITICAL THINKING STANDARDS	Birsel AYBEK Özgür KIVANÇ	Çukurova University
USING DIGITAL TOOLS IN TEACHING ENGLISH ONLINE	Aysel Hasanova Novruz gizi	Azerbaijan Institute of Theology
PSYCHOLOGICAL ASPECTS AFFECTING THE FORMATION OF MANAGEMENT SKILLS AMONG STUDENTS	Mujkan MEMMEDZADE	Azerbaijan State Academy of Physical Education and Sports, Baku, Azerbaijan
SOCIO-PSYCHOLOGICAL ANALYSIS OF THE CONCEPT OF IDENTITY IN INTERGROUP PERCEPTION AND INTERACTION IN MANAGEMENT	Zeynab Hacamova	Azerbaijan National Academy of Sciences, Baku, Azerbaijan
THE ROLE OF MODERN TECHNOLOGIES IN THE DEVELOPMENT OF SCIENCE	Sabira ISKANDAROVA Firuza ALIYEVA	Azerbaijan National Academy Of Sciences, Baku, Azerbaijan

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**Session -1 / Hall-5****01.05.2024****Moderator: Prof. Dr. Raul D.S.G. Campilho****Meeting ID: 851 7785 3338 / Passcode: 010203****Toronto Local Time: 09:30-11:30****Ankara Local Time: 16:30-18:30**

TITLE	AUTHOR(S)	AFFILIATION
ADVANCEMENTS IN DIELECTRIC POLYMER NANOCOMPOSITES FOR ENHANCED ENERGY STORAGE APPLICATIONS	Alejandro Ruiz Sánchez, Jorge Andrés Sierra Del Rio	Instituto Tecnológico Metropolitano, Medellín, Colombia.
AUTOMATIC DISTRIBUTION SYSTEM FOR METAL SHEET HANDLING IN THE FACTORY FLOOR	João P.P. Fernandes, Raul D.S.G. Campilho	University of Porto, Portugal
DEVELOPMENT OF QUALITY ASSURANCE PROCEDURES FOR FIXING COMPONENTS IN THE AUTOMOTIVE INDUSTRY	Rafael J.O. Simões, Raul D.S.G. Campilho	University of Porto, Portugal
INVESTIGATIONS ON THE MECHANICAL PROPERTIES AND WELDABILITY OF ADDITIVELY MANUFACTURED INCONEL 718 ALLOYS	Salih YAZICI Durmuş Ali BİRCAN	Çukurova University, Türkiye
MATERIAL SELECTION FOR RACING CAR WHEEL NUT USING FUZZY AHP MULTI-CRITERIA DECISION-MAKING	Salih YAZICI Durmuş Ali BİRCAN	Çukurova University, Türkiye
INFLUENCE OF AGGREGATE GRADATION AND CEMENT CONTENT ON THE BEHAVIOR OF A TUFF AS A BASE MATERIAL FOR FLEXIBLE PAVEMENT	Dr. Abdelkader ZERROUK Dr. Abdelkader BOUGARA Dr. Nacer Eddine MEZIANE	Chlef University
ANALYSIS OF MECHANICAL AND THERMAL STRESSES IN POROUS HYGROTHERMAL CYLINDER IN FRACTIONAL ORDER DERIVATIVE	Anand Kumar Yadav	Shishu Niketan Model Senior Secondary School, India
STUDY OF THE FERMI SURFACE OF SINGLE-CRYSTAL RHENIUM AT LOW TEMPERATURES	Dr. Uktam USAROV	Samarkand State University of Architecture and Civil Engineering, Samarkand, Uzbekistan.
A COMPARATIVE ANALYSIS OF THE THERMAL-MECHANICAL BEHAVIOUR OF COMPOSITE SLABS MADE WITH NORMAL WEIGHT CONCRETE AND LIGHTWEIGHT CONCRETE	Abdenmour LAKHAL Prof Abdelkader BOUGARA Dr. Nouredine BENLAKEHAL	University Hassiba Ben Bouali of Chlef, Algeria
HIGH POWER HETEROMODULAR NANOCOMPOSITE IN THE TiC-TiB <sub>2</sub> -BN-SiC-B <sub>4</sub> C-SiAlON-Al <sub>2</sub> O <sub>3</sub> -C CARBON FIBER SYSTEM	Z. Kovziridze, N.Nijradze, G. Tabatadze, T. Cheishvili, Ts. Danelia, N. Darakhvelidze	Georgian Technical University, Georgia
CIRCULAR ECONOMY IN ACTION: USEFUL CHEMICALS PRODUCTION FROM PROCESS RESIDUES (SPENT GRAINS)	Redi BUZO, Ilirjan MALOLLARË, Luljeta PËNGULË, Fjora CANE	University of Tirana, Tirana, Albania University F.S. Noli, Korçe, Albania

All participants must join the conference 10 minutes before the session time.

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Kindly keep your cameras on till the end of the session.

**Session -1 / Hall-6****01.05.2024****Moderator: Dr. Felicia ANDREI****Meeting ID: 851 7785 3338 / Passcode: 010203****Toronto Local Time: 09:30-11:30****Ankara Local Time: 16:30-18:30**

TITLE	AUTHOR(S)	AFFILIATION
TORSIONAL EVALUATION ON DIFFERENT BENDING CONDITIONS OF TWO NICKEL TITANIUM ROTARY GLIDE PATH FILES WITH DIFFERENT ALLOY	Chiara Bramucci, Rosemary Abbagnale, Ippolito Caputo, Marco Seracchiani, Rodolfo Reda, Alessio Zanza, Luca Testarelli	"La Sapienza" University of Rome, Rome, Italy
EXPLORING THE MEDIATING ROLE OF MINDFULNESS IN THE RELATIONSHIP BETWEEN SELF-CONCEALMENT AND PSYCHOLOGICAL FLEXIBILITY IN DEVELOPING PSYCHOLOGICAL DISTRESS	Wajiha Malik Anna Sharif	University of Gujrat, Sialkot
RISK FACTORS AND NUTRITIONAL SUPPORT IN PATIENTS WITH HYPERGLYCEMIA	Dr. Sc.Burbuqe Kurtaj-Bajrami Dr. Sc. Alberta Tahiri	College of Medical Sciences "Rezonanca", Kosovo University "Haxhi Zeka" Pejë, Kosovo
IN THE TWO ALZHEIMER RAT MODEL, BOVINE LACTOFERRIN TREATMENT IMPROVES COGNITIVE FUNCTIONS BY REDUCING A $\beta$ /TAU ACCUMULATION	Sedanur KILIÇ Prof. Dr. Şenay GÖRÜCÜ YILMAZ Assist. Prof. Dr. Ahmet Sarper BOZKURT Prof. Dr. Sibel OĞUZKAN BALCI	Gaziantep University
COVID-19 VACCINATION DYNAMICS AND PUBLIC PERCEPTIONS: IMPLICATIONS FOR POST-PANDEMIC PLANNING	Assoc. Prof. Silvi BOZO	Catholic University "Our Lady of Good Counsel", Tirana, Albania
NEONATAL ENDOCRINE DYSFUNCTION AND DISEASES	Dr. Rajmonda Tare	Regional Hospital, Elbasan, Albania
ADVANCEMENTS IN DETECTION METHODS FOR NITROSAMINE DRUG SUBSTANCE-RELATED IMPURITIES	Dr. Felicia ANDREI	University of Medicine and Pharmacy, Romania
PITYRIASIS ROSEA, CASE REPORT	Dr. Denada SELFO	Faculty of Public Health, Nursing Department, Vlore, Albania
EFFECTS OF CRYPTOCARYA MOSCHATA FRACTIONS ON PLANKTONIC CELLS AND BIOFILMS OF CANDIDA ALBICANS AND STREPTOCOCCUS MUTANS	MSc. Jonatas Silva de Oliveira MSc. Beatriz Ribeiro Ribas MSc. Amanda Costa Ferro Dr. Camilla Olga Tasso Rafaelly Camargo Prof. Dr. Alberto José Cavaleiro Prof. Dr. Janaina Habib Jorge	São Paulo State University (Unesp)
ENDOGENOUS CARDIOTONIC STEROIDS IN CHRONIC KIDNEY DISEASE AND OTHER BIOMARKERS WITH DIAGNOSTIC AND PROGNOSTIC SIGNIFICANCE	Dr. Kalina Metodieva Dr. Maria Motrenikova Dr. Teodor Kuskunov Dr. Anelia Bivolarska	Medical University of Plovdiv

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SENESCENCE- ASSOCIATED BIOMARKERS	Dr. Kalina METODIEVA Dr. Iliyan DIMITROV Dr. Elisaveta APOSTOLOVA Dr. Anelia BIVOLARSKA	Medical University of Plovdiv
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**Session -1 / Hall-1****02.05.2024****Moderator: Dr. Ines MAKNI****Meeting ID: 851 7785 3338 / Passcode: 010203****Toronto Local Time: 09:30-11:30****Ankara Local Time: 16:30-18:30**

TITLE	AUTHOR(S)	AFFILIATION
THE EFFECT OF A POLISHING PROTOCOL IN 3D-PRINTING RESIN FOR DENTURE BASE ON SURFACE AND BIOLOGICAL PROPERTIES	MSc. Amanda Costa Ferro DDS. Lais Scabelo MSc. Jonatas Silva de Oliveira MSc. Beatriz Ribeiro Ribas Prof. Dr. Janaina Habib Jorge	São Paulo State University (UNESP), School of Dentistry, Araraquara
COMPARING PATIENT SATISFACTION IN PUBLIC AND PRIVATE HOSPITALS IN TUNISIA	Dr. Nehla RMADI Dr. Ines MAKNI Pr. Mounira HAJJAJI Pr. Kaouthar JMAL HAMMAMI	Hèdi Chaker University Hospital of Sfax Higher Institute of Nursing Sciences of Sfax
IN-SILICO STUDY OF ZINGIBER OFFICINALE PROVES THE MANAGEMENT OF ALCOHOLIC LIVER DISEASE	Shashi Ranjan Shashank Shekher Mishra Gaurav Ranjan Shakti P Pattanayak	Central University of South Bihar, Gaya, India DIT University, Dehradun, India
SHIFT WORK AND NURSES' HEALTH	Dr. Amel KCHAOU Dr. Anouare HRAIRI Dr. Nada KOTTI Dr. Feriel DHOUIB Dr. Ons WALHA Pr. Mohamed Larbi MASMOUDI Pr. Mounira HAJJAJI Pr. Kaouthar JMAL HAMMAMI	University of Sfax Hedi Chaker University Hospital
LEVELS OF THERAPEUTIC COMPLIANCE AMONG TYPE 2 DIABETIC PATIENTS IN SOUTHERN TUNISIA	Dr. Ons WALHA, Dr. Houda BEN AYED, Dr Mariem BEN HMIDA, Dr Bouthaina TRABELSI, Dr Mahdi KCHAOU, Dr Maissa BEN JMEAA, Dr Sourour YAICH	University of Sfax, Tunisia
PREVALENCE AND FACTORS ASSOCIATED WITH PHYSICAL ACTIVITY IN TYPE 2 DIABETIC PATIENTS	Mahdi Kchaou, Houda Ben Ayed, Bouthayna Trabelsi, Mariem Ben Hmida, Ons Walha, Feten Hadj Kacem, Sourour Yaich	University Hospital Hedi Chaker, Sfax
INCIDENCE AND PREDICTIVE FACTORS OF CATHETER-RELATED INFECTIONS IN PERITONEAL DIALYSIS: A CHALLENGE TO OVERCOME	Bouthaina Trabelsi Werchfeni, Mariem Ben Hamida, Houda Ben Ayed, Najla Damak, Mouna Baklouti, Mahdi Kchaw, Ons Walha, Nesrine Dhieb, Sourour Yaich, Mohamed Ben Hamida	Hedi Chaker Hospital, Sfax, Tunisia
FACTORS INFLUENCING THE EMIGRATION OF TUNISIAN YOUNG DOCTORS	Emna Mziou, Maroua Trigui, Mouna Baklouti, Bouthaina Trabelsi, Nessrine Dhieb,	Hygiene Department, Habib Bourguiba University Hospital, Sfax, Tunisia

	Zeineb Mallek, Fedi Ben Dhaou, Becem Mnif, Mondher Kassis	
STUDY OF THERMAL CYCLING EFFECT ON VARIOUS NOTCH CONFIGURATIONS IN GFRP LAMINATES FOR AUTOMATIVE AND AEROSPACE APPLICATIONS	Shahzad Hassan, Riffat Asim Pasha, Ghulam Murtaza	University of Engineering and Technology, Taxila, Pakistan
MICROENCAPSULATION OF SASKATOON BERRY EXTRACT - HEALTH ASPECT	Dr Sabina Lachowicz-Wiśniewska Prof. Michał Świeca Dr Katarzyna Lisiecka	Calisia University, Poland Lublin University of Environmental and Life Sciences, Poland

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**Session -1 / Hall-2****02.05.2024****Moderator: Assoc. Prof. Dr. Leyla BAHAR****Meeting ID: 851 7785 3338 / Passcode: 010203****Toronto Local Time: 09:30-11:30****Ankara Local Time: 16:30-18:30**

TITLE	AUTHOR(S)	AFFILIATION
RECENT ACHIEVEMENTS IN THE SURGICAL TREATMENT OF INFRARENAL ANEURYSMS OF THE ABDOMINAL AORTA	Namazov Ilqar Namazova Kamala Guliyev Rasim Aslanov Azer Guliev Rashad Ahmadov Sadig Shirinova Nargiz Budagov Ilham Ahmadova Ulviyya Murvaladova Narmin Ibrahimova Gulnar	The Scientific Surgery Center named after Akademik M. Topchubashov
THE USE OF EXOSOMES IN INFERTILITY TREATMENT	Leyla BAHAR	Mersin University, Türkiye
NURSING MIGRATION IN A GLOBALIZING WORLD	Burcu ÇAKI DÖNER Emine İNCE Kevser Sude KIVCI	Gaziantep Islamic Science and Technology University, Türkiye
OBSTETRIC VIOLENCE AND THE RESPONSIBILITIES OF THE NURSE	Burcu ÇAKI DÖNER Hazime TAŞCI Büşra ELMACI	Gaziantep Islamic Science and Technology University, Türkiye
EVAULATION OF THE FACIAL ARTERY WITH 3D CT ANGIOGRAPHY IN THE TURKISH POPULATION	Ahsen Kadriye TAŞCI Sedat MEYDAN Yasin ARİFOĞLU Serdar BALSAK Bahar ATASOY Özge PASİN	Bezmialem Vakıf University, Türkiye
COMPARISON OF LAPAROSCOPIC AND OPEN METHODS IN INGUINAL HERNIA SURGERY	Fatih TÜRKÖGLU	Selcuk University, Türkiye

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**Session -1 / Hall-3****02.05.2024****Moderator: Assist. Prof. Berkay Eren PEHLİVANOĞLU****Meeting ID: 851 7785 3338 / Passcode: 010203****Toronto Local Time: 09:30-11:30****Ankara Local Time: 16:30-18:30**

TITLE	AUTHOR(S)	AFFILIATION
CURRENT APPLICATIONS OF PHYSIOTHERAPEUTIC VAGUS NERVE STIMULATION IN AUTONOMIC NERVOUS SYSTEM REGULATION	Berkay Eren PEHLİVANOĞLU	Bahcesehir University
EMOTIONAL FEELINGS EXPERIENCED IN WOMEN AFTER PERINATAL LOSS: LITERATURE REVIEW	Cansu IŞIK Beyza YALÇINKAYA	University of Health Sciences
NEGATIVE EMOTIONS EXPERIENCED BY WOMEN DURING VAGINAL EXAMINATION IN LABOR: LITERATURE REVIEW	Beyza YALÇINKAYA Cansu IŞIK	University of Health Sciences
THE EXAMINATION OF THE RELATIONSHIP OF ATTITUDES TOWARDS PREMARITAL SEX AND SEXUAL DYSFUNCTION OF THE WOMEN WHO LIVES AT TURKEY	Nathan Kaan GÖK Sultan OKUMUŞOĞLU	Lefke Avrupa Üniversitesi, KKTC
CBRN AND FOOD SAFETY	İsmail Musab YÜCER Prof. Dr. Dilek ÖZTAŞ Aslı Ece ACAR FİLİZCİ Prof. Dr. Aytunç ATEŞ	Ankara Yıldırım Beyazıt University
INVESTIGATION OF THE AVAILABILITY OF ELYMUS REPENS IN HEAVY METAL ADSORPTION (Pb <sup>2+</sup> ,Co <sup>2+</sup> )	Yusuf Sina BALKİS Kübra Miray KÖKEN Dr. Yakup EKER	Yalova Atatürk Bilim ve Sanat Merkezi, Yalova, Türkiye

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**Session -1 / Hall-4****02.05.2024****Moderator: Assoc. Prof. Dr. Ardita TODRI****Meeting ID: 851 7785 3338 / Passcode: 010203****Toronto Local Time: 09:30-11:30****Ankara Local Time: 16:30-18:30**

TITLE	AUTHOR(S)	AFFILIATION
AN ASSESSMENT OF THE USE OF COMMUNICATION IN CREATING AWARENESS ON VESICOVAGINAL FISTULA (VVF) AMONGST WOMEN IN KADUNA STATE, NIGERIA	Aleyomi Timileyin Paul Olubukola Racheal Adesokan	Kaduna State University
UNDERSTANDING THE IMPACT OF DEREGULATED IMMIGRATION POLICIES ON SKILLED HUMAN CAPITAL FORMATION BY STUDY MIGRANTS IN OVERLAPPING GENERATIONS ECONOMIES	Dr. Akira SHIMADA	Nagasaki University, Japan
EMPIRICAL EVIDENCE OF 30% WOMEN ON BOARD REPRESENTATION REQUIRED OF PUBLIC LISTED COMPANIES BY THE MALAYSIAN CODE ON CORPORATE GOVERNANCE	Norsurianna Teh Binti Abdullah Professor Datuk Dr. Noor Inayah Ya'akub Professor. Dr. Abu Bakar Abdul Hamid	Infrastructure University Kuala Lumpur
MIGRATION MANAGEMENT IN ALBANIA: PROGRESS TOWARDS EUROPEAN UNION ACCESSION	Dorina Gjipali Pranvera Beqiraj	Aleksandër Moisiu University, Durrës, Albania
MIGRATION IN EUROPE: A HISTORICAL ANALYSIS AND CONTEXTUALIZATION OF THE CONCEPT OF INTEGRATION	Dorina Gjipali Rezana Konomi	Aleksandër Moisiu University, Durrës, Albania Tirana University, Albania
BUSINESSES AGE: A KEY PLAYING FACTOR EVIDENCE FROM ALBANIAN MARKET	Ardita TODRI Marsel SULANJAKU	University of Elbasan "Aleksandër Xhuvani"
THE RELATIONSHIP BETWEEN ON-JOB-EMBEDDEDNESS AND TURNOVER INTENTION AMONG HEALTHCARE PROFESSIONALS IN ETHIOPIA	Samuel Bekele Tadesse Shavina Goyal	Punjabi University, India
DOES MONETARY POLICY AFFECT INCOME INEQUALITY IN TURKIYE?	Ilkin Namazli	La Sapienza University of Rome
BREAKING AWAY FROM SOCIALIST REALISM: PETRO MARKO'S THE LAST CITY	Enkelejda Malaj	University of Tirana
CRIMINAL POLICIES IN ALBANIA	Ela KERKA Sonja Memoçi	Univrsty of Tirana, Albania Specialist at Ministry of Justice of Albania

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**Session -1 / Hall-5****02.05.2024****Moderator: Pedro Izquierdo****Meeting ID: 851 7785 3338 / Passcode: 010203****Toronto Local Time: 09:30-11:30****Ankara Local Time: 16:30-18:30**

TITLE	AUTHOR(S)	AFFILIATION
MEDIDAS ERGONÓMICAS Y PROTOCOLOS DE SEGURIDAD E HIGIENE EN EL ENTORNO LABORAL PARA LA PRODUCTIVIDAD	Amy Selene Ocaña Magaña Flor De María Ramos Mejía José Mariano Yáñez Cabrera Karen Julissa Presenda Gómez Pablo Enrique Magaña Torres	Universidad Juárez Autónoma de Tabasco
VIDA COTIADIANA DENTRO DEL AREA DE TRABAJO: UNA UTOPIA LABORAL	Aguilera Hernández José Ángel De Dios De Dios Luis Fernando López López José Denis Pérez Carrera Braulio Jesús Pérez Jiménez Eduardo Pérez Gómez Yahir Vidal	Universidad Juarez Autonoma De Tabasco, División Academica De Ciencias Economico, Administrativo Dacea
USO DEL COMERCIO ELECTRÓNICO EN EMPRESAS TEXTILES:UNA REVISIÓN DE LA LITERATURA	Pedro Izquierdo Yeni jazmín soberano Hernández Joel Pérez Villamil Marisol Rodríguez Jiménez Elizabeth Fernández Pereyra Yeni Jazmín Soberano Hernández Pedro Antonio Izquierdo Montealegre	Universidad Juárez Autónoma De Tabasco

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**Session -1 / Hall-6****02.05.2024****Moderator: Lecturer, PhD İrina-Ana DROBOT****Meeting ID: 851 7785 3338 / Passcode: 010203****Toronto Local Time: 09:30-11:30****Ankara Local Time: 16:30-18:30**

TITLE	AUTHOR(S)	AFFILIATION
A DREAM COUNTRY: PERCEPTIONS OF CANADA AMONG IRANIAN LGBTI+ IMMIGRANTS IN TURKEY	Hilal DEMİRCİ Prof. Dr. Tuncay Ercan SEPETCİOĞLU	Aydın Adnan Menderes University
IDEOLOGICAL ASPECTS OF FASHION	Lecturer, PhD İrina-Ana DROBOT	Technical University of Civil Engineering Bucharest, Romania
PROCEDURE FOR IMPLEMENTATION OF INTERNATIONAL AGREEMENTS UNDER THE ALBANIAN LAW	Pranvera Beqiraj Ph.D. Dorina Gjipali	Aleksandër Moisiu University, Durrës, Albania
FEEDBACK ON THE IMPLEMENTATION OF A COLLABORATIVE APPROACH FOR THE REHABILITATION OF TRADITIONAL HOUSES IN THE OLD TOWN OF CONSTANTINE, ALGERIA	Dr. Karima BOUFENARA	University of Constantine 3
THE IMPACT OF HIDDEN AGREEMENTS ON FREE AND EFFECTIVE COMPETITION	Prof. Asoc. Dr. Rezana Konomi Dr. Dorina Gjipali	Tirana University, Albania Aleksandër Moisiu University, Durrës, Albania
THE IMPACT OF CYBER ATTACKS IN ALBANIA IN RELATION TO NATIONAL SECURITY AND CITIZENS' PRIVACY	Dr. Oljana Hoxhaj	"Ismail Qemali" University of Vlora, Albania
THE ROLE OF THE GEORGIAN MIDDLE CORRIDOR OF THE GREAT SILK ROAD IN INTERMODAL TRANSPORTATION	Amirani Lazarashvili Phd, Rezo Tedoradze	Georgian Technical University

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**Session -1 / Hall-1****03.05.2024****Moderator: Prof. Assoc.Dr. Jonida Bushi****Meeting ID: 851 7785 3338 / Passcode: 010203****Toronto Local Time: 09:30-11:30****Ankara Local Time: 16:30-18:30**

TITLE	AUTHOR(S)	AFFILIATION
ENDANGERING ACADEMIC INTEGRITY: A DISCOURSE OF THE NEGATIVITIES ATTACHED TO AGE RESTRICTION WHILE DISTRIBUTING ACADEMIC SCHOLARSHIP AMONG THE APPLICANTS FROM DEVELOPING COUNTRIES	Abdul-Rahman Balogun Muhammed-Shittu	Khazar University, Baku, Azerbaijan
READING DIGITAL OR PRINT? METACOGNITIVE PRACTICES OF READING IN THE L2 LANGUAGE CLASSROOM: A LEBANESE CASE STUDY	Dr. Deema Dakakni	Lebanese American University, Beirut-Lebanon
THE SIGNIFICANCE OF PEDAGOGICAL PRACTICE: MENTOR-STUDENT DYNAMICS IN TEACHER EDUCATION	Prof. Assoc.Dr. Jonida Bushi Prof.Assoc.Dr. Florinda Tarusha Prof.Assoc.Dr. Ema Kristo	University of Tirana, Albania University of Elbasan
TECHNOLOGICAL PERSPECTIVE IN LEADERSHIP STRATEGIES FOR GLOBAL HIGHER EDUCATIONAL SUSTAINABILITY	Prof. Dr. Lamara Kadagidze Prof. Dr. Tamar Gamsakhurdia Dr. Erekle Ugrelidze	Grigol Robakidze University, Georgia
NEOLIBERALISM AND LEGAL REGULATIONS IN THE TOBACCO SECTOR IN TÜRKİYE	Dr. Öykü ŞAFAK ÇUBUKÇU	Ankara Yıldırım Beyazıt University
INVESTIGATING TRENDS IN AIR TEMPERATURE, PRECIPITATION, AND RUNOFF OF THE CITY OF MUĞLA FROM 2007 TO 2015	Dr. Günseli ERDEM ALTIN	Yeditepe University, Türkiye

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**Session -1 / Hall-2****03.05.2024****Moderator: Dr. Yasmina KELLOUCHE****Meeting ID: 851 7785 3338 / Passcode: 010203****Toronto Local Time: 09:30-11:30****Ankara Local Time: 16:30-18:30**

TITLE	AUTHOR(S)	AFFILIATION
ARTIFICIAL NEURAL NETWORKS MODEL FOR PREDICTING THE SIMPLE COMPRESSIVE STRENGTH OF LIME-STABILIZED SOILS	Dr. Yasmina KELLOUCHE, Seydou KANTE, Quilulo Nunes Alvaro VUMI, Dr. Ahmed Bilal SARI	University Djilali Bounaama, Algeria Hassiba Benbouali University, Algeria
CONCRETE STRENGTH ASSESSEMENT: USING ANN FOR PREDICTIVE MDELING	Merouane GUETTIOUI, Yasmina KELLOUCHE, Abdelkader BOUGARA	University Hassiba Benbouali, Chlef, Algeria
ENHANCING BREAST CANCER DETECTION WITH DEEP LEARNING: APPLYING TRANSFER LEARNING	Khadija Aguerchi, Dr. Younes jabrane, Dr. Maryam habba, Dr. Mustapha Ameur	Cadi Ayyad University, Morocco
THE ROLE OF ARTIFICIAL INTELLIGENCE IN DIAGNOSING CUTANEOUS LEISHMANIASIS: A REVIEW OF PRESENT INNOVATIONS AND PROSPECTS FOR ADVANCEMENT	Hasnaa TALIMI Pr. Kawtar RETMI Pr. Rachida FISSOUNE Dr. Meryem LERMANI	Institut Pasteur du Maroc, Casablanca, Morocco National School of Applied Sciences, University Abdelmalek Essaadi, Tangier, Morocco Mohammed VI Polytechnique University Ben Guerir, Morocco
ANALYSIS OF CYBERSECURITY IN HEALTHCARE INSTITUTIONS IN ALBANIA	PhD(c) Aldo Cani, Assoc. Prof. Aurora Simoni	The Directorate of Information Technology, Tirana, Albania University of Tirana, Tirana, Albania
USING TEXTURAL FEATURES OF CELL NUCLEI TO DEVELOP AN ARTIFICIAL NEURAL NETWORK FOR IDENTIFYING CELLS UNDERGOING CHEMICAL DAMAGE	Svetozar MIJUSKOVIC Jovana PAUNOVIC PANTIC Igor PANTIC	University of Belgrade, Faculty of Medicine, Serbia
PREDICTION OF ENERGY CONSUMPTION FOR A PCM-INTEGRATED BUILDING USING ANN AND SVM MODELS: A CASE STUDY OF THE CITY OF AGADIR	Kaoutar JRAIDA, Youness EL Mghouchi, Amina MOURID, Chadia HAIDAR	Moulay Ismail University, Morocco

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**Session -1 / Hall-3****03.05.2024****Moderator: Gülşen AKGÜL****Meeting ID: 851 7785 3338 / Passcode: 010203****Toronto Local Time: 09:30-11:30****Ankara Local Time: 16:30-18:30**

TITLE	AUTHOR(S)	AFFILIATION
DETERMINATION OF UNMANNED AERIAL VEHICLE LANDING GEAR MATERIAL SELECTION WITH USING MULTI-CRITIA DECISION MAKING METHOD	Yıldız SAYICI Hüseyin HALILOGLU Assoc. Prof. Dr. Ahmet FEYZIOGLU	Marmara University
PRODUCTION OF HOLLOW PLA/PBS NANOFIBERS INCLUDE PROPOLIS BY COAXIAL ELECTROSPINNING METHOD	Ecem ÖZDİLEK Dr. Sema SAMATYA YILMAZ, Prof. Dr. Ayse AYTAC	Kocaeli University
CROSSLINKING OF POLYVINYL ALCOHOL/SODIUM CASEINATE WITH LACTIC ACID	Naz Doğa DÜLGER Dr. Sema SAMATYA YILMAZ Prof. Dr. Ayse AYTAC	Kocaeli University
STUDY OF FEST METHODS FOR MICROPROCESSOR CENTRALIZATION OF ARROWS AND SIGNALS IN ORDER TO INCREASE TEST COVERAGE AND REDUCE THE RESOURCE INTENSITY OF BENCH TESTS	Nazila Ragimova Almammadova Mehriban Kamenieva Nina Bibikov Mykyta	Azerbaijan State Oil and Industry University Ukrainian State University of Railway Transport
RECOVERY OF ZINC METAL FROM ELECTRIC ARC FURNACE FLUE DUST BY HYDROMETALLURGICAL METHODS	Esra ERDOĞAN NAKİPOĞLU Assoc. Prof. Dr. Meltem YILDIZ	Kocaeli University
DEVELOPMENT OF WATER-BASED ULTRA HIGH GLOSS TRIM PAINT	Ahmet Can ÜNAL Serkan YILMAZSÖNMEZ Koray DEDEOĞLU Erdem AKYÜZ	Marshall Boya ve Vernik San. A.Ş., Kocaeli / Türkiye
INVESTIGATION OF PH EFFECT ON CR(VI) ION REMOVAL FROM WASTEWATER USING ADSORPTION METHOD	Gülşen AKGÜL Gözde KOÇAK MUTLU Prof. Dr. Ali KARA	Uludağ University, Bursa, Turkey
INVESTIGATION OF PH EFFECT ON CU(II) ION REMOVAL FROM WASTEWATER USING ADSORPTION METHOD	Gülşen AKGÜL Gözde KOÇAK MUTLU Prof. Dr. Ali KARA	Uludağ University, Bursa, Turkey
THE EFFECT OF pH ON Cu+2 ADSORPTION BY UPA POLYMER	Elif Umay EKİNCİOĞLU Petek BALCI Prof. Dr. Ali KARA	Uludag University, Bursa, Turkey
THE EFFECT OF pH ON Cr(VI) ADSORPTION BY UPA POLYMER	Elif Umay EKİNCİOĞLU Petek BALCI Prof. Dr. Ali KARA	Uludag University, Bursa, Turkey

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**Session -1 / Hall-4****03.05.2024****Moderator: Assoc. Prof. Dr. Gökhan ÇAYLI****Meeting ID: 851 7785 3338 / Passcode: 010203****Toronto Local Time: 09:30-11:30****Ankara Local Time: 16:30-18:30**

TITLE	AUTHOR(S)	AFFILIATION
NEW TYPE ANION REMOVING AGENTS THAT ARE OBTAINED FROM WASTE COOKING OILS	Gökhan ÇAYLI	Istanbul University-Cerrahpaşa
NMR CHARACTERIZATION OF BIO-BASED ISOCYANATES	Gökhan ÇAYLI	Istanbul University-Cerrahpaşa
STRUCTURAL SOLUTIONS WITH FLEXIBLE CEMENTITIOUS COMPOSITES	Rohat INATCI	Istanbul Technical University
FLOW AND HEAT TRANSFER ANALYSIS IN A CHANNEL CONTAINING INCLINED BAFFLES AND GRADUALLY EXPANDING BOTTOM WALL	Selma AKÇAY	Çankırı Karatekin University, Çankırı, Türkiye
OBTAINING GRAIN ORIENTATION INFORMATION FROM THE EBSD IMAGE	Habip Gökay KORKMAZ, Yusuf ŞAHİN, Serkan TOROS, Mevlüt TÜRKÖZ	Nigde Omer Halisdemir University Konya Technical University
AN EXAMINATION ON FORECASTING PROCESSES WITH THE GREY MARKOV MODEL	Havva KOCABAŞA Fatma Feyza GÜNDÜZ	Adana Alparslan Türkeş Science and Technology University

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**Session -1 / Hall-5****03.05.2024****Moderator: Dr. Asma Awan****Meeting ID: 851 7785 3338 / Passcode: 010203****Toronto Local Time: 09:30-11:30****Ankara Local Time: 16:30-18:30**

TITLE	AUTHOR(S)	AFFILIATION
SURGICAL SITE INFECTIONS: PREVALENCE AND RISK FACTORS	Ghada Nasri, Houda Ben Ayed, Mariem Ben Hmida, Mouna Baklouti, Boutheina Trabelsi, Maissa Ben Jmeaa, Maroua Trigui, Mondher Kassis, Jamel Dammak, Sourour Yaich	Hedi Chaker University Hospital, Sfax, Tunisia Habib Bourguiba University Hospital, Sfax, Tunisia
THE RELATIONSHIP BETWEEN SHAME AND GUILT AS SELF-CONSCIOUS EMOTIONS AND DEPRESSION, IN EMERGING ADULTHOOD	Angela Sula	University of Tirana
A PROGRAM EVALUATION TO FOSTER PARTNERSHIPS FOR AN EQUITABLE ACCESS TO HEALTHCARE IN NEVADA, USA	Dr. Asma Awan Prof. Dr. Manoj Sharma	University of Nevada Las Vegas
EVALUATION OF HEALTHCARE WORKERS' KNOWLEDGE OF VACCINATION IN PROFESSIONAL ENVIRONMENT IN A HOSPITAL IN SFAX, TUNISIA	Zeineb Mallek, Maroua Trigui, Emna Mziou, Bouthaina Trabelsi, Fedi Ben Dhaou, Mbarka Massouri, Mahdi Hajlawi, Saida Hbib, Mondher Kassis	Habib Bourguiba University Hospital, Sfax, Tunisia
MOBILE HEALTH: PROMOTING SEXUAL REPRODUCTIVE HEALTH AMONG YOUTH	Hiba Houradi, MS , Loubna Amahdar, PhD , Chaimae Moujahid, MS, Jack Turman Jr., PhD	Hassan 1st University, Settat, Morocco Indiana University Fairbanks School of Public Health, Indianapolis, IN
THE EFFECT OF SMARTPHONE ADDICTION ON NECK PAIN, PHYSICAL ACTIVITY AND BODY AWARENESS IN YOUNG ADULTS	Pınar BAŞTÜRK, Ebru AKBUĞA KOÇ	University of Health Sciences Yeditepe University
EFFECTS OF PHYSICAL ACTIVITY AND SPORTS PARTICIPATION ON SELF-ESTEEM AND QUALITY OF LIFE IN YOUNG ADULTS	Pınar BAŞTÜRK, Ebru AKBUĞA KOÇ	University of Health Sciences Yeditepe University
GENDER COMPARISON FOR MOTOR COORDINATION IN 1st and 2nd GRADE ELEMENTARY SCHOOL CHILDREN	Dr. Keida Ushtelena Entela Kostrista	Sports University of Tirana, Albania
A REVIEW OF ANTHROPOMETRIC CHANGES AND MOTOR SKILLS IN 7-11 YEAR OLD CHILDREN	Keida Ushtelena, Danjela Cakuli	Sports University of Tirana, 1001, Tirana World Academy of Tirana 2,1001, Tirana, Albania
HOSPITAL INFORMATION SYSTEM: A PILLAR OF SUCCESS IN COVID-19 VACCINATION IN MOROCCO	EL BOUZIDI Asmae, MAROUANE Saadia, RHIHIL Abdallah, BAGHDADI Siham	Ecole Nationale de Commerce et de Gestion de Casablanca Université Hassan II de Casablanca (Maroc) Université Ibn Zohr

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**Session -1 / Hall-6****03.05.2024****Moderator: Dr. Ahmed Chhaidar****Meeting ID: 851 7785 3338 / Passcode: 010203****Toronto Local Time: 09:30-11:30****Ankara Local Time: 16:30-18:30**

TITLE	AUTHOR(S)	AFFILIATION
DETERMINATION OF RISK FACTORS FOR MUSCULOSKELETAL DISORDERS IN THE AGRI-FOOD SECTOR	Dr. Zina Hakim Dr. Ahmed Chhaidar Dr. Zouhour Gassara Dr. Anouare Hrairi Dr. Imen Sellami Pr. Mounira Hajjaji Pr. Kaouthar Jmal Hamamai	University of Sfax, Tunisia
THE IMPORTANCE OF BIOMECHANICAL ANALYSIS IN PERFORMANCE INDICATORS IN THE GAME OF BASKETBALL	Aida Bendo, Eli Papa	Sports University of Tirana, Tirana, Albania Albanian University Sport Federation, Tirana, Albania
MEDICINES ISOLATED FROM PLANTS: MORE IMPORTANT THAN THEY SEEM AT FIRST SIGHT	Bogdan-Catalin SERBAN Octavian BUIU Marius BUMBAC Cristina-Mihaela NICOLESCU Vlad DIACONESCU	National Institute for Research and Development in Microtechnologies, Romania Valahia University of Targoviste, Romania University of Medicine and Pharmacy "Carol Davila," Romania
TRANS FATS: SOURCES CONSUMPTION, HEALTH EFFECTS AND REGULATION	Bogdan-Catalin SERBAN Octavian BUIU Marius BUMBAC Cristina-Mihaela NICOLESCU Vlad DIACONESCU	National Institute for Research and Development in Microtechnologies, Romania Valahia University of Targoviste, Romania University of Medicine and Pharmacy "Carol Davila," Romania
THE IMPACT OF WEIGHT LOSS ON ELITE BOXERS. REVIEW	Phd.( c ) Marsida Bushati Prof.Asc. Sead Bushati	Sports University of Tirana, Albania
THE ROLE OF GENETIC DETERMINANTS IN PHYSICAL FITNESS AND SPORT PERFORMANCE	Jonida BALLA Prof. Dr. Dhurata BOZO	Sport University of Tirana, Tirana, Albania
RELATIONS BETWEEN MALNUTRITION AND REPRODUCTIVE DISORDERS IN FEMALE ATHLETES	Suela XHUFU Prof. Dr. Dhurata BOZO	Sport University of Tirana, Tirana, Albania
THE IMPACT OF EXERCISES ON SPINAL INJURIES OF YOUNG VOLLEYBALL PLAYERS. (LITERATURE SUMMARY)	Junida Pogoni, Arben Kaçurri	Sports University of Tirana, Albania
A LITERATURE REVIEW ON IMPROVING AEROBIC ENDURANCE IN PRE-PUBERSCENT CHILDREN	Laureta Derhemi	Sports University of Tirana, Tirana, Albania
EFFECTS OF 8-WEEK HIIT TRAINING WITH EXTENSIVE INTERVALS COMBINED WITH CHANGE OF DIRECTION (COD) IN VO2MAX AND ANAEROBIC CAPACITY OF YOUTH SOCCER PLAYERS	Msc Arben Bici, Prof. Dr. Agron Kasa	University of Sport of Tirana, Albania

**Session -1 / Hall-7****03.05.2024****Moderator: Dr. Teuta Budlla (Myftiu)****Meeting ID: 851 7785 3338 / Passcode: 010203****Toronto Local Time: 09:30-11:30****Ankara Local Time: 16:30-18:30**

TITLE	AUTHOR(S)	AFFILIATION
STABILITY AND ANALYSIS OF HOPF BIFURCATIONS IN A DELAYED PREDATOR-PREY SYSTEM	Dorina Guxholli, Valentina Shehu	Aleksandër Moisiu, University, Durrës, Albania Faculty of Natural Sciences, Tiranë, Albania
POWER OF RELATIONAL ALGEBRA IN SQL SERVER	Dr. Adrian NAÇO Dr. Teuta Budlla (Myftiu)	Polytechnic University of Tirana
OPTIMAL PARAMETER SELECTION WITH PROBABILISTIC METHODS	MSc. Blerina Boçi, Prof. Assoc. Aurora Simoni	University Aleksandër Moisiu Durrës, Albania. University of Tirana, Albania.
SOME CONCEPTS ON GENERALIZED INTUITIONISTIC FUZZY NORMED SPACES	Vakeel A. Khan and Mohd Kamran	Aligarh Muslim University, Aligarh-202002, India.
COMBINING THE PSO AND SVD METHODS IN DIGITAL WATERMARKING	Aurora Simoni, Besiana Çobani, Ornela Gordani	University of Tirana, Tirana, Albania
IMPLEMENTATION OF THE RAMSEY-CASS-KOOPMANS (RCK) MODEL TO UNDERSTAND THE ECONOMIC GROWTH OF ALBANIA	Besiana Cobani, Aurora Simoni, Ornela Gordani	University of Tirana, Tirana, Albania
SOME RESULTS ON NEUTROSOPHIC NORMED SPACES	Vakeel A. Khan, Amit Kumar	Aligarh Muslim University, India
FRACTIONAL NON-LINEAR PROBLEM WITH NONHOMOGENEOUS BOUNDARY CONDITIONS(EXISTENCE AND UNIQUENESS)	Phd.DJEBAILI Manel Pr. MERAD Ahcene	Abbes Laghrour University Larbi Ben M'hidi University
ON THE ACTIVATION FUNCTIOND FOR SOLVING NONLINEAR INTEHRO-DIFFERENTIAL EQUATIONS	Muhammad Mehran Marjan Uddin	University of Engineering and Technology Peshawar, Pakistan
ASSESSMENT OF THE ECOLOGICAL CONDITION OF WATER AND SEDIMENT, CASE STUDY OF THE ARTIFICIAL LAKE IN SFERK - KLINA MUNICIPALITY	Skender Demaku, Donika Sylejmani, Arbnorë Aliu, Enis Shabani, Bahrije Dobra	University of Pristine, "Hasan Pristina", Pristine, Kosovo
MONITORING HEAVY METALS AND SPATIAL ANALYSIS USING POLLUTION INDICES AND CARTOGRAPHIC VISUALIZATION: A CASE STUDY IN KOSOVO	Skender Demaku, Donika Sylejmani, Arbnorë Aliu, Almë Ejupi, Bahrije Dobra	University of Pristine, "Hasan Pristina", Pristine, Kosovo

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AN EXAMINATION ON FORECASTING PROCESSES WITH THE GREY  
MARKOV MODEL

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**ABSTRACT**

Today's conditions require making the right decision using limited and uncertain data. All people, companies, or states in a decision-making situation want to make the most effective plans by accurately predicting future situations to maintain and improve their positions. Future predictions must be accurate and precise to achieve these goals. From this perspective, future forecasting techniques are of great importance for individuals and organizations that want to accurately predict future.

In this study, the Grey Markov model, which is one of the techniques for predicting the future, is introduced, and information about the application areas, prediction power, and effect of this model is provided through a detailed scientific literature review. The literature review reveals that there are not many studies using the Grey Markov model, and even fewer studies have been conducted, especially in the field of social sciences. In addition, the findings show that this model is a useful method for predicting the future of datasets with large fluctuations.

**INTRODUCTION**

Individuals, companies, and states may have to make different decisions to continue their businesses or duties because of developments and changes in the economic, technological, and social fields. Making the right decisions for the future is of great importance for people to have a better life and for businesses and organizations to make more profit or gain superiority over their competitors. In today's world, where uncertainties can appear in any form at any time, it is important for individuals, businesses, and organizations to plan their future in advance instead of leaving them to coincide. To prepare such plans, future forecasts must be made precisely and accurately. From this perspective, forecasting techniques are of great importance in future-oriented decisions. The Grey Markov is one of the forecasting techniques and obtained by combining the Grey prediction method with the Markov chain.

Grey prediction is one of the main areas of Grey System theory. This method can predict the future state of uncertain systems by using a small amount of data (Akay and Atak, 2007, p. 1671). Unlike other forecasting methods, the essential feature of the Grey prediction

is that it does not require strict assumptions about the dataset and can be successfully applied in the analysis of systems with limited data (Köse et al., 2015, p.84). The Grey prediction method was developed to predict the future using grey models (Gündüz and Ataş, 2022, p.29). GM (1,1) is one of the most extensively used Grey prediction models and refers to first-order and single-variable grey model (Liu and Lin, 2006, p.277). It is used to predict the behavior of variables in a system during future period.

Markov chain is one of the techniques used to explain a series of random events in real life and to predict the future states of these random events (Karaca and Alp, 2017, p.2). The most important element of the Markov chain is the list of all possible states that the system can be in over time (Şentürk and Alp, 2016, p.138). The transition from one state to another does not depend on the past states of the system, but only on the previous state. Therefore, for the Markov process, there is no need to know the past states of the system except for the previous state. Due to this feature, it is a method successfully applied in many fields.

The aim of this study is to examine the Grey Markov model and to introduce the usage areas, forecasting power, and impact of this model. In this context, the Grey prediction and Markov chain methods that compose the Grey Markov are mentioned, and the Grey Markov model is explained. Then, a detailed scientific literature review was conducted about the Grey Markov. Based on the studies in the literature, the Grey Markov is investigated in terms of its predictive power and impact.

### **GREY SYSTEM THEORY**

Grey system theory is a mathematical approach, first developed by Ju-Long Deng in 1982, and aims to extract information from a small amount of imprecise data (Deng, 1982). This theory is a method used to predict system behaviors for which no clear information can be obtained with the help of limited data (Apalı and Acun, 2018, p.1242).

In Grey system theory, grey refers to the level of knowledge of the subject under investigation (Liu and Lin, 2004, p.197). If all information about the system under study is known, such systems are referred to as white systems; if no information is known, such as black systems; and for systems with partial information, such as grey systems.

The Grey system theory is grouped into six main research and application areas such as Grey production, Grey relation analysis, Grey modeling, Grey prediction, Grey decision making, Grey control (Aydemir et al., 2013, p.188)

Because the Grey Markov model uses the Grey prediction method, only Grey prediction is mentioned in this study.

### **Grey Prediction**

Grey prediction is a sub-branch of Grey System theory and a forecasting method developed to control uncertain situations (Gündüz and Ataş, 2022, p.29). This method aims to predict the future using grey models. The Grey prediction method can achieve accurate results in situations with uncertain and incomplete information. Since it is a method that can work with at least 4 observations, it is frequently used in many fields (Akay and Atak, 2007, p.1671).

**GM (1,1) Model**

The GM (1,1) is one of the models used in the Grey prediction method and represents a first-order and single-variable grey model. Traditional prediction techniques usually deal directly with original historical data and attempt to model their evolutionary behavior. Nevertheless, the GM(1,1) prediction model starts by transforming the original data series into a data series that monotonically increases through a pre-transformation called the accumulated generating operation (AGO) (Wang and Mang, 2008, p.1245).

The procedures for the grey model are formulated as follows:

Assume the original series to be  $X^{(0)}$

$$X^{(0)} = \{x^{(0)}(1), x^{(0)}(2), \dots, x^{(0)}(n)\} \tag{1}$$

A new sequence  $X^{(1)}$  is created with the accumulated generating operation (AGO).

$$X^{(1)} = \{x^{(1)}(1), x^{(1)}(2), \dots, x^{(1)}(n)\} \tag{2}$$

Where  $x^{(1)}(k) = \sum_{i=1}^k x^{(0)}(i), k = 1, 2, \dots, n,$

Create the Grey differential equation:

$$x^{(0)}(k) + az^{(1)}(k) = b, k = 2, \dots, n \tag{3}$$

Where

$$z^{(1)}(k) = ax^{(1)}(k) + (1 - a)x^{(1)}(k - 1) \tag{4}$$

Predict the developing coefficient  $a$  and the Grey input  $b$  in equation (2) by the ordinary least-squares (OLS) method:

$$[a, b]^T = (B^T B)^{-1} B^T Y_N \tag{5}$$

Where

$$B = \begin{bmatrix} -Z^{(1)}(2) & 1 \\ -Z^{(1)}(3) & 1 \\ \vdots & \vdots \\ -Z^{(1)}(4) & 1 \end{bmatrix}, Y_N = \begin{bmatrix} x^{(0)}(2) \\ x^{(0)}(3) \\ \vdots \\ x^{(0)}(n) \end{bmatrix} \quad (6)$$

Create the following whitened first-order differential equation for future prediction:

$$\frac{dx^{(1)}}{dt} + ax^{(1)} = b \quad (7)$$

With the initial condition:  $x^{(1)}(1) = x^{(0)}(1)$

Calculate the grey reflection Eq. (7) and obtain the predicted values for the data series  $X^{(1)}$  from AGO as

$$\hat{x}^{(1)}(k+1) = \left[ x^{(0)}(1) - \frac{b}{a} \right] e^{-ak} + \frac{b}{a} \quad (8)$$

By applying the inverse AGO (IAGO)  $x^{(0)}(k) = x^{(1)}(k) - x^{(1)}(k-1)$  to Eq. (8), the predictions for the original data series can be obtained:

$$\begin{aligned} \hat{x}^{(1)} &= x^{(0)}(1) \\ \hat{x}^{(0)}(k+1) &= (1 - e^a) \left( x^{(0)}(1) - \frac{b}{a} \right) e^{-ak}, k = 0, 1, 2, \dots \end{aligned} \quad (9)$$

## MARKOV CHAIN

Markov chains technique is a stochastic process containing the Markov property.

The Markov property is the future state of the process that can be predicted using only the previous state without knowing past states (Elgharbi et al., 2019, 209). This means that the future state of the process depends only on the present state, regardless of the past.

$$P(x_{n+1} = i_{n+1} | x_0 = i_0, \dots, x_n = i_n) = P(x_{n+1} = i_{n+1} | x_n = i_n) \quad (10)$$

Where  $\{x_n: n \in T \subset \mathbb{N}\}$  is a stochastic process, and  $i_0, i_1, i_2, \dots, i_{n+1}$  are the states of the system.

The properties of a Markov chain are defined by conditional probability denoted as:

$$P\{X_{n+1} = j | X_n = i\} \quad (11)$$

The formula (11) shows the probability of state  $j$  at time  $n + 1$  when state  $i$  is at time  $n$ .

The k-step transition probability matrix is denoted as:

$$p_{ij}^{(k)} = P\{X_{m+k} = j | X_m = i\}, (i, j \in I, m \geq 0, k \geq 1) \quad (12)$$

Where  $p_{ij}^k \geq 0, i, j \in I, \sum_{j \in I} p_{ij}^{(k)} = 1, i \in I, p_{ij}^k$  is the conditional probability which from state  $i$  to state  $j$  after k-step transition.

### GREY MARKOV MODEL

The basic idea of building the Grey Markov model:

#### I. Establishing the GM (1,1) Model

According to the GM (1,1) model, calculating grey prediction data by formulas (1-9).

#### II. Partitioning of States by Markov Chain

Partitioning into  $n$  zones based on grey prediction data, any state zone  $Q_i$  is denoted as

$$Q_i = [Q_{1i}, Q_{2i}], i = 1, 2, \dots, n \quad (13)$$

Where,  $Q_{1i} = \hat{x}^{(0)}(k) + A_i, Q_{2i} = \hat{x}^{(0)}(k) + B_i$ , the user is assured of the value  $A_i, B_i$  and  $n$  by grey prediction result.

#### III. Calculating the Transition Probability Matrix

The formula for the Markov transition probability matrix is as follows:

$$P_{ij}^{(k)} = M_{(ij)}(m) | M_i \quad i, j = 1, 2, \dots, n \quad (14)$$

Where  $P_{ij}^{(k)}$  is the probability which transfer k steps from  $Q_i$  to  $Q_j$ ,  $M_i$  is the number of data that is in the grey zone  $Q_i$ , and  $M_{(ij)}(m)$  is the data number which transfer k steps from  $Q_i$  to  $Q_j$ . The transition probability matrix is demonstrated as:

$$P^{(k)} = \begin{bmatrix} P_{11}^{(k)} & P_{21}^{(k)} & \vdots & P_{1n}^{(k)} \\ P_{21}^{(k)} & P_{22}^{(k)} & \vdots & P_{2n}^{(k)} \\ \dots & \dots & \vdots & \dots \\ P_{n1}^{(k)} & P_{n2}^{(k)} & \vdots & P_{nn}^{(k)} \end{bmatrix} \quad (15)$$

#### IV. Revising the Prediction Data

According to state  $Q_i$  selecting the row  $(P_{i1}, P_{i2}, \dots, P_{in})$  in transition probability matrix  $P^{(k)}$ , if the max value is  $P_{ij} = \text{Max} \{P_{i1}, P_{i2}, \dots, P_{in}\}$ , then the state may transfer from  $Q_i$  to  $Q_j$ . The final prediction result can be improved by the zones of state  $Q_j$  and grey prediction value as the equation (16) shows:

$$Y(k) = \hat{x}^{(0)}(k) + (A_j + B_j)/2 \quad (16)$$

#### A LITERATURE REVIEW ON GREY MARKOV STUDIES

There are a very limited number of studies using the Grey Markov in the literature, and even fewer in the field of social sciences. These studies can be summarized as follows:

He and Huang (2005) aimed to forecast the electrical energy demand in China. Since the time series of electrical energy demand show large fluctuations, the Grey Markov model is used in the analysis of the study. The findings of the study show that, the accuracy of the Grey Markov in forecast future value is higher than GM (1,1).

Qingfu et al. (2007) used the Grey Markov model to predict the traffic volume ratio in their study. The results shows that the Grey Markov has acceptable performance in accuracy and applicability of the forecasting traffic volume ratio.

Zhou et al. (2007) determined agricultural production yield in China by using the Grey Markov model. In the study, two examples of forecasting were applied as oil plant and cotton plant yield. The data from 1977 and 2005 was used for the analysis. The result of the study indicates that Grey Markov is more suitable in agriculture than GM (1,1).

Wang and Meng (2008) aimed to compare the GM (1,1) and Grey Markov for the electricity demand forecasting in China. They calculated the predict value from 2006 to 2016. The study reveals that the Grey Markov model is better for estimating the electric-power demand than GM (1,1).

Wei and Jinfu (2009) estimated passenger traffic by using the Grey Markov model. First GM (1,1) was set up to estimate the sequence of data. Then the predicted results were fitted by using the Markov Chain transition matrix. The results indicates that the Grey Markov model has higher forecast accuracy.

Chen and Guo (2010) aimed to establish a Z-Score financial crisis prediction model using the Grey Markov and present a case study demonstrating the application of the Grey Markov model. The results refers that the accuracy of the Z-score value estimated using the financial crisis prediction model created in this study confirms a successful standard. The model could predict Z-scores with precision.

Zhan-Li and Jin-Hua (2011) estimated fire accidents in a city. Fire accidents are affected by various factors and its data fluctuate. Therefore, they used a Grey Markov model to predict fire accidents in this study. The data sequence of fire accidents between 2005-2009 were employed. The results indicates that Grey-Markov has a higher forecast accuracy and excellent applicability.

Juan and Liu (2011) used Grey Markov to estimate the number of populations in China. The number of populations from 1991 to 2010 was used as a data of the study. First the Grey model prediction sequence was generated and then Markov chain was created to adjust the data. The results show that the Grey Markov is better in the fitting degree and is higher in the forecasting accuracy than Grey model.

Chen et al. (2011) aimed to forecast wind power based on wind speed data. In the study, first wind speed was predicted based on the GM (1,1). Then it was estimated based on the Grey Markov model and compared the two models. As a result, it was found that the accuracy of the Grey Markov is higher than that of GM (1,1).

Dong et al. (2012) estimated the annual maximum water level at Yuqiao Hydrological Station in China. They used the Grey Markov model to analyze the study. The reason of choosing the Grey Markov in the study was the model takes the advantages of the Grey System and Markov Chains theory. Results of the study indicate that the accuracy of the Grey Markov model is acceptable for forecasting the maximum water level.

Önalán (2014) used the Grey Markov method to model the change in exchange rates and obtain change forecasts. TL-Dollar (TL/USD) buying rate data between 17.09.2012 and 17.11.2013 was used for the study. The study shows that Grey Markov has good forecasting accuracy of exchange rates prediction.

Chen et al. (2015) estimated inflation by using the Grey Markov model. The data from 2005 to 2013 of China's inflation was employed for the analyze. The study shows that Grey Markov has not only good forecasting accuracy but also excellent applicability in inflation forecasting.

Wang et al. (2018) estimated the relative gas emission in a coal mine of China. Since the mine gas emission forecast has a randomness trend, the Grey Markov model was established in the study. According to the results, the accuracy of the Grey Markov model is significantly higher than the GM (1,1).

Jia et al. (2020) used the Grey Markov model to forecast coal consumption in Gansu Province, China. First, the GM (1,1) was used for the study. According to the results, the relative prediction error in some years was large. To reduce the error, the Grey Markov was established. The study shows that the Grey-Markov model has higher forecast accuracy and has a good performance in estimating the coal consumption.

Bağcı (2020) estimated the unemployment rate in Turkey using the Grey Markov model. Annual data between 2005 and 2019 were analyzed for the study. First, annual unemployment rate data for the period 2005-2019 were analyzed with the GM (1,1) model and the prediction results were calculated. Afterwards, the number of possible situations for analysis was determined and it was shown which situation each observation was in. The Grey Markov chain was obtained with the matrix consisting of the transitions of these states and new prediction results of all observations were calculated. As a result, it was concluded that the Grey Markov analysis better detects the fluctuations occurring in the series and the path it follows over time is more similar to the path followed by the real series.

Jin et al (2020) estimated the traffic accidents in China. In the study, first the GM (1,1) and then the Grey Markov was used for the prediction. In the study, the data on the traffic accidents between 2010 and 2017 were employed. The results of the methods that used for prediction were compared. The study shows that the prediction accuracy of the Grey Markov is better than that of the GM (1, 1).

### CONCLUSION

The aim of this study is to introduce the Grey Markov model to show its application areas, predictive power, and effectiveness through a detailed review of the scientific literature. A review of the studies on the Grey Markov model reveals that there are not many studies in the literature and that there are very few studies, especially in the field of social sciences. The model has been used in areas such as industry, environment and ecology, economy, traffic applications, etc. It has been determined that most studies have been conducted in China, while studies conducted in Turkey using the Grey Markov model are very limited. Additionally, the GM (1,1) model's forecasting power decreases when working with data series with large fluctuations and the Grey Markov model is a method used to increase the forecasting power of the GM (1,1). Studies in the literature have shown that the Grey Markov model is more accurate and precise than the GM (1,1).

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**FROM THE HISTORY OF THE STUDY OF SOCIO-CULTURAL PROCESSES IN THE  
NAKHCHIVAN AUTONOMOUS REPUBLIC DURING THE PERIOD OF INDEPENDENCE**

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The years 1995-2020 constitute a special period in the history of the Nakhchivan Autonomous Republic, which is an integral part of Azerbaijan. The period that began with the adoption of the first Constitution of the independent Republic of Azerbaijan in 1995 and the determination of the status of the Nakhchivan Autonomous Republic within the independent Republic of Azerbaijan with that document is distinguished by its own characteristics. So far, Azerbaijani historiography has mainly focused on the political and economic aspects of the processes in the Nakhchivan Autonomous Republic after 1995.

The study of social and cultural development processes was mainly secondary in nature. However, the research of socio-cultural development processes in Nakhchivan was started in the Soviet era. During the Soviet era, the ideological barriers to conducting research in this direction were less compared to the works written on political history. It was the result of this that A. Aliyev conducted research and published monographs on the cultural development of Nakhchivan MSSR in the 50s of the 20th century, and I. Mollayev on the development of education in the 70s and 80s. Even after the restoration of state independence in Azerbaijan, a number of books and monographs were published on the socio-cultural development processes of that period.

About the history of socio-cultural development of the autonomous republic in the years after the restoration of state independence, including its separate directions, Ismail Hajiyeve, Isa Habibbayli, Haji Fakhreddin Safarli, Abulfaz Guliyev, Zahmet Shahverdiyev, Ismail Zeynalov, Adalat Gasimov, Hamza Jafarov, Yegane Mammadova, Sevinj Abbasova, Mammad Mammadov, Gadir Akbarov, Flora Alasgarova, Javadkhan Gasimov, Nuray Bektashi, Novruzali Rahimov and others wrote monographs, books and articles.

Academician I. Hajiyeve is the author of numerous and large-scale research works on the history of socio-cultural development of the autonomous republic. The fact that I. Hajiyeve was a direct participant in the processes taking place in this period, one of the executors of science, education and humanitarian policy in the autonomous republic, referring to numerous official sources and archival documents in his works increases the scientific importance of these books and monographs. In his monographs published in different years, the author analyzed in detail the development of both social policy and culture in different areas and directions in the autonomous republic [7; 8; 9; 10].

A number of works of Academician I. Habibbeyli are also important in terms of studying the history of socio-cultural development of the autonomous republic in 1995-2020, especially science and education policy [11; 12]. H. Safarli and A. Guliyev are devoted to the study of development issues of social and humanitarian sciences in some autonomous republics [15; 21].

In the monograph "Nakhchivan Autonomous Republic in 1991-2001" by Z. Shahverdiyev and I. Zeynalov, special attention was paid to social and cultural development measures, along with other aspects of public life, and in the processes taking place in this direction, personality and personnel in the development of science and education. potential factors are brought to the fore [22].

A. Gasimov studied the development history of the Nakhchivan Autonomous Republic in 1969-2003 in the context of the political and statesmanship activities of national leader Heydar Aliyev. As in other areas of social life, the author highlighted the personality factor in social and cultural development, and talked about Heydar Aliyev's unparalleled activity in this direction [13; 14].

During the years of independence, the issues of educational development in the Nakhchivan Autonomous Republic were studied in detail in Hamza Jafarov's monograph entitled "Education in Nakhchivan: development path and opportunities". Chronologically, this research work covers the

period up to the first decade of the XXI century [4]. The history of the development of education in the autonomous republic was studied in Yegane Mammadova's doctoral dissertation on history defended in 2017, and the main goal was to study the development of general education schools in 1991-2015 [18].

S. Abbasova conducted research on the history of the development of the women's movement in the autonomous republic, in her published monographs, books and articles, she investigated the participation of women in the socio-cultural life of Nakhchivan, gender problems, and paid attention to the steps taken in the direction of strengthening their social position. In the fourth chapter of the author's monograph, the object of research was directly the general characteristics of the women's movement in Nakhchivan during the period of independence [1]. Besides studying the history of the development of the women's movement in the autonomous republic until 2007, S. Abbasova's identification of existing problems and suggestions for solutions should be noted as one of the particularly important issues.

In the monographs of Mammad Mammadov, who has been in charge of the newspaper "Sharq qapysi", the press organ of the Supreme Assembly of the autonomous republic for many years, the struggle for state independence and socio-political processes in Nakhchivan have been defined as the main object of research, but issues related to socio-cultural development have also been discussed. The materials in these monographs, distinguished by the wealth of sources and facts, allow studying the interaction of socio-political processes and socio-cultural processes [16; 17].

G. Akbarov analyzed the role of Heydar Aliyev in the protection of national and moral values in the Nakhchivan Autonomous Republic, the essence of the state policy on the protection and development of national and moral values in 1995-2015 [5]. One of the issues that the author paid attention to was the question of how to continue and develop the course defined in this field in the next period. He tried to explain the issues of national and moral development in state policy and administration based on the concept of historical succession.

F. Alasgarova and C. Gasimov analyzed the foundations of the state youth policy in the Nakhchivan Autonomous Republic, studied the forms and methods of implementing this policy [6, p. 441-452]. In the article of N. Bektashi, the role of music schools in the development of Nakhchivan musical culture in 1991-2020 was studied [3, p. 211-214].

The socio-philosophical aspects of ecological and demographic problems were studied based on the materials of the Nakhchivan Autonomous Republic in the dissertation submitted by N. Rahimov for the degree of Candidate of Philosophical Sciences [20].

In the years after the restoration of state independence, collective works of a fundamental nature were written on the history, social and cultural development of Azerbaijan, as well as the Nakhchivan Autonomous Republic. Among such works are the multi-volume "History of Azerbaijan", "History of Nakhchivan" [19], "Regions of Azerbaijan" published in 2017. It is necessary to mention the three-volume "New Development Period" [2], "Nakhchivan Encyclopedia".

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ARMENIAN CLAIMS TO NAKHCHIVAN AND ITS IMPACT TO THE HISTORICAL  
GEOGRAPHY OF THE REGION (1918-1924s years)

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Azerbaijan People Republic the new sovereign state, created in May 1918 in the Muslim East, has lived and worked in hard and difficult conditions for 23 months. The Republic had to fight against the political and economic policies of the world's major powers, including Russia, the United States, England and France, and resorted to all means to maintain its sovereignty, and faced very complex challenges along the way. Under the pressure of these states, on May 29, 1918, the National Council of Azerbaijan was forced to decide on the issue of Iravan to the armenians in order to maintain their sovereignty while discussing the border problem between Azerbaijan and Armenia and he considered this decision a "historic necessity", a "unavoidable disaster" for heartbreak. During the Azerbaijan People Republic, neighboring countries made a number of territorial claims against Azerbaijan. At that time, its territory was 113.895, 97 sq. km. Its 97,296,67 sq. km was undeniable, and 16,598,30 sq. km was disputed. To resolve such issues, the Treaty of Friendship was first signed on June 4, 1918, between the Ottoman Empire and the Republic of Azerbaijan. It was the first agreement signed by the Azerbaijan People Republic with any foreign state. The second article of the Batumi Treaty sets the border between Azerbaijan, Georgia and Armenia. According to the Batumi contract, Azerbaijan also suffered territorial losses. According to the agreement, the Sharur section of the Sharur-Daralayaz province and the Nakhchivan accident, except for Ordubad, were transferred to Turkey. In addition, the regions of Kamarly, Ulukhanli and Vedibasari of the Iravan province were transferred to Turkey. On March 12, 1921, the Moscow Treaty was signed. With the participation of a representative of the Soviet Russia to clarify some of the territories following the Moscow Treaty, Turkey signed an agreement on October 13, 1921, between the three South Caucasus republics. With the participation of a representative of the Soviet Russia to clarify some of the territories following the Moscow treaty, Turkey signed an agreement on October 13, 1921, between the three South Caucasus republics. The contract consisted of 20 articles and 3 annexes. A number of provisions of this treaty were consistent with the relevant articles of the Moscow Treaty. In general, this document was rejecting unequal rights, forcible contracts, and the Sevriye treaty. Article 5 of the agreement was directly related to the fate of Nakhchivan. Thus, the Moscow and Kars treaties also resolved Nakhchivan's autonomy status.

**Keywords:** Nakhchivan, Moscow treaty, Kars treaty, autonomy status, Azerbaijan People Republic, Ottoman empire, controversial zone, historical geography.

**Introduction.** According to Article XV of the Turkmenchay treaty, armenians started to move to many regions of Azerbaijan, including Nakhchivan. The goal of the armenians to move to this area was to change the ethnic composition of the population by force, and to turn these lands into armenian settlements. Even in this regard, in 1828, an "armenian province" was created on the territory of the Nakhchivan and Iravan khanates. Later times, popular uprisings and revolts have led to the collapse of this province. Seeing that it was impossible for armenians to invade Nakhchivan in the 19th century, they began to carry out this work at the beginning of the 20th century, or more precisely, in 1918-1924 by gun. At that time, their patrons as Russia, England, and the United States were providing military and financial support to armenians. The main purpose of these great powers was to create an armenian state in these geographies, to break the Ottoman state's relationship with the Turkic world and so on. were issues. However, as a result of the struggle of the Nakhchivan population and the support of the Ottoman state, such issues, namely, the transfer of Nakhchivan to the armenians, did not occur. Later, Nakhchivan's autonomy status did not allow any of Nakhchivan's territories to compromise with another state.

**Nakhchivan general governorship.** It is very interesting that while the Araz-Turkic Republic still existed, the Azerbaijani government established the Nakhchivan general governorship on February 28, 1919, based on the proposals of M. Mirbagirov and the provisional government of Nakhchivan, B. Nakhchivanski [2, p.12]. On February 28, 1919, the general governorship of Nakhchivan was established by the decision of the Government of the People Republic of Azerbaijan (In the documents, this governorship is also known as "South-West Azerbaijan general-governorship" or "General-governorship of Nakhchivan, Ordubad, Sharur-Daralayaz and Vedibasir districts.").

**Gumri, Moscow and Kars treaties.** On December 2, 1920, Turkey and the Armenian Dashnak government signed the Gumri agreement. According to this agreement, starting from the Lower Karasu river, the Araz river is located on the north of Kecachin, on the Arpachay river, then on the Karakhan valley, on the eastern part of the Great Kemli - Kyzyldash - Great Aghbaba.

On March 16, 1921, the RSFSR and Turkey signed an agreement consisting of 16 articles and annexes. According to the third article, the parties agreed that Nakhchivan province would create an autonomous territory under the auspices of Azerbaijan, under the provisions of paragraph C of Annex 1 to this Agreement, provided that Azerbaijan would not compromise any third state.

With the participation of a representative of the Soviet Russia to clarify some of the territories following the Moscow treaty, Turkey signed an agreement on October 13, 1921, between the three South Caucasus republics. The contract consisted of 20 articles and 3 annexes. Article 5 of the agreement was directly related to the fate of Nakhchivan. Here again the issue of keeping Nakhchivan within Azerbaijan and granting autonomy was fixed.

The territory of Nakhchivan was defined within the boundaries set out in Annex III of the Treaty: "[Nakhchivan territory] starts from Urmia village, from there on a straight line to the Arazdeyen station (this station will remain for the Armenian SSR), then on a straight line to the west of Dashburun mountain (3142), thence to the river Dashburun (4108), mountain rod (6607 or 6587), "Rod." Going along the administrative boundaries of the Iravan and Sharur-Daralayaz provinces south of the spring (spring), from the height of 6629 to the coal (6839 or 6930), then to the height of 3080, to Sayatdagh (7868), to the village of Gurdgulag, Hamasur mountain (8160), to the height of 8022, Kukudagh (10282) and [finally] at the eastern administrative border of the former Nakhchivan province"[3; 4, p. 146].

Turkish sources note that according to the Kars treaty, Kars and Erdahan sanjags were handed over to Artvin Turkey in the southern part of Surmali and Batum east of the Araz river [1].

**Conclusion.** Relations between Nakhchivan which was transferred to the Soviet administration under the auspices of Azerbaijan and Turkey continued until 1924. After the relations were cut, the Caucasus Central Executive Committee, acting under the influence of the Armenians, gave 9 villages of Nakhchivan to Armenia under the pretext of defining the border. But they could not go much further under the agreement with Turkey. Turkey has formed a legal and political base for the establishment of good neighborly relations and business relations with the South Caucasus republics, ensuring the security of its borders. The "Nakhchivan issue" has been fairly settled in accordance with historical and ethno-cultural realities. Armenia's intentions to seize this historic territory of Azerbaijan, namely Nakhchivan, have been in vain. However, despite all this, Nakhchivan was isolated from Azerbaijan. We can note some changes in Nakhchivan's borders.

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MICROENCAPSULATION OF SASKATOON BERRY EXTRACT - HEALTH ASPECT

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**ABSTRACT**

Saskatoon berries, renowned for their abundant antioxidant content and potential health benefits, have garnered increasing attention in the food and pharmaceutical sectors. Microencapsulation, a promising technique, presents an avenue to bolster the stability and bioavailability of bioactive compounds derived from Saskatoon berries. Moreover, microencapsulation techniques can address the challenges linked to the inherent instability of these bioactive compounds, thereby prolonging the shelf life of products derived from Saskatoon berries. Consequently, the primary objective of this study was to investigate the bioactivity aspects *in vitro* of microencapsulated Saskatoon berry extract using galactooligosaccharides and inulin.

Saskatoon berry extract underwent microencapsulation employing a combination of different carrier materials, including inulin with varying concentrations of galactooligosaccharides (5%, 10%, 15%, 20%, and 25%). The resultant powders were evaluated for their polyphenolic compounds and antioxidants (ABTS, FRAP, CHP), inhibition of xanthine oxidase (XO inhibition) activities, and encapsulation efficiency. Additionally, the prebiotic value of the obtained powder against a range of probiotic microorganisms, including *Faecalibacterium prausnitzii*, *Lactobacillus rhamnosus GG*, *Lactobacillus helveticus*, *Lactobacillus salivarius*, *Lactobacillus plantarum*, *Bifidobacterium animalis*, and *Bifidobacterium longum*, was assessed.

Research findings have indicated that microencapsulation effectively preserves the polyphenols and their antioxidant activity in Saskatoon berries. Encapsulation efficiency averaged 90% in trials incorporating a 20% addition of galactooligosaccharides with inulin, with particularly notable efficacy observed in tests with a 20% addition of galactooligosaccharides. Moreover, the resulting capsules exhibited significant prebiotic activity against the tested probiotic microorganisms. Well-designed, high-quality Saskatoon berry powders hold promise for leveraging the biological potential of Saskatoon berry bioactives across various applications, including functional foods, nutraceuticals, and pharmaceuticals. This research received full funding from the National Science Centre, Poland [grant no. 2020/39/D/NZ9/01810].

**Keywords:** *Amelanchier alnifolia*, polyphenolic compounds, microencapsulation, galactooligosaccharides.

**BUD PRODUCTIVITY, BUDBURST and ROOTING FEATURES of SOME GRAPEVINE CUTTINGS**

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**ABSTRACT**

It is important to know the bud productivity and budburst duration in grape cultivars to have information about the dormancy period of the vines and to determine a specific cultivar for a given region. The budburst duration of grape cultivars differs. In this study; The bud productivity, budburst and rooting properties of cuttings collected from Dulkadiroglu district of Kahramanmaras province were determined. Ten grape cultivars (Sergi Karası, Yediveren, Kabarcık, Azezi, Pafi grape, Lang lang grape, Dökülgen, Mahrabaşı, Hönüsü, Deve Gözü) with 3 replications, 30 cuttings total, were used as a plant material. As a result, Yediveren was determined as the cultivar having the earliest budburst with increasing temperatures, followed by Mahrabaşı, Sergi karası, Azezi, Lang lang grape, Deve gözü, Kabarcık and finally Pafi grape and Dökülgen. All cuttings of the Hönüsü were found dead. It has been determined that the cultivar called Mahrabaşı is a superior genotype compared to other cultivars with its viability, short budburst duration (low chilling), long root structure, and highest root number.

**Keywords:** bud viability, budburst, rooting, grapevine, mahrabaşı, Kahramanmaraş

**INTRODUCTION**

The World grape production in 2021 was approximately 84 million tons [1] and Turkey had 2 million tons of fresh grapes and 1.6 tons of raisin grape production in 2022 [2]. While Turkey is the 5th country in the world for fresh grapes it is 1st raisin grape-producing country, in addition, our country produces 3.6 million tons of grape production in total from 3.9 thousand hectares of grape production area [1, 2]. Viticulture in Kahramanmaraş is an important agricultural event in the region. As a scientific research, there are not many studies conducted related to viticulture in the region. However, the fruit groups cultivated in the region in 2004 were examined and viticulture was stated as the most widely grown fruit species with approximately 24 thousand ha and 105 thousand tons of grape production [3]. In a study determining the viticulture potential of Kahramanmaras for the years between 2004-2018 was stated that a decreasing trend was observed in the vineyard areas in the years provided above. In the study, the vegetation period in Kahramanmaras was calculated as 280 days, the annual average temperature was 16.9 °C and the light duration was 2.144, and these values were found to be suitable for viticulture [4]. Grape varieties need to be exposed to temperatures between 0-7 °C for a certain period of time during the winter dormancy period [5]. In this way, when the air temperatures reach a certain level, the grapevines start to break the buds [6]. In order to select grape varieties suitable for a given region, it is necessary to know especially the chilling requirement and budburst rates of the varieties [7]. As a result, it will be useful to have information about the bud productivity, budburst and root structure characteristics of the grape varieties grown in Kahramanmaras in order to offer information to the growers.

**MATERIAL AND METHODS**

This study was carried out in Kahramanmaras Sutcu Imam University Faculty of Agriculture Department of Horticulture in 2022. The cuttings collected from Sergi karasi, Yediveren, Kabarcık, Azezi, Pafi grape, Lang lang grape, Dökülgen, Mahrabaşı, Hönüsü, Deve gözü varieties grown in

Dulkadiroglu district of Kahramanmaras were planted in a mixture of perlite and peat. The cuttings length (cm), cuttings diameter (cm), cuttings root length (cm), the number of cutting roots (cm), bud viability and budburst were determined. Areas marked with a '-' sign were recorded as buds that did not break at the end of 60 days and bud viability is calculated from the values (Table 1). In the study, (10) grape varieties \* (3) with replications, 30 different vine cuttings total, were used as plant material.

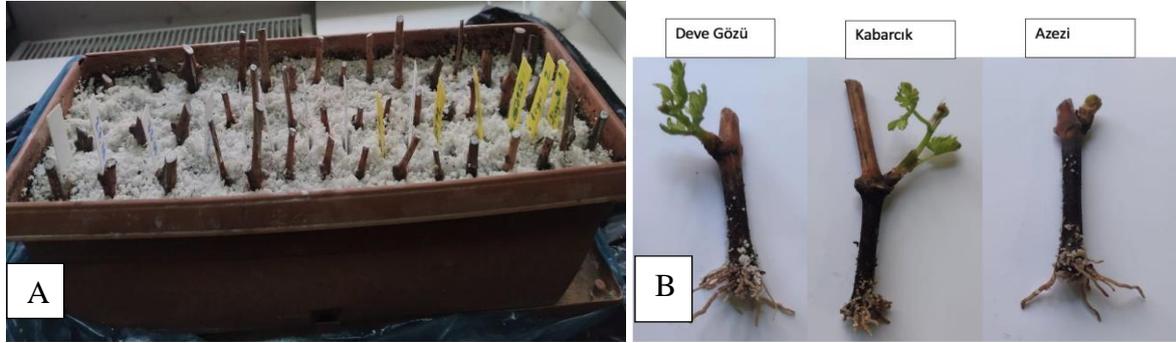


Figure 1. A. Thirty cutting cut from one bud, B. Bud and root structures of Deve gözü, Kabarcık and Azezi grape varieties

## RESULTS AND DISCUSSION

Table 1. Detected cutting length (cm), cutting diameter (cm), cutting root length (cm), cutting root number (cm), and budburst (days).

Name of cultivar	Replications (number)	Cutting length (cm)	Cutting diameter (cm)	Cutting root length (cm)	Cutting root number (number)	Budburst (day)
Sergi karası	1	4,5	8.12	1	1	48
	2	6	8.93	3	16	29
	3	-	-	-	-	-
Yediveren	1	-	-	-	-	-
	2	-	-	-	-	33
	3	-	-	-	-	-
Kabarcık	1	-	-	2	3	-
	2	10	8.27	3	6	55
	3	-	-	4	14	-
Azezi	1	-	-	1	4	-
	2	-	-	0	3	-
	3	7	7.96	2	11	40
Pafi	1	4	8.96	3	13	-
	2	4	-	0	0	57
	3	-	-	2	5	-
Lang lang	1	-	-	-	-	-
	2	-	-	-	-	-
	3	-	-	-	-	40
Dökülgen	1	-	-	5	8	57
	2	-	-	2	3	-
	3	-	-	-	-	-
Mahrabaşı	1	4	5.18	3	22	27

	2	7	6.24	4	17	34
	3	11	7.93	7,5	14	51
Deve Gözü	1	6	6.37	2	7	33
	2	8	8.86	6	25	51
	3	-	-	-	-	-
Hönüsü	1	-	-	-	-	-
	2	-	-	-	-	-
	3	-	-	-	-	-

In this study, which was carried out at Kahramanmaraş Sutcu Imam University, the cuttings obtained from Kahramanmaraş Dulkadiroglu district were cutting length (cm), cutting diameter (cm), cutting root length (cm), number of cutting roots (cm), bud viability, and budburst (days) criteria were examined [Table 1, Figure 1].

Studies on the determination of budburst and bud productivity in viticulture have been carried out by many researchers [7, 8]. Choosing suitable grape varieties in a region is related to knowing the cold tolerance of the varieties [9], chilling requirement and viability rates [7, 8]. As a result of the observations, the genotype of Yediveren was determined as the early budburst grape variety. Yediveren grape variety was followed by Mahrabaşı, Sergi karası, Azezi, Lang lang grape, Deve gözü, Kabarcık, Pafi and Dökülgen. The cultivar with the longest root length was determined as Deve gözü. This variety is followed by Mahrabaşı, Kabarcık, Sergi karası and Azezi grapes. The genotype with the highest number of roots was found to be the Mahrabaşı variety, followed by the Deve Göz, Azezi, Sergi karası, Kabarcık varieties. Varieties that do not break some cuttings due to lack of chilling or different abiotic and biotic reasons, although the buds are alive, except Mahrabaşı, are shown with '-' in the table. These varieties are especially Hönüsü, Yediveren, Kabarcık, Azezi, Pafi, Lang lang, Dökülgen, Deve Gözü and Sergi karası. Considering all the measures that we made in this study, Mahrabaşı grape variety was determined to be a superior genotype compared to other varieties as all cuttings were viable, short bud burst period (low chilling), long root structure, and the highest root number [Table 1].

The cultivars of belong to *Vitis vinifera* are needed 50-400 chilling hours, however, other cultivars are required 250-2250 hours in damage-free conditions. Varieties with low chilling are likely to be damaged by late frosts [7]. In this way, in future studies, it is necessary to calculate the chilling requirement of the varieties used in the study and to determine their tolerance to cold in order to have information about which varieties are more sensitive or tolerant to cold, to make comparisons between varieties and to give advice to growers.

## CONCLUSION

As a result, bud productivity and budburst features in grapevines are important parameters for the dormancy period of the vines and determining informations a specific cultivar. The budburst duration of grape cultivars differs in all cultivars. The bud productivity, budburst and rooting properties of cuttings collected were determined in this study. Yediveren was found as the cultivar having the earliest budburst, followed by Mahrabaşı, Sergi karası, Azezi, Lang lang, Deve Gözü, Kabarcık, Pafi and Dökülgen. Hönüsü had found dead buds. Mahrabaşı was a superior cultivar about viability, low chilling, root structure, and root number.

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NUMERICAL SCHEME FOR SOLVING A CLASS OF NONLINEAR INTEGRO-DIFFERENTIAL EQUATIONS USING ACTIVATION FUNCTIONS

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**ABSTRACT**

A numerical algorithm rooted in the activation functions of neural networks has been effectively deployed for solving nonlinear integro-differential equations featuring kernels of both weakly singular and difference types. Through the presentation of numerous numerical examples, the efficacy of this method is demonstrated, with results meticulously compared against those derived from classical Richardson extrapolation and Runge methods of order 4. Remarkably, this activation function-based approach emerges as a formidable contender, boasting minimal CPU time requirements. Despite its computational efficiency, the method does not compromise on accuracy, delivering results that are not only reasonable but also exhibit a notable level of precision. Moreover, its simplicity shines through, particularly when tackling integro-differential equations featuring weakly singular kernels, making it a preferred choice for such scenarios

**Keywords:** Activation function, Neural networks, Integro-differential, Numerical algorithm.

**INTRODUCTION**

Integro-differential equations (IDEs) stand as pivotal subjects within the realm of applied mathematics due to their wide-ranging applications across various fields, particularly in Engineering and Physical sciences. These equations represent a synthesis of both differential and integral calculus, encapsulating dynamic systems where the evolution of a function is influenced by both its derivatives and its integral over a given domain.

Nonlinear integro-differential equations, in particular, have garnered significant attention and scrutiny from researchers and practitioners alike. Despite their complexity, these equations retain immense relevance and interest due to their profound implications in modeling a plethora of phenomena encountered in real-world scenarios.

Indeed, numerous physical phenomena find succinct representation in the framework of integral equations, leading to the formulation of integral equation models. These models serve as powerful tools for understanding, analyzing, and predicting the behavior of complex systems across diverse domains such as mechanics, electromagnetics, fluid dynamics, and quantum mechanics.

Within engineering disciplines, nonlinear integro-differential equations find application in areas like structural mechanics, where the response of complex structures to external forces necessitates the consideration of both differential and integral terms. Similarly, in physical sciences, phenomena such as diffusion-reaction processes, wave propagation, and population dynamics often manifest through equations of this nature, demanding sophisticated mathematical techniques for their analysis and solution.

The enduring interest in nonlinear integro-differential equations stems not only from their intrinsic mathematical richness but also from their profound impact on advancing our understanding of natural phenomena and facilitating technological innovation. Consequently, ongoing research endeavors continue to explore novel analytical and numerical methods, as well as interdisciplinary approaches, to address the challenges posed by these intriguing equations and unlock their full potential in addressing real-world problems.

## RELATED WORKS

In the literature, numerous numerical techniques have been devised by researchers to effectively approximate Volterra integral equations. Among these methods, Simpson's quadrature method has garnered significant attention and exploration for solving Volterra integral equations of the second kind. Mirzaee, in particular, conducted an in-depth study focusing on the application of Simpson's quadrature method in this context [9]. This method, named after Thomas Simpson, offers a practical approach to numerical integration by approximating the integral as a series of quadratic interpolations. Mirzaee's research contributes to the understanding and advancement of numerical methods for solving Volterra integral equations, providing valuable insights and potentially paving the way for further developments in this field.

The block method, a powerful numerical approach, has been employed by researchers such as Mustafa [10] and Campbell [11] to tackle the intricate task of approximating solutions to Volterra integral equations incorporating delay. This methodology, characterized by its structured partitioning of the domain into blocks, offers a systematic framework for discretizing the integral equation and solving it efficiently. Mustafa's and Campbell's studies represent significant contributions to the field, as they delve into the specific challenges posed by Volterra integral equations with delay and propose innovative strategies for their resolution. By harnessing the capabilities of the block method, these researchers have advanced our understanding of how to effectively handle Volterra integral equations in scenarios where temporal delays play a crucial role. Their work not only enriches the repertoire of numerical techniques available for such problems but also opens up avenues for further exploration and refinement in this important area of mathematical analysis.

Rahman [29] and Shafiqul [36] both utilized Hermite polynomials in their respective studies. Hermite polynomials, renowned for their special properties, were employed as a foundational tool in their numerical investigations. By leveraging the unique characteristics of Hermite polynomials, Rahman and Shafiqul were able to address intricate mathematical problems effectively, showcasing the versatility and applicability of this polynomial basis. Their utilization of Hermite polynomials underscores the importance of selecting appropriate mathematical tools tailored to the specific requirements of the problem at hand. Through their research, Rahman and Shafiqul have contributed to advancing the understanding and application of Hermite polynomials in numerical analysis, offering valuable insights and methodologies that have potential implications across various fields, including but not limited to physics, engineering, and applied mathematics.

Numerous methodologies exist for tackling both linear and nonlinear equations of this nature, as extensively discussed in the references [5], [10], [15], [32], [33], and [38]. These references serve as comprehensive reservoirs of techniques, offering a diverse array of approaches to address the intricacies presented by such equations. From classical methods to modern algorithms, these sources encompass a spectrum of strategies designed to effectively navigate the complexities inherent in solving linear and nonlinear equations. By consulting these references, researchers and practitioners can access a wealth of insights and methodologies tailored to their specific problem domains, thereby enhancing their ability to tackle these equations with precision and efficiency.

## MATERIAL AND METHODS

In this section, we develop a computational method that relies on activation functions to solve nonlinear Volterra integro-differential equations (VIDEs) numerically of the form.

$$u'(t) = f(t, u(t)) + \int_a^t K(t, s, u(s)) ds, u(a) = u_0. \quad (3.1)$$

For the interval  $t \in [a, b]$ , where  $f, K$  are sufficiently smooth functions, as described in references [3, 2, 118, 119, 28], the method is applicable for solving both classical Volterra integro-differential equations (VIDEs) and non-standard VIDEs. Classical VIDEs refer to equations where the integral term in (1) doesn't depend on  $u'(s)$ , while non-standard VIDEs encompass classical equations where the integral term additionally depends on  $u(t)$ , as outlined in references [117, 27]. A well-known example of a non-standard VIDE is perhaps the logistic equation with a memory term, as detailed in references [62, 15, 16].

Collocation methods are extensively employed in the resolution of integral equations, as evidenced by various references [2, 14, 30, 31, 27]. In our approach, the collocation method involves approximating  $u'$  using neural networks featuring unit step (Heaviside) activation functions, denoted as  $H$ . By integrating the neural network that represents  $u'$ , we subsequently derive an approximation for  $u$  as well.

At this juncture, when we substitute the approximations for  $u$  and  $u'$  into the integro-differential equations and assess them at appropriate collocation points within the interval  $I$ , we can ascertain the coefficients of the collocation solutions. The utilization of unit step functions in this context provides a means to tackle a wide array of integral equations while enjoying certain computational benefits. Notably, it enables the derivation of an explicit formula for computing the coefficients associated with the collocation solutions.

This approach facilitates the acquisition of an analytical representation for the collocation solutions. Furthermore, we can demonstrate that approximate solutions can also be expressed in terms of alternative activation functions, such as logistic and Gompertz functions. These functions offer additional flexibility and may better capture the underlying dynamics of the system under consideration, broadening the scope of feasible solutions and enhancing the overall modeling capabilities.

The investigation delves into the analysis of numerical errors incurred during the approximation of both  $u$  and  $u'$ , shedding light on the intricacies of these approximations. Through meticulous examination, a series of a priori and a posteriori estimates are formulated to characterize these errors. Several numerical examples are meticulously scrutinized, with the ensuing results meticulously compared against those generated by the conventional piecewise polynomial collocation method.

Remarkably, the collocation method introduced here, rooted in Activation functions, emerges as a formidable contender in terms of computational efficiency, demanding notably less CPU time than its classical counterpart. Moreover, its accuracy proves to surpass that of the piecewise polynomial collocation method, particularly evident when tackling integro-differential equations housing weakly singular kernels. This comparative assessment underscores the method's efficacy and robustness in addressing complex mathematical scenarios, thereby affirming its potential for widespread adoption in numerical analysis and computational mathematics.

For  $t$  belonging to the interval  $[a, b]$ , where  $f$  and  $K$  are functions with adequate smoothness. Assume that equation (3.1) possesses a traditional solution, and consequently, according to

Theorem 2.2,  $u(t)$  could be uniformly approximated over  $I$  by a combination of bounded sigmoidal functions. We opt to employ unit step (sigmoidal) functions for this purpose.

for  $t \in [a, b]$ , where  $f$  and  $K$  are sufficiently smooth functions. Let's say that equation (3.1) has a classical solution. According to Theorem 2.2 this implies that the function  $u(t)$  could be accurately approximated across the interval  $I$  by combining bounded sigmoidal functions. Specifically, we opt to employ unit step (sigmoidal) functions for this purpose.

$$u'_N(t) = \sum_{k=1}^N a_k H(t - t_k) + a_0 H(t - t_{-1}), t \in I. \tag{3.2}$$

This would constitute a neural network designed to approximate the function.  $u'$  Here, the coefficients  $a_k, k = 0, 1, \dots, N$  are unknowns, and  $t_k = a + kh, h = \frac{b-a}{N}, k = -1, 0, \dots, N$ .

Integrating equation (2.3) we obtain

$$u_N(t) = \int_a^t u'_N(s) ds + u_0 = \sum_{k=1}^N a_k \int_a^t H(t - t_k) ds + a_0 \int_a^t H(t - t_{-1}) ds + u_0, t \in I. \tag{3.3}$$

For all  $t$  within the interval  $I$ , where  $u_0$  represents the initial data in equation (3.1), it's evident that  $u_N$  serves as an approximation to  $u$ . It's worth noting that equations (3.2) and (3.2) share the same

unknown coefficients  $a_k$ . Through the definition of Heaviside functions, we observe the following for every  $t$  belonging to the interval  $I$ .

$$\int_a^t H(s - t_{-1}) ds = t - a, \int_a^t H(s - t_k) ds = t - t_k,$$

for each  $k$  such that  $t_k \leq t$ , where as

$$\int_a^t H(s - t_k) ds = 0,$$

for each  $k$  such that  $t_k > t, k = 1, \dots, N$ . Thus, equation (3.3) transforms into

$$u_N(t) = \sum_{k=t_k < t}^N a_k(t - t_k) + u_0, t \in I. \tag{3.4}$$

By substituting  $u_N$  and  $u'_N$  into equation (3.1), we formulate the collocation equation. Then, if  $\{t_0, t_1, \dots, t_N\}$  represents the set of collocation points, we can assess the collocation equation at these points, resulting in a nonlinear algebraic system of  $N + 1$  equations, where the unknown coefficient are the  $a_k$ 's, with  $k = 0, \dots, N$ . Solving this nonlinear system yields the  $a_k$ 's, from which we can derive  $u_N$  and  $u'_N$ .

The values of the unknown coefficients are given in the following:

$$a_0 = f(a, u_0),$$

$$a_1 = f(t_1, a_0(t_1 - a) + u_0) - a_0 + \int_a^{t_1} K(t_1, s, a_0(s - a) + u_0, a_0) ds,$$

$$a_i = f\left(t_i, \sum_{k=0}^{i-1} a_k(t_i - t_k) + u_0\right) - \sum_{k=0}^{i-1} a_k + \sum_{j=1}^i \int_{t_{j-1}}^{t_j} K\left(t_i, s, \sum_{k=0}^{j-1} a_k(s - t_k) + u_0, \sum_{k=0}^{j-1} a_k\right) ds$$

for each  $i = 1, 2, \dots, N$ .

**Experimental Study**

**Table 1:** The present technique for obtaining a numerical solution involves employing collocation points and activation functions to approximate the integro-differential equation. Adjusting the quantity of collocation points allows for fine-tuning the accuracy and efficiency of the numerical solution. Performance and reliability of this method are evaluated through comparisons with alternative approaches. [8] 1.2700e-05.

**Table 1:** Illustrates the outcomes achieved using the method proposed in this study, computed across various collocation nodes. Comparative analysis against alternative methods demonstrates the superior performance of our approach in terms of both accuracy and computational efficiency. The superiority of our method is evident upon reviewing the results. It not only yields accurate results but also achieves this with significantly reduced computational time compared to other methodologies.

**Table 2:** The current method for acquiring a numerical solution utilizes collocation points and activation functions to approximate the integro-differential equation. Fine-tuning the accuracy and efficiency of the numerical solution is achieved by varying the number of collocation points. The performance and reliability of this approach are assessed by comparing it with alternative methods.

**Table 2:** Displays the results obtained through the method introduced in this study, calculated across different collocation nodes. Comparison with alternative methods highlights the superior performance of our approach in terms of both accuracy and computational efficiency. The effectiveness of our

method becomes apparent upon examining the outcomes, as it not only produces precise results but also accomplishes this with notably less computational time compared to other methodologies.

**Problem 4.1:** Take into account the following classical nonlinear VIDE like,

$$u'(t) = 2t - \left(\frac{1}{2}\right) \sin(t^4) \exp(t^2) - \int_0^t t^2 s \cos(t^2 u(s)) ds \quad (4.2)$$

with the initial condition is  $u(0) = 0$ , where  $t$  ranges from 0 to 1, and the exact solution is  $u(t) = t^2$ .

**Table 1**

$t = 0.9$	$N = 25$	$N = 50$	$N = 100$
$ u - u_N $	$8.6839e - 002$	$7.4946e - 002$	$6.9331e - 002$
$u_N$	0.7232	0.7351	0.7407
$u$	8.100	0.8100	0.8100

**Problem 4.2:** Take into account the following classical nonlinear VIDE like, with a weakly singular kernel,  $K$ , i.e

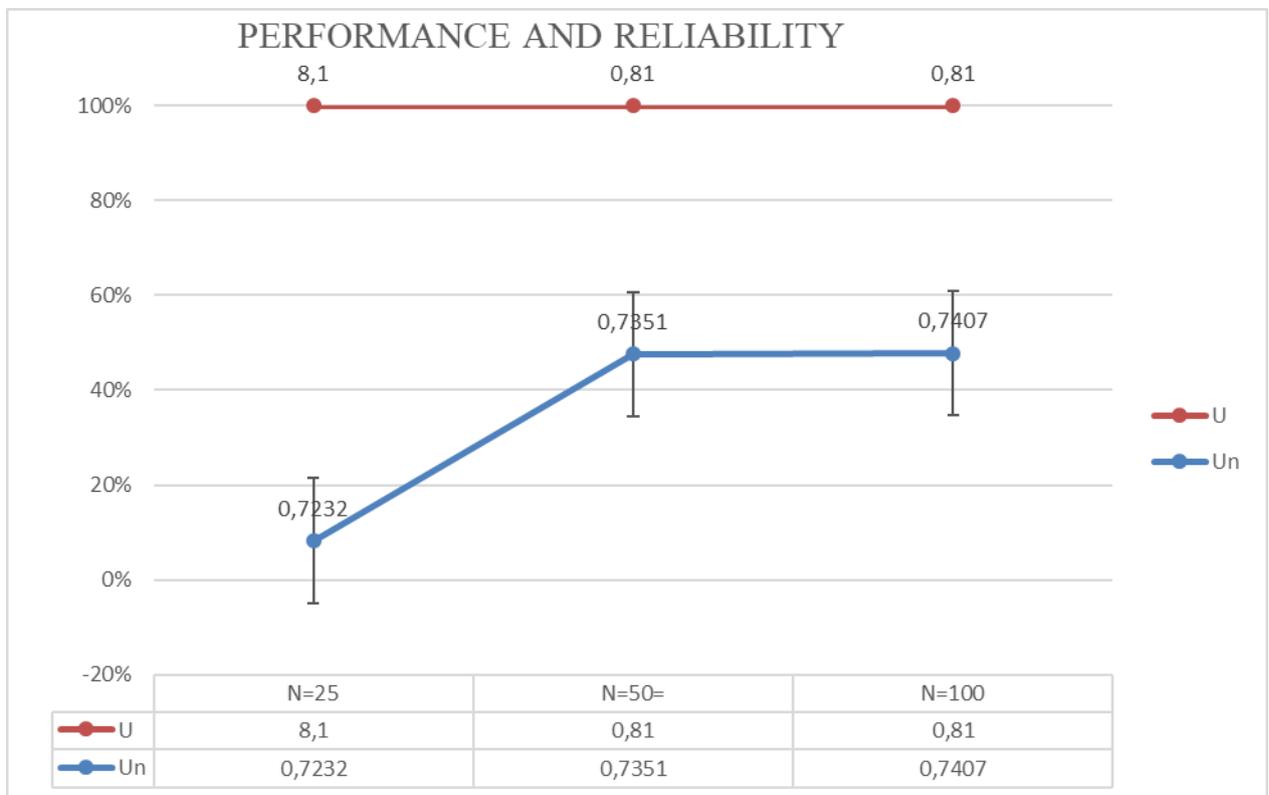
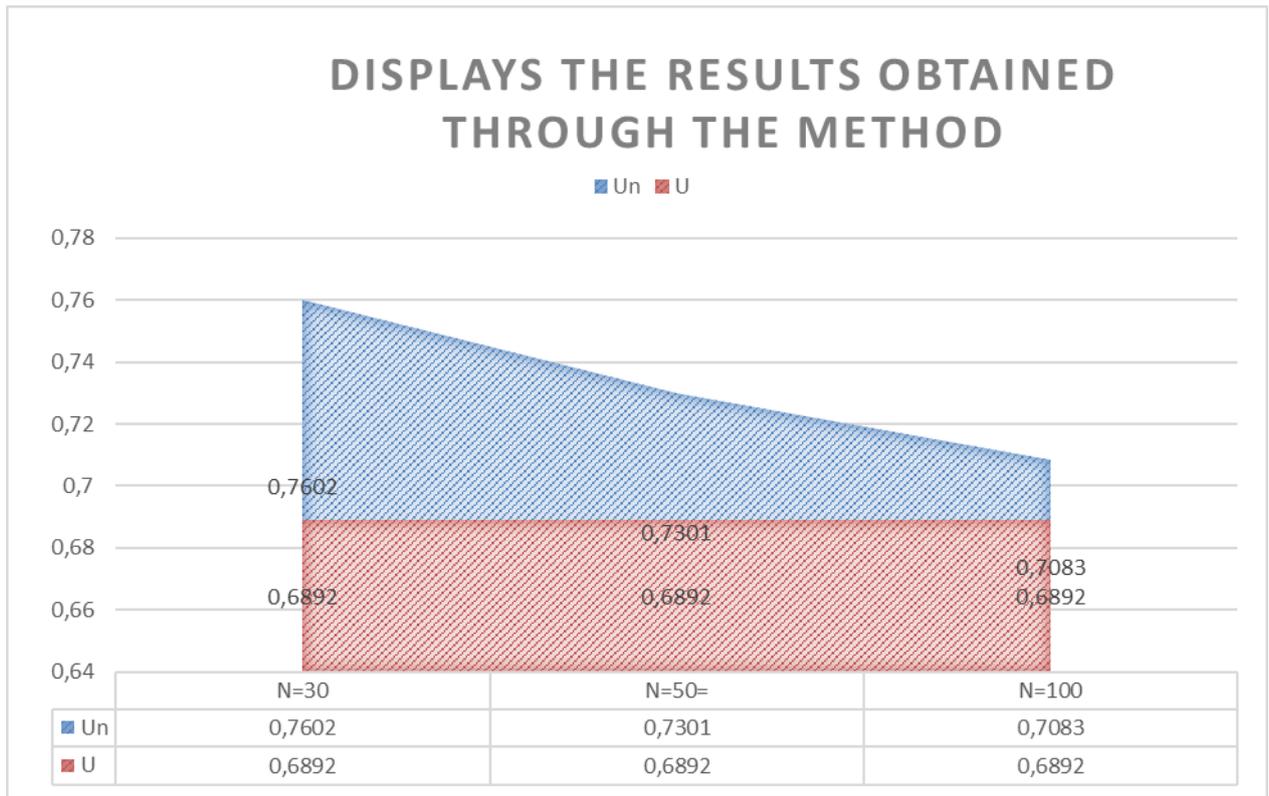
$$u'(t) = \left(\frac{1}{8}\right) u(t) + \left(\frac{t}{3} + \frac{1}{2}\right) \sqrt{t} - \int_0^t \frac{u^2(s)}{\sqrt{t-s}} ds \quad (4.2)$$

with the initial condition is  $u(0) = 0.5$ , where  $t$  ranges from 0 to 1, and the exact solution is  $u(t) = \sqrt{t + 1/2}$ .

**Table 2**

$t = 0.8$	$N = 30$	$N = 50$	$N = 100$
$ u - u_N $	$4: 4469e 002$	$1: 9034e 002$	$2: 3370e 004$
$u_N$	0: 7602	0: 7301	0: 7083
$u$	0: 6892	0: 6892	0: 6892

Graphical Analysis



## CONCLUSION

The numerical algorithm, founded on the activation functions of neural networks, has been effectively deployed for solving nonlinear integro-differential equations encompassing kernels of weakly singular types as well as difference types. Several numerical examples are provided, and their results are compared against those obtained through the classical Richardson extrapolation method and Runge methods of order 4. This method, leveraging activation functions, emerges as competitive in terms of minimal CPU time required. In terms of accuracy, it demonstrates a reasonable performance, while its simplicity shines particularly when addressing integro-differential equations featuring weakly singular kernels.

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**STUDY OF THERMAL CYCLING EFFECT ON VARIOUS NOTCH CONFIGURATIONS  
IN GFRP LAMINATES FOR AUTOMOTIVE AND AEROSPACE APPLICATIONS**

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**Abstract**

The combined effect of notch configurations and thermal loading conditions adversely affects the mechanical properties of Fiber Reinforced Polymer (FRP) laminates. These laminates have several potential applications with high strength-to-weight ratios in sectors such as automotive and aerospace. In these applications, for several requirements, cut-out holes are to be made in these laminates, but the thermal cycling caused tensile strength drops are a limitation for applications in advanced thermal conditions. These conditions include scenarios where parameters such as peak temperatures, dwell time, heating/cooling rates, and number of cycles are varied severely and constantly. There is a need to address the effect of notch shapes, sizes, and thermal cycling parameters on the variation of mechanical properties of FRP laminates. This study is designed to investigate the effect of thermal cycling on cross-ply and angle ply Glass Fiber Reinforced Polymer (GFRP) based laminates. Four different shapes of cut-out holes are selected in this study including circular notch (CN), square notch (SN), Vertical rectangular notch (VRN), and horizontal rectangular notch (HRN). Three different sets of sizes are selected for these holes and tensile testing is done for specimens with and without thermal cycling. The effect of varying thermal cycling parameters including peak temperatures, dwell time, and heating/cooling rates for a cross-ply specimen with a circular notch of 3mm diameter is investigated. The decrease in tensile strength with the increase in notch size and thermal cycling is compared for angle ply and cross ply conditions. The average drop in tensile strength due to thermal cycling in all the samples is 8%. The findings of this study provide a better understating of the cut-out hole specifications on the decrease in tensile strength that is required to find the optimal design specifications for applications of these laminates in automotive and aerospace applications.

**Keywords:** Glass Fiber Reinforced Polymers (GFRPs), Notched Specimens, Thermal Cycling, Tensile Strength, Cut-out holes.

**Introduction**

Fiber Reinforced Polymer (FRP) Composite Laminates are being preferred in present products due to their high strength-to-weight ratio. The combined effect of notches and temperature variation in aerospace and automotive applications causes the strength reduction of FRP composite laminates [1]. To analyze this problem, there is a need for an experimental investigation of Thermal Cycling and Notch Size Effect on various geometries for the case of glass/epoxy FRP composite laminates under loading. However, the mechanical behavior of these materials can be complex, and their response to different types of loading and environmental conditions is not well understood [2]. One of the major challenges in characterizing the mechanical properties of composite materials is the presence of defects, such as notches or cracks, which can significantly affect their behavior. To accurately determine the mechanical properties of composite materials with notches, it is important to consider the effect of thermal cycling, which is the repeated exposure of the material to different temperatures [3]. Thermal cycling can cause the material to expand and contract, leading to stresses and strains that can affect its mechanical properties. Additionally, thermal cycling can cause the formation and growth of cracks, which can further complicate the material's behavior [4]. Several studies have investigated the effect of thermal cycling on the mechanical behavior of composite materials with notches [5].

In conclusion, the literature review underscores the critical impact of thermal cycling on various notched geometries in composite materials. The studies reviewed reveal that thermal cycling can lead to degradation in mechanical properties, affecting stiffness, strength, fracture mechanics, and fatigue life [6]. The choice of matrix material, reinforcing fibers, temperature range, cycle frequency, environmental conditions, and composite configuration all play pivotal roles in determining the material's response to thermal cycling. The significance of investigating thermal cycling lies in its profound influence on the mechanical properties of composites, necessitating the development of predictive models for structural integrity [7]. The exploration of different notched geometries further contributes to a comprehensive understanding of how these irregularities shape the mechanical behavior of composite materials. However, the existing literature highlights the need for more research, especially into complex notched configurations, diverse composite types, and standardized testing protocols to advance our understanding and guide future developments in the field. The aim of this study is to analyze the mechanical behavior of different notched composite materials under thermal cycling conditions [8].

However, most of these studies have focused on simple geometries, such as straight notches or holes. The effect of thermal cycling on more complex notched geometries, such as rectangular notches, square notches with different sizes, or notches with varying radii, is not well understood. Therefore, this research aims to investigate the effect of thermal cycling on various notched geometries to determine their mechanical properties. This study involves experimental testing of composite specimens under thermal cycling conditions. The results of this research provide valuable insights into the behavior of composite materials with notches under thermal cycling conditions, which can inform the design and use of these materials in various applications. The current literature on thermal cycling effects in composite materials, specifically focusing on various notched geometries, reveals several gaps warranting further investigation. Firstly, there is a need for research into more complex notched configurations that emulate real-world scenarios [9]. Additionally, the literature tends to be biased towards specific types of composites, neglecting the diversity of matrix materials, and reinforcing fibers available. Standardized testing protocols are lacking, hindering effective cross-study comparisons. Moreover, the existing body of work predominantly explores mechanical aspects, overlooking potential influences on thermal and electrical properties. Addressing these gaps will contribute to a more comprehensive understanding of how composite materials respond to thermal cycling and guide future advancements in the field.

## **Materials and methods**

For this study, GFRP composites are fabricated through the hand lay-up method. E-glass fibers and Epoxy ML 506 with Cobalt (HA-11) as a hardener are used in this study. Methyl Ethyl Ketone Peroxide (MEKP) is incorporated as a curing agent and an essential catalyst to initiate the polymerization of the epoxy resin. Molding wax is applied before the application of epoxy resin as a releasing agent. The fabrication method commenced with the preparation of a frame mold constructed using a combination of wood and glass. The incorporation of spikes strategically deployed around the glass frame facilitated the sequential knitting of fibers at different stages of the lay-up process. The hand lay-up process then began by layering the glass fibers obtained from yarn onto the mold surface manually. The fibers were carefully arranged and oriented according to the desired lay-up configuration i.e. Cross ply (CP) and Angle Ply (AP), ensuring the proper alignment and distribution of fibers for optimal mechanical properties. After positioning the fibers, to ensure uniform distribution and consolidation of the fiber layers the resin matrix was applied by hand by brushing it onto the fiber layers. The resin infused the fibers, forming a wet lay-up. Care was taken to remove any air bubbles or voids that could compromise the structural integrity of the composite. The process was repeated to build up the desired four numbers of layers. Thereafter, the newly manufactured composites were left to cure at room temperature for seven days till the fabrication of composite laminates. The fiber volume fraction of the composites was 47% and the epoxy volume fraction was 50.4%. After curing, the composite Sheet was carefully removed from the mold. Then the test samples were prepared in compliance with ASTM D3039 standards [10]. These specimens were precisely cut and notched using a Computerized Numerical Controlled (CNC) laser machine manufactured by ECO Laser, model EL-1310 -13 W-RD.

Each test involved the fabrication of three specimens. Following the guidelines outlined in ASTM Standard [11], the tensile specimens were carefully crafted. They measured 300 mm in length, with a gauge length of 200 mm, and featured a rectangular profile with a width of  $36 \pm 0.5$  mm. Each layer composing the laminate had a thickness of 0.4 mm, resulting in a total specimen thickness of  $3.2 \pm 0.1$  mm. The size of the circular, square, vertical rectangular, and horizontal rectangular notch was 3mm, 6mm, and 9mm and these specimens were considered to compare with the thermally cycled specimens of the same notches results. Four types of notches were prepared for this experimental investigation for Cross Ply configuration and Angle Ply configuration i.e. circular notch (CN), square notch (SN), vertical rectangular notch (VRN), and horizontal rectangular notch (HRN) each type having different three dimensions as shown in figure 1 and the dimensions are shown in table 1.

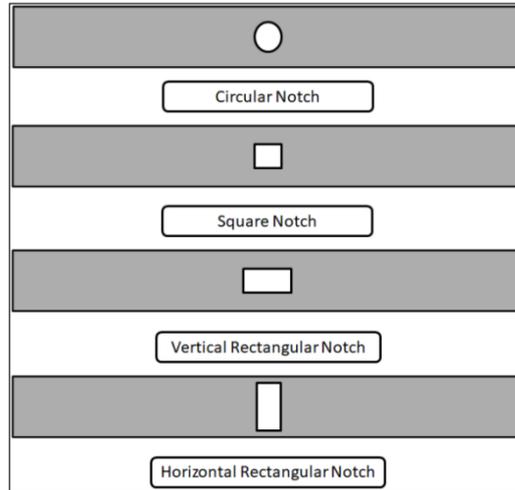


Figure 1: Types of notches used in this study.

Table 1: Notch specifications for different types of notches used in this study.

Notch	CN (Dia)	SN (l*l)	VRN (l*w)	HRN (w*l)
1	3	3	3*3	3*3
2	6	6	3*6	6*3
3	9	9	3*9	9*3

Three sets of specimens having all types of notches i.e., circular, square, vertical rectangular, and horizontal rectangular were subjected to thermal cycling. The thermal cycling tests contained 150 thermal cycles, and the procedure began with a cyclic temperature profile replicating real-world conditions, with a ramp rate of  $15^{\circ}\text{C}$  per minute and a dwell period of 2 minutes at both low and maximum temperatures of  $-5^{\circ}\text{C}$  and  $110^{\circ}\text{C}$ , respectively. Throughout the experiment, the temperature within the chamber is continuously monitored and controlled, and the graph for one complete thermal cycle is shown in Figure 2 (left). Cross-ply laminate configuration specimen CP-CN1 with circular notch selected for further analysis and subjected to different peak temperatures of thermal cycling i.e.,  $-5^{\circ}\text{C}$  to  $100^{\circ}\text{C}$ ,  $-10^{\circ}\text{C}$  to  $105^{\circ}\text{C}$ ,  $-15^{\circ}\text{C}$  to  $110^{\circ}\text{C}$ ,  $-20^{\circ}\text{C}$  to  $115^{\circ}\text{C}$  and  $-25^{\circ}\text{C}$  to  $120^{\circ}\text{C}$  at constant dwell time of 60 seconds as shown in figure 2 (right). Cross-ply laminate configuration specimen CP-CN1 further thermally cycled range of  $-5^{\circ}\text{C}$  to  $110^{\circ}\text{C}$  at a constant dwell time of 60 seconds tested with a variation in the rate of cooling or heating of specimen on both extremes.

After the defined above number of cycles tensile testing was done on this set of specimens and the results obtained from this methodology are vital for understanding the thermal behavior and stability of the glass fiber composite material, which are presented and discussed in the next chapter. For CP-CN1, two more thermal cycles are also applied with varying dwell times in one cycle and using different heating/cooling rates for the sample and the complete details of these cycles are shown in

table 2. After precisely preparing the specimens and subjecting them to a controlled thermal cycling process, the subsequent mechanical evaluation was conducted utilizing a robust Universal Testing Machine, specifically the WE 1000B model with a capacity of 1000kN. The mechanical tests adhered to the rigorous standards outlined in ASTM D3039 [10] and ASTM D5766 [11]. This controlled testing rate allows for a detailed examination of the material's response to tensile forces, ensuring a comprehensive understanding of its mechanical properties under the specified conditions.

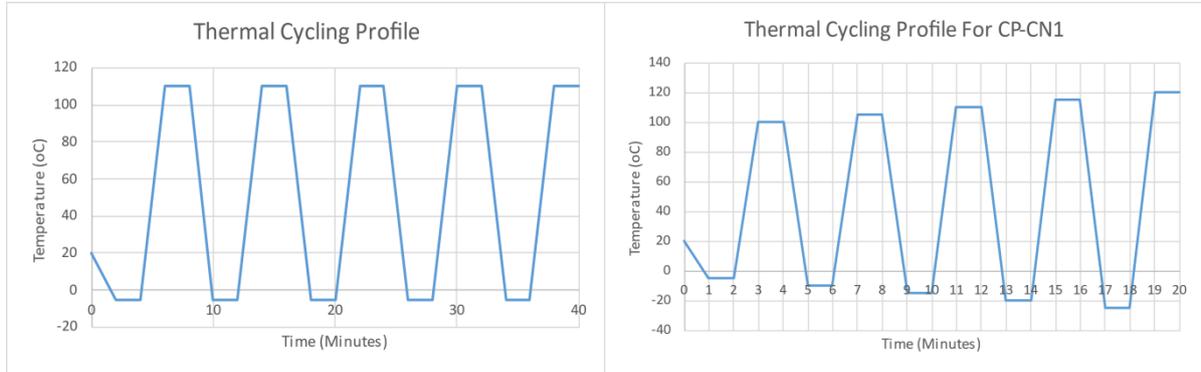


Figure 2: Thermal Cycling Profiles used in this study.

Table 2: Different Thermal Cycles applied to AP-CN1.

TC ID	Thermal Cycle 2 (TC2)		Thermal Cycle 3 (TC3)	Thermal Cycle 4 (TC4)
	TC Peaks Range		Dwell Time (s)	Heating/Cooling Rate
1	-5°C	100°C	60	10°C/min
2	-10°C	105°C	90	13°C/min
3	-15°C	110°C	120	16°C/min
4	-20°C	115°C	150	19°C/min
5	-25°C	120°C	180	22°C/min

## Results and Discussion

### 1. Cross Ply Specimens

The cross-ply specimens are tested both with and without any thermal cycling and the tensile strength results from these tests are shown in table 3. For all three notch sizes, the tensile strength values exhibit a general behaviour of fall in strength with bigger notch sizes. Figure 3 shows the comparison of different notch configurations and the notch number indicates the dimensions of the notches as the notch dimensions are as per table 1. The common trend of a decrease in tensile strength with the increase in notch size is observed in all cases but the difference at different sizes is not the same for all notch types as VRN exhibited the highest fall in strength while HRN showed the least difference in tensile strength with increasing notch size. All three notch-sized specimens for all notch types were subjected to thermal cycling as explained in the methodology section with the details of peak temperatures of thermal cycling, and dwell time at high and low temperatures along heating and cooling rates. All these parameters are kept constant for all the samples of different notch configurations. The trend in the strength values is almost the same as before the thermal cycling but all values are lower than that of before the thermal cycling and the average drop in strength values is 8%.

Table 3: Tensile strengths of Cross Ply specimens with and without thermal cycling for different notch configurations.

	Without Thermal Cycling (MPa)				After Thermal Cycling (MPa)			
	CN	SN	VRN	HRN	CN	SN	VRN	HRN
1	258.7	244.4	420.4	230.6	241	227.5	391.8	214.2
2	240.7	227.4	380.2	216.7	221.5	210.3	350.9	200.4
3	220.2	190.5	272.6	203.1	200.6	174.3	246.7	180.6

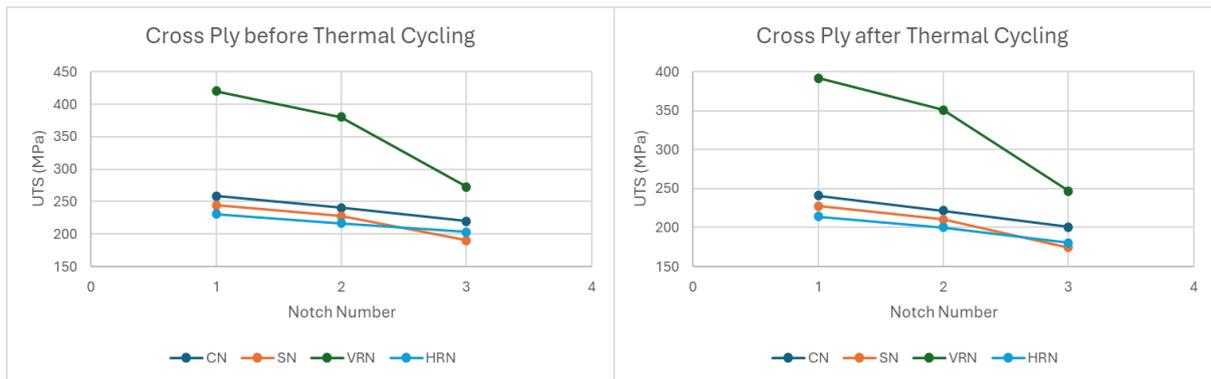


Figure 3: Tensile strengths of cross ply specimens without thermal cycling (Left) and after thermal cycling (Right).

### Angle Ply Specimens

The same procedure that was carried out on cross ply specimen was applied to the angle ply specimen and the results of tensile strength for angle ply specimens with different notch types and dimensions are presented in this section. Table 4 shows the tensile strength for the samples with and without thermal cycling and the trend of decreasing tensile strength with the increase in notch dimensions. The highest tensile strength recorded is for the circular notch or CN and the lowest value recorded is for the VRN. The trend of the minimum drop in the tensile strength of HRN is just like the one from the cross-ply as shown in the following figure 4. Square notch tensile strength values are in between CN and HRN. The difference in the tensile strengths of angle ply specimens before and after thermal cycling is clear and CN recorded higher values than SN and HRN just like in the case of cross ply after thermal cycling. The average drop in tensile strength is 8%, the same as CP. The highest value recorded in all these samples is of the AP-CN1 which is the sample with a circular notch of 3mm diameter and its tensile strength is the highest that even after thermal cycling, it is just below the TS of AP-CN1 without thermal cycling. In the case of cross ply, VRN exhibited the highest tensile strength among all other notch configurations but in the case of angle ply, VRN is recorded to show the lowest tensile strength in both before and after thermal cycling as shown in figure 4.

Table 4: Tensile strengths of Angle Ply specimens with and without thermal cycling for different notch configurations.

	Without Thermal Cycling (MPa)				After Thermal Cycling (MPa)			
	CN	SN	VRN	HRN	CN	SN	VRN	HRN
1	251.3	223.2	196	208.3	233.2	208.6	182.1	193.3
2	187	183.1	142.3	194.8	172.7	169.5	130.4	178.8
3	162.2	156.7	131.2	174.2	147.1	142.9	118.4	158.6

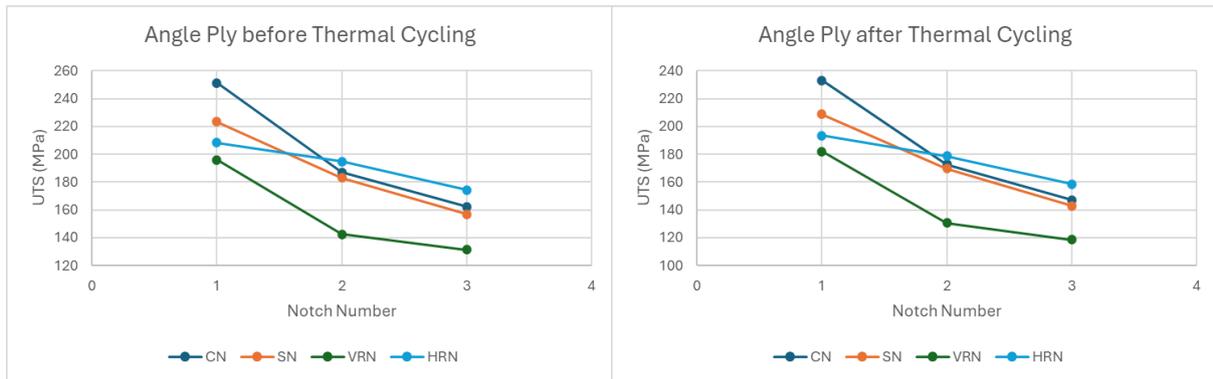


Figure 4: Tensile strengths of Angle ply specimens without thermal cycling (Left) and after thermal cycling (Right).

## 2. Comparison of Cross Ply and Angle Ply

Figure 5 shows the comparison of Cross Ply and Angle Ply specimens with all notch configurations. As mentioned earlier, the behaviour of vertical rectangular notch is quite the opposite in cross-ply and angle ply in the case of cross-ply, VRN exhibited the highest values among other notch types and even the biggest notch size has better tensile strength than the smallest notch in any other notch type. But in the case of angle ply, VRN was recorded to exhibit the lowest tensile strength among other notch types for both with and without thermal cycling. Other than that, CN has the highest tensile strength among other notch types in cross-ply, and in angle-ply, CN exhibited the best tensile strength. The strength tends to decrease with the increase in notch size but in the case of HRN, the drop in tensile strength is the least in all cases for both cross ply and angle ply and even in thermal cycling conditions.

## 3. Results for CP-CN1 under different thermal cycling conditions:

As specimen CP-CN1 exhibited the best tensile strength among all other notch configurations in cross-ply laminates, it was considered for further thermal cycling where peak temperature was varied in

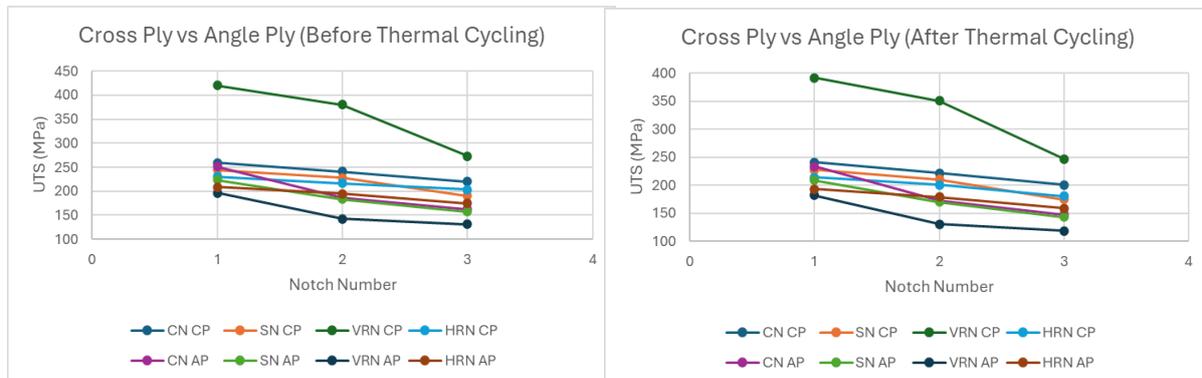


Figure 5: Comparison of Cross Ply and Angle Ply without thermal cycling (Left) and after thermal cycling (Right).

TC2, dwell time was varied with constant temperature, and heating rate in TC3 and for the third thermal cycling, TC4, heating and cooling rate was varied. The results of the tensile strengths of all these scenarios are shown in Table 5. This table shows the comparison of tensile strengths of cross-ply specimens with a circular notch of 3mm under different thermal cycling conditions.

Table 5: Tensile Strengths of CP-CN1 under different thermal cycling conditions.

TC ID	TS (MPa) for CP-CN1				
	Before TC	TC1	TC2	TC3	TC4
1	258.7	241	241	241	241
2	258.7	241	237.6	233.2	229.2
3	258.7	241	233.1	221.1	213.5
4	258.7	241	226.6	207.4	195.2
5	258.7	241	220.5	188.9	165.4

Figure 6 shows the tensile strengths of CP-CN1 without thermal cycling and under thermal cycling with varying peak temperatures, dwell time, and heating/cooling rates while keeping the other parameters constant. For no thermal cycling and TC1, the results are in a straight line as all the conditions are kept the same. In TC2, the peak temperatures increase 50C in each cycle and because of that, the tensile strength gradually decreases from 241 MPa to 220MPa. When dwell time is varied in TC3, it causes the tensile strengths to drop gradually and the drop in these values is more than that of TC2 as it drops as low as 189MPa. Varying the heating/cooling temperatures affected the tensile strength the most as the lowest values are recorded in the case of TC4 with the lowest recorded value as 165MPa.

From all the results in different notch configurations and thermal cycling conditions, it is evident that the notch size has a significant effect on the tensile strength of laminated fiberglass composites in both

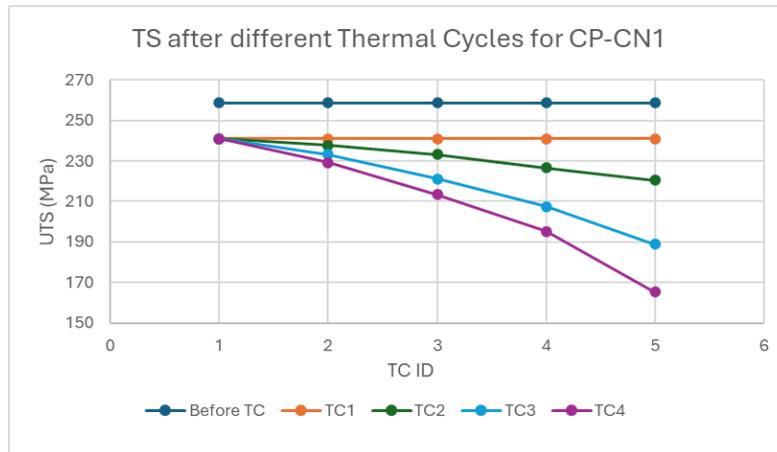


Figure 6: Tensile strengths of CP-CN1 under different thermal cycling scenarios.

cross-ply and angle-ply configurations. Varying the notch size affected the strength significantly and change in tensile strength is different in different notch types but the drop in strength with increasing the notch dimension is recorded in all cases. [12] also reported a similar behavior in the case of circular notches where increasing the diameter of the notch resulted in a drop in the tensile strength of the specimen.

In the case of the vertical rectangular notch, the behavior is quite different in cross-ply and angle-ply configurations as in the case of cross-ply configuration, the strength values are quite higher than all the other values and in the case of angle-ply configuration, the VRN values are lowest than all other values. The reason for this different behavior can be due to the parameters involved in the notch preparation method etc. As in the case of open-hole or cutout laminates, the failure starts from the boundary of the hole as discussed by [13]. The conditions during the notch preparation could have caused the strength to vary significantly.

Figure 7 shows the broken samples after tensile testing both with and without the thermal cycling specimens are shown. All shown samples fractured at the notch except the horizontal rectangular notch

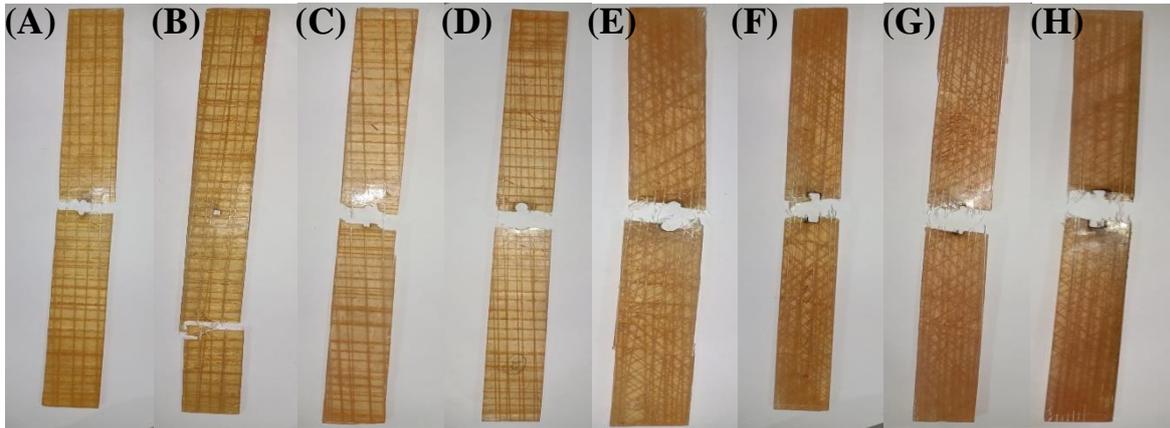


Figure 7: Broken Samples: (a, b) CP specimens with no TC, (c, d) CP Specimens with TC, (e, f) AP specimens with no TC, and (g, h) AP specimens with TC.

in the case of cross-ply as it fractured near the end and not at the point where the notch is created. The reason for this behavior can be due to some entrapped air bubbles in the matrix as the stress is concentrated at that point instead of the notch. In all these images, the fracture point observed is the point where the notch is present and in all these cases, the specimens broke in a manner that the notch is divided in half. It supports the point that the function of the notches is fulfilled as the stress concentration point is set precisely. From the studies reported, thermal cycling causes the tensile strength to drop with the increase in the number of cycles [12]. In this study, the same number of cycles, peak temperatures, dwell time, and heating/cooling rates are applied to both cross-ply and angle-ply configurations with multiple notch shapes and sizes. In all cases, the tensile strength is reported to drop, and the average strength drop for both cross-ply and angle-ply is 8%. Thermal cycling also results in surface damage as reported by [14] but this phenomenon is not observed in this study and the mentioned study also reported that stacking configuration also affected the drop in tensile strength due to thermal cycling. However, in the present study, stacking configuration has not affected the drop in tensile strength even though the tensile strengths for cross-ply and angle-ply laminates are different for both the specimens with and without thermal cycling.

CP-CN1 exhibited the best strength among other notch types and dimensions from cross-ply specimens and it was subjected to further thermal cycling where in three different scenarios, peak temperatures, dwell time, and heating/cooling rates were varied to observe the effect of these parameters in the tensile strength of CP-CN1. The results revealed that the tensile strength dropped in all scenarios but the gradient of drop in the strength is different as varying the heating rate affected the strength the most and varying the peak temperatures affected the strength the least among these thermal cycling scenarios. Varying the dwell time affected the strength between TC2 and TC4. [15] reported a similar trend in a drop of flexural strengths with varying thermal cycling conditions and mechanical testing parameters like crosshead velocity. For the comparison of cross-ply and angle-ply, cross-ply specimens exhibited better strength than angle-ply laminates in most of the cases. The difference in the strengths depends on several factors like composite design parameters such as fiber volume ratio, directions of the fibers, stacking sequence, number of layers in the finished product, and curing conditions. In these conditions, continuous glass fiber is used, and cross-ply configuration showed better strength, but it is very hard to predict as if woven fibers are used, the effect of fiber

volume ratio affects the mechanical properties differently. The results of this study showed progress towards understanding the effect of open hole shapes and sizes in the case of glass fiber-reinforced polymers and, the effect of thermal cycling is considered.

## Conclusion

From this study, the following conclusions can be made from the results of mechanical testing and analysis of the trends of strength drop in different laminate configurations and notch specifications: The tensile strength of the specimens dropped with the increase in the notch dimensions, and it decreased further when thermal cycling is applied. Circular notched specimens showed the highest tensile strength among other notch types such as square notch, vertical rectangular notch, and horizontal rectangular notch except for VRN exhibiting quite opposite behavior for cross ply and angle ply. The drop in tensile strength is minimum in the case of horizontal rectangular notches even though the overall strength in these notches is less than that of circular and square notches. The average drop in tensile strength because of thermal cycling in both cross-ply and angle-ply for all the notch dimensions is 8%. The effect of varying the thermal cycling parameters including peak temperatures, dwell time, and heating/cooling rates showed that in all thermal cycling scenarios, the tensile strength of CP-CN1 is less than that without thermal cycling. Varying the heating/cooling rate caused the highest decrease in the tensile strength of CP-CN1 and peak temperature variation affected the strength the minimum while dwell time variation effects are in between the ones from peak temperature variation and heating/cooling rates variation. Generally, cross-ply laminates showed better strength than the angle-ply ones in both scenarios with and without thermal cycling.

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**ENDANGERING ACADEMIC INTEGRITY: A DISCOURSE OF THE NEGATIVITIES  
ATTACHED TO AGE RESTRICTION WHILE DISTRIBUTING ACADEMIC  
SCHOLARSHIP AMONG THE APPLICANTS FROM DEVELOPING COUNTRIES**

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**ABSTRACT**

Academic integrity has been methodically investigated. In prior researches, the investigations focus largely on students' nature of conducts regarding academic and school activities in general after the admissions, while being so limited in their acumens about paramount causality. This study has theoretical and practical contributions to the literature and the real world by uncovering the negativity associated with the age-limit criterion in scholarship admissions and how it jeopardizes the stability of integrity within and outside institutions. A total of 82 participants from 11 countries across 2 continents of Africa and Asia were interviewed at five selected countries. Age restriction in scholarship admission was reported to deprive and discriminate against aged competent and qualified scholarship applicants. Thus, adjustment of age to meet the required age in the scholarship has been considered as a defense mechanism overtime. Implications of this misconduct are discussed, and recommendations are provided.

**Keywords:** scholarship, academic integrity; age; negativity; applicants developing; countries.

**THE IMPACT OF CYBER ATTACKS IN ALBANIA IN RELATION TO NATIONAL SECURITY AND CITIZENS' PRIVACY**

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**ABSTRACT**

Over the past two years, Albania has confronted significant cybersecurity threats that have raised serious concerns about national security. As the nation progresses in information and communication technology, it becomes increasingly vulnerable to cyber-attacks that jeopardize sensitive data through unauthorized disclosures. Cybercrimes are particularly challenging due to their sophistication, technical complexities, and international scope, which transcend traditional geographical boundaries, making them difficult for local authorities to trace and mitigate. In response to these emerging threats, Albania has endeavoured to align its domestic laws with the European Union's and has ratified the Budapest Convention on Cybercrime. These efforts include revisions to criminal laws to reflect the Convention's standards and the formulation of a national cybersecurity strategy. The recurrent cyber-attacks since July 2022, allegedly conducted by Iranian actors, have targeted the sensitive data of Albanian citizens for financial gain. These attacks led to the temporary shutdown of Albania's primary online service portal, E-Albania, and the unauthorized distribution of personal data. The repercussions of these cyber incidents were starkly evident in September 2022 when breaches compromised security at national borders and airport security apparatus, disseminating footage from surveillance cameras. Despite governmental countermeasures, these events have underscored the deficiencies in Albania's cybersecurity infrastructure and response capabilities, leading to public unrest and highlighting the urgent need for robust cybersecurity frameworks. Recent developments also indicate an increased collaboration between Albania and international cybersecurity agencies to bolster defences and enhance investigative capabilities. This partnership aims to build a more resilient digital infrastructure and foster a culture of cybersecurity awareness among citizens and institutions alike. This paper discusses the critical role of cybersecurity in safeguarding individual privacy and protecting classified information within a secure cyberspace. It emphasizes the imperative of unwavering commitment to implementing and maintaining secure networks to pre-emptively address cyber threats, irrespective of the associated costs.

**Keywords:** collaboration, cyber attack, information, privacy law, strategy

**INTRODUCTION**

In recent years, Albania has experienced rapid technological advancement, leading to widespread digital transformation across various sectors of society. This transformation has been marked by the increasing integration of information and communication technology (ICT) into daily operations and governance, enhancing efficiencies and providing new opportunities for economic and social development [1]. Digital access reflects the gap in Internet access and people's ability to access it depending on their digital literacy [2]. However, this progress has also exposed Albania to a myriad of cybersecurity threats that have serious implications for national security. Cyber-attacks have evolved from mere nuisances to complex, coordinated operations that can disrupt critical infrastructure, leak sensitive information, and compromise governmental operations. The vulnerabilities in Albania's digital infrastructure have become apparent, necessitating a comprehensive examination and strategic response to mitigate these risks. The cyber-attacks on Albania's parliament and telecommunications infrastructure are indicative of a broader trend where cyber adversaries target national critical infrastructures to gain political, economic, or espionage advantages. These attacks often involve sophisticated techniques such as ransomware, phishing, and Advanced Persistent Threats (APTs),

which are capable of bypassing conventional security measures. The attackers not only aim to steal sensitive information but also seek to undermine public trust in government institutions and disrupt essential services. For instance, targeting the telecommunications infrastructure could cripple the entire network, leading to significant disruptions in communication, data transfer, and overall connectivity. Such incidents can have strong effects on other sectors, including emergency services, banking, and transportation, thereby amplifying their impact beyond the initial breach.

Cybersecurity is no longer just an IT issue but a strategic constitutional [3] and domestic law [4] priority. The security of cyberspace is critical in protecting not only the privacy of individuals but also the integrity of critical national infrastructure [5]. Even the year 2023 has been characterized by a diverse activity of hackers all over the world, who have put a lot of sensitive data at risk [6]. Digital security is based on information security, which consists of three basic principles such as confidentiality, integrity, and availability [7]. As Albania continues to digitize its government services, financial systems, and national security apparatus, the potential impacts of cyber-attacks grow more severe. The threats range from identity theft and financial fraud to espionage and sabotage, highlighting the need for robust cybersecurity measures to safeguard national and individual interests. The objective of this paper is to analyse the cybersecurity threats faced by Albania, particularly in the context of its evolving ICT landscape and the corresponding national security risks. This analysis aims to assess the current threat landscape by identifying the types of cyber-attacks Albania has faced, the vulnerabilities exploited, and the potential actors involved; evaluate the effectiveness of Albania's legislative and strategic responses to these threats, with an emphasis on compliance with international cybersecurity standards like the ratification of the Budapest Convention [8]; discuss the challenges and limitations of Albania's current cybersecurity measures in mitigating sophisticated cyber-attacks and to propose actionable recommendations for enhancing Albania's cybersecurity framework to better protect against future threats.

## **CYBERSECURITY THREAT LANDSCAPE IN ALBANIA**

In recent years, Albania has witnessed a surge in cyber-attacks that have targeted various sectors including government, finance, and critical infrastructure. These incidents range from simple malware attacks to sophisticated state-sponsored operations aimed at espionage or sabotage. The paper provides an overview of the significant cyber incidents that have transpired over the past two years, highlighting the sophistication and frequency of these attacks, which underscore the vulnerability of Albania's digital infrastructure. The cyber threats faced by Albania are diverse in their nature and impact. The most common threats include:

- a) Phishing and social engineering Attacks: These involve deceiving individuals into divulging confidential information. Government employees and corporate executives have been frequent targets, with attackers seeking access to secure systems.
- b) The Russian-based Clop Ransomware attacks: These involve attackers encrypting an organization's data and demanding ransom for decryption keys. Such attacks can cripple critical systems, leading to significant operational disruptions. [9]
- c) Distributed denial of service (DDoS) Attacks: These aim to overwhelm systems with massive amounts of traffic to shut down websites or online services. This type of attack has been particularly prevalent against government portals, affecting public access to services.
- d) Advanced persistent threats (APTs): These are complex attacks, often state-sponsored, that aim to stealthily gather information or gain long-term access to networks. APTs represent a significant threat due to their stealth and persistence, which make them difficult to detect and eradicate.

One of the most notable events in recent history was the attack on Albania's national online service portal, E-Albania. The portal was targeted by a sophisticated cyber-attack believed to be orchestrated by state-sponsored actors. This incident resulted in the temporary shutdown of the portal, affecting the delivery of public services, and exposing sensitive personal information of thousands of citizens. The attack was characterized by the deployment of destructive malware designed to disrupt service and exfiltrate data, reflecting a high level of sophistication and strategic planning. Another significant incident involved the unauthorized access and publication of surveillance camera footage from national border checkpoints and airport security scanners. This breach compromised national security

by exposing critical operational details to potential malicious actors. The incident highlighted vulnerabilities in the security of networked surveillance systems and raised concerns about the potential for more severe implications if such breaches were to occur in more sensitive domains.

While attributing cyber-attacks to specific actors can be challenging, several incidents in Albania have been tentatively linked to state-sponsored groups. For instance, cybersecurity experts and international intelligence collaborations have suggested Iranian state-sponsored actors' involvement in some of the most disruptive attacks. This attribution is based on the sophistication of the attacks, their alignment with geopolitical interests, and digital footprints that match known Iranian cyber operation tactics. The cyber-attacks in Albania have had profound implications for national security, which rendered websites and services unavailable [10] :

- a) Loss of public trust: Repeated cyber incidents have eroded public confidence in digital services and government ability to protect citizen data, potentially hampering the digital transformation agenda.
- b) Economic impact: Cyber-attacks have led to direct financial losses through fraud, ransom payments, and the cost of mitigating attacks and restoring services. Indirect costs include lost productivity and the long-term impact on international investment due to perceived cyber security weaknesses.
- c) Geopolitical risks: The involvement of state-sponsored actors in cyber-attacks introduces a complex geopolitical dimension, complicating Albania's foreign relations and requiring careful diplomatic handling.

### **LEGISLATIVE AND STRATEGIC RESPONSES TO CYBER THREATS - OVERVIEW OF LEGISLATIVE FRAMEWORK**

Albania has recognized the urgent need to strengthen its cybersecurity infrastructure and has taken significant steps to update its legislative framework accordingly. The cornerstone of these efforts is the ratification of the Budapest Convention on Cybercrime, which aligns Albania with international standards in combating cybercrime. This alignment has necessitated comprehensive reforms to national laws, particularly those governing electronic communications, data protection, and criminal justice. The primary legal instruments in Albania's fight against cybercrime include amendments to the Criminal Code which introduce specific offenses related to cyber-attacks, such as unauthorized access to computer systems, data interference, system interference, and misuse of devices [11]. These laws are designed to cover a broad spectrum of cyber activities that threaten the security of the state and its citizens. In conjunction with cybercrime laws, Albania has also enhanced its data protection regulations to safeguard personal information against unauthorized access and breaches. These laws are aligned with the General Data Protection Regulation (GDPR) of the European Union, emphasizing the rights of individuals to control their personal data and imposing stringent requirements on data processors and controllers [12]. Recognizing the potential impact of cyber-attacks on critical infrastructure, Albania has developed specific regulations aimed at enhancing the resilience of vital sectors such as energy, water, transportation, and healthcare. These regulations mandate the implementation of robust cyber-security measures to ensure compliance and readiness against cyber threats.

The 21st century has faced human society with a series of modern challenges related to the Internet. In this context, another danger similar to viruses has spread globally, spyware [13]. Alongside legislative updates, Albania has launched several strategic initiatives to strengthen its cybersecurity defences. These initiatives reflect a comprehensive approach involving government agencies, the private sector, and international partners. The cornerstone of Albania's strategic response is its National Cybersecurity Strategy, which outlines the key objectives and actions for enhancing cybersecurity capabilities across the country. This strategy focuses on several core areas, including building cybersecurity awareness, developing technical capabilities, enhancing incident response, and fostering international cooperation. As part of its strategic plan, Albania has established dedicated institutions responsible for implementing cybersecurity policies and coordinating defence mechanisms across various sectors. Notable among these is the National Agency for Information Society (NAIS), which plays a pivotal role in overseeing the cybersecurity of government digital services and infrastructure.

Recognizing the shortage of skilled cybersecurity professionals, Albania has invested in capacity building and skills development initiatives. This includes partnerships with universities and international bodies to offer specialized cybersecurity training and education programs designed to equip individuals with the necessary skills to tackle current and future cyber threats. Albania actively seeks international collaboration to bolster its cyber-security defences. This includes participation in international forums, sharing best practices, and engaging in joint exercises with other nations. Such collaborations are crucial for staying updated with the latest cyber threat intelligence and response tactics. In response to specific cyber incidents, Albania has demonstrated a capacity to mobilize and adapt its strategies. Following the attacks on government digital services, immediate measures were taken to isolate affected systems, conduct forensic analyses, and restore services with enhanced security protocols. These responses are regularly reviewed and adjusted to reflect the evolving nature of cyber threats.

Despite these comprehensive measures, Albania faces several challenges in the effective implementation of its cybersecurity strategies [14]. The rapid pace of technological change presents a continuous challenge. Cyber attackers frequently develop new methods to exploit vulnerabilities, and keeping pace with these innovations requires constant updates to cybersecurity technologies and practices. Resource constraints, including limited financial and human capital, pose significant barriers to the implementation of effective cybersecurity measures. Budgetary limitations often restrict the ability to deploy advanced technological solutions or to hire and retain skilled cybersecurity personnel. The complexity of international cyber law and the need for harmonization with internal legal frameworks can impede swift legislative responses to new cyber threats. Additionally, the enforcement of cybersecurity laws is often challenged by jurisdictional and procedural issues, especially when dealing with cybercrimes originating from abroad. Looking forward, Albania must continue to refine and expand its legislative and strategic responses to cyber threats. This involves not only keeping abreast of technological advancements but also enhancing international cooperation to address the global nature of cyber threats. Additionally, fostering a culture of cybersecurity awareness among citizens and businesses will be crucial for building a resilient digital ecosystem. This section on legislative and strategic responses highlights Albania's proactive approach in establishing a robust cybersecurity framework. By continuously updating its legislative and strategic measures, Albania aims to build a secure and resilient cyberspace that can withstand the evolving landscape of cyber threats.

### **CHALLENGES AND LIMITATIONS IN CYBER-SECURITY IMPLEMENTATION**

While Albania has made considerable strides in updating its cybersecurity framework, the actual implementation of these measures faces numerous obstacles. These challenges are not unique to Albania but are exacerbated by specific socio-economic factors, infrastructural limitations, and geopolitical complexities. This section explores the key issues impeding the effective deployment of cybersecurity strategies in Albania and discusses the impact of these challenges on the nation's overall cyber resilience [14, 3, 4]. One of the primary challenges facing Albania is the presence of outdated technological infrastructure across many sectors, particularly in public institutions. Legacy systems are often incompatible with modern cybersecurity tools and practices, making them inherently vulnerable to newer forms of cyber-attacks. The process of updating these systems is not only costly but also disruptive to daily operations, posing a significant hurdle for widespread modernization efforts. The availability of advanced cybersecurity tools is crucial for detecting and mitigating sophisticated cyber threats. However, financial constraints limit the acquisition of state-of-the-art cybersecurity technologies. Without access to comprehensive monitoring and incident response tools, Albania's ability to pre-empt and respond to cyber threats is significantly hampered.

Albania faces a critical shortage of skilled cybersecurity professionals. This gap is due to a combination of brain drain, where talented individuals emigrate for better opportunities, and the nascent stage of cybersecurity education within the country. The lack of experienced professionals affects all aspects of cybersecurity implementation, from policy formulation and enforcement to operational cybersecurity management and incident response. Ongoing training and professional development are essential for maintaining an adept cybersecurity workforce capable of handling new and evolving threats. However, limited resources and lack of access to international training programs

constrain Albania's ability to provide continuous professional development opportunities for its cybersecurity personnel. The complexity and dynamic nature of cyber laws pose a significant challenge. Laws and regulations need frequent updates to keep pace with the rapid evolution of technology and cyber tactics. However, legislative processes can be slow, and there is often a lag between technological advancements and corresponding updates in the legal framework, leaving gaps that can be exploited by cybercriminals. Even with a robust legal framework, the enforcement of cybersecurity laws presents its own set of challenges. The cross-border nature of many cyber-attacks complicates jurisdictional issues, making it difficult to track and prosecute perpetrators located in different countries. Furthermore, there is often a need for greater coordination between various national and international law enforcement agencies to effectively address cyber threats.

One of the fundamental challenges in strengthening cybersecurity in Albania is the generally low level of awareness about cyber risks among the public and within organizations. Without a broad understanding of potential cyber threats and the best practices for mitigating them, individuals and businesses are more vulnerable to cyber-attacks. There is often resistance to implementing comprehensive cybersecurity measures, both from individuals and institutions. This resistance can stem from a lack of understanding of the risks involved, the perceived inconvenience of adopting new practices, or concerns about the costs associated with implementing such measures [15]. Cybersecurity requires significant investment in technology, training, and personnel. However, competing economic priorities mean that cybersecurity often does not receive the necessary budget allocation, limiting the ability to implement comprehensive cyber defences. The financial impact of cyber incidents themselves can further strain limited resources. The costs associated with recovering from cyber-attacks, such as system repairs, data recovery, and reputational damage control, can be substantial, diverting funds from proactive cyber-security measures. Looking ahead, Albania faces the dual task of overcoming existing challenges and anticipating future cybersecurity needs. Addressing these issues will require a multifaceted approach:

- a. Investment in technology and infrastructure: Increased investment in updating and securing technological infrastructure is essential.
- b. Capacity building: Strengthening educational programs in cybersecurity and providing continuous professional development for existing personnel will help mitigate the skill gap.
- c. Enhancing legal frameworks: Streamlining legal processes to ensure quick updates to cyber laws and improving enforcement mechanisms will enhance compliance and deterrence.
- d. Promoting cyber-security awareness: Broad-based awareness campaigns aimed at the public and private sectors can elevate the general understanding of cybersecurity and encourage more secure practices.
- e. International cooperation: Engaging more deeply in international cybersecurity initiatives can provide Albania with access to resources, expertise, and support networks necessary to bolster its cyber defences.

Addressing these challenges is crucial for safeguarding Albania's digital landscape against the increasing frequency and sophistication of cyber threats [16].

## **1. Future perspective**

The preceding sections have outlined the extensive and multifaceted cyber threats facing Albania as it continues to integrate more deeply into the digital global landscape. Albania's legislative and strategic responses, while proactive and aligned with international standards, face significant implementation challenges that stem from technological, human resource, regulatory, and financial constraints. The nature of cyber threats is inherently dynamic and continuously evolving. As such, Albania's cybersecurity measures must be adaptable and forward-looking to keep pace with emerging technologies and methodologies employed by cybercriminals. Despite notable strides in legislative and strategic frameworks, there are critical gaps in enforcement, technological capacity, and professional expertise. These gaps hinder effective response and mitigation of cyber threats, leaving sensitive data and critical infrastructure at risk. Limited resources and a general lack of cybersecurity awareness across all sectors increase Albania's vulnerability to cyber-attacks. These issues are compounded by a cultural resistance to adopting new security practices and technologies. Cyber-security is a global issue

that transcends national borders. Albania's continued engagement with international bodies and adherence to global cybersecurity norms and practices is crucial for enhancing its defensive capabilities. To address the findings and overcome the challenges identified, the following policy actions are recommended:

- a. **Enhanced investment in cyber-security:** Allocate greater resources to cybersecurity initiatives, focusing on both technological upgrades and human capital development. This includes investing in state-of-the-art security tools and expanding training programs to build a robust pool of cyber-security professionals.
- b. **Regular legal and regulatory updates:** Establish mechanisms for the rapid update of cybersecurity laws and regulations to respond to new cyber threats. This should include streamlined procedures for adapting to technological changes and an agile legal framework capable of addressing the complexities of cybercrimes.
- c. **Public awareness campaigns:** Launch comprehensive awareness campaigns targeting both the general public and specific sectors vulnerable to cyber threats. These campaigns should focus on educating stakeholders about the risks of cyber-attacks and the best practices for prevention and response.
- d. **Strengthening public-private partnerships:** Foster stronger collaborations between government bodies and the private sector to share knowledge, resources, and strategies for cybersecurity. This approach can leverage the strengths and capabilities of both sectors to create a more resilient cyber-security ecosystem.
- e. **Expanding International Collaboration:** Deepen involvement with international cybersecurity initiatives and partnerships. Participate actively in global forums and bilateral agreements to benefit from shared intelligence, joint exercises, and capacity-building efforts.

To further enhance Albania's cybersecurity posture, the following areas should be considered for future research. States should investigate the implications of new technologies such as artificial intelligence, blockchain, and the Internet of Things (IoT) on national cybersecurity strategies [17]. Research should focus on both the opportunities these technologies present and the new vulnerabilities they introduce. According to economic impact of cyber-security investments, it is important to conduct studies to understand the return on investment in cybersecurity measures. This research would provide insights into the most cost-effective strategies for reducing cyber risks and justify increased expenditure in this area. Regarding the cultural aspects of cyber-security, it is necessary to encourage countries to explore how cultural factors influence cybersecurity practices and acceptance of cybersecurity policies. Understanding these cultural dynamics could help in designing more effective, culturally sensitive awareness programs. International cyber law and cooperation aims to examine the effectiveness of international cyber laws and treaties in fostering cooperation and deterring cybercrime. This research could lead to better frameworks for international collaboration and conflict resolution. In the framework of solidarity and international assistance, it is worth emphasizing the help offered by Microsoft in the investigation of Iranian hacker attacks [18].

### **ENHANCING CYBER SECURITY THROUGH USA COLLABORATION**

In this period of rapid technological developments, it is very difficult for cyber protection to be guaranteed only by traditional instruments, such as the Budapest Convention [19] or Council Framework Decision 2005/222/JHA [20]. The collaboration between the United States and Albania in the realm of cybersecurity marks a pivotal development. After the chaos caused by the attacks, the Albanian officials could not confirm the time of the restoration of services on the government platforms [21]. The U.S. Cyber Command's deployment of a 'Hunt Forward' operation in Albania not only underscores the strategic importance of Albania within the cybersecurity domain but also illustrates a proactive approach to cyber defence that is becoming increasingly essential worldwide. The 'Hunt Forward' operation by the U.S. Cyber Command in Albania was a landmark event, being the first of its kind in the country. This operation was not merely a gesture of solidarity but a calculated move to bolster Albania's cybersecurity infrastructure against the backdrop of escalating cyber threats, particularly those emanating from state-sponsored actors. The initiative stems from a broader strategy by the United States to extend its cybersecurity umbrella over allies, ensuring a collective defence mechanism that is robust and responsive to the dynamics of global cyber threats.

The operation involved U.S. cyber operators working directly with Albanian counterparts to identify, monitor, and analyse adversary tactics, techniques, and procedures. This direct engagement facilitated a hands-on transfer of knowledge and skills, crucial for building Albania's capacity to defend against and respond to cyber incidents. Such collaborative efforts are critical as they enhance understanding among allied nations and foster a unified approach to tackling cyber threats.

The strategic benefits of such operations are manifold. Firstly, they serve as a deterrent to potential cyber adversaries by demonstrating a strong alliance and a shared commitment to cybersecurity. Secondly, the operation provided invaluable insights into the cyber threat landscape that Albania faces, allowing for the development of tailored defensive strategies that are informed by real-time data and expert analysis. Furthermore, this collaboration has operational advantages. By allowing U.S. cyber experts to work alongside Albanian officials, it ensures that the cybersecurity measures implemented are not only sophisticated but also contextualized to the specific needs and challenges faced by Albania. This is particularly important for a country like Albania, which is navigating its path towards digital transformation and is vulnerable to the kinds of sophisticated cyber-attacks that can derail such progress. A significant aspect of the 'Hunt Forward' operation involves capacity building and skill development. The U.S. experts involved in the operation conducted workshops, training sessions, and simulations designed to enhance the skills of Albanian cyber defence personnel. This training aims to equip them with the knowledge and tools necessary to independently detect, prevent, and respond to cyber threats, thereby improving the country's overall cybersecurity posture. This initiative also serves as a model for other nations in the region, demonstrating the benefits of international cooperation in cybersecurity. It highlights how strategic partnerships can be leveraged to enhance the individual and collective capabilities of nations to tackle the complex landscape of global cyber threats. According to General Nakasone cybersecurity is national security [22]. Looking forward, the 'Hunt Forward' operation is expected to be the first in a series of steps towards deeper cybersecurity collaboration between the U.S. and Albania. The success of this initial engagement is likely to pave the way for more sustained cooperation, which could include joint cyber drills, shared cyber threat intelligence, and continuous engagement in cyber policy making and strategy development. The ongoing collaboration will likely focus on adapting to the rapidly evolving cyber threat landscape, with an emphasis on developing adaptive, proactive, and resilient cyber defence mechanisms. This will not only enhance Albania's capabilities but also contribute to the broader goal of securing cyberspace as a global common.

### CONCLUSION

Albania's journey towards a secure cyberspace is fraught with challenges yet filled with opportunities for significant improvement. By continuously adapting to the evolving cyber landscape, investing in critical resources, and fostering a culture of cybersecurity awareness and cooperation, Albania can enhance its resilience against cyber threats. The recommendations provided aim to guide policymakers and stakeholders in strengthening Albania's cybersecurity framework and ensuring a safer digital future for all citizens. In conclusion, the U.S. Cyber Command's 'Hunt Forward' operation in Albania represents a critical juncture in international cyber defence collaboration. It underscores the importance of strategic partnerships and collective defence in the digital age, where cybersecurity is integral to national and international security. As cyber threats grow more sophisticated, such collaborative endeavours will be crucial in safeguarding the digital infrastructures that underpin modern economies and societies. This operation is a testament to the proactive steps being taken by nations to defend against the pervasive threats in cyberspace, ensuring a secure and resilient digital future for all. These efforts are vital not only for protecting national security but also for supporting Albania's aspirations for economic and technological development in an increasingly digital world.

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**FIRST EVIDENCE OF MICROPLASTIC CONTAMINATION IN THE FRESHWATER AND SEDIMENTS OF ISHMI RIVER, ALBANIA**

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**Abstract**

The pervasive existence of microplastics in aquatic ecosystems has prompted concerns regarding their potential impacts on the surrounding biota and food chain. While the presence of microplastics in marine environments has been extensively studied, the consequences of microplastic contamination in freshwater bodies remain insufficiently explored. This study aims to present foundational data on microplastic contamination in Ishmi River in central Albania. The investigation delves into the size, shape, distribution, and composition of microplastics on river surface water and sediments, depending these parameters in factors such as population density, land occupation, wind patterns, and geohydrological processes.

Microplastics were detected in all samples, indicating widespread contamination of the river with plastic particles. The prevalent microplastic morphology was the fiber type, falling within the size range of 100 to 200  $\mu\text{m}$ , with the predominant colors being black, transparent and red. The visual counts of microplastics introduced measurement uncertainty, particularly for black-colored microplastics, highlighting the potential for underestimation or overestimation of the total count.

Polypropylene and polyethylene collectively constituted most polymer types (70%). Fourier transform infrared (FTIR) spectroscopy analyses revealed that 25% of the analyzed samples hide information about the type of waste, suggesting further investigation on methodology. Furthermore, the data indicate that the distribution of microplastics is significantly influenced by the geohydrological characteristics of the river.

**Keywords:** freshwater; microplastic size; density separation; FTIR spectroscopy.

**1. Introduction**

The potential threat of microplastics to the Adriatic Sea originating from river waters is a matter of growing concern[1]. Rivers serve as conduits for the transport of microplastics from inland areas to marine ecosystems, and their discharge into the Adriatic Sea raises several environmental and ecological issues affecting marine life, ecosystems, and potentially human health [1], [2]. Addressing this issue requires comprehensive monitoring, research, and concerted efforts to mitigate the sources of microplastic pollution in riverine and coastal environments [3].

Microplastics (MPs) are plastic particle less than 5mm. These particles manifest in a diverse array of shapes, including fibers, fragments, pellets, spheres, flakes, foams, and films [4]

As time progresses, the challenge of plastic pollution intensifies, particularly as plastics within aquatic environments undergo fragmentation into smaller components. However, the complete degradation of these microplastics is contingent upon the polymer type, and such degradation occurs only over extensive temporal scales [4], [5]

A revision of the current literature abroad, reveals that the contribution of rivers to global plastic pollution is still debated[6], [7], [8].

In Albania we still don't have any documented information regarding MPs pollution in rivers. Through these works, we showed first evidence of microplastic pollution in Ishmi river and sediments. According to National Environmental Agency, Ishmi river is [9]the most polluted river in Albania. Environmental plastics encompass a diverse array of litter, and their characteristics are often delineated based on various factors such as size, origin, shape, polymer type, and color in existing literature. [10]However, there is currently no universally accepted classification system.

By this study we reached to know the dynamics of different plastic polymers present in different stations of Ishmi River [11]. The technique in use for MPs detections was optical microscope (Kozo XJPG304, Sony TCC-8.1 version 7.3.1.7 40x100 zoom) and FTIR Nicolet 6700 spectroscopy was used for polymer analysis. FTIR spectroscopy is a methodology that furnishes valuable insights into the molecular composition and structural characteristics of a given sample. The most prevalent polymers in the environment, reflecting global production rates, include high- and low-density polyethylene (HD/LD-PE), polyethylene terephthalate (PET), polypropylene (PP), polystyrene (PS), and polyvinyl chloride (PVC), polyamide fibers (nylon) [10].

## 2. Material and methods

### 2.1. Geographical extent of Ishmi river

Albania, situated in the southern region of the Balkan Peninsula, is characterized by its compact size, covering a total area of 28,748 square kilometers. It shares borders to the north and northeast with Montenegro, Kosovo, and Macedonia, while its southern and southeastern boundaries are defined by Greece. The country's perimeter spans a total of 1094 kilometers [12]with approximately 427 kilometers of coastline, 48 kilometers along rivers, and 72 kilometers adjacent to lakes (as illustrated in Fig. 1). To the west and southwest, Albania is predominantly exposed to the Adriatic Sea, extending along a coastline of 273 kilometers, and the Ionian Sea to the south, stretching over 154 kilometers.

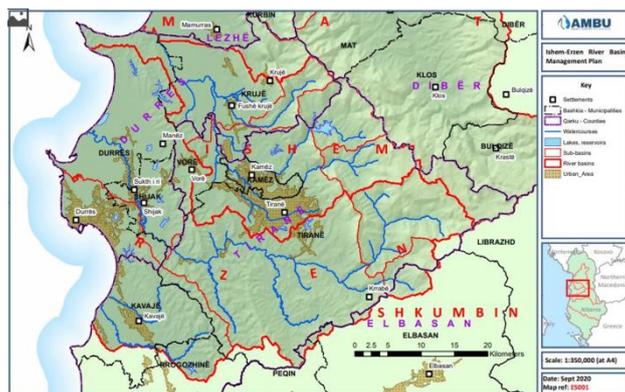


Fig.1. Map of Ishmi Basin

According to the competent organs for environmental assessment[9], the most polluted river in Albania is the Ishmi river. The Ishëm river basin has a geographical extension that starts from the western part of the Priska Neck, continuing in Tirana, Rinas, Fushë Krujë, Bërçulë Bubq to flow into the Adriatic in the area called Kepi Rodonit. This basin consists of three rivers, which are: The Tirana River that runs through the northern part of Tirana (River Bank), on the border with Paskuqan municipality [13], [14]The Lana River, which originates from the western part of the Priska Pass and has a length of 29km, and after passing through the middle of Tirana, in the northeast of Bërçulle, joins the Tirana River, giving rise to the Ishem River.

The Ishem river has a length of 74 km. Its extent passes from the area of Rinas, Fushë Krujë, Bubq to flow into the Adriatic at Cape Rodoni. The maximum flow is 1,980 m<sup>3</sup>/sec. The main amount of solids transported in the sea is 2 million tons/year. Ishmi is mainly fed by surface waters with relatively high mineralization of 461 mg/l. The water temperature varies from 6.12 °C in January to 24.7 °C in August. The waters of Ishmi are used for irrigation[14], [15], for this reason, there is an immediate need to assess the level of pollution with microplastics in it.

**2.2. Sources of pollution of Ishmi River**

According to Environmental National Agency [16] the norm in the monitoring stations of the Ishmi River, where the situation presents itself with a high level of pollution classified in Class V - Bad situation. Ammonia content has exceeded the limited levels at the station Ura Kamëz, with the highest average value of 24.8 mg/l, classifying this station in Class V - Bad condition. Ishmi river stations are classified as Class V – Poor condition. The content of nitrates in all the monitored stations results in values lower than the allowed rate. Ortho phosphates have an exceedance of the limit value in the Ishmi river, classifying it in Class V - Bad condition. Also, it has been estimated that there is a presence of total phosphorus in the monitoring stations of the Ishmi River in high values as well [16] Referring to the content of the physico-chemical parameters monitored by the Laboratory of the National Environment Agency, this basin is classified in Class V - Bad condition.

The reason of these bad conditions is a considerable number of different activities take place near the monitoring points in the Ishmi basin. At the monitoring stations of the Tirana River (Brarit Bridge and Kamza Bend Bridge) activities of the mining and quarrying industry, food and beverage production, timber activities, waste management, intensive agriculture, leather production, treatment and management are carried out [16], [17]. Near the monitoring points of the Lana River (Lanabregas and Dogana Kashar) mainly activities of food and beverage production, management take place waste as well as the chemical industry. Around the monitoring points of the Ishem River (Ura e Gjola and Ura Rinas) activities of intensive agriculture, chemical industry, mining-quarry industry as well as energy industry activities take place. According to the map( fig.2) there is no development of activities in the vicinity of the Ura Salmer station on the Ishmi River.

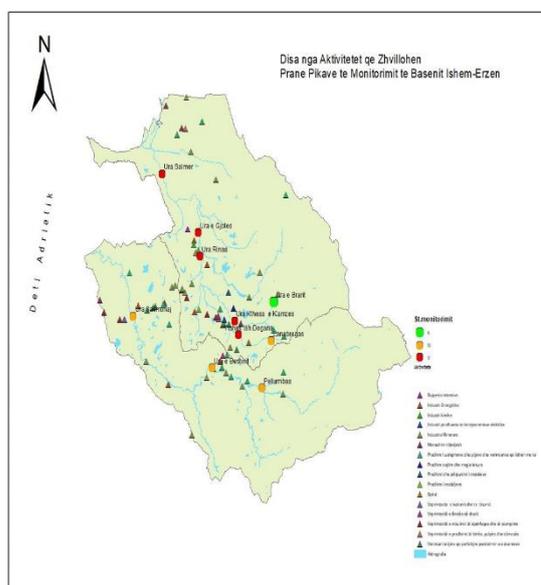


Fig. 2. Map of different industrial activities lied along Ishmi Basen

**2.3. Sample collection.**

In this study, the sampling of microplastics (MP) was conducted across three designated stations ( Rinas Bridge, Gjola Bridge ang Paskuqan Bridge). Sampling of surface waters along the coastline occurred on June 2023. At each sampling site, a total of 2L of surface water were collected from

depths ranging from 0 to 20 centimeters. In the same time an amount of 2 kg of sediments were collected in the coast line of river. All samples were collected in glass bottles and were transported in laboratory at 4°C.

Station	Name	Coordinates
Station I	Rinas Bridge	N 41°26'11.8" E019° 41' 47.6"
Station II	Gjola Bridge	N41°28'06.3" E 019°41'33.1"
Station III	Paskuqan Bridge	N 41° 21'03.5" E019°48'28.4"

Tab.1. Coordinates of sampling stations

#### 2.4. Sample treatment

Two liter of sample were mixed with NaCl at the ratio 1:300. It was placed in a constant-temperature oscillation box and vibrated at 100 r/min at 70 °C for 24h[18]. To facilitate the digestion of organic matter, 20 milliliters per liter of hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) 30% were added, following established protocols [19]. Upon the addition of H<sub>2</sub>O<sub>2</sub>, the beaker was positioned atop a heat plate mixer at 70 °C, and after completion of the mixing process, the mixture underwent a density separation for 24h. In the end of density separation only 1/3 of the water column (surface part) passed filtration through a 2,2-micrometer quartz filter paper utilizing a filtration pump. The resultant filter paper was subsequently transferred to a glass Petri dish and subjected to drying at room temperature within an oven for 24h.

Sediments sample was thrown in bakery and put in the oven at 90 degrees for the time needed for total drying. The dried sample sieve in 500-75 µm for 30 minutes.[20] The obtained samples were thrown in a saturated water solution with NaCl and left for 72h on the magnetic plate for a perfectly homogeneous; all the sample content was thrown in a separatory funnel and left for 24 hours. After decanting big particles and separating densities, only 1/3 of the water column (surface part) was treated with H<sub>2</sub>O<sub>2</sub> at 30% at 60 °C in the magnetic plate[21]. After 48h, the solution was thrown in a separatory funnel and let for 72 h. After the second decantation, the water column was filtered by a vacuum pump through 2,2 µm filter paper. The filter papers were put in a glass Petri dish in oven and dried at 30 °C for 72 h[22].

In order to enhance the accuracy of results and prevent sample contamination throughout the sampling procedure, the utilization of cotton garments, laboratory gloves, and sterilized glass containers was implemented. Within the laboratory setting, nitrile gloves and cotton attire were worn consistently throughout experimentation, analysis, and determination processes. Moreover, all laboratory equipment utilized in the experiment underwent thorough washing with ultra-pure water.

#### 2.5. Sample analysis

##### Microscopic Analysis

Once dried, the filter papers were transferred to a glass Petri dish for observation under a microscope to complete the identification process. Sample images were obtained under a stereomicroscope, and the filter paper was scanned at an optical microscope (Kozo XJPG304, Sony TCC-8.1 version 7.3.1.7 40x100 zoom). Each site's samples underwent analysis thrice. Analyzed filters were segregated into distinct pre-cleaned Petri dishes and readied for identification. The characteristics including shapes and colors of all microplastic (MP) particles were meticulously documented.



Fig.3. Microscope image of MP waste in samples

The microplastics identified on the filter paper under microscopic examination exhibited the following attributes in shape and color:

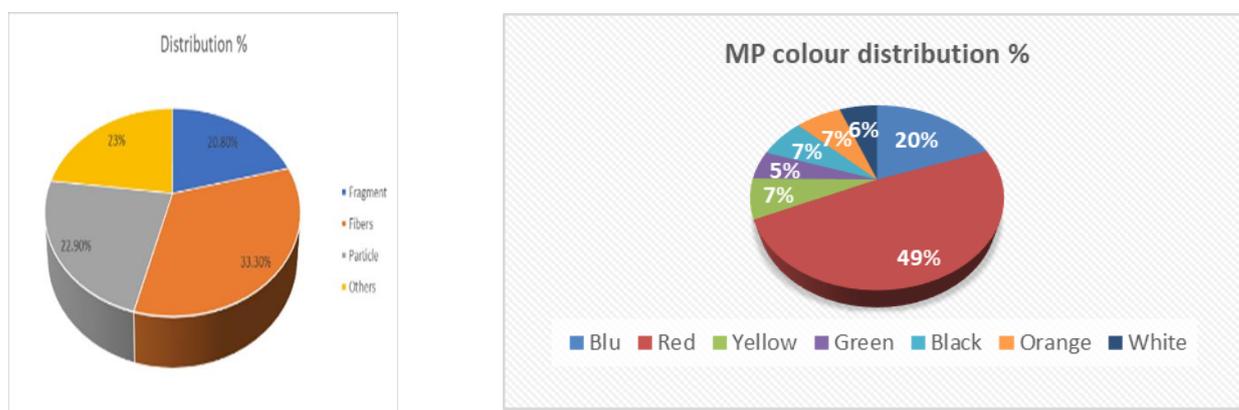
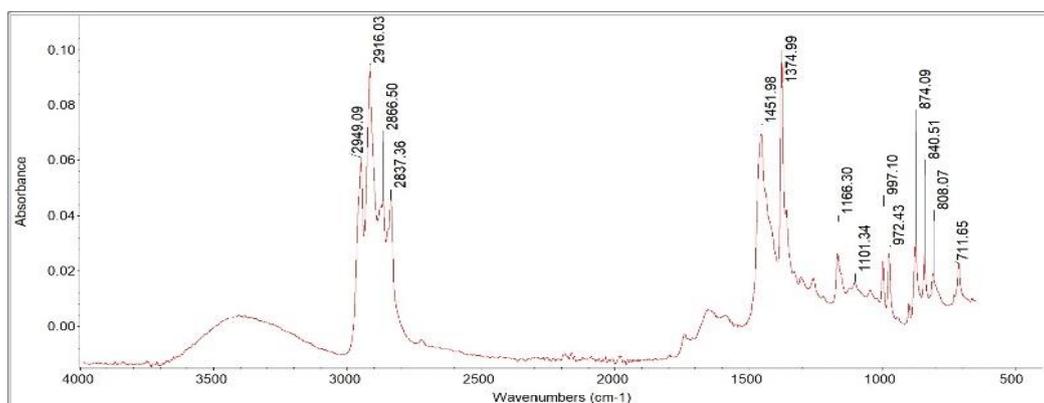


Fig. 4. Distribution of shape and color of MP waste found in samples analysis

Polymer FTIR identification of microplastics

Samples paper filters were analyzed with ATR-FTIR Nicolet 6700 with 64 scans and MCT detector [23].

Every particle gathered underwent identification utilizing FTIR-ATR. Analysis of the sample compositions revealed the predominant categories of microplastics to include polyethylene (PE), polypropylene (PP), polystyrene (PS), and Polyvinyl chloride (PVC), etc. [24].



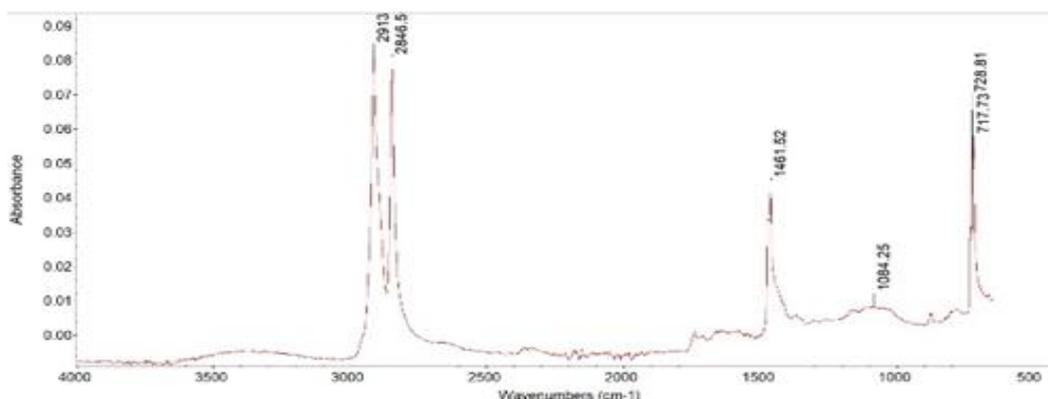


Fig.5. Examples of the FTIR spectra microplastic waste found in the water and sediment samples, which were measured by micro-FTIR spectroscopy: upper panel polypropylene, second panel polyethylene.

After recording all the results from the paper filter analysis, in the table below, a classification of the most common type of polymers preset in our samples and the compatibility they have shown with the system library is made.

Polymer type	FTIR Match
Polyethylene	75,72% - 81,7%
Polypropylene	79,29% - 86,3%
Polystyrene	54,46% - 70,24%
Polyvinyl chloride	46,93%
Polymethyl Methacrylate	62,87%
Polyester	46,8%
Polybutadiene	44,27% - 62,25%

Tab. 2. Table of sample polymers match with FTIR library polymers

## Discussion

According to microscope view most MP waste were more concentrated in the sediment samples. The average abundance of MP items collected by filtration after chemical treatment and density separation was 37 items. Most of these pieces (33,3%) were in the shape of fibers, and the most widespread color was red-colored (49%). Thorough identification of microplastics hinges on the utilization of specialized instrumentation to validate the polymer type. Microplastics present on the filter membrane can undergo direct scanning using Attenuated Total Reflection Micro-Fourier Transform Infrared Spectroscopy (ATR- $\mu$ -FT-IR), thereby minimizing microplastics loss. Comparison of the infrared spectrum of an unidentified particle with a standard spectrum stored in the database enables the identification of the closest match. Fine-tuning instrument parameters can enhance sample detection efficiency. Generally weak signals were observed for  $\text{CH}_3$  bands at approximately  $2949\text{ cm}^{-1}$ ,  $2837\text{ cm}^{-1}$ ,  $1374\text{ cm}^{-1}$ , and  $\text{CH}_2$  bands at around  $2848\text{ cm}^{-1}$  and  $1451\text{ cm}^{-1}$ [25]. For higher resolution in the technical conditions of the apparatus means higher energy and higher absorption bands when there is a reduction of the noise bands.

It is suspected that MP residues with a density higher than the density of the saturated NaCl solution are lost. So consideration should be directed towards selecting a high-density salt, with a preference

for denser alternatives such as sodium iodide (NaI) over sodium chloride (NaCl). This strategic selection aids in achieving qualitative discrimination between microplastic waste and the residual solution.

## Conclusion

FTIR technology definitely is one of the valuable techniques in the identification of MP polymers.

According to the results of these study the most frequently detectable microplastic residues are those in the form of fibers, raising doubts that they are clothing residues since their identifying polymer was PE in 75,72% - 81,7% FTIR match, being accompanied by polypropylene (PP) which has been detected with a high stiffness too.

The typology of the detected polymers gives us the opportunity to think about the high variety of waste types that reach the river in different ways.

The methodology requires revision for improvement in the chemical treatment process to have as little loss of information as possible.

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**PREDICTION OF ENERGY CONSUMPTION FOR A PCM-INTEGRATED BUILDING  
USING ANN AND SVM MODELS: A CASE STUDY OF THE CITY OF AGADIR**

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**Abstract**

Predicting energy consumption in buildings is undoubtedly important for efficient management. In this research two machine learning techniques, namely Artificial Neural Network (ANN) and Support Vector Machines (SVM), were adopted in order to predict the hourly heating, cooling and total energy consumptions of a building integrating phase change material (PCM) located in the city of Agadir in Morocco. Five different meteorological parameters are used as input variables of the models. The database was generated using the simulation program TRNSYS. The results show that the SVM model exhibits good agreement with the TRNSYS simulation results and consistently outperform the ANN model.

**ENDOGENOUS CARDIOTONIC STEROIDS IN CHRONIC KIDNEY DISEASE AND OTHER BIOMARKERS WITH DIAGNOSTIC AND PROGNOSTIC SIGNIFICANCE**

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**ABSTRACT**

Chronic kidney disease (CKD) is characterized by persistent progression and many complications that could be managed if the deterioration of kidney function is detected in time. For this purpose, suitable biomarkers with sufficient sensitivity and specificity are needed. Localization of damage classifies them as biomarkers detecting glomerular disease and biomarkers for tubulointerstitial disease. The first group includes markers such as dendrin, nephrin, podocin, podocalyxin, immunoglobulin G, transferrin, netrin-1, pyruvate kinase M2, calprotectin, growth factors like PDGF, TGF- $\beta$ , etc. Markers for tubulointerstitial damage are less abundant. Kidney injury molecule-1 (KIM-1), neutrophil gelatinase-associated lipocalin (NGAL), liver fatty acid-binding protein (L-FABP), interleukin 18, uromodulin, vanin-1, and galectin- 3 are classified in that group. In addition, biomarkers characterizing CKD can be various amino acids and their metabolic products. Such, for instance, are tryptophan and products of its metabolism, asymmetric and symmetric dimethylarginine, some essential amino acids, tyrosine, valine, phenylalanine, citrulline, etc. Endogenous cardiostatic steroids (eCSTs) as a category of hormones that circulate within the bloodstream and are excreted through urine can also be good indicators for kidney function. These hormones are notably elevated in individuals diagnosed with chronic kidney disease (CKD) and congestive heart failure (CHF). Key representatives of eCSTs, such as ouabain (EO), marinobufagenin (MBG), and telocinobufagin (TCB), exhibit analogous biological effects. Due to their interaction with Na/K-ATPase, these compounds are capable of disrupting pump functionality and triggering signaling pathways that not only worsen CKD but also lead to its related complications. Emerging research highlights that the presence of heightened eCST levels, particularly EO and MBG, may serve as negative prognostic indicators in CKD, correlating with an increased mortality rate among patients undergoing hemodialysis. The quantification of eCSTs in both serum and urine can be accomplished through either high-performance liquid chromatography coupled with mass spectrometry (LC-MS) or enzyme-linked immunosorbent assay (ELISA). Moreover, the pharmacological inhibition of eCSTs offers a potential strategy for slowing down CKD progression, showcasing a promising method of treatment.

**Keywords:** chronic kidney disease, biomarkers, glomerular, tubulointerstitial, amino acids, cardiostatic steroids, effects, kidney function.

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Cellular senescence is a biological process, characterized by decline of physiological functions, leading to impaired functions of the whole organism. Ageing at a molecular level is related to accumulation of macromolecules' damage such as structural and functional alterations affecting DNA, certain essential proteins, lipids and carbohydrates. Causes for these alterations usually are accumulated reactive oxygen species, which underlines the impotence of antioxidants intake. In addition, human's genome expresses genes that can delay cellular senescence and such gen, for instance, is alpha- Klotho. It was found that polyphenols and gamma- aminobutyric acid (GABA) can contribute to increased expression of alpha- Klotho gen. Moreover, there are blood biomarkers with positive correlation in terms of ageing, which can facilitate the detection of premature cellular senescence. There are many researches conducted on senescence- associated secretory phenotype factors (SASP factors). A big part of these studies shows that SASP factors can reflect the intensified ageing process due to the strong correlation between them and chronological age. Some of the factors mentioned are growth differentiation factor 15 (GDF 15); insulin- like growth factor binding protein - 2 (IGFBP – 2); tumor necrosis factor - alpha (TNF- alpha); IGFBP – 7; interleukins (IL- 8, IL- 15, IL- 1 Beta, IL- 17 A); interferon- inducible protein – 10 (IP – 10); interferon gamma (IFN – gamma); monocyte chemoattractant protein – 1 (MCP – 1); tissue inhibitors of metalloproteinase – 2 (TIMP – 2); staniocalcin – 1 (STC – 1) and etc. In conclusion, detection of blood biomarkers for cellular senescence is good prospect for prediction of cellular dysfunction caused by premature senescence.

**Keywords:** cellular senescence, dysfunction, alpha- Klotho, SASP factors, detection.

**EFFECTS OF 8-WEEK HIIT TRAINING WITH EXTENSIVE INTERVALS COMBINED WITH CHANGE OF DIRECTION (COD) IN VO<sub>2</sub>MAX AND ANAEROBIC CAPACITY OF YOUTH SOCCER PLAYERS**

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**Abstract**

The purpose of the present study show the effects of HIIT training of 30" high speed with extensive intervals at 105%-110%- 115% and 120% of vVo<sub>2</sub>Max of the players, but with Change of Direction (COD). Fifteen soccer player Age 16 year old of Football School participated in one Test Group. The Test group participated for 8 weeks in the different running circuit 120m -140m with direction change 45-90-180grade. Realization time of running is 30 sec. The recovery time between repetitions is 45"the first two weeks and 30sec for the other six weeks. The recovery time between Series are 3 minutes. The number of Repetitions and Series First and Second week are 3 x 3 x 30". The recovery time between repetitions is 45". Running Speed 4.1m/s. Total Running Distance 1080meters. Third and Fourth week are 3 x 3 x 30". The recovery time between repetitions is 30". Running Speed 4.4m/s. Running Distance 1170meters. Fifth and Six week are 3 x 3 x 30". The recovery time between repetitions is 30". Running Speed 4.4m/s. Total Running Distance 1215 meters. Seven and Eight week are 3 x3 x 30". The recovery time between repetitions is 30". Running Speed 4.8m/s. Running Distance 1260meters. The test to measure Vo<sub>2</sub>Max is Astrand 6 minute in in ergo metric bicycle Monark 839. The test to measure Anaerobic Capacity is RAST 6 x 35 m. The result shows that from 11 player that concluded the Interventional Training 27% of them improved the FI by 64-73%. Other 27% of the players improved the FI by 44-50%. The other 27% of them improved FI by 26-29% and the rest 19 % of the players improved by 9-17%. All the group improved FI by 41%. The result shows that from 10 player that concluded the Astrand Test 6 minute, 30% of them improved the Vo<sub>2</sub>Max by 25-29%%. Other 30% of the players improved the Vo<sub>2</sub> Max by 19-21%%. The other 40 % of them improved Vo<sub>2</sub>Max by 14-17%. All the group improved Vo<sub>2</sub>Max by 21%.

Conclusion: High Intensity Interval Training with extensive intervals at 105% -110% - 115% and 120% of vVo<sub>2</sub>Max in 30" and 30" recovery, combined with Change of Direction (COD) improve VO<sub>2</sub>max and Anaerobic Capacity of soccer player age 16 year old.

**Key words:** HIIT, Aerobic Capacity, Anaerobic Capacity, Soccer Player, Change of Direction (COD).

**Introduction**

Soccer is mainly a game dominated by acyclic running with different intensities of the aerobic and anaerobic zone. During a match, aerobic metabolism is the predominant source of energy as players must perform >70% of low-intensity activities. (Jens Bangsbo et al., 2006) The average value of oxygen consumption is estimated to be 70-75% of a player's maximum (VO<sub>2</sub>max) due to the average and maximum heart rates at values of 85% and 98%. (Krustrup, P., et al., 2011, Magni Mohr, et al., 2016) Although aerobic metabolism dominates energy provision during a match, blood lactate concentrations have been reported above 12 mmol. (Krustrup, P., et al., 2011) This indicator gives information about increased levels of anaerobic metabolism during the performance of intense actions such as sprinting, shooting or kicking, which are often decisive during a match. (Krustrup, P., et al., 2011) During high-intensity exercises that last longer over a few seconds, adenosine triphosphate (ATP) is resynthesized by both aerobic and anaerobic processes. (Medbo JI, et al., 1988) The ability to resynthesize ATP can limit performance in many sports. Thus, if possible, training athletes for sports

involving high-intensity exercise should improve the athletes' ability to release energy both aerobically and anaerobically. (Tabata, Izumi et al., 1996) VO<sub>2</sub>max in male soccer players ranges from 50–75 mL/kg/min (155–205 mL/ kg0.75/min), while goalkeepers have 50–55 mL/ kg/min (155 –160 mL/kg 0.75/min). Today, HIIT has become popular for improving variables related to endurance performance among various populations, including adult endurance athletes, team sports, and other individual sports. High Intensity Interval Training (HIIT) offers a variety of protocols, to name a few, intervals of varying duration and intervals that (i) "repetitive sprint runs" with sprints of 3-7 s duration, interspersed with recovery periods less than 60 s, (ii) "interval sprint runs" with 30 s maximal sprints and 2–4 min passive recovery periods, and (iii) HIIT with short (<45 s) or long ( 2–4 minutes) of interval duration. In many of the intensity and duration of training, as well as the recovery of the number of repetitions and sets, HIIT protocols stimulate the processes that stimulating the uptake of maximum oxygen (VO<sub>2</sub>) in adults. In contrast, HIIT performed by children and adolescents is less studied than HIIT performed by adults. Several studies in young and healthy athletes have shown that VO<sub>2</sub>max is related to the performance of sprints, sprints, repeated sprints and jumps in relation to HIIT. Recent reviews about HIIT and children focus on cardio-res and me-related fitness in children and adolescents.

### Material and Method

#### Participants

In this study were recruited 18 football player's age 16-year-old of the Football Master's High School "Loro Borici" in Tirana. The football team participated in the activity organized by AFF, for the Amateur category, age U-17 season 2017-2018. The study was carried out with the permission of the school director "Loro Borici" and the approval of the coach of the players.

#### Tests

- Anthropometric measurements (Height, Weight and BMI).
- RAST Test 6 x 35 m ( Anaerobic Capacity )
- Astrand test 6 min in ergo metric bicycle ( Aerobic Capacity )





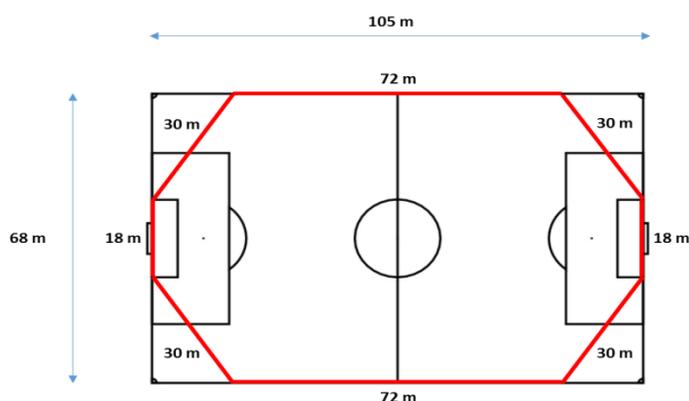
**Protocol and Test Administration**

**Cooper Test 12 minute**

The Cooper Test Run was conducted in a football field with artificial grass measuring 105 m x 68 m, in the training facilities of the Albanian National Football Team. The perimeter of the football field was modified in the form of a runway 300m (Figure 1). Footballers who were previously identified by a number from 1 to 15 before ran for 12 minutes at the perimeter of the set. At the end of the test, the data was thrown into a table in Excel format where the VO2 max levels were identified for each player according to the rates set by the Cooper test.

Determining 100% of Maximum Aerobic Power Speed  
 The definition was made using the following formula:  
 $100\% \text{ MAS} = \text{Running Distance} / \text{Time of Completion}$

Figure 1. Runway perimeter



After defining the levels of Vo2 max of the players based on the Cooper test rates, we divided the subjects into two groups, the Control and the Test Group. The test group included 14 players who had run in the Copper Test 2700-2850 meters had the average of 100% of MAS the 3.9m / s. Only one players of the test group, who had run in the Copper Test 2400meters, had the average of 100% of MAS the 3.3m / s.

**RAST Test 6 x 35 m ( Anaerobic Capacity )**

**Test configuration**

Figure 1 displays the test configuration for the RAST – this setup must be adhered to if accurate and reliable data is desired.



Figure 1. Test configuration for the Running-Based Anaerobic Sprint test.

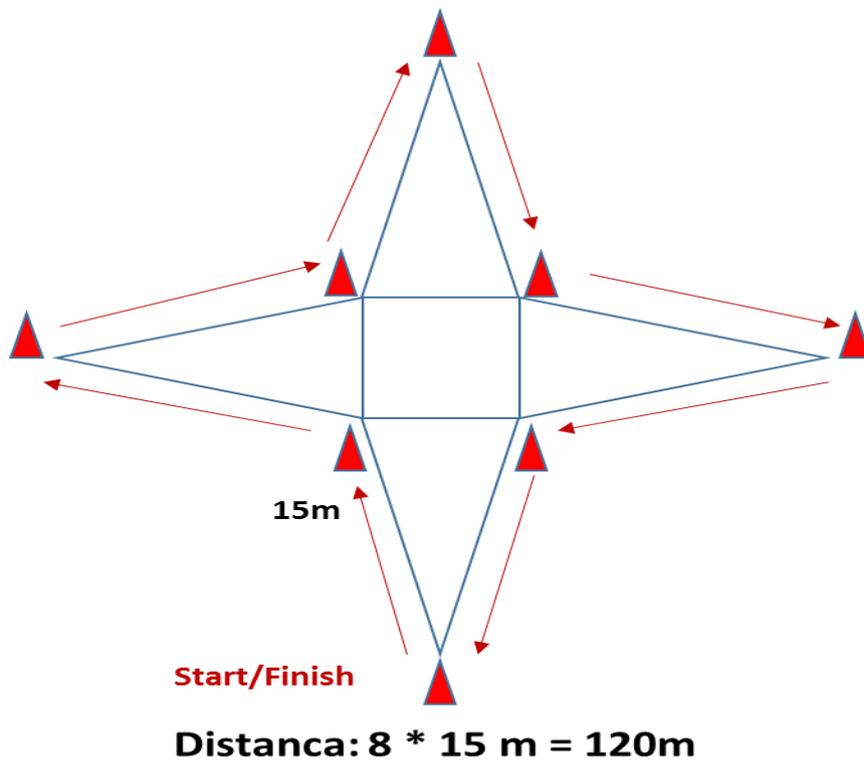
**Equipment requirements**

Before the start of the test, it is important to ensure you have the following items:

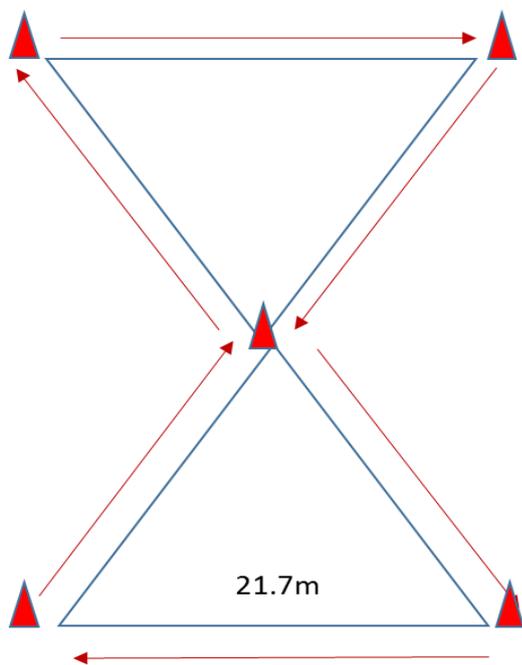
- Reliable and consistent testing facility of at least 50m in length (e.g. indoor hall or artificial sports field).
- Test administrators (minimum of two). One administrator times the duration of each sprint, whilst the other times the 10-second recovery periods.
- Weighing scales
- Timing gates (preferred, but not essential)
- Measuring tape ( $\geq 35\text{m}$ )
- Stopwatch
- Marker cones
- Performance recording sheet



First – Second Week



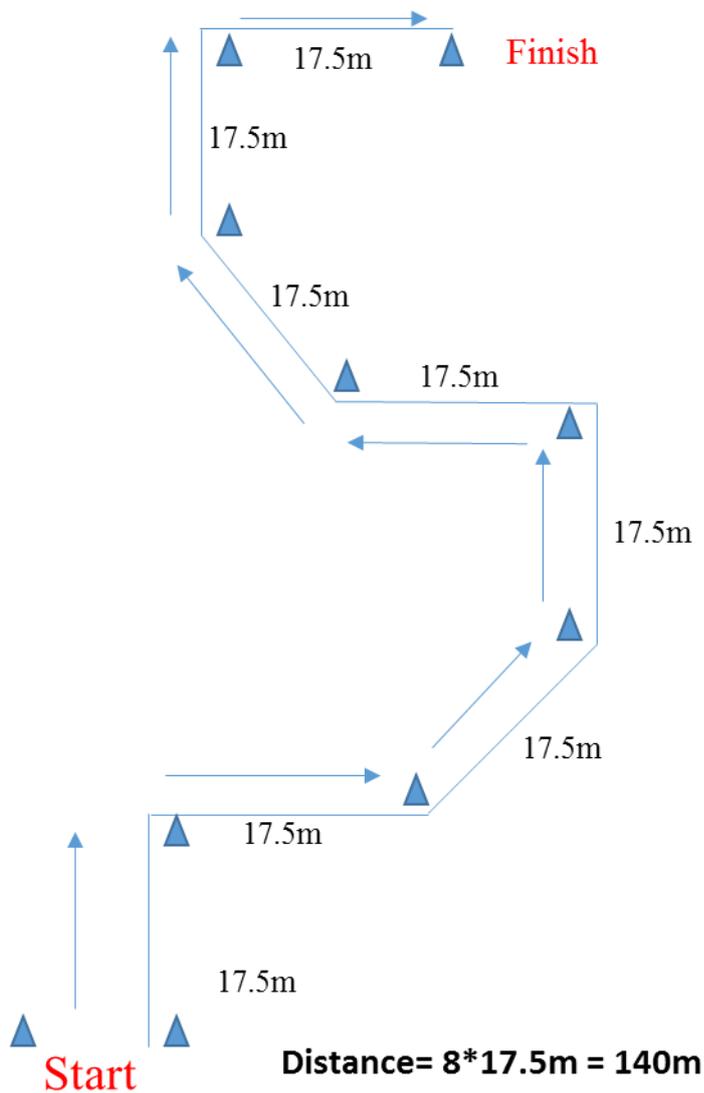
Third - Fourth Week



Fifth –Six Weeks



Seventh –Eight Weeks



Due to the specificity of the running circuits which is with change of direction, the player could cover within 30 seconds according the speed of running defined in the training Program. The Training Program was conducted every Monday, Wednesday and Friday at 10:00 am in an artificial grass field. The training intervention starts with a warm up for 10 minutes. The footballers start the interventional training with a command of a time distance of 5 seconds from each other.

**Intervention Training Program**

				Recovery Time (Sec)						Recovery Time (Sec)			Total Distance (meter)			Circuit Distance
Week I	Work "	30	30	30	45"/3'	30	30	30	45"/3'	30	30	30	( Meter Linear)	COD ( Meter )	COD ( Meter)	
	Distance (m)	126	126	126		126	126	126		126	126	126	126	1134	1080	120
vVo2Max 105%	Speed (m/s)	4.2	4.2	4.2		4.2	4.2	4.2		4.2	4.2	4.2				
Week II	Work "	30	30	30	45"/3'	30	30	30	45"/3'	30	30	30				
	Distance (m)	126	126	126		126	126	126		126	126	126	126	1134	1080	120
vVo2Max 105%	Speed (m/s)	4.2	4.2	4.2		4.2	4.2	4.2		4.2	4.2	4.2				
Week III	Work "	30	30	30	30"/3'	30	30	30	30"/3'	30	30	30				
	Distance (m)	135	135	135		135	135	135		135	135	135	135	1215	1170	130
WVo2Max 110%	Speed (m/s)	4.5	4.5	4.5		4.5	4.5	4.5		4.5	4.5	4.5				
Week IV	Work "	30	30	30	30"/3'	30	30	30	30"/3'	30	30	30				
	Distance (m)	135	135	135		135	135	135		135	135	135	135	1215	1170	130
WVo2Max 110%	Speed (m/s)	4.5	4.5	4.5		4.5	4.5	4.5		4.5	4.5	4.5				
Week V	Work "	30	30	30	30"/3'	30	30	30	30"/3'	30	30	30				
	Distance (m)	141	141	141		141	141	141		141	141	141	141	1269	1215	135
vVo2Max 115%	Speed (m/s)	4.7	4.7	4.7		4.7	4.7	4.7		4.7	4.7	4.7				
Week VI	Work "	30	30	30	30"/3'	30	30	30	30"/3'	30	30	30				
	Distance (m)	141	141	141		141	141	141		141	141	141	141	1269	1215	135
vVo2Max 115%	Speed (m/s)	4.7	4.7	4.7		4.7	4.7	4.7		4.7	4.7	4.7				
Week VII	Work "	30	30	30	30"/3'	30	30	30	30"/3'	30	30	30				
	Distance (m)	144	144	144		144	144	144		144	144	144	144	1296	1260	140
vVo2Max 120%	Speed (m/s)	4.8	4.8	4.8		4.8	4.8	4.8		4.8	4.8	4.8				
Week VIII	Work "	30	30	30	30"/3'	30	30	30	30"/3'	30	30	30				
	Distance (m)	144	144	144		144	144	144		144	144	144	144	1296	1260	140
vVo2Max 120%	Speed (m/s)	4.8	4.8	4.8		4.8	4.8	4.8		4.8	4.8	4.8				

**Measurements**

All participants were subjected to anthropometric measurements ( Table 1) and tests related to the VO2 max RAST Test 6x35 m evaluation prior to the study protocols.

Table 1. Anthropometric measurements average data

Gender	Masculin
Number	18
Age ( year )	16.4
Weight ( Kg )	65
Height ( cm )	176
BMI ( Kg*m2 )	21

### Training Intervention

In a linear running, the speed as define in the training program are different compare with the running with The evidence suggests that running distance with directional changes, which would have to be traversed within 30 seconds, was approximately 125 m, 135m, 140, and 145m.

- **In the first and second week** the group conducts training sessions Monday - Wednesday - Friday, where the circus was repeated 3x3x30", Recovery Time 45" between Repetitions and 3' between Series. The total distance was 1080m.
- **In the third and fourth week** group perform training sessions Monday- Wednesday - Friday where the circuit was repeated 3x3x30" times. Recovery Time 30" between Repetitions and 3' between Series. The total distance was 1170m.
- **In the fifth and sixth week**, groups perform training sessions Monday- Wednesday - Friday where circuit was repeated 3x3x30" times. Recovery Time 30" between Repetitions and 3' between Series. The total distance was 1215m.
- **In the seven and eight week**, groups perform training sessions Monday- Wednesday - Friday where circuit was repeated 3x3x30" times. Recovery Time 30" between Repetitions and 3' between Series. The total distance was 1260m.

In every two weeks the speed of running and total distance has been increased as shown in the tables above.

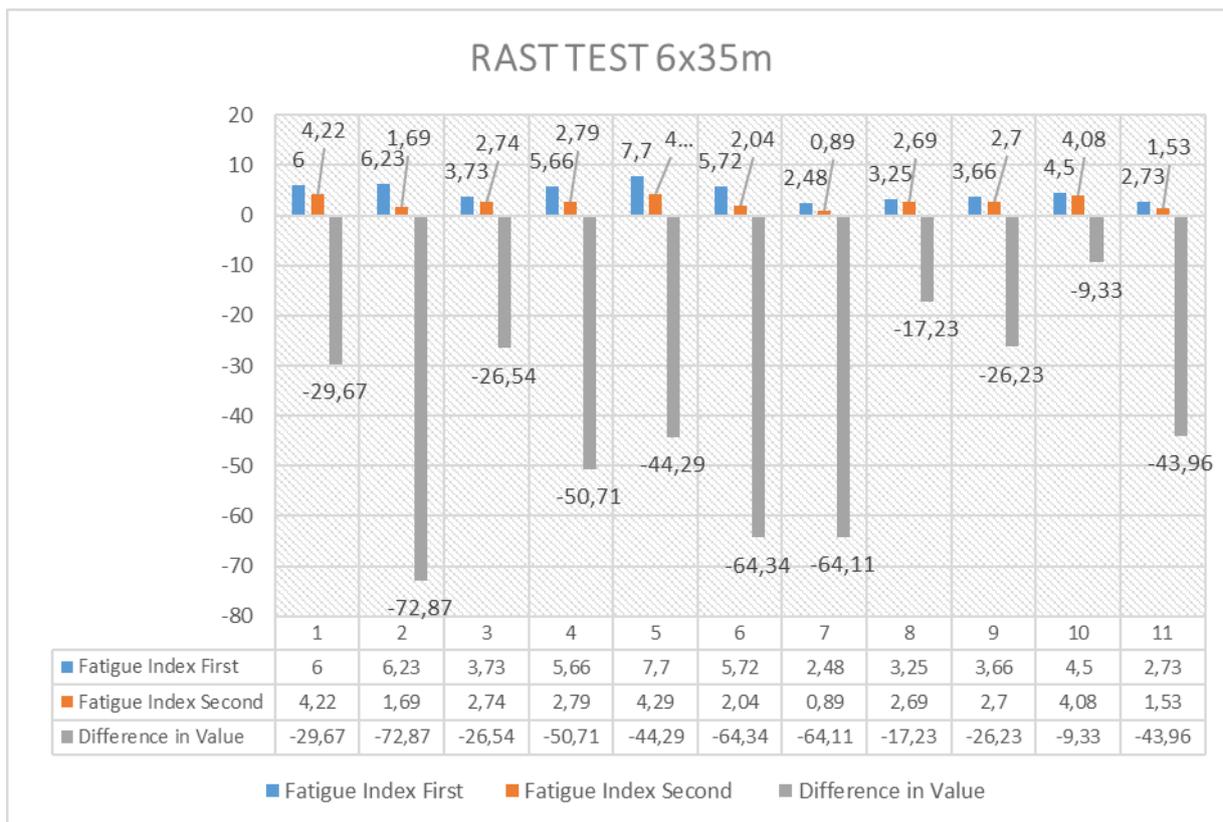
At the end of each repetition, the subjects performed 30" of passive recovery, At the end of each serie there was 3 minutes of active recovery in the field. The training duration depend on the number of repetitions.

The experiment period lasted for 8 weeks.

### **Results**

#### **RAST Test 6x35m (Anaerobic Capacity)**

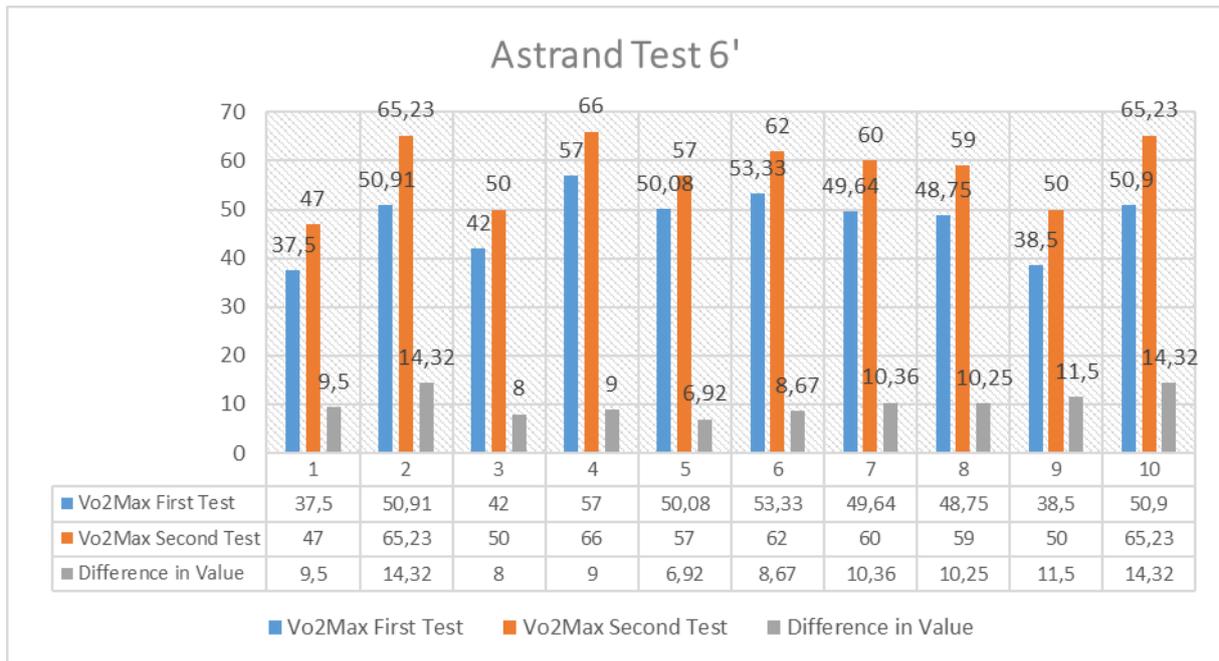
At the end of the intervention training 4 subject failed to complete the intervention training due to injury in the official match. All other participants were present in 8 week of the intervention training. In the limits of this study, we may mention the inability to control the nutrition and daily regimen, and especially the time when subjects went to sleep at night.



The result shows that from 11 player that concluded the Interventional Training 27% of them improved the FI by 64-73%. Other 27% of the players improved the FI by 44-50%. The other 27% of them improved FI by 26-29% and the rest 19 % of the players improved by 9-17%. All the group improved FI by 41%.

**Astrand Test 6' Ergo Metric Bicycle ( Vo2 Max )**

The results of the Astrand test developed, one prior to interventional training and one after the 8 week training period, showed that the subjects of the test group had a greater increase in Vo2max.



The result shows that from 10 player that concluded the Astrand Test 6 minute, 30% of them improved the Vo2Max by 25-29% . Other 30% of the players improved the Vo2 Max by 19-21% . The other 40 % of them improved Vo2Max by 14-17% . All the group improved VO2Max by 21% .

**Discussions**

In the study of Cavar et al., 2018, the authors says that “Many sports, including soccer, are not well represented by track running because field and court events involving a change of directions are used. Thus, this specific type of locomotion should be used in the endurance testing and training procedures. Leger et al., 1988 were the first to recognize this problem and used a multistage 20-m shuttle run test (Beep test) for the indirect assessment of V\_ O2max and later the research of Buchheit et al., (2011).” The literature review show the researches in the training for youth category are very small in numbers (Clemente et al., 2021). In the meta analyse, Effects of high-intensity interval training in men soccer player’s physical fitness (Clemente et al., 2021), the authors says “HIIT (overall) was found to produce significant improvements in VO2max, field-based aerobic performance, RSA, and sprinting,”. The study of (Clemente et al., 2021) shows improvement in Vo2 Max according the protocolls used, where results are, in SiHIIT range from 2.2-7.5%, average 4.8%, LiHIIT range from 1.6-27.9%, average 7.1, RST 1.4-5%, average 2.7 SIT 3% and SSGs 2.1-25.4%, average 8.4. In the meta analyse of HIIT effects performed by Young Athletes (Engel et al., 2018 ) in conclusion the authors say ” The present findings suggest that young athletes performing HIIT may improve certain important variables related to aerobic, as well as anaerobic, performance.” The study of De Frutos et al., 2021, the authors suggested that “More frequent rest intervals between the shorter intervals would attenuate the increase in physical exertion, making it “easier” to maintain interval work over time. This is a positive finding because it can help fitness professionals and trainers with more options when prescribing HIIT.”

The authors Micah Zuhl and Len Kravitz says that “The relationship of the work and recovery interval is also a consideration. Many studies use a ratio of exercise to recovery, for example a ratio of 1:1 could be a 30-second interval followed by 30 seconds of recovery. A ratio of 1:2 would be a 30-second interval followed by a 1-minute rest. Typically, the ratios are designed in order to challenge a particular energy system of the body.”

“However, research shows that HIIT leads to similar and in some cases better improvements in shorter periods of time with some physiological markers.”

In studies where field tests and lab tests are used, there is always concern that subjects are giving the maximum in field tests. But benchmarking of laboratory labs with field tests makes it possible to reach conclusions about the effectiveness of intervening training. Based in all literature observation mentioned above, the study was projected with COD running. The results from the study show that HIIT Training Sprint Running for duration of 30”x 30” for 8 weeks and the gradual increase in running distance and volume brought significant improvements to the Vo2 max and Anaerobic Capacity of the subjects involved in the intervention training.

The result shows that from 11 player that concluded the Interventional Training 27% of them improved the FI by 64-73%. Other 27% of the players improved the FI by 44-50%. The other 27% of them improved FI by 26-29% and the rest 19 % of the players improved by 9-17%. All the group improved FI by 41%. The result shows that from 10 player that concluded the Astrand Test 6 minute, 30% of them improved the Vo2Max by 25-29%%. Other 30% of the players improved the Vo2 Max by 19-21%%. The other 40 % of them improved Vo2Max by 14-17%. All the group improved Vo2Max by 21%.

## Conclusion

Conclusion: High Intensity Interval Training with extensive intervals at 105% -110% - 115% and 120% of vVo2Max in 30” and 30” recovery, combined with Change of Direction (COD) improve VO2max and Anaerobic Capacity of soccer player age 16 year old.

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**CIRCULAR ECONOMY IN ACTION: USEFUL CHEMICALS PRODUCTION FROM  
PROCESS RESIDUES (SPENT GRAINS)**

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**Abstract**

The brewer's spent grains (BSG) can produce xylitol and polylactic acid, which have various potential applications in different industries. In addition to being used as an alternative sweetener, xylitol can be used as a natural sweetener in food and beverage products, providing a healthier alternative to sugar and cosmetics. It can be used to produce different by-products, such as toothpaste and other personal care products. Xylitol can also be used in the manufacturing of pharmaceutical products, such as capsules and tablets.

The other possible useful chemical is Polylactic Acid (PLA), which is used because of its properties as biodegradable plastics. PLA can replace petroleum-based plastics in various applications, such as packaging, textiles, and automotive components.

On the other hand, PLA can be used to produce various chemical products, such as paints, coatings, and adhesives. These applications clearly demonstrate the versatility of xylitol and polylactic acid, which can contribute to a more sustainable and healthier future by reducing the reliance on non-renewable resources and promoting circular economies. This study performed process modelling and simulation for xylitol and polylactic acid produced from brewer's spent grains.

From this work, some optimistic results have been reached, and further study is already underway to finish with a process-designed plant for a relative small production capacity of these chemicals.

**Keywords:** brewer's spent grains, Xylitol, Polylactic Acid, process modelling, simulation diagram, plant design

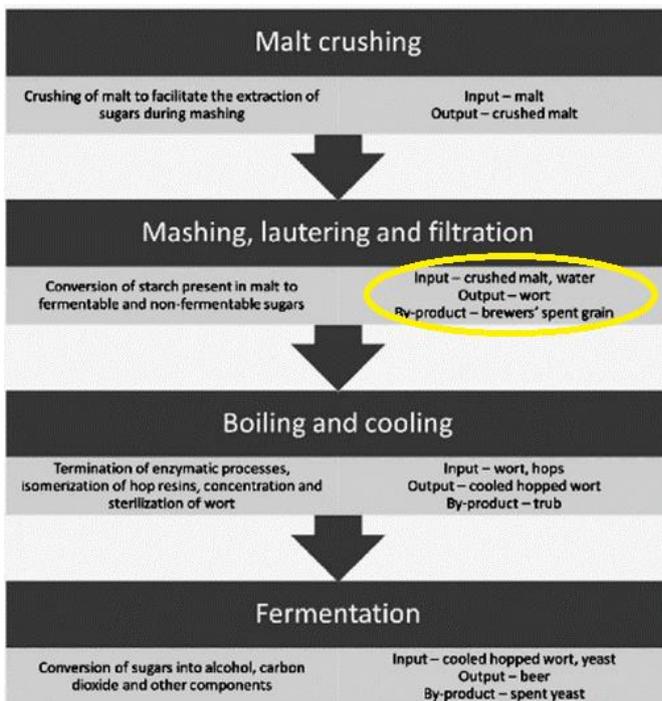
**Introduction**

The process modelling and simulation for xylitol and polylactic acid production from brewer's spent grains involve using engineering software to create a virtual representation of the production process. This allows for the analysis of the process under different conditions and the optimization of various parameters. The simulation helps in understanding the system's behaviour, predicting the process's performance, and identifying potential areas for improvement. The proposed design for a processing facility of xylitol and polylactic acid from brewer's spent grain involves detailed process modelling and simulation. The process is based on using spent grain from surrounding breweries and

microbreweries as its input. The simulation results, fermentation kinetics, equipment specifications, and cost analysis are part of the deliverables for the process design. Preliminary findings indicate that variations in temperature significantly impact microbial activity involved in **bioconversion processes**, leading to optimal decompositions within specific ranges suitable for respective type(s) of input material(s). Additionally, techno-economic analyses for producing xylitol and lactic acid from brewer's spent grains show different heat and mass integration scenarios. This demonstrates the comprehensive approach to process modelling and simulation, which includes economic considerations. In summary, the process modelling and simulation for xylitol and polylactic acid production from brewer's spent grains involve engineering software to design, analyze, and optimize the production process, considering both technical and economic aspects.

**Materials and Methods**

The production of xylitol and polylactic acid from brewer's spent grains faces several challenges, including: Low sugar concentration; Contamination; Cost; Logistics: The logistics of collecting and transporting brewer's spent grains can be a challenge, as it requires coordination with local breweries and microbreweries. From the beer production it is discharged an amount of 20 kg of brewer's spent grain per 1 hl of beer produced.



The production of xylitol and polylactic acid from brewer's spent grains offers significant potential benefits, including waste reduction, economic value creation, and environmental sustainability. Ongoing research is focused on addressing these challenges and optimizing the production process to improve the yield and reduce the cost of xylitol and polylactic acid production from brewer's spent grains.

Figure 1 Informative technology of the beer production and wastes

**Characterizing the Brewer's Spent Grains**

Brewer's Spent Grain Valorization is of very important interest to study due to its multidimensional physical and chemical composition. Firstly, it is to be mentioned that this kind of residue comes

out from the second complex, very important technology stage: mashing, lautering and filtration, as can be seen in the reference picture in Figure 1:

In Figure 2, a photo of the brewer's spent grains is shown.



Figure 2: A photo of the brewer's spent grains as a solid waste of beer production

Some target positive indicators to be mentioned:

Highlights the resource recovery aspect, emphasizing waste conversion into valuable products.

It uses "valorization," which sounds impactful and emphasizes the economic potential of the research. Mentions

the simulation methodology. "these are both valuable outputs, ensuring both are represented in the title. Now for the objective of the study: Polylactic Acid and Xylitol Production from Brewer's Spent Grains", it is to be listed logically as follows:

- More concise and direct, focusing on the leading products and the simulated process.
- It might be preferred if our research paper focuses heavily on the technical details of the simulation.
- Clearly emphasizes sustainability: This aspect is gaining increasing importance in research and industry, so highlighting it in the title is smart.
- Mentioned both products: Polylactic acid and xylitol; Identifies the methodology: Specifying "A Simulation Study" clarifies the research approach; Concise and informative: The title is catchy without being overly long or complex. The physical and chemical properties (characteristics) of the studied spent grains, according to the literature reports, are shown in Table 1 below:

Table 1: The composition and properties of the spent grain according to the literature

Component	Content, %dry matter										
Cellulose	-	-	-	25.4	23.0-25.0	16.8	22.2	12.0-25.0	21.9	12.0	21.7
Hemicellulose	-	-	-	-	30.0-35.0	28.4	26.8	20.0-25.0	29.6	40.0	19.2
Lignin	-	-	-	11.9	-	27.8	14.1	10.0-28.0	21.7	11.5	19.4
Ash	3.8	3.4	3.3	2.4	4.0-4.5	4.6	-	2.0-5.0	1.2	3.3	4.2
Proteins	26.9	21.8-26.4	26.7	24.0	19.0-23.0	15.3	-	19.0-30.0	24.6	14.2	24.7
Fat	-	3.6-5.8	-	10.6	-	-	-	10.0	-	13.0	-
Phenolics	-	1.6-2.0	-	-	-	-	-	-	-	2.0	-
Reference	42	43	44	45	46	47	41	48	49	50	51

Another version of the table of the characteristics of the brewer's spent grains is shown below: "Circular Economy in Action: It is the most attractive trend in the modern research and development movement. Transforming industrial wastes and residues into useful chemicals such as polylactic acid and xylitol, especially from Brewer's Spent Grains," is another triggered issue that immediately draws attention with its impactful hook that sets the stage for the research. This clear focus effectively emphasizes simulation while specifying the two valuable products obtained. Another

Table 1. Chemical composition of dry brewers spent grain \*.

Proteins	Lipids	Fibers	Carbohydrates	Lignin	Arabinoxilan (AX)	Ashes	Lyzine	Study
234 mg/g	-	-	459 mg/g	-	-	-	-	[19]
24.69%	-	-	-	-	-	4.18%	-	[16]
15-28%	5-8%	-	-	-	-	4.5-6%	-	[13]
20%	-	50%	-	10-28%	40%	-	14.30%	[8]
18-35.4%	-	-	-	-	-	-	14.30%	[14]
14.2-31%	3-13%	59.1-74.1%	-	-	-	-	-	[20]
15-26%	3.9-10%	70%	-	-	-	-	-	[21]
19.20%	-	-	-	22.30%	-	4.54%	-	[22]
15.4-30%	10%	-	-	11.9-27.8%	-	2-5%	-	[3]
31%	9%	-	-	16%	-	4%	-	[18]
15.3-24.6%	-	-	-	11.9-27.8%	-	1.2-4.6%	-	[23]
22.44%	5.3%	-	46.52%	19.57%	-	3.54%	-	[24]
31.81%	-	-	3.07%	12.72%	-	-	-	[25]

\* values are expressed of dry matter.

issue is a kind of modern angle: It aligns our research with the growing interest in circular economy principles, appealing to a broader audience. On the other hand, our study emphasizes the environmental benefits of diverting brewer's spent grain from waste streams into valuable products, aiming to be focused on the simulated production methods' process optimization and potential scalability.

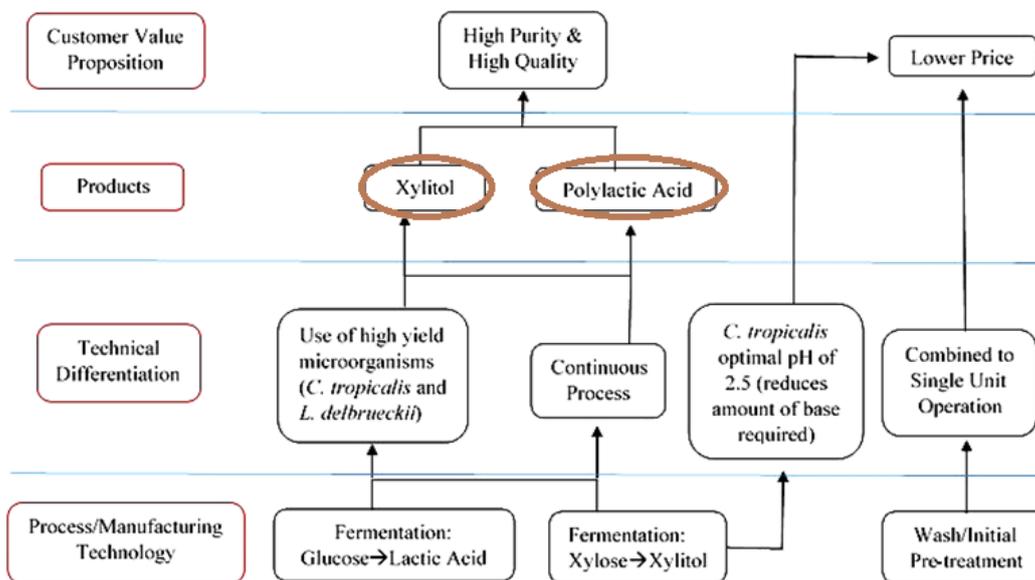


Figure 3—Innovation map showing essential design decisions to optimize the process, including a crucial pretreatment step and choice of high-yield microorganisms (as referred to in the literature).

The process simulation for producing polylactic acid and xylitol from brewer's spent grains involves several steps, including pretreatment, fermentation, and separation. The designed process can produce significant quantities of xylitol and polylactic acid. The process consists of collection, universal pretreatment, and a split to feed. Detailed flowsheet and Aspen model with simulation results, fermentation kinetics and results, equipment specifications, and cost analysis are part of the

deliverables for the process design. Additionally, techno-economic analysis for brewer's spent grains used in producing xylitol and lactic acid shows different scenarios based on heat and mass integration. Brewer's spent grain, a waste product from the beer industry, is being studied for its potential to be transformed into commercial by-products, including xylitol and lactic acid (see fig 3). The potential of brewers' spent grain in the circular economy is also being explored, as indicated by the most well-known literature being studied, which shows the growing interest in utilizing this waste product to produce valuable chemicals. The standard procedure for the construction of the flowsheet and process diagram is shown in fig.4 with the main stages of the process synthesis for both interested compounds.

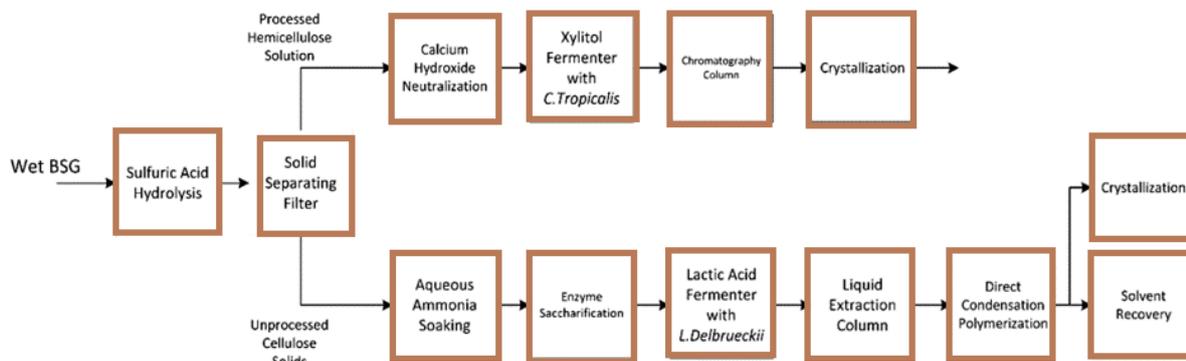


Figure 4. A structures first and conceptual process synthesis (also mentioned in the literature)

**Results and Discussions**

According to the simulation philosophy, primarily has to construct a main flowsheet (see Fig.5) of the process diagram, as it is widely structured from the same research studies from another research group [], which aims to describe the entire production process in some details, using a simulation computer programs Aspen Pro.

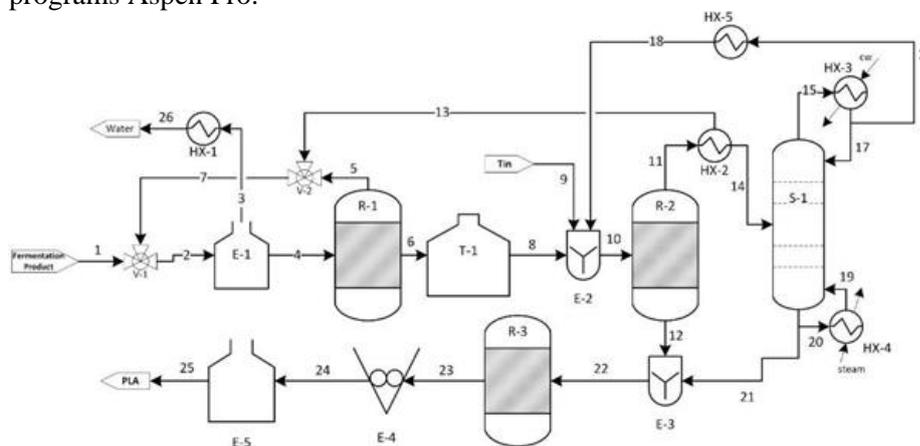


Figure 5. Preliminary general process diagram for the Xylitol and Polyactic Acid process modelling and simulation

Recovery of Polyactic Acid Process Materials: Two processes were considered to recover the solvents used in

the polyactic acid polymerization process. The first process is intended to recover highly pure streams of each solvent that can be recycled.

The benefits of using brewer's spent grains for xylitol and polyactic acid production include waste reduction, economic value creation, and environmental sustainability. Brewer's spent grains are a by-product of the brewing industry and are rich in xylan. This hemicellulose can be hydrolyzed into xylose for xylitol production and further fermented into lactic acid for polyactic acid production. Utilizing this waste product contributes to the circular economy, reducing the environmental impact of waste disposal and creating value from a material that would otherwise be discarded. Furthermore, the production of xylitol and polyactic acid from brewers spent grains offers potential for economic profitability, as demonstrated by techno-economic analyses. This approach aligns with the principles of sustainable resource utilization and green chemistry, making it an attractive option for environmental and economic reasons.

Producing xylitol and polylactic acid from brewer's spent grains involves several steps, including pretreatment, fermentation, and separation. The process can be summarized as follows:

- ✓ Collection: Brewer's spent grains are collected from local breweries and microbreweries;
- ✓ Pretreatment: The spent grains are washed with an acid pretreatment to break down the hemicellulose and release the sugars for further processing;
- ✓ Splitting: The pretreated spent grains are split into two streams. One stream is fed to a xylitol fermenter, while the other stream is fed to a lactic acid fermenter;
- ✓ Fermentation: The xylitol fermenter uses *Candida tropicalis* yeast to convert the sugars into xylitol, while the lactic acid fermenter uses a highly acidophilic strain of yeast to produce lactic acid;

Separation: The xylitol and lactic acid are separated from the respective fermentation broths, purifying the xylitol from the aqueous solution. This process has been designed to produce the normalized amount for our country's capacity of xylitol and polylactic acid.

*Economic Analysis and Sensitivity Analysis:* The analysis shows that it is primarily sensitive to changes in the market price of PLA, followed by changes in xylitol price, changes in raw material costs, and finally, changes in utility costs. The economic indicators would be significantly affected by a decrease in the price of PLA, which implies that we must competitively sell this product to remain attractive to investors.

*Profitability Analysis Raw Materials:* Following the preliminary analysis described in the product selection section, an in-depth assessment of all the raw materials needed to produce each selected product was conducted. While the preliminary research focused mainly on the cost of the most abundant materials (acids, bases, and buffers), this thorough assessment includes enzymes, catalysts, fermentation media and solvents.

### **Conclusions and Recommendations**

This study suggests that the proposed process be considered for implementation. Operating costs are somewhat high but not a road block to financial success. Cell culture media dominates the operating costs, which is regarded as a continuous process that uses much less media than the equivalent batch mode.

From the more experience cited in the literature, they can recommend the following courses of action. It is a well-known fact that there is a range of valuable properties like the ability to ferment arabinose (the second most plentiful sugar in BSG hemicellulose) into xylitol and increase xylose to xylitol efficiency. These organisms could increase production without increasing operating costs. However, the complete reports on these organisms could not be obtained within the timeframe of this project, so they had to be excluded from consideration. Further research into their metabolic parameters could be fruitful. Secondly, cited also from the other research group, if pre-made media is the most prohibitive cost, making the necessary media in-house may be better. Cell debris from fermenter effluent can be used as nutrients to grow up the next batch of culture. Further research would have to be done on obtaining the remaining raw ingredients and the cost of the mixing and storage vessels for such extensive collections of media. However, it presents a possible cost-reducing option. The process consists of collection, universal pretreatment, and a split to feed one of two continuous fermenters. A highly acidophilic strain of the yeast *Candida tropicalis* ferments xylose into xylitol, which is then purified and pelleted in a marketable state. *Lactobacillus delbrueckii* bacteria ferments glucose into lactic acid, which is then polymerized to form polylactic acid of the desired molecular weight.

Ø The use of food waste brings benefits to both reducing environmental pollution and to industry. Turning by-products into value-added components reduces food production costs and quantifies their nutritional value.

Ø It is necessary to find low-cost sources of valuable compounds of plant origin, given the upward trend of vegetarian and vegan diets.

- Ø The researchers seek new alternatives for food fortification, and the conversion of vegetable by-products in higher value products for obtaining functional compounds has their attention, with researchers showing more and more interest.
- Ø Transition of an economy from linear to circular mode of production and consumption require bringing a long-term usage approach to material resources ensured by maximizing their economic potential and minimizing waste production.
- Ø Recent advancement in technological innovations and progressive circular strategies/policies by nations clearly point to the most awaited circular shift happening globally, especially in vital key sectors, like environment, clean energy, infrastructure, healthcare, and solid waste management.
- Ø Worldwide, recently proposed environmental policies of most of nations clearly reflects their seriousness and commitment toward adopting/adapting for the circular model to assure the fore-coming generations of its take to recuperate the Earth toward cleanliness and greenery.
- Ø Novel innovation projects based on the circularity of wastes/or products should be supported/promoted/encouraged/incentivized/subsidized in order to innovate the efficient and sustainable treatment processes to transform waste products into value-added products with added recyclability/reusability potential along with minimal associated hazards.
- Ø Start-ups/entrepreneurship programs based on the business models of circular economy need to be encouraged/promoted/supported (by subsidies),
- Ø The smart strategies and processes to make its execution possible with utmost practicality and preciseness.
- Ø Implementation of the circular economy should be a collaborative effort between different businesses/industries, policymakers, and investors.
- Ø Circular economy sector should be incentivized for the circular economy opportunities to attract big investments.

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READING DIGITAL OR PRINT? METACOGNITIVE PRACTICES OF READING IN THE  
L2 LANGUAGE CLASSROOM: A LEBANESE CASE STUDY

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**Abstract**

**Introduction and Research Purpose:** The Covid 19 pandemic has reaped compromised performance in reading and writing yielding to an overall decline in student performance in schools and universities alike. Despite their seeming advantages and conveniences, the ubiquitous use of digital technologies in the second language learning classroom have not been without their vices. As such, students as well as teachers have not been exposed to the necessary training vis a vis digital literacies that introduce the use of metacognitive skill sets needed to navigate and use digital technologies in the L2 classroom.

**Methods:** The study at hand was descriptive and inferential whose data was taken from a purposive, convenient sample of 111 students at a private, English-speaking university during the academic year of 2023 in Beirut, Lebanon. Data collection involved measuring students' reading performance through two questionnaires, OSORS (Online Survey of Reading Strategies) as well as SORS (Survey of Reading Strategies) to measure the metacognitive skill sets used for online and offline reading.

**Results:** The findings revealed that students were more likely to revert to using Problem Solving metacognitive skill sets as well as Global Skill sets more for offline reading than for online reading. The findings seem to indicate that students carry over what they have learned in the traditional reading classroom as they have not been taught the necessary skills to navigate online reading classrooms.

**Keywords:** digital vs print; digital learning; metacognitive skills; OSORS; SORS; critical thinking

**AYRIK OTU (ELYMUS REPENS) BİTKİSİNİN AĞIR METAL ADSORPSİYONUNDA  
(Pb<sup>2+</sup>,Co<sup>2+</sup>) KULLANILABİLİRLİĞİNİN İNCELENMESİ**  
**INVESTIGATION OF THE AVAILABILITY OF ELYMUS REPENS IN HEAVY METAL  
ADSORPTION (Pb<sup>2+</sup>,Co<sup>2+</sup>)**

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**ÖZET**

Su kaynaklarının her geçen gün önem kazandığı dünyamızda, suların korunması ve dikkatli kullanılması gerekmektedir. Endüstriyel atık sularda ağır metallerin bulunması, ekolojik sistem ve canlılar için ciddi tehlike oluşturmaktadır. Bu çalışmada; ayrik otunun sucul ortamda ağır metal adsorpsiyonunda kullanılabilirliğinin araştırılması amaçlanmıştır. Ayrıca adsorpsiyon işleminde klasik adsorpsiyon deneylerinde olduğu gibi **ekstra enerji** harcanmaması hedeflenmiştir. Bu kapsamda; Kocaeli ilinde bulunan tarımsal bir alandan toplanmış ayrik otları kullanılmıştır. Ayrik otları yıkanıp, etüvde kurutulduktan sonra öğütülerek elekten geçirilmiştir. Ağır metal adsorpsiyonunun hesaplanmasında 50 mL'lik büretlere belirli konsantrasyonlarda Pb<sup>2+</sup>, ve Co<sup>2+</sup> iyonlarını içeren çözeltiler yerleştirilmiştir. Alt kısımda ise toz haldeki ayrik otu; iki tarafı açık cam boru içerisinde önce pamuk, üzerine farklı miktarlarda ayrik otu olacak şekilde yerleştirilmiştir. Farklı büretlerde bulunan Pb<sup>2+</sup>, Co<sup>2+</sup> iyonu içeren çözeltiler, alttaki ayrik otu bulunan cam boruya damlatılarak ayrik otu ile ağır metal iyonlarının teması sağlanmıştır. Ayrik otu ile temas ederek aşağıya süzülen çözeltilerde gravimetrik olarak Pb<sup>2+</sup> için KI ile, Co<sup>2+</sup> için alkali Na<sub>2</sub>CO<sub>3</sub> ile çöktürme suretiyle ayrik otu üzerinde ağır metal tutunum yüzdesi hesaplanmıştır. Sonuç olarak; ayrik otunun 0,6 g'ının 200 ppm Pb<sup>2+</sup> çözeltisi (pH:7,00) için % 85, 200 ppm Co<sup>2+</sup> çözeltisi (pH:7,00) için % 84 oranında tutma kapasitesine sahip olduğu belirlenmiştir. Bu sonuçların; tarımsal alanlarda atıl durumda bolca bulunan bir bitkinin (Elymus Repens), ağır metal adsorpsiyonunda ekstra hiçbir işlem yapılmadan kolayca kullanılabileceğini açıkça ortaya koyduğu söylenebilir.

**Anahtar Kelimeler:** Ayrik Otu (Elymus Repens), Ağır Metal, Kurşun, Kobalt, Adsorpsiyon

**ABSTRACT**

In our world, where water resources are gaining importance day by day, they need to be protected and used carefully. The presence of heavy metals in industrial waste water create a serious danger for ecological system and living. In this study; it's aimed to investigate the usability of Elymus Repens in heavy metal adsorption in aquatic environment. In addition, it's aimed not to spend extra energy in the adsorption process as in classical adsorption experiments. In this context; Elymus Repens collected from an agricultural area in Kocaeli province were used. Elymus Repens was washed and dried in

oven after that ground and sieved. In the calculation of heavy metal adsorption, solutions containing certain concentrations of  $Pb^{2+}$ , and  $Co^{2+}$  ions were placed in 50 mL burettes. In the lower part, the powdered Elymus Repens was placed in a glass tube open on both sides, first cotton and then weed in different amounts. Solutions containing  $Pb^{2+}$ ,  $Co^{2+}$  ions in different burettes were dripped into the glass tube with the Elymus Repens at the bottom and the heavy metal ions were contacted with the Elymus Repens. The percentage of heavy metal retention on the Elymus Repens was calculated by gravimetric precipitation with KI for  $Pb^{2+}$  and with alkaline  $Na_2CO_3$  for  $Co^{2+}$  in the solutions filtered down by contact with the Elymus Repens. As a result, it was determined that 0.6 g of the Elymus Repens had a retention capacity of 85% for 200 ppm  $Pb^{2+}$  solution (pH:7.00) and 84% for 200 ppm  $Co^{2+}$  solution (pH:7.00). It can be said that these results clearly show that a plant (Elymus Repens), which is abundantly available in agricultural areas, can be easily used in heavy metal adsorption without any extra treatment.

**Keywords:** Elymus Repens, Heavy Metal, Lead, Cobalt, Adsorption

**ADVANCEMENTS IN DIELECTRIC POLYMER NANOCOMPOSITES FOR ENHANCED ENERGY STORAGE APPLICATIONS**

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The potential to store significant amounts of energy using a simple device with a prolonged lifespan renders capacitors an appealing option for the future of electric power storage. However, their limited permittivity has hindered widespread application, particularly in electric vehicles and electronic devices. Researchers are actively refining ceramic and polymer materials for energy storage, yet the dielectric limitations impede their use in high-energy storage applications. Consequently, there has been considerable interest in ceramic composites and polymers due to their enhanced dielectric constant and strength. This paper provides a concise overview of dielectric polymer nanocomposites for energy storage applications, outlining the key properties of these materials and detailing advancements in dielectric and polymeric nanocomposites that surpass traditional dielectric materials.

**ECOTOXICOLOGICAL IMPACT OF BENZOPHENONE-TYPE UV FILTER AS A SUNSCREEN INGREDIENT ON *CIRRHINUS MRIGALA***

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**ABSTRACT**

Organic ultraviolet filters (OUVFs) are commonly used in sunscreens and personal care products to protect against UV radiation. However, the Benzophenone-type UV filters (BP-UV) are a major contaminant of aquatic ecosystems. This is because they accumulate in aquatic organisms due to their high lipophilicity. Living organisms have an antioxidant defense system to protect themselves against oxidative stress caused by contaminants. This study aimed to investigate the lethal toxicity of BP-UV (Diphenylmethanone) in *C. mrigala*. It also aimed to study the hematological alterations and antioxidant enzyme activity, specifically catalase and superoxide dismutase, in the organs (gills, heart, kidney, muscles, liver) of *C. mrigala* after sub-lethal exposure (5 and 15% of 96h LC<sub>50</sub>) for two weeks. The 96 h LC<sub>50</sub> of BP was estimated to be 7.99±0.37 mgL<sup>-1</sup> by probit software. In the blood parameters, sub-lethal concentrations showed changes such as decreased leukocyte indices, decreased glucose levels, and increased triglyceride levels. Catalase and superoxide dismutase activity increased time-dependently during the first week and gradually decreased thereafter in all fish organs during chronic exposure to different sub-lethal concentrations of the BP-UV filter as compared to the control group. Furthermore, significant changes were observed in the studied fish with the increase in sub-lethal concentrations of BP.

**Key words:** BP, lethal toxicity, chronic toxicity, hematological parameters, Superoxide dismutase, Catalase, *Cirrhinus mrigala*

**Introduction**

In recent years, due to ozone layer degradation, UV (ultraviolet) rays have continuously proliferated, and they have a significant impact on human health (Díaz-Cruz *et al.* 2008). Ultraviolet rays strike the superficial layer of the earth in different ranges (Kim and Choi 2014). Exposure to dangerous radiation from UV rays is highly associated with the progression of epidermal cancer (Ichihashi *et al.* 2003). As a result, concerns about skin damage such as suntan, burns, premature aging, and skin tumor risk have increased due to radiation, making UV rays a common hazard.

Benzophenone-type UV filters (BP's) are the most important component in the organic-type UV filter family (Ramos *et al.* 2015). Numerous classes in the name of Benzophenone-type UV filters are used as commercial products, comprising benzophenone abbreviated as BP, and other derivatives of benzophenone are 2,3,4 hydroxy benzophenone named as (2,3,4-trihydroxybenzophenone), BP-1

named as (2,4-dihydroxy benzophenone), BP-8 (2,2'-dihydroxy-4-menthoxybenzophenone), moreover, there is BP-2 named as (2,2',4,4'-tetrahydroxybenzophenone), BP-4 named (5- benzoyl-4-hydroxy-2 methoxybenzene sulfonic acid) as well as most important (BP-3) named as (2-hydroxy-4-methoxybenzophenone).

Benzophenone-type UV filters have been widely used in cosmetics, sunscreens, and personal care products (PCPs) to provide epidermal safety and protect against ultraviolet radiation (Giokas *et al.* 2007). Because they are highly photostable and often lipophilic and highly stable in aquatic ecosystems (Balmer *et al.* 2005), and also detected in surface water, soil, sediment (Jeon *et al.*, 2006), wastewater (Balmer *et al.* 2005), and raw drinking water and in organs of fish (Balmer *et al.* 2005). In the fish present in rivers and lakes of Switzerland and Texas streams, the existence of Benzophenone-type UVF's has been detected by examination (Fent *et al.* 2010).

BP is commonly used in various skin care products to protect against denaturation and reflect solar radiation. It has been found to have high usage in PCPs (Fent *et al.* 2010). However, due to its low solubility in water, BPs are persistent in the environment and living organisms after bioaccumulation (Ramos *et al.* 2015). Since BP has been reported as a toxicant causing oxidative stress in fish by increasing the ROS (reactive oxygen species) production, disturbs the total antioxidant activity. Underneath usual circumstances, the anti-oxidative defense mechanism of organisms can eliminate ROS to defend biological macromolecules. Conversely, when the level of ROS is encouraged by contaminants, and surpass the ability of the anti-oxidative protection mechanism, it will demolish the equilibrium, and as a result, the anti-oxidative action of enzymes will slow down (Canales-Aguirre *et al.* 2011). Perhaps, it is considered that Benzophenone (Diphenylmethanone; BP) reduced the fish's antioxidant as well as detoxifying systems (Liu *et al.* 2015).

Despite the existence of BP in the aquatic ecosystem, little is known about its impacts and modes of action. Fish have been used as model test organisms in aquatic water bodies because they are an important source of proteins for human beings. That's why, for both socio-economic reasons and environmental security, it is important to evaluate the health of fish for the measurement of environmental conditions. *Cirrhinus mrigala* is a freshwater species belonging to cyprinidae family, commonly consumed in Pakistan, and is present commonly in freshwater ecosystems of the country. But now, pollution is a serious problem in freshwater bodies which directly affects aquatic biota (Hamid *et al.* 2016). This research work was designed to determine 96-h LC<sub>50</sub> of BP to fish. After being exposed to sub-lethal levels of BP for two weeks, hematological parameters, biochemical factors, and antioxidant activity were monitored in *Cirrhinus mrigala*. This is because aquatic organisms are frequently exposed to pollutants for extended periods (Javed 2013).

## Materials and Methods

### Test Chemicals

Benzophenone (Diphenylmethanone; BP) UV filter of the Sigma Aldrich was used as a test chemical. The stock solution of BP was prepared in dimethyl sulfoxide (DMSO) of analytical grade. Concentrations of DMSO were under 0.1 % in the experiment. Its working solutions of required concentrations were formulated by additional dilutions of stock solution in deionized water to check acute and chronic toxicity.

### Experimental Fish and Acclimatization

The experiment was conducted in the Toxicology Research laboratory at Fisheries Research Farm, Department of Zoology, Wildlife and Fisheries, University of Agriculture, Faisalabad, Pakistan, and the experimental fish for the present study was *Cirrhinus mrigala* collected from the Fisheries Research Farm. To facilitate the adaptation of *C. mrigala* in a new environment, fish was acclimatized for two weeks in tanks. Water quality and aeration were maintained in this period. The research work was divided into two phases, in one phase 96-h LC<sub>50</sub> was checked. For the assessment of chronic toxicity, 90 *C. mrigala* were utilized in 3 treatments (control, T1=5% of 96-h LC<sub>50</sub>, and T2=15% of 96-h LC<sub>50</sub>), each with 3 replicates, in 50-liter aquariums. To examine the effects of sub-lethal concentrations, hematological and biochemical studies were conducted on the fish.

## 96-h acute toxicity testing

The 96-h LC<sub>50</sub> of BP was checked using 450 *C. mrigala* divided into 15 treatments with three replicates. The treatments contained different concentrations (0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, and 14 mg/Liter in 50-liter aquariums. For 96-h, fish (n=10) were exposed to all concentrations. The proper aeration was maintained in glass tanks for the respiration of fish. All dead fish were removed to maintain water quality. During the trial, all physicochemical factors of water like temperature, pH, natural 12:12 day/night photoperiod hardness, and dissolved oxygen were maintained and monitored.

## Hematology and Antioxidant Enzyme Analysis

The samples of blood were taken to determine the white blood cells (WBCs), neutrophils, lymphocytes, and monocytes and the plasma was separated to measure glucose, and triglyceride levels by using standard protocols. Fishes were dissected and the samples of different body organs such as gills, heart, kidney, muscle, and liver were collected to determine the antioxidant enzyme activity in terms of catalase (CAT), and superoxide dismutase (SOD). Enzyme activity was monitored by following Weydert and Cullen (2010). To check oxidative stress, activity was checked weekly.

## Statistical Analysis

The probit method was used to calculate the 96-h LC<sub>50</sub> of *C. mrigala* for the BP UV filter (Hamilton *et al.* 1977). To analyze data statistically, ANOVA and Tukey's/Student Newman-Keul tests were used.

## Results

### Acute toxicity of BP

All water quality parameters were monitored and maintained during the trial. Dead fish were removed to avoid contamination in the water. The probit analysis method confirmed 7.99mg/L as 96-h LC<sub>50</sub> lethal toxicity level for BP in *C. mrigala*. Table 1. Represented the acute toxicity of BP.

### Effects on hematological and biochemical parameters

Differences in blood indices were observed between fish exposed to sub-lethal concentrations (5% and 15% of LC<sub>50</sub> concentration) of BP and the control group. Table 2 presents the results of these blood indices. Table 3 shows the impact of sub-lethal concentrations of BP on some biochemical factors (glucose, and triglycerides) of *C. mrigala* blood.

### Effects on CAT and SOD

CAT and SOD activity was measured in various organs (gills, liver, heart, muscle and kidney) of *C. mrigala* following exposure to sub-lethal doses (5% and 15% of 96-hr LC<sub>50</sub>) for two weeks (Fig. 1). Fish organs displayed a significant initial increase in the activity of CAT and SOD compared to the control group in all sampled organs; however, the activity of both enzymes decreased with time (Fig. 2).

## Discussion

Over the past two decades, emerging pollutants have become a cause for concern due to their ecotoxicological impacts. These pollutants can also transform into reactive byproducts after transforming. BP, which is commonly used in cosmetics, personal care products, sunscreens, building materials, (Mao *et al.* 2019) and more, has high lipophilicity and light stability, leading to their increased production and usage levels. As a result, they have entered aquatic water bodies directly or indirectly, and can be absorbed by fish through their skin and mouth (Fent *et al.* 2010). Studies have shown that the estimated 96-hour LC<sub>50</sub> of BP for *C. mrigala* is 7.99mg/L, while Du *et al.* (2017) found that the 96-hour LC<sub>50</sub> of BP on zebrafish (*Brachydanio rerio*) to be 3.89 mg/L. These findings are consistent with Li's (2011) conclusion that the 96-hour LC<sub>50</sub> values of BP-2 are less than 10 mg/L for most aquatic organisms.

Hematologic parameters can be helpful in assessing the toxicity of xenobiotics (Frag and Alagawany 2018). Significant changes in blood indices and biochemical factors were observed. Oliveira-Lima *et al.* (2022) found no significant difference in total leukocytes, but noted an increase in neutrophils and a decrease in lymphocytes after exposure to BP. This study also showed a decrease in neutrophils,

which is usually associated with their recruitment to areas of inflammation (Havixbeck and Barreda 2015; Choi and Kemper 2013). Despite having a low phagocytic capacity, neutrophils can migrate to connective tissue to participate in immune defense, leading to a decrease in their frequency in the blood. The impact of BPs on blood and biochemical factors suggests that they accumulate in the fish's body.

The study's findings indicate that the exposure of fish to Benzophenones (BPs) for as little as two weeks, even at sub-lethal levels, can cause significant changes in the activities of antioxidant enzymes such as catalase (CAT) and superoxide dismutase (SOD). As time goes on, the activity of CAT and SOD decreases, which can lead to an increase in the generation of reactive oxygen species (ROS) in certain organs, causing damage at a cellular level. This was confirmed by Aziz *et al.* in their research conducted in 2021. Similarly, Liu *et al.* found in their study conducted in 2015 that BPs cause oxidative stress, leading to an inflammatory response in different animal tissues at varying levels. The SOD enzyme is the first line of defense against the toxic effects of oxygen and is considered a biomarker for the synthesis of ROS. Meanwhile, the CAT enzyme helps convert hydrogen peroxide into water and oxygen. The study found fluctuations in the activities of CAT and SOD in fish, which are highly sensitive to chemical stress and play a crucial role in detecting environmental toxicity early on by serving as an oxidative stress signal. BPs have been reported as toxicants that cause oxidative stress in fish. They increase ROS production, disturb total antioxidant activity, and initiate lipid peroxidation. Hanson *et al.* in 2006 and Gao *et al.* in 2013 found that BP produces ROS, which interferes with the activities of CAT and SOD. Liu *et al.* (2015) found that BPs reduce the antioxidant and detoxifying systems of fish.

## Conclusion

The 96-hour LC<sub>50</sub> of BP (benzophenone) on *C. mrigala* was found to be 7.99 mg/L. Our research confirmed that BPs cause changes in blood indices and antioxidant enzymes in fish. This is possibly due to the production of reactive oxygen species that largely inhibit the activities of antioxidant enzymes at different levels in different body organs. Therefore, the release of BPs directly and indirectly into aquatic ecosystems can have harmful effects on aquatic life. It is crucial to conduct further research to understand how various BPs affect aquatic organisms and their distinct mechanisms of toxicity.

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**Table 1: 96-h Acute Toxicity of Benzophenone-Type UV Filter**

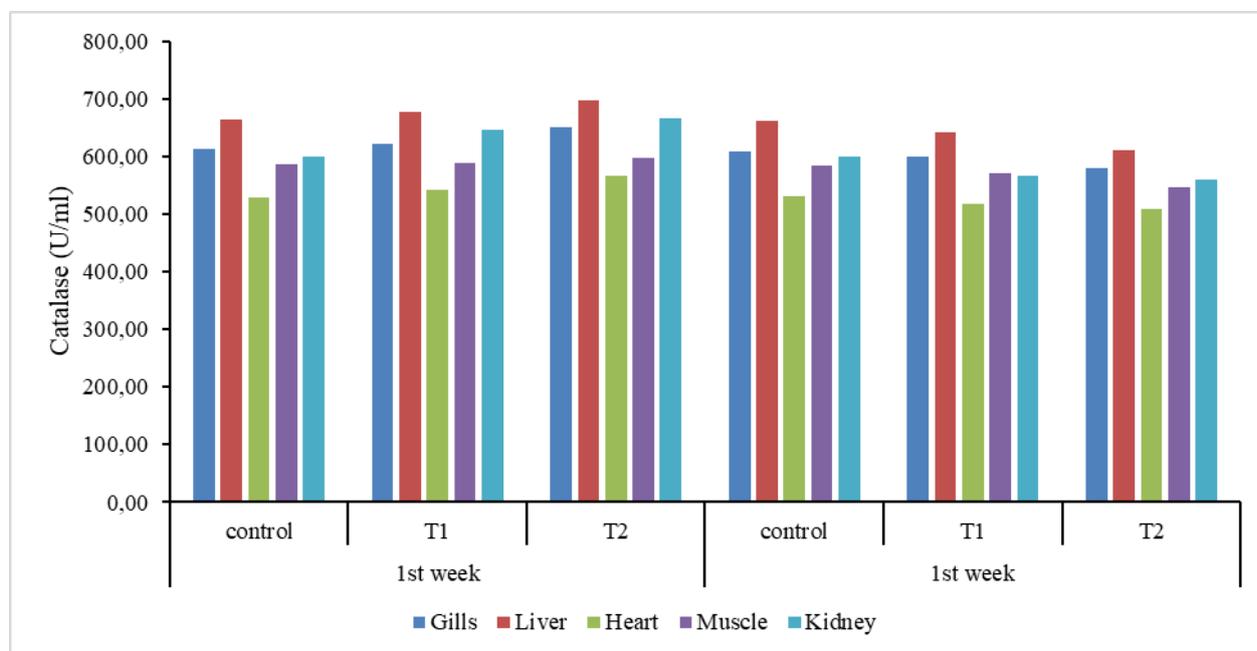
Species	Chemical	Mean Lethal concentrations(mg/L)	95% Confidence Interval (mg/L)	
			LCL	UPL
<i>C. mrigala</i>	BP	7.99	6.72	8.72

**Table 2: Blood indices of *C. mrigala* exposed to sublethal concentrations of Benzophenone-Type UV Filter**

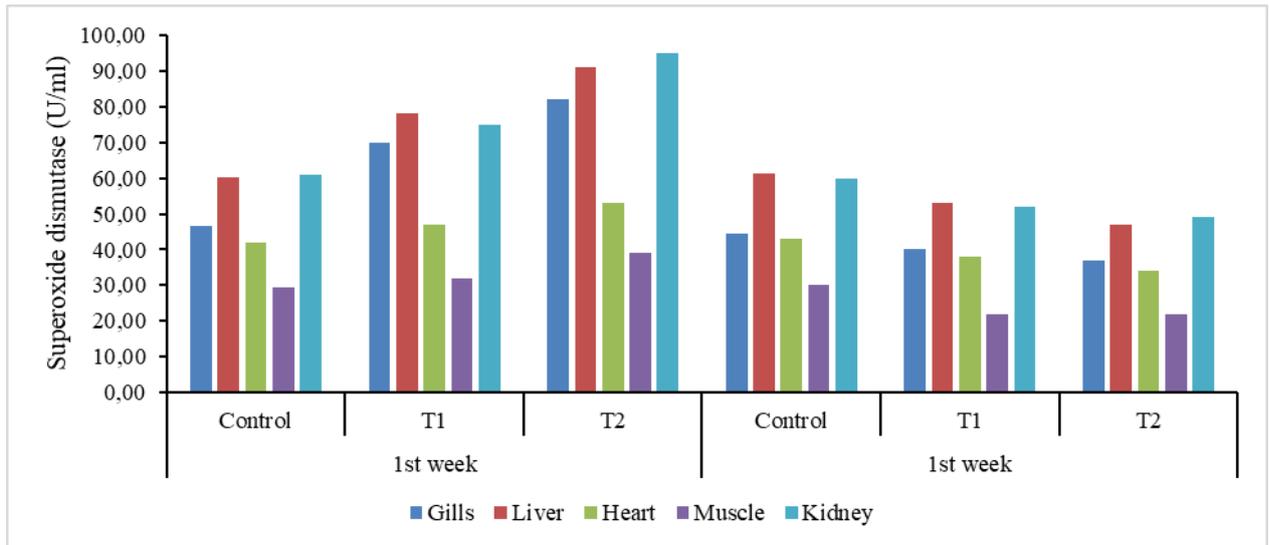
	Control	T1 (5% of 96-h LC <sub>50</sub> )	T2 (15% of 96-h LC <sub>50</sub> )
WBC (mm <sup>3</sup> )	5900±600	5000±525.18	3800±6069
Neutrophil (%)	21.26±1.49	17.37±1.49	16.29±1.50
Lymphocyte (%)	75.31±3.25	78.72±1.98	72.57±1.99
Monocyte (%)	4.99±0.40	4.58±0.69	2.23±0.49

**Table 3: Biochemical factors of *C. mrigala* exposed to sublethal concentrations of Benzophenone-Type UV Filter**

	Control	T1 (5% of 96-h LC <sub>50</sub> )	T2 (15% of 96-h LC <sub>50</sub> )
Glucose (mg/dL)	3.67±0.05	1.9±0.03	2.32±0.16
Triglyceride (mg/dL)	1.59±0.06	1.70±0.05	1.74±0.02



**Fig. 1: Effect of BP on catalase activity (UmL<sup>-1</sup>) in different organs of *C. mrigala*. Values are means of three replications. T1= (5% of 96-h LC<sub>50</sub>), T2= (5% of 96-h LC<sub>50</sub>)**



**Fig. 2: Effect of BP on superoxide dismutase activity ( $\text{U mL}^{-1}$ ) in different organs of *C. mrigala*. Values are means of three replications. T1= (5% of 96-h  $\text{LC}_{50}$ ), T2= (5% of 96-h  $\text{LC}_{50}$ ).**

ASSESSMENT OF THE ECOLOGICAL CONDITION OF WATER AND SEDIMENT, CASE  
STUDY OF THE ARTIFICIAL LAKE IN SFERK - KLINA MUNICIPALITY

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**ABSTRACT**

The goal of this study is to evaluate the quantity of heavy metals in the water and sediment, of the artificial lake in the Sferk village of municipality Kline. The study site is directly impacted by the geological composition of the rocks present (including: clastic, alluvium, proluvium, glacigene and lake sediments). Results indicate that there were significant changes in the concentrations of heavy metals at various sediment and water sample locations. Sampling and measurements took place in October/ 2023. The elements analyzed include Fe, Ni, Cr, Pb, Zn, Mn, Cu and Cd, with metal determination performed using ICP-OES (Inductively Coupled Plasma-Optical Emission Spectrometry). The study indicates medium contamination from these elements in the water and sediment, posing potential a risk to aquatic biota, but also to humans, considering the food chain.

**Keywords:** lake, water, sediment, ICP-OES method

**MONITORING HEAVY METALS AND SPATIAL ANALYSIS USING POLLUTION INDICES AND CARTOGRAPHIC VISUALIZATION: A CASE STUDY IN KOSOVO**

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The environmental challenges in Kosovo are intensified by extensive anthropogenic activities, leading to severe pollution. Practices of inadequate waste management also contribute significantly to the degradation of the environment. Water, sediment, and soil are particularly vulnerable to contamination, posing significant environmental threats.

This scientific research focuses on evaluating the quality of soil, water, and sediment in Lake Henci. The elements analyzed include Cu, Cd, Pb, Ni, Cr, Mn, and Fe, with metal determination performed using ICP OES (Inductively Coupled Plasma-Optical Emission Spectrometry). The results reveal the presence of pollution in water samples, evident through a comparison of element concentrations against guidelines provided by the EPA and WHO. To assess the pollution level in this region, various indices were calculated, including the Heavy Metal Index (HMI) as a crucial tool for quantifying metal contamination. Additionally, the Contamination Factor (CF) was computed, offering nuanced insights into the overall environmental pollution scenario. The results have been compiled as cartographic products, specifically thematic maps using interpolation methods within the geographic information system with a spatial resolution of 10 meters. Additionally, spatial analyses were conducted to complement this research.

Based on our findings, it is evident that sediment and soil samples exhibit concentrations of heavy metals within the normal range. Conversely, water samples display elevated levels of Cu, Zn, Cd, Pb, and Ni. This area needs sustained monitoring to establish comprehensive oversight and regulatory measures.

**Keywords:** Lake; pollution; heavy metals; ICP-OES- method

**TORSIONAL EVALUATION ON DIFFERENT BENDING CONDITIONS OF TWO NICKEL  
TITANIUM ROTARY GLIDE PATH FILES WITH DIFFERENT ALLOY**

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**Aims:** Aim of the current study is to compare the torsional resistance of two different glide path files, the Mtwo 10.04 and the Hyflex EDM Glide Path files 10.05, under different bending conditions.

**Material and methods:**

Thirty Mtwo 10.04 files and thirty Hyflex EDM glide path file 10.05 were used in the present study (N=60) and divided into 3 test groups of 10 files. A customized device made of a mobile structure with a connection that holds the handpiece and the artificial canal was used for the experiment to make the measurements repeatable. The artificial canals were created with a 90° curvature, a 60° curvature, and lastly a straight canal. Each file was rotated at 300 rpm with a maximum torque value of 5.5 Ncm with the apical 3 mm firmly secured in a vise. The torque at fracture and the time to fracture were recorded by the software integrated in the handpiece and evaluated through statistical analysis.

**Results:** Statistical analysis did not found significant differences in the values of torque to fracture (TtF) between these 3 groups.

**Conclusions:** In conclusion, the results of the present study should be explained by the flexural rigidity, for Hyflex EDM Glide Path 10.05 is influenced by the combination of rectangular cross-sectional shape and CM Wire and S Shaped cross-sectional design and Austenitic NiTi for the Mtwo 10.04. These combinations of characteristics could justify the results of the present study, the absence of difference between an austenitic and a martensitic file on the torsional resistance under different bending conditions.

**FİZYOTERÖPATİK VAGUS SİNİR STİMÜLASYONUNUN OTONOM SİNİR SİSTEMİ  
REGÜLASYONUNDA GÜNCEL KULLANIM ALANLARI**

**CURRENT APPLICATIONS OF PHYSIOTHERAPEUTIC VAGUS NERVE STIMULATION  
IN AUTONOMIC NERVOUS SYSTEM REGULATION**

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**ÖZET**

Vagus sinir stimülasyonu (VSS), vagus siniri üzerine düşük düzeyde elektriksel uyarıların uygulanmasıyla gerçekleştirilen bir tedavi yöntemidir. Bu çalışmanın amacı farklı hastalık gruplarında fizik tedavi ve rehabilitasyon uygulamalarından biri olan VSS'nun olası etkinliklerini ve mekanizmalarını derleyerek klinisyenlere yeni bir seçenek sunmaktır.

Vagus Sinir Stimülasyonu (VSS), depresyon, anksiyete, epilepsi, obezite, metabolizma kontrolü, inme, nörolojik rehabilitasyon, inflamatuvar hastalıklar, hipertansiyon ve kalp ritim bozuklukları gibi çeşitli sağlık sorunlarının tedavisinde umut vaat eden bir terapötik yaklaşım olarak öne çıkmaktadır. VSS, sinir sisteminin parasempatik dalının bir parçası olan vagus sinirini hedef alarak çalışır ve çeşitli vücut fonksiyonlarını düzenler. Dolayısıyla çeşitli stimülasyon tekniklerinin kullanımı ile otonom sinir sistemi regülasyonu gerçekleştirilebilir. Literatür incelendiğinde depresyon ve anksiyete üzerindeki etkileriyle bilinen VSS, sinir sistemi üzerinde olumlu bir düzenleyici rol oynayarak mental sağlığı iyileştirebilir. Epilepsi vakalarında yapılan çalışmalar, VSS'nin nöbet sıklığını azaltma potansiyeline işaret etmektedir. Obezite ve metabolizma kontrolü konusundaki araştırmalar, VSS'nin kilo kaybını destekleyebileceğini göstermektedir. İnme ve nörolojik rehabilitasyon süreçlerinde VSS'nin kullanımı, motor becerilerin ve yaşam kalitesinin artırılmasına yönelik umut vaat eden sonuçlar ortaya koymaktadır. VSS'nin anti-inflamatuvar etkileri, inflamatuvar hastalıkların yönetiminde etkili olabilir. Hipertansiyon ve kalp ritim bozuklukları alanındaki araştırmalar, VSS'nin kardiyovasküler sağlık üzerindeki olumlu etkilerini vurgulamaktadır.

Sonuç olarak, Vagus Sinir Stimülasyonu, çeşitli sağlık sorunlarının tedavisinde potansiyel bir çözüm olarak değerlendirilmekte ve gelecekte daha fazla araştırma ve klinik çalışmaya ihtiyaç duymaktadır.

**Anahtar Kelimeler:** Vagus Sinir Stimülasyonu (VSS), Teröpatik Yaklaşımlar, Nörolojik Rehabilitasyon

**ABSTRACT**

Vagus Nerve Stimulation (VNS) is a therapeutic approach involving the application of low-level electrical stimulation to the vagus nerve. The aim of this study is to compile the potential effectiveness and mechanisms of VNS, a form of physical therapy and rehabilitation, in different patient groups, providing clinicians with a novel option.

Vagus Nerve Stimulation (VNS) emerges as a promising therapeutic approach in the treatment of various health issues, including depression, anxiety, epilepsy, obesity, metabolism control, stroke, neurological rehabilitation, inflammatory diseases, hypertension, and heart rhythm disorders. Targeting the vagus nerve, which is part of the parasympathetic branch of the nervous system, VNS regulates various bodily functions, allowing for the modulation of the autonomic nervous system through the use of different stimulation techniques. Upon reviewing the literature, VNS is recognized for its positive regulatory role on the nervous system, particularly in improving mental health by addressing depression and anxiety. Studies on epilepsy patients suggest the potential of VNS in reducing seizure frequency. Research on obesity and metabolism control indicates that VNS can support weight loss. The application of VNS in stroke and neurological rehabilitation shows promising results in enhancing motor skills and improving quality of life. The anti-inflammatory effects of VNS

suggest its effectiveness in managing inflammatory diseases. Research in the field of hypertension and heart rhythm disorders underscores the positive impact of VNS on cardiovascular health.

In conclusion, Vagus Nerve Stimulation is being evaluated as a potential solution for various health issues, but further research and clinical studies are warranted for a comprehensive understanding of its efficacy and mechanisms.

**Keywords:** Vagus Nerve Stimulation (VNS), Therapeutic Approaches, Neurological Rehabilitation

## GİRİŞ

Son yıllarda, vagus sinir stimülasyonu (VSS) fizyoterapi ve rehabilitasyonun terapötik uygulama alanlarından biri haline gelmiştir. Parasempatik sinir sisteminin önemli bir bileşeni olan vagus siniri, kalp atış hızı, sindirim ve inflamasyon dahil olmak üzere çeşitli vücut fonksiyonlarının düzenlenmesinde önemli bir rol oynamaktadır. Araştırmacılar vagus siniri ile çeşitli fizyolojik süreçler arasındaki karmaşık bağlantıları daha derinlemesine araştırdıkça, sayısız sağlık durumunun tedavisi için ümit verici yolları ortaya çıkmaktadır. Bu çalışma, depresyon ve anksiyete gibi zihinsel sağlık sorunlarından epilepsi ve felç gibi nörolojik bozukluklara ve ötesine kadar çeşitli sağlık alanlarında vagus sinir stimülasyonunun kullanımına ilişkin kapsamlı bir genel bakış sunmayı amaçlamaktadır.

## GENEL BİLGİLER

### Depresyon ve Anksiyete

Vagus sinir uyarımı (VNS) etkili bir antikonvülsan cihazdır ve kronik tedaviye dirençli depresyonda antidepresan etkiler göstermektedir. Vagus siniri, anksiyete düzenlenmesinde önemli olan beyin bölgelerine (locus coeruleus, orbitofrontal korteks, insula, hipokampus ve amigdala) uyarım gönderdiğinden, bu yol, anksiyete bozukluklarını karakterize eden çeşitli somatik ve bilişsel semptomların algılanması veya etkilenmesinde rol oynayabilir. Bu gerekçeye ve VNS'nin epilepsi ve depresyon tedavisi gören hastalardaki anksiyolitik etkilerine ilişkin raporlara dayanarak, stabil ilaçların yanı sıra yardımcı VNS'nin potansiyel olarak etkinliği güncel inceleme konuları arasındadır. [1]

Anksiyete bozukluklarının nöroanatomi, vagus sinirinin manipülasyonunun anksiyete üzerinde etkileri olması gerektiğini düşündürmektedir.[2] VSS'nun vagus sinirinde uyardığı duyuşal aferent sinir lifleri beyne gider ve nükleus soliter traktta (NTS) sonlanır. Bu lifler, beynin bağırsak içindeki organlardan bilgi almasının birincil yoludur. Bilgi oradan beyindeki tüm norepinefrin liflerinin birincil bölgesi olan locus coeruleus'a gider.[3, 4, 5] Norepinefrin (NE), anksiyetenin patogeneğinde ve düzenlenmesinde rol oynayan önemli bir nörotransmitter olarak kabul edilmektedir. Teorik olarak bu NE kontrol bölgesini doğrudan uyarın uygulamanın anksiyete üzerinde önemli etkileri olabilir.[6, 7, 8, 9, 10] Ayrıca serotoninin Obsesif Kompulsif Bozukluk (OKB) ve diğer anksiyete bozukluklarının patofizyolojisinde önemli bir nörotransmitter olduğu düşünülmektedir. OKB'de SRI tedavisine verilen yanıtta serotonerjik mekanizmaların açıkça rol oynadığı gösterilmiştir.[11, 12] VSS'nün serotonin döngüsünü arttırdığını gösteren çalışmalar bulunmaktadır.[13] Bunun yanında VSS'nun talamus, insula, amigdala ve beyin sapındaki aktiviteyi arttırdığı bilinmektedir. Bu da teorik olarak anksiyete modülasyonu veya algısı ile ilişkilidir.[14, 15, 16, 17, 18]

### Epilepsi

Vagus sinir stimülasyonu (VSS), tıbbi olarak dirençli epilepside yardımcı bir tedavi olarak 1997 yılından bu yana FDA onaylı olarak uygulanabilmektedir. Diğer tedavi yöntemlerinin yanında destekleyici bir tedavi olarak kullanılmasının yanında farklı komplikasyonların geliştiği veya gelişme riskinin olduğu vakalarda birincil tedavi olarak da kullanılabilir. Bununla birlikte, klinik çalışmalarda bildirilen fayda değişkenliği bu uygulama metodu hakkında soru işaretlerini de beraberinde getirmektedir. FDA onaylı olarak gerçekleştirilen VSS yalnızca kısmi epilepsisi olan yetişkinler ve ergenler için onaylanmış olmasına rağmen, çocuklarda ve jeneralize epilepsisi olan hastalarda etkinliği hakkında henüz yeterince araştırma bulunmamaktadır. Englot ve arkadaşlarının gerçekleştirmiş oldukları bir metaanaliz; "VSS, rezeksiyona uygun olmayan tıbbi tedaviye dirençli epilepsi hastalarında etkili ve nispeten güvenli bir yardımcı tedavidir. Ancak, VSS kullanılarak tam

nöbetsizliğin nadiren elde edildiğini ve hastaların dörtte birinin tedaviden herhangi bir fayda görmediğini bilmek önemlidir.” Sonucuna vurgu yapmaktadır [19].

VSS uygulamalarının epilepside kullanımına ilişkin ilk çalışmalar vagus sinir uyarımının köpeklerde deneysel olarak oluşturulan nöbetleri durdurmak için kullanılabileceğini göstermesi ile ortaya çıkmıştır[20]. Bunun sonucunda doğrudan stimulan uygulama yapan ilk implante cihaz geliştirilerek 1988 yılında alandaki çalışmalar başlatılmıştır [21, 22]. Pek çok klinik çalışma sonrasında 1997 yılında FDA epilepside VSS uygulamalarına onay vermiştir. Uyarın parametreleri değişiklik gösterirken; gerçekleştirilen çalışmalar, nöbetlerden maksimum korunmanın periyodik olarak 20-30 Hz'de verilen uyarılarla sağlanabileceğini ileri sürmektedir.[20] Çoğu hasta şu anda 30 Hz'de, 30 saniye açık ve 5 dakika kapalı sabit bir uyarı döngüsüyle uyarılmaktadır.[23] Klinik araştırmalar, cihazın test edilen hastaların çoğunda karmaşık kısmi nöbetlerin görülme sıklığını azalttığını ve hastaların %20-40'ının nöbet sıklığında %50'den fazla bir azalma elde ettiğini bulmuştur.[24, 25] VNS, tamamen beyinde meydana gelen patolojik olaylarla ilişkili bir hastalığın tedavisinde periferik müdahalenin kullanıldığı sınırlı sayıdaki tedavi metodundan biridir.[26]

## **Obezite ve Metabolizma Kontrolü**

Obezite batılılaşmış toplumlarda giderek artan salgın hastalıklardan biri olarak kendini göstermektedir. 100 pound'dan (VKİ>30) fazla kilolu hastalar obeziteli olarak kabul edilir ve hipertansiyon, diyabet, kalp hastalığı, uyku apnesi ve osteoartrit gibi birçok durum için risk altındadır. Davranış değişikliği ve farmakolojik tedaviler bu hasta grubunda kalıcı bir başarı ile sonuçlanmamıştır. Hem mide kısıtlamasını hem de malabsorbtif prosedürleri içeren cerrahi seçenekler, kalıcı kilo kaybı sağlayarak bu popülasyonda eşlik eden hastalıkların sayısını ve şiddetini azaltmıştır. Ancak ameliyatlarda kısa ve uzun vadeli komplikasyon potansiyelleri bulunmaktadır. Afferent vagal sinir stimülasyonu, standart cerrahi kilo verme prosedürlerine uygun bir alternatif olarak değerlendirilebilir.[27]

VSS uygulamaları diğer tedavi amaçları için gerçekleştirilirken İlginç bir şekilde, bazı hastalarda kilo kaybı ve gıda alımında değişiklikler gözlenmiştir, bu da VNS'nin obezite için terapötik potansiyelini düşündürmektedir.[28, 29, 30, 31] Vagus siniri, hepatik glikoz üretimi, pankreatik endokrin ve ekzokrin sekresyonu ve metabolik algılama dahil olmak üzere metabolik homeostaz için gerekli birçok fonksiyonda rol oynar.[32] Obezitenin hayvan modellerinde vagal sinyallemenin bozulduğu rapor edilmiştir [35, 36]. Düşük frekansta vagal sinir stimülasyonunun vagus sinirini aktive ettiği ve hem hayvanlarda hem de insanlarda vücut ağırlığını azalttığı rapor edilmiştir [30, 33, 34].

Günümüzde obezite tedavisi için iki farklı türde vagal sinir nöromodülasyon yöntemi önerilmiştir: Düşük frekanstaki (<40 Hz) vagal sinir nöromodülasyonuna vagus sinirini aktive eden vagal sinir stimülasyonu adı verilirken, yüksek frekanslı vagal sinir nöromodülasyonuna vagal blokaj adı verilir. Bu uygulama vagal sinyali inhibe eder [35]; her iki yöntemin de hayvanlarda ve insanlarda kilo kaybına neden olduğu rapor edilmiştir.[33, 34, 37, 38] Gastrointestinal sistem tarafından salgılanan beyin-bağırsak peptidleri, sinyalleri hipotalamusa ve beyin sapına ileterek, farklı metabolik yollar ve nöronal yollar aracılığıyla iştah ve enerji tüketimi arasındaki dengeyi düzenler. Vagal sinir, beyin-bağırsak peptidlerinin gıda alımı üzerindeki etkilerine aracılık etmede önemli bir oyuncudur [39].

## **İnme ve Nörolojik Rehabilitasyon**

İnme dünya çapında sakatlığın önde gelen nedenidir ve bireylerin yaklaşık %60'ında üst ekstremitelerde bozuklukları felçten 6 ay sonra da devam eder. Bu eksiklikler üst ekstremitenin fonksiyonel kullanımını olumsuz etkiler ve günlük aktivitelere katılımı kısıtlar. Nörolojik rehabilitasyonun önemli bir amacı fonksiyonel bağımsızlığı ve aktivitelere katılımı artırarak yaşam kalitesini arttırmaktır. İnme iyileşmesinin altında yatan nörobiyolojik süreçlerin daha iyi anlaşılması, motor bozuklukların iyileştirilmesine yönelik hedefe yönelik yaklaşımların geliştirilmesine yol açmıştır.[40]

Böyle bir hedefe yönelik strateji, esnekliği artırmak ve kronik felçten sonra üst ekstremitelerde fonksiyonunun iyileşmesini desteklemek için rehabilitasyonla eşleştirilmiş kısa Vagus Sinir Stimülasyonu (VNS) patlamalarını kullanır. Vagus sinirinin uyarılması, korteks boyunca asetilkolin ve norepinefrin gibi plastisiteyi teşvik eden nöromodülatörlerin salınmasını tetikler. Nöromodülatörlerin motor eğitimiyle eş zamanlı olarak zamanlanmış olarak devreye girmesi, işlevi iyileştirmek için motor korteksteki göreve özgü esnekliği yönlendirir ve eşleştirilmiş VNS tedavisinin temelini oluşturur. [40]

Eurofizyolojik ve nörogörüntüleme çalışmaları, felçten sonra kalan ağlardan yararlanarak beynin işlevi geri kazanma yeteneğinin altında yatan nörobiyolojik süreçlerin daha iyi anlaşılmasını sağlamıştır. Kronik üst ekstremitte eksikliklerini iyileştirmeye yönelik bir yaklaşım, plastisite olarak adlandırılan bu yeniden düzenleme kapasitesini arttırmaktır. Rehabilitasyon tek başına motor ağlarında bir miktar yeniden düzenlemeye neden olur, ancak bu değişiklikler, önemli gelişmeleri sınırladığı düşünülen mimari ve anatomik kısıtlamalar çerçevesinde meydana gelir. Sonuç olarak, rehabilitasyonla birlikte yeniden yapılanmayı geliştirebilecek stratejiler daha fazla iyileşmeyi destekleyebilir. [41, 42, 43, 44, 45, 46, 47, 48]

Nöromodülatör ağların aktivasyonu, plastisite ile güçlü bir şekilde bağlantılıdır[49], dolayısıyla bu mekanizmaları devreye sokmak, felç iyileşmesi için plastisiteyi arttırmaya yönelik potansiyel bir strateji sağlar. Nukleus basalis (NB) içindeki kolinerjik nöronlar ve locus coeruleus'taki (LC) noradrenerjik nöronlar, korteksin geniş alanlarına yaygın olarak yayılan artan nöromodülatör sistemin bir parçasıdır. NB nöronlarından asetilkolin (ACh) ve LC nöronlarından norepinefrin (NE) salınımı, uyarılma, hafıza pekiştirme ve hedefe yönelik davranışın dikkat modülasyonu dahil olmak üzere birçok davranışsal ve bilişsel süreçte önemli bir rol oynar.[49, 50] Vagus siniri, nukleus traktus solitarius'a (NTS) projeksiyonlar gönderir ve bu da nöromodülatör çekirdeklere projeksiyon yapar. Bu nedenle, bu nöromodülatör ağların kortikal plastisitedeki rolü VSS uygulamaları ile pekiştirilebilir.[49, 50, 51]

## **İnflamatuvar Hastalıklar**

VSS uygulamaları popülerleştikçe bu uygulamaların endikasyon dışı kullanımı, birçok hayvan deney modelinde ve doğuştan gelen, bağışıklık sistemini etkileyen bir takım durumların tedavisine yönelik klinik çalışmalarda araştırılmaya başlanmıştır [52,53]. Altta yatan sistemik antiinflamatuvar mekanizmaya, kolinerjik antiinflamatuvar yolun (CAP) bir parçası olarak makrofajları eksprese eden dalağın  $\alpha 7$  nikotinik asetilkolin reseptörüne ( $\alpha 7nAChR$ ) bağlanan vagus sinirleri aracılık eder.[54]

Beyn ve iç organlar, yaklaşık %80 afferent ve %20 efferent lifler içeren vagus sinirinin (VS), iç organ fonksiyonlarının homeostatik düzenlemelerinde çok sayıda anahtar rol oynadığı otonom sinir sistemi içinde etkileşim içindedir. Son veriler VS'nin antiinflamatuvar rolüne dikkat çekmektedir. Bu vagal fonksiyona, bazıları hala tartışılan çeşitli yollar aracılığıyla ulaşılabilir. Bunlardan ilki, vagal afferent lifler tarafından uyarılan ve adrenal bezlerden kortizol salınımına yol açan antiinflamatuvar hipotalamik-hipofiz-adrenal eksenidir. Kolinerjik anti-inflamatuvar yol adı verilen ikinci yola, makrofajlarla sinaptik bağlantı noktasında asetilkolin (ACh) salgılayan enterik nöronlar üzerinde sinaps yapan vagal efferent lifler aracılık eder. ACh, bu makrofajların a-7-nikotinik ACh reseptörlerine bağlanarak bir pro-inflamatuvar sitokin olan TNFa salınımını inhibe eder. Son yol, VS'nin dalak sempatik sinirini uyardığı dalak sempatik anti-inflamatuvar yoldur. Dalak sinirinin distal ucunda salınan norepinefrin (noradrenalin), ACh salgılayan dalak lenfositlerinin  $\beta 2$  adrenerjik reseptörüne bağlanır. Son olarak ACh, a-7-nikotinik ACh reseptörleri yoluyla dalak makrofajları tarafından TNFa salınımını inhibe eder. Bu yolların anlaşılması terapötik açıdan ilginçtir çünkü bunlar, inflamatuvar bağırsak hastalığı ve romatoid artrit gibi TNFa ile ilişkili hastalıklarda anti-inflamatuvar düzenlemeyi uyarmak için çeşitli şekillerde hedeflenebilir. Diğerlerinin yanı sıra, invaziv veya invaziv olmayan bir prosedür olarak VS stimülasyonu giderek daha polpüler hale gelmekte ve bu tedavinin kronik inflamasyonu hafifletmedeki potansiyel etkinliğini değerlendirmek için çeşitli klinik çalışmalar devam etmektedir.[55]

## **Hipertansiyon**

Hipertansiyon (HT), ani kardiyak ölüm için en güçlü risk faktörlerinden biridir. Kronik HT, Avrupa'da genel nüfusun %30-45'ini ve Amerika Birleşik Devletleri'nde 65 milyonu aşkın yetişkini etkilemekte ve her yıl yaklaşık 5 milyon yeni teşhis konulmaktadır. HTN kaynaklı kalp hastalıkları, yüksek arteriyel kan basıncının ikincil komplikasyonları nedeniyle hastalık ve ölümün önde gelen nedenleridir. Zamanla, HTN sol atriyal dilatasyona, sol ventriküler hipertrofiye ve ventriküler gevşemenin bozulmasına neden olur ve dolayısıyla ventriküler sistol ve diyastolik dolumu etkileyerek kalp yetmezliği (HF) riskinin artmasına neden olur. HT'nin bir nedeni de sempatik sinir sistemi aktivitesinin uygun olmayan şekilde artmasıdır; bu, otonom sinir dengesinin yeniden sağlanmasının HT tedavisinin etkili bir yolu olabileceğini düşündürmektedir.[56, 57]

## Kalp Ritmi Bozuklukları

Aritmilerin patofizyolojisinde kalp ile otonom sinir sistemi arasındaki etkileşimlerin öneminin giderek daha fazla farkına varılmaktadır. Bu etkileşimler aritmilerin hem başlatılmasında hem de sürdürülmesinde rol oynar ve hem atriyal hem de ventriküler aritmilerde önemlidir. Aritmilerin patofizyolojisinde otonom sinir sisteminin önemi göz önüne alındığında, mevcut tedavileri geliştirmek ve kardiyak-otonom hedeflere yönelik ek müdahalelere öncülük etmek için sahada kayda değer çabalar sarfedilmektedir.[58]

## SONUÇ ve TARTIŞMA

VSS uygulamaları vagal sinire direk olarak uygulanabilen bir nöromodülasyon uygulaması olduğundan sistemik etkiler ortaya çıkarabilen uygulamalardır. İnflamasyon, otonom bulgular vb. temel yaşamsal faktörler üzerinden birincil etkiler açığa çıkarılabildiğinden bu uygulamalar temelde pek çok hastalığın tedavisinde kullanılabilecek teorileri gün yüzüne çıkarmaktadır.

Bu doğrultuda gerçekleştirilen çalışmalar henüz sınırlı sayıda olsa da pek çok çalışma umut vaadederek düzeyde yüksek olumlu sonuçları ortaya koymayı başarmıştır. Gerçekleştirilecek çalışmaların ve çalışmalara dahil edilen denek sayılarının artışı VSS uygulamalarının etkinliği hakkında akıldaki soru işaretlerini giderirken yeni çalışmalara da ışık tutacaktır.

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**AN ASSESSMENT OF THE USE OF COMMUNICATION IN CREATING AWARENESS ON VESICOVAGINAL FISTULA (VVF) AMONGST WOMEN IN KADUNA STATE, NIGERIA**

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**Abstract**

This study investigates the use of Communication in creating awareness on Vesicovaginal Fistula (VVF) Amongst Women in Kaduna State. The objective of this research is to investigate the way both direct and indirect patient seek for information about with Vesicovaginal Fistula (VVF) and to find out the challenges faced by caregivers and stakeholders in creating awareness about VVF in Kaduna State. The study was anchored on The Health Belief Model (HBM) and Diffusion of Innovation Theory. The study adopted a mixed-method approach, combining survey and in-depth interview. The population of the study comprised 58 women with VVF cases and interview was conducted with one health provider and one stakeholder in charge of VVF cases in Kaduna State. The adopted census sampling technique due to small size of the population and adopted snow ball for the interview conducted. The data were presented using simple percentage and frequency tables; qualitative data underwent thematic analysis. The findings revealed that women rely on media and healthcare practitioners as primary sources of information about VVF, which highlights the important role these channels play in disseminating health information. It was discovered that majority of respondents learn about VVF through media outlets, such as television, radio, and the internet. The study concluded that health practitioner and stakeholder are faced with challenges such as; deep-rooted beliefs surrounding practices such as female genital mutilation and home deliveries, perceived as traditional or religious mandates, collaboration and coordination challenges and financial challenges. The study recommends that there is need for developing and implementing comprehensive public health communication strategies that utilize a mix of traditional media, social media, and direct community engagement to ensure wide-reaching awareness campaigns.

**Keywords:** Vesicovaginal Fistula, VVF awareness, communication

**RECENT ACHIEVEMENTS IN THE SURGICAL TREATMENT OF INFRARENAL ANEURYSMS OF THE ABDOMINAL AORTA**

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**ABSTRACT**

Aortic aneurysms are the 13th leading cause of death in the United States. In 95-96%, the aneurysm is usually infrarenal. The purpose of the study is to develop measures for the surgical treatment of aneurysms of the infrarenal area of the aorta, our achievements in the perioperative period, and measures to prevent possible complications that may arise in the postoperative period. In 2020-2024, we analyzed the clinical materials of 125 patients who applied with the diagnosis of "Infrarenal

aneurysm of the abdominal aorta". 98.4% of patients are men, 1.6% are women. Patients complained of abdominal pain, lower limb pain, constipation, urinary retention, and hypertension. 8.8% of the patients had no complaints and were discovered accidentally during USM.

All patients underwent appropriate examinations in the preoperative period. 76.8% of patients took antiaggregant and anticoagulant, 93.6% hypotensive, 8.8% antiarrhythmic, and 26.4% hypolipidemic drugs per os. All patients were found to have 2 or more comorbidities. In addition, 48% of patients have diabetes; hypertension in 93.6%; 37.6% have chronic ischemic heart disease, post-infarction cardiosclerosis, heart failure; 14.4% post-aortic coronary bypass; chronic obstructive pulmonary disease in 64.8%; prostate adenoma in 8.8%; atrial fibrillation in 24.8%; syphilis in 1.6%; Hepatitis C in 6.4%; 56.8% had surface erosions and ulcers of the stomach and duodenum.

Patients with high concentrations of troponins were transferred to the intensive care ward at the preoperative stage, intravenous nitroglycerin 10 mg infusion, detoxification therapy was performed, and cardioprotectors and drugs that improve rheology and antioxidants were injected. 12% of patients underwent myocardial coronary stenting. During the operation, POLYMAILLE (LOT #21060268) vascular synthetic prostheses manufactured by the French company Perouse Medical were used. "Aneurysm resection, synthetic prosthesis of the aorta" surgery was performed on 27.2% of patients. At this time, the aortic area containing the aneurysm was resected and replaced with a 20 mm linear synthetic prosthesis. A fusiform aneurysm 10 cm long and 74 mm in the widest part was found in the abdominal aorta at the infrarenal level in the male patient whose clinical material was examined. A mural thrombus reaching 42 mm in the thickest part of the aneurysm wall was observed. 72.8% of patients underwent "Thrombendartectomy from the abdominal aorta, the biiliac-bifemoral synthetic prosthesis of the aorta" operations. At this time, an 18 x 9 mm 2-branched synthetic prosthesis was used.

Anesthesia was performed using combined epidural-intubation anaesthesia. During the perioperative period, if necessary, nitroglycerin was infused at 0.2-0.4 µg/kg min. When intraoperative hypotension develops, norepinephrine 0.1-0.3; dopamine was infused at 3-5 µg/kg min. Infusion therapy was performed, aprotinin 50,000 TV, erythrocyte mass, and fresh frozen plasma were transferred; the acid-alkaline balance of the blood was determined, and metabolic disorders were corrected. To auto-transfuse the blood collected from the surgical wound, the Cell-Saver device produced by LivaNova of Great Britain and the Procedure sets provided by BESAN company operating in Azerbaijan were used. Mortality was noted in 3 patients (2.4%) in the early postoperative period. The main cause of death in the early postoperative period: "Thrombohemorrhagic syndrome" developed as a result of internal bleeding in 1 patient; 1 patient had "large intestinal obstruction, polyorgan failure", and 1 patient had "acute myocardial infarction". Since 1 patient (0.8%) developed acute kidney failure in the postoperative period, the patient underwent 3 sessions of temporary hemodialysis and the patient recovered. The patients' in-hospital bed days were 5-8 days. On the 4th-5th day of the operation, the patients were activated and fed.

Thus, to prevent cardiac complications in the postoperative period, we consider it appropriate to detect patients with abdominal aortic aneurysms early before the main stage of the operation, perform angiography of the coronary vessels of the heart in time, and, if necessary, perform stenting. At the same time, continuous infusion of nitroglycerin and the use of anticoagulants are advisable in the early stages of the operation. To prevent the development of ischemic processes in the large intestine, it is important to control the pressure in these vessels during surgery, as the internal iliac arteries participate in the collateral blood supply of the left half of the large intestine. To correct possible disorders in the blood coagulation system during the postoperative period, we consider it necessary to transfer aprotinin and fresh frozen plasma at the end of the operation.

**Keywords:** Aortic aneurysms, chronic ischemic heart disease, vascular synthetic prostheses, aneurysm resection, abdominal aorta.

**EXPLORING THE MEDIATING ROLE OF MINDFULNESS IN THE RELATIONSHIP BETWEEN SELF-CONCEALMENT AND PSYCHOLOGICAL FLEXIBILITY IN DEVELOPING PSYCHOLOGICAL DISTRESS**

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**ABSTRACT**

Current research investigated the mediating role of mindfulness in the relationship between self-concealment and psychological flexibility in developing psychological distress in the cultural setting of Pakistan. A total of 300 individuals took tests to assess their self-concealment, mindfulness, psychological flexibility, and psychological discomfort. The study found a negative association ( $\beta = -0.31$ ,  $p = 0.03$ ) between self-concealment and mindfulness, showing that higher levels of self-concealment led to lower levels of mindfulness. Mindfulness had a significant indirect influence on the link between self-concealment and psychological distress ( $\beta = -0.07$ ,  $SE = 0.02$ ,  $LLCI = -0.11$ ,  $ULCI = -0.03$ ), indicating a potential moderating role. There was a negative correlation ( $\beta = -0.34$ ,  $p = 0.01$ ) between self-concealment and psychological flexibility. Higher levels of self-concealment were associated with lesser psychological flexibility. However, there was no significant influence of psychological flexibility on psychological distress ( $\beta = 0.02$ ,  $p = 0.36$ ). A mediation analysis found a significant indirect influence of psychological flexibility on the link between self-concealment and psychological distress ( $\beta = 0.01$ ,  $SE = 0.0097$ ,  $LLCI = -0.01$ ,  $ULCI = 0.02$ ), indicating a partial mediating role. These findings emphasize the need of addressing self-concealment and increasing mindfulness and psychological flexibility in mental health interventions within Pakistani culture, which has implications for improving psychological well-being and resilience.

**Key words:** Self concealment, psychological inflexibility, Mindfulness, Psychological distress, adolescence.

**Introduction**

The current study examined teenagers' inflexibility, self-concealment and distress. In Pakistan, a great deal of study is needed in this area. It can be financially psychologically detrimental to conceal information about oneself. (Vangelistic, 1994). According to recent study, our wellbeing is impacted by the things we choose to expose and keep hidden about ourselves. There are blocked memories in the own unconscious. Over time, relationships degrade in quality due to maladaptive tendencies toward self-concealment (Rodebaugh,2009). People hide their true selves from the outside world because of a fear of being ashamed of who they are when they reveal themselves.

However, recent research appears to indicate that thoughts connected to disordered eating may not always result in increased psychological distress (Brannan and Petrie, 2008). The main cause of psychological distress, according to mindfulness-based cognitive behavior therapies like Mindfulness-Based Cognitive therapy, is a maladaptive way of experiencing or reacting to negative cognitions and related events. According to these therapies, maladaptive and avoidance-based coping strategies-which frequently make psychological distress wors-are less likely to arise when "negative" thoughts and sensations are experienced non-judgmentally as mental processes rather than as the ultimate reality of one's life.

Scholarly investigations reveal that this conceptualization of mindfulness is negatively associated with a broad range of adverse psychological consequences, such as anxiety and depression (Brown and Ryan, 2003), general psychological distress (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006), and emotional distress in high-stress interpersonal situations (Beitel, Ferrer, & Cecero, 2005) furthermore, data appears to point to a potential adverse relationship between mindfulness and thoughts associated with disordered eating (Lavender, Jardin, & Anderson, 2009). Moreover, a study indicates that mindfulness could moderate the relationship between disordered eating and psychological discomfort (Masuda et al., 2010).

According to Huang et al.'s research from 2021, mindfulness and psychological well-being are positively correlated, and mindfulness also acts as a mediator between psychological well-being and traumatic childhood events. The study focused on adolescents. According to Li et al. (2022), mindfulness can mitigate the detrimental effects of cyber-ostracism on teenagers' psychological health by acting as a moderator in the interaction between the two.

Study by Arslan and Allen's (2021), students' psychological well-being is enhanced and stress is reduced when they have a greater sense of purpose in life and cognitive flexibility. This is because these factors mitigate the impact of Covid-19 crisis on students' well-being. In a metaphorical sense, flexibility serves as a barrier to safeguard mental health and promote mental well-being. It has been demonstrated that cognitive flexibility can effectively alleviate the psychological issues that teenagers face.

By learning and honing self-care techniques during times of high stress, such as adolescence, people can improve their psychological well-being by cultivating awareness and acceptance of their inner experiences without passing judgement. Because of this, many therapists employ mindfulness as one of their psychological techniques. For instance, negative childhood experiences can result in a decline in psychological well-being, but mindfulness interventions can enhance well-being and lessen the effects of negative childhood experiences.

Similarly, a wealth of research has demonstrated that psychological flexibility is inversely correlated with a variety of distress states, such as anxiety, depression and general psychological distress, and positively correlated with psychological well-being.

According to another research, those who exhibit more psychological rigidity are also more likely to support stigmatizing ideas about other individuals who have mental health issues, such as prognostic pessimism, which holds that one's chances of recovery are little (Masuda & Latzman, 2011).

Based on empirical research, mindfulness has been found to be negatively correlated with a range of negative psychological outcomes. These outcomes include emotional distress in stressful interpersonal and emergency situations (Beitel; Ferre, & Cecero, 2005), fairly stable traits like rumination (Coffey & Hartman, 2008), specific symptoms of depression and anxiety (Brown & Ryan, 2003), and nonspecific psychological symptoms (Baer et al., 2006). Additionally, preliminary research findings imply that mindfulness-based interventions foster the practice of mindfulness or metacognitive awareness, which in turn produces positive psychological outcomes (Carmody, Reed, Merriam et al., 2008).

It was hypothesized that because self-concealment is a symptom of limited psychological flexibility, there may be a positive correlation between self-concealment and psychological discomfort. (Masuda et al., in press). A conscious effort to downregulate, correct, avoid, control or repress undesirable private experiences (such as unpleasant emotions, critical thoughts and personal secrets) may be represented as self-concealment. In contrast, such coping may paradoxically result in increased emotional suffering even if it may first appear to be beneficial (Campbell-Sills, Barlow, Brown, Woods, 2007). When viewed in this light, self-concealment may be associated with unfavourable consequences not because it involves concealing secrets in and of itself but rather because it could be a sign of psychological rigidity or a lack of awareness.

After comparing the findings and reviewing all pertinent recent research on all factors, it can be said that mindfulness plays a mediating function between the development of psychological distress

in teenagers and the association between psychological inflexibility and self-concealment. Nonetheless, not much research has been done, particularly in Pakistan, on psychological inflexibility and self-concealment. In order to analyze this phenomenon within the Pakistani setting, the current researchers looked at the psychological constructs mentioned above in elderly individuals.

## Method

### Participants

The sample consisted of 150 private sector and 150 public sector institutes included both boys and girls with an age range of 14-20 years ( $M = 29.95$ ,  $SD = 7.90$ ). Based on gender,

### Measures

Demographic information sheet comprises of personal information which consist of the name, age, gender, education, number of siblings, family system, birth order, religion, any psychological or physical disease and parents are alive or dead which is required for research purpose.

*Self concealment scale (SCS)*, Larson, D. G. also, R. L. Chastain (1990) is used which comprise of 10 items of self concealing is applied. The procedure of self-concealment, seen here as an unexpected instance of limit guide in the support of protection (Derlega and Chaikin), can likewise be seen inside a model of self-introduction or picture the executives in which social communications existing chances to uncover upsetting or adverse specific information

(Schlenker, 1980). The scale uses a 5-point Likert scale ranging from 1 (strongly disagree) to 5

(strongly agree). The inner consistency evaluation of Cronbach's alpha showed  $\alpha = .83$  ( $N : 300$ ).

*Psychological flexibility questionnaire (PFQ)*, Dr. Maya Maor, Ben-Itzhak (2014), Kashdan and Rottenberg (2010) illustrate psychological flexibility as the capacity to "perceive and adjust to different situational requests; move attitudes or conduct collections when these methodologies reduced individual or social working; keep up equalization among vital life spaces; and know, open, and focused on practices that are consistent with profoundly held qualities". Lack of flexibility, then again, is related with gloom, nervousness, rumination, stress and failure to get ready for unreachable objectives (Kashdan and Rottenberg, 2010; Nolen-Hoeksema, Wisco, and Lyubomirsky, 2008). The scale utilizes a 6-point Likert scale running from 1 to 6. So as to test PFQ's construct validity, a 20 items questionnaire survey the initial reliability list brought about Cronbach's alpha = 0.918.

*Mindful Attention Awareness Scale (MAAS)* Brown, K.W. and Ryan, R.M. (2003). The attribute MAAS is a 15-item scale planned to evaluate a center usual for mindfulness, to be specific, an exposed perspective in which consideration, educated by a touchy consciousness of what is happening in the present, basically sees what is occurring. The scale tends to subjective, passionate, physical, relational, and general areas in an aberrant way. MAAS utilize a 6-point Likert-type scale extending from 1 (quite often) to 6 (never). Mindfulness has been portrayed as a procedure of pointing out a specific nature of minute by-minute experience (Kabat-Zinn, 1990). The MAAS has great Cronbach's alpha, extending from .82 to .87. The coefficients of internal consistency of the MAAS were over .90.

*Kessler's psychological distress (K10)* planned by Ronald. J. Kessler (2003), to evaluate the dimension of psychological distress. The K10 scale encompasses 10 items regarding emotional expresses each by a five-level response scale. The portion can be exploited as a concise screen to discriminate dimensions of distress. The measure can be utilized as a short screen to discriminate dimensions of distress. The Kessler Psychological Distress Scale (K10) is a measure of psychological distress, example of item from this scale includes, "Did you feel tired out for no good reason" and "Did you feel hopeless". Response level are all of the time, most of the time, a little of the time, and none of the time. Scores of the 10 items are then figure out yielding a base score of 10 and a maximum extreme score of 50. Little scores display short dimensions of psychological distress and more scores reveal large sums of psychological

distress. The inner consistency (Cronbach's alpha) revealed was useful for this scale 0.919 (Cornelius, Groothof, Klink and Brouwer, 2013). The reliability coefficient of present examples  $\alpha = 0.809$ .

**Procedure**

The procedure was divided into three phases. In the first phase (research design and tools selection) the sample of 300 participants was chosen for this study from different public and private educational institutes. Every fifth institute was chosen through random sampling technique and sample size was selected through purposive sampling. SCS, PFQ, MAAS and K10 are used for research purpose. In the second phase (pilot study) was done. Sample of 90 adolescents was collected to observe that either the formulated book of research was easily understandable to the targeted population or not. Firstly, approval from the concerned authority to gather data was taken. Beforehand administered the participants were briefed regarding the aim of the research. In the third phase (data collection and results reporting), permission for data collection was obtained from different institutes. Booklet was formulated consisting of consent form, demographic form and assessment tools used in this study. The participants of research completed questionnaire without any complication.

**Ethical considerations**

The researcher maintained the confidentiality of all participant personal information; yet, the participants were made aware of the study’s goal and were not misled at any point. It was also explained to the participants that they might withdraw from the study at any time. Foundation experts and individual members were acknowledged and expressed gratitude for their cooperation.

**Results**

**Table 1. Coefficients for Relationships Between Self-Concealment, Mindfulness, and Psychological Distress**

Predictor	Outcome	B	SE	p-value
TSCS	TMAAS	-0.31	0.08	0.0003
TSCS	TKPDS	-0.07	0.05	0.18
TMAAS	TKPDS	0.23	0.03	< 0.001

Note: TSCS=Self-Concealment, TMAAS=Mindfulness (TMAAS), TKPS=Psychological Distress.

Results indicated substantial negative correlation ( $\beta = -0.31, p = 0.03$ ) between self-concealment and mindfulness, indicating that higher levels of self-concealment are related with lower levels of mindfulness. However, the direct effect of self-concealment on psychological distress was not statistically significant ( $\beta = -0.07, p = 0.18$ ), whereas the direct effect of mindfulness on psychological distress was significant ( $\beta = 0.23, p < 0.001$ ). This suggests that higher levels of mindfulness are associated with lower levels of psychological distress.

Furthermore, the mediation analysis revealed that mindfulness has a strong indirect effect on the connection between self-concealment and psychological distress. Mindfulness had a significant indirect effect on psychological distress ( $\beta = -0.07, SE = 0.02, LLCI = -0.11, ULCI = -0.03$ ), indicating that it may moderate the association between self-concealment and psychological distress.

**Table 2. Coefficients for Relationships Between Self-Concealment, Psychological Flexibility, and Psychological Distress**

Predictor	Outcome	$\beta$	SE	p-value
TSCS	TPFQ	0.34	0.13	0.01
TSCS	TKPDS	-0.15	0.05	0.01
TPFQ	TKPDS	0.02	0.02	0.36

Note: TSCS=Self-Concealment, TPFQ=Psychological Inflexibility, TKPS=Psychological Distress.

Results indicate a significant negative association between self-concealment and psychological flexibility ( $\beta = -0.34, p = 0.01$ ), signifying that the higher levels of self-concealment are associated

with lower psychological flexibility. Additionally, there is a significant positive association between self-concealment and psychological distress ( $\beta = 0.15$ ,  $p = 0.01$ ), indicating that higher levels of self-concealment are associated with higher levels of psychological distress. However, the direct effect of psychological flexibility on psychological distress was not statistically significant ( $\beta = 0.02$ ,  $p = 0.36$ ).

Moreover, the mediation analysis revealed a significant indirect effect of psychological flexibility on the relationship between self-concealment and psychological distress. The indirect effect of psychological flexibility on psychological distress was significant ( $\beta = 0.01$ ,  $SE = 0.0097$ ,  $LLCI = -0.01$ ,  $ULCI = 0.02$ ), suggesting that psychological flexibility partially mediates the relationship between self-concealment and psychological distress.

## Discussion

The present study's findings provide insight into the complex interactions among psychological distress, psychological flexibility, self-concealment, and mindfulness. Consistent with recent research, the results revealed a substantial negative association between self-concealment and mindfulness, replicating prior findings that those who engage in self-concealment behaviors have lower levels of mindfulness (Keng et al., 2011; Levin et al., 2014). This shows that the inclination to hide or suppress elements of oneself can inhibit the development of present-moment awareness and acceptance, both of which are essential components of mindfulness.

Furthermore, mindfulness's significant indirect influence on the relationship between self-concealment and psychological pain implies that it may guard against psychological distress (Khouri et al., 2015; Shonin et al., 2015). These findings highlight the importance of interventions aimed at strengthening mindfulness capacities, as they may mitigate the harmful effects of self-concealment on mental health outcomes. Given the stigma associated with mental health concerns in Pakistan (Rafique & Echeverri, 2020), developing mindfulness skills may provide individuals with a culturally acceptable way of dealing with psychological discomfort, encouraging resilience and emotional well-being.

Further, the reported inverse relationship between psychological flexibility and self-concealment is consistent with earlier studies that highlight the negative effects of self-concealment on adaptive coping methods (Levin et al., 2012; Weissman et al., 2016). People who keep parts of themselves hidden could find it difficult to accept what has happened to them and show less psychological flexibility, which would make it more difficult for them to react to stressors in an adaptive way. People may feel more pressure to fit in with society's standards in a collectivist culture like Pakistan, where social peace and interpersonal ties are highly valued (Ali & Arooj, 2019). This could make it harder for them to adapt flexibly to stressors.

Moreover, psychological flexibility could potentially have a role in mediating this correlation, given the noteworthy indirect influence it has on the relationship between psychological distress and self-concealment (Feroz et al., 2018; Levin et al., 2020). According to studies, psychological flexibility may act as a mediator in the relationship between psychological distress and self-concealment, as evidenced by the noteworthy indirect influence of psychological flexibility on this relationship (Kashdan & Breen, 2020). In a variety of cultural situations, psychologically focused interventions have demonstrated potential in enhancing psychological well-being (Hayes et al., 2021). This stresses that psychological flexibility exerts a significant indirect impact on the connection between psychological distress and self-concealment, highlighting the significance of culturally sensitive therapies that take into account Pakistan's particular sociocultural setting. Interventions that foster psychological flexibility can enable people to negotiate cultural norms while maintaining their psychological health, which can lead to more flexible coping mechanisms and better mental health outcomes.

The results of the present investigation are corroborated by international research in addition to national investigations. According to Hoge et al. (2015)'s meta-analysis, for instance, mindfulness-based therapies are successful in lowering psychological distress symptoms in a variety of demographics. Similarly, research from Western cultures has shown that self-concealment negatively impacts mental health outcomes (Kashdan & Adams, 2014), highlighting the importance of addressing self-concealment in mental health interventions across cultural boundaries.

Subsequent studies may delve deeper into the dynamic and longitudinal character of these connections, examining the ways in which alterations in psychological flexibility, mindfulness, and self-concealment across time influence psychological discomfort. Further understanding of the intricate interactions between these variables may also be gained by looking at potential moderators such as personality traits and social support.

As a result, the current study highlights opportunities for further investigation and clinical practice while emphasizing the significance of addressing self-concealment and encouraging mindfulness and psychological flexibility in therapies meant to improve mental health outcomes.

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ANALYSIS OF MECHANICAL AND THERMAL STRESSES IN POROUS HYGRO-THERMAL CYLINDER IN FRACTIONAL ORDER DERIVATIVE

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Abstract

The governing equations for hygro-thermal porous cylindrical medium in fractional order derivative are formulated. Mathematical expression for distribution of mechanical and thermal stresses are derived. Effect of hygro-thermal parameter on radial and tangential displacement are studied. The numerical results for a particular material are illustrated graphically to observe these effects. Variations of displacement, stresses are shown graphically. The equation of plane motion in cylindrical co-ordinate system in r-z plane without body forces and having the displacement components of displacement vector  $\mathbf{u} = (u_r, u_z)$ , The cylindrical polar coordinates  $(r, z)$  with symmetry about z-axis are constituted as

The constitutive equations have the forms

$$\begin{aligned} \sigma_{rr} &= (\lambda + 2\mu) \frac{\partial u_r}{\partial r} + \lambda \frac{u_r}{r} + \lambda \frac{\partial u_z}{\partial z} - \gamma^t T - \gamma^m m + \zeta \psi, \\ \sigma_{\theta\theta} &= \lambda \frac{\partial u_r}{\partial r} + (\lambda + 2\mu) \frac{u_r}{r} + \lambda \frac{\partial u_z}{\partial z} - \gamma^t T - \gamma^m m + \zeta \psi, \\ \sigma_{zz} &= \lambda \frac{\partial u_r}{\partial r} + \lambda \frac{u_r}{r} + \lambda \frac{\partial u_z}{\partial z} - \gamma^t T - \gamma^m m + \zeta \psi, \\ \sigma_{zr} &= 2\mu e_{rz}, 2e_{rz} = \frac{\partial u_r}{\partial z} + \frac{\partial u_z}{\partial r}, e_{zz} = \frac{\partial u_z}{\partial z}, e_{rr} = \frac{\partial u_r}{\partial r}, e_{\theta\theta} = \frac{u_r}{r}, \\ g^* &= -\zeta e_{ij} - d\psi + \xi^t T + \xi^m m, \end{aligned}$$

The motion equation will be in the form

$$\begin{aligned} (\lambda + 2\mu) \left( \frac{\partial^2 u_r}{\partial r^2} + \frac{1}{r} \frac{\partial u_r}{\partial r} - \frac{u_r}{r^2} \right) + \mu \frac{\partial^2 u_r}{\partial z^2} + (\lambda + \mu) \frac{\partial^2 u_z}{\partial r \partial z} \\ - \gamma^t \frac{\partial T}{\partial r} - \gamma^m \frac{\partial m}{\partial r} + \zeta \frac{\partial \psi}{\partial r} = \rho \frac{\partial^2 u_r}{\partial t^2}, \\ (\lambda + 2\mu) \frac{\partial^2 u_z}{\partial z^2} + (\lambda + \mu) \left( \frac{\partial^2 u_r}{\partial r \partial z} + \frac{1}{r} \frac{\partial u_r}{\partial z} \right) + \mu \left( \frac{\partial^2 u_z}{\partial r^2} + \frac{1}{r} \frac{\partial u_z}{\partial r} \right) \\ - \gamma^t \frac{\partial T}{\partial z} - \gamma^m \frac{\partial m}{\partial z} + \zeta \frac{\partial \psi}{\partial z} = \rho \frac{\partial^2 u_z}{\partial t^2}, \end{aligned}$$

$$\begin{aligned}
 D_h \left( \frac{\partial^2 T}{\partial r^2} + \frac{1}{r} \frac{\partial T}{\partial r} + \frac{\partial^2 T}{\partial z^2} \right) + d_h \left( \frac{\partial^2 m}{\partial r^2} + \frac{1}{r} \frac{\partial m}{\partial r} + \frac{\partial^2 m}{\partial z^2} \right) - \frac{\partial T}{\partial t} \\
 - \frac{\gamma^t T_0}{\rho C_E} \left( \frac{\partial^2 u_r}{\partial t \partial r} + \frac{\partial^2 u_z}{\partial t \partial z} \right) + \xi^t \frac{\partial \psi}{\partial t} = 0, \\
 D_m \left( \frac{\partial^2 m}{\partial r^2} + \frac{1}{r} \frac{\partial m}{\partial r} + \frac{\partial^2 m}{\partial z^2} \right) + d_m \left( \frac{\partial^2 T}{\partial r^2} + \frac{1}{r} \frac{\partial T}{\partial r} + \frac{\partial^2 T}{\partial z^2} \right) - \frac{\partial m}{\partial t} \\
 - \frac{\beta^m m_0 D_m}{k_m} \left( \frac{\partial^2 u_r}{\partial t \partial r} + \frac{\partial^2 u_z}{\partial t \partial z} \right) + \xi^m \frac{\partial \psi}{\partial t} = 0,
 \end{aligned}$$

**Keywords:** Porous cylinder, Hygro-thermal-elasticity; Stress distribution, Fractional order derivative.

**RISK FACTORS AND NUTRITIONAL SUPPORT IN PATIENTS WITH  
HYPERGLYCEMIA**

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**ABSTRACT**

Diabetes mellitus (sugar disease) is a chronic disorder of carbohydrate metabolism characterized by an increased concentration of glucose in the blood (hyperglycemia). Glucose from the digestive tract is transferred through the blood to the cells, where it is used as a source of energy. Insulin is a hormone that allows glucose from the blood to enter the cells. When there is enough insulin, glucose enters the cells, so its concentration in the blood is kept at a low level. Disturbance of carbohydrate metabolism occurs with an absolute lack of insulin (Diabetes mellitus type 1) or if there is resistance to insulin (Diabetes mellitus type 2). Glycosylated (glycated) hemoglobin (HbA1c) is an important biomarker for diagnosing and monitoring diabetes, which gives us information about the average level of glucose in the blood over the last 2 to 3 months. Hemoglobin is a protein found in erythrocytes and its main function is to transport oxygen throughout the body. At the same time, blood glucose is not enzymatically bound to hemoglobin (hemoglobin is glycated), which results in HbA1c. A normal HbA1c level in people who do not have diabetes is between 4.5% and 6.2%. Values between 6.2% and 6.5% indicate an increased risk of diabetes, and if the level is above 6.5%, it is a sign of diabetes. Poor diabetes control leads to an increased risk of complications from the disease, so it is recommended that the HbA1c value be below 6.5%. People who have diabetes should control HbA1c every 3 months. 245 respondents were analyzed. The division is made according to the type of therapy used, namely oral, insulin and combined. The results indicate a significant improvement in the condition of the patients, which corresponds to the values of the HbA1c marker.

At the same time, in order to determine the risk factors for the occurrence of hyperglycemia and how they affect the level of glucose in the blood, to determine the eating habits and physical activity habits of people with hyperglycemia, a study was conducted that included 150 patients with hyperglycemia in Kosovo, with the help of an online questionnaire that included patients with hyperglycemia, complemented by a biochemical analysis of the blood of these patients. Also, the value of glucose in the blood was taken into account, as well as anthropometric measurements, which were used to calculate the body mass index of each patient (that is, the BMI index).

In order to determine the relationship between risk factors, as well as food habits, with the level of glucose in the blood, i.e. with hyperglycemia, the responses from the questionnaire were sublimated, the BMI values were calculated and with the help of the regression analysis, the Pearson's correlation coefficient was calculated (which shows the size of that connection, that is, the degree of strength of the connection between the variables) and the coefficient of determination (shows the direction of that connection). Results where  $p < 0.05$  are considered significant. With increasing awareness of the relationship between nutrition and health, attention is being paid to functional, nutritional and fortified food products, as well as dietary supplements, which will minimize the risk of diseases including type 2 diabetes and provide health benefits.

**Key words:** hyperglycemia, risk factors, nutritional support.

IN THE TWO ALZHEIMER RAT MODEL, BOVINE LACTOFERRIN TREATMENT IMPROVES COGNITIVE FUNCTIONS BY REDUCING A $\beta$ /TAU ACCUMULATION

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**ABSTRACT**

Alzheimer's disease (AD) is a neurodegenerative disorder characterized by progressive cognitive decline. Treatment approaches aim to delay the onset/progression of the disease. There is an urgent need to develop new therapeutic agents to provide definitive treatment. Bovine lactoferrin (bLf) was first isolated from cow's milk hence its name. bLf is an iron-binding glycoprotein. The intestinal and systemic immunomodulatory effect of oral bLf intake is evidence that it may have a regulatory effect on similar pathological processes of AD. In this study, we evaluated the potential of bLF to regulate A $\beta$ /Tau pathology in AD and its contribution to cognitive processes. In the two AD rat models induced by okadaic acid (OKA) (Tau model) and colchicine (A $\beta$  model), seven groups were performed (6 animals in each group) and a total of 42 animals were studied. Groups; 1- Control, 2- PBS, 3-bLf, 4- colchicine, 5- OKA, 6- Colchicine+bLF, 7- OKA+bLF. Morris water maze and open field tests were applied to the groups for cognitive analysis before and after treatment. At the end of the tests, hippocampus, cerebrospinal fluid (CSF), and serum sampling were performed. ELISA (A $\beta$ , Tau, Ferritin, TAS, and TOS), gene expression (*Fpn*, *Bax*, *Bcl-2*, *p38*, *FoxO*, and *GSK-3 $\beta$* ), and data analyses were performed on these samples. The results showed that bLf provided cognitive improvement. In addition, A $\beta$ /Tau levels decreased in the hippocampus and cerebrospinal fluid (CSF) after treatment. Iron levels were relatively decreased in the hippocampus, serum, and CSF. While two genes were downregulated (*Fpn* and *Bcl-2*) in AD hippocampus tissue, their upregulation was detected after treatment, and the other four genes were downregulated (*Bax*, *p38*, *FoxO*, and *GSK-3 $\beta$* ) while they were upregulated in AD. TAS and TOS analyses demonstrated the antioxidant effect of bLF in the AD hippocampus.

**Keywords:** Alzheimer's Disease, Okadaic acid, Colchicine, CSF, hippocampus, bovine lactoferrin, ferritin.

## INTRODUCTION

Alzheimer's disease (AD) is a neurodegenerative disease characterized by progressive cognitive deficits. In the definitive diagnosis of the disease,  $A\beta$  accumulation and tau fibrillation are sought by postmortem sampling. In the biology of AD, there is a dysfunction of several pathways that results in the loss of synaptic homeostasis [1]. The biggest problem in AD is that it begins with short-term memory loss and individuals ignore this onset. Therefore, this neglect of disease progression increases severity and degeneration in older ages. The genetic basis of AD is complex and there are many genes other than the known AD-related genes. However, none of them are directly responsible for the formation of the disease and they are targets with poor treatment potential. While functional capacity is relatively preserved in mild cognitive impairments in patients with AD, in the case of advanced dementia, independence is lost and daily life is affected. The distinct clinical phenotype is gradual and progressive dementia accompanied by amnesic symptoms [2]. Currently, although clinical markers (CSF, tau, PET) in the diagnosis of AD facilitate the diagnosis, they are not practical examples that can be used frequently to follow complex cognitive processes and prognosis. Therefore, there is a need for urgent treatment approaches that do not require repeated biological sampling to slow or eliminate progression in patients whose onset is predicted by tests.

In this study, we planned two different drug-induced Alzheimer's rat models with bovine lactoferrin, which will reduce/eliminate  $A\beta$  and tau proteins in AD pathology and show the result of this treatment with diagnostic markers.

## RELATED WORKS

Central nervous system (CNS) diseases are one of the important health problems all over the world. Oxidative stress load increases in disease-related tissues and an inflammatory response develops. The lactoferrin (LF) is contained in mammalian milk and binds iron. It can penetrate cells and is delivered to serum, bile, and CSF. It has a wide spectrum of action [3]. bLf is an iron-binding glycoprotein from the transferrin family and has many functions such as iron distribution, antiviral, immunomodulatory, antimicrobial, antitumor, antioxidant, and prebiotic. Therefore, it can be a good tool in the treatment of diseases. The limited natural sources of LF which is used as a nutritional supplement, are a limitation for its use in high amounts. There are studies on synthetic LF use as antimicrobials [4]. Among the studies on bLf, its effect on the COVID-19 pandemic, which has recently affected the whole world, is noteworthy. The results demonstrated the effectiveness of bLF derived from the human lung cell line (H1437) on SARS-CoV-2. Additionally, bLF strongly affects different viral strains [5]. Although its viral and tumoral effects have been studied, there is limited data on its effect on neurodegenerative diseases.

## MATERIALS and METHODS

Study permissions were received from Gaziantep University Animal Experiments Local Ethics Committee (271/2022). This research was supported by Gaziantep University Scientific Research Projects (SBF.YLT.22.08). The study created two different AD models for  $A\beta$  and tau fibrillation. 42 Wistar albino female rats (10-12 weeks, 200-250 g) were included in the model. Rats were randomly assigned to 6 groups. Groups; Control, phosphate buffer saline (PBS), bLf, colchicine (COL), okadaic acid (OKA), COL+bLf, OKA+bLf. The study created two different AD models for  $A\beta$  and tau fibrillation. 42 Wistar albino female rats (10-12 weeks, 200-250 g) were included in the model. Rats were randomly assigned to 6 groups. Groups; Control, phosphate buffer saline (PBS), bLf, colchicine (COL), okadaic acid (OKA), COL+bLf, OKA+bLf. OKA for the  $A\beta$  model and COL for the tau model were performed intracerebroventricularly (ICV) with stereotaxic surgery. Memory loss was tested with cognitive analyses (Morris Water Maze-MWM test and Open Field-OFT test). Cognitive tests were performed again at the end of treatment in the bLF-treated groups. Then, CSF sampling was performed under anesthesia, and hippocampal tissues were removed. Finally, serum was obtained by taking intracardiac blood. Total antioxidant (TAS), total oxidant (TOS), ferritin, and gene expression analyses were performed on these samples.

The MWM test was performed in a water-filled pool. The pool was covered with black paint and divided into 4 equal parts. Different colored symbols were placed on each dial. The platform was positioned in a random quadrant, 1 cm below the water. According to the principle of the test, the rats

were subjected to learning for 4 days, and the probe trial was performed on the sixth day. During the learning process, rats were released into the pool from each quadrant. He was allowed to swim for 120 sec. At the end of the period, they were directed to the platform and allowed to stand on the platform for 5 sec. Rats that learned this behavior for 4 days were expected to find the removed platform on the fifth day. Behaviors were recorded using an automated system with a camera (Ethovision). Probe trials were taken as basis in evaluating the results and latency time, distance traveled, and speed were calculated.

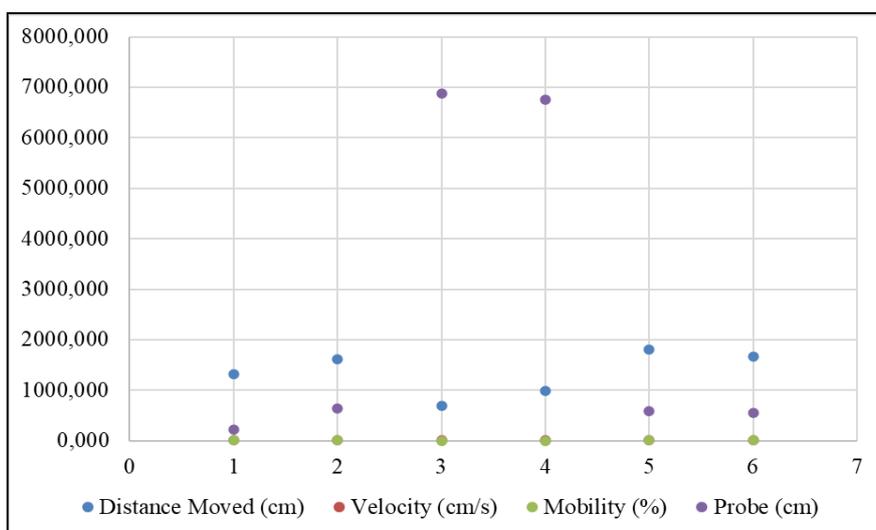
The OPF test designed to test anxiety behavior was used to determine the anxiety level of the animal depending on the time it spent in a closed box. In the test, rats were released from one side of the box. He was allowed to move freely for 5 minutes and his behavior was recorded by an automatic system. Immobilization, total distance traveled, and time spent at the edge, corner, and middle were calculated.

After behavioral experiments, CSF was sampled under anesthesia, and hippocampal dissection was performed from whole brain tissue. Serum and tissues were partitioned for ELISA and gene expression. TAS (Elabscience), TOS (Elabscience), and ferritin levels (Fine Test) were measured calorimetrically from serum, brain, and CSF using a spectrophotometer with an ELISA kit according to manufacturer protocol. For gene expression analyses, total RNA was obtained. Then, complementary DNA (cDNA) was obtained from total RNA in a thermal cycler (Veriti), and expression changes were detected with Real-Time PCR (Rotor-Gene Q). A total of 10 µL of the reaction mixture was prepared for cDNA analyses. Reaction mix; 5XRT Buffer, oligo dT (10 µM), random primers (10 µM), total RNA, OneScript®Plus RTase, and nuclease-free H<sub>2</sub>O. Incubation conditions; 15 min at 55 °C and 5 minutes at 85° C. Expression changes were performed by quantitative comparative analysis. The 20 µl reaction mixture contained 2X SYBR mix, 10X primer, and nuclease-free ddH<sub>2</sub>O. Incubation conditions; 1 cycle of 15 min at 95°C, 5 sec at 94°C, and 40 cycles of 30 sec at 60°C.

SPSS 22.0 package program was used in statistical analyses. Onw-Way ANOVA was used for differences between groups, and Mann-Whitney U or Kruskal-Wallis tests were used for comparisons between the groups. ΔΔCt values were used to evaluate the results and fold change values were calculated with  $2^{-\Delta\Delta Ct}$ .

**RESULTS AND DISCUSSIONS**

MWM analyses indicate cognitive improvement under the influence of bLf in both AD models. In the mechanism where losses in learning behavior were demonstrated with the MWM test, an improvement was detected in the time to find the platform after treatment. The difference between the groups was statistically significant (P < 0.05)



**Figure 1.** MWM test result of groups.

It was shown that the anxiety behavior analyzed in OFT tests decreased with bLf treatment. The test determined that the AD model groups spent more time on the edge and in the corner, their movements were slower and their speed was lower. After bLf treatment, speed and mobility were observed while the time spent in the middle area increased. The difference between the AD model and treatment groups was significant ( $P < 0.05$ ) (Figure 2).

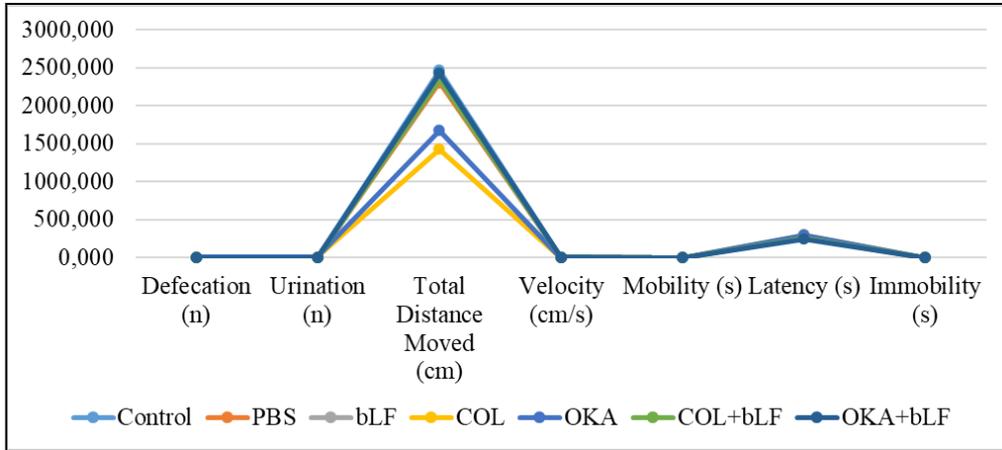


Figure 2. OFT test results of groups.

Differential changes between genes were statistically significant between the groups ( $P < 0.05$ ) (Figure 3).

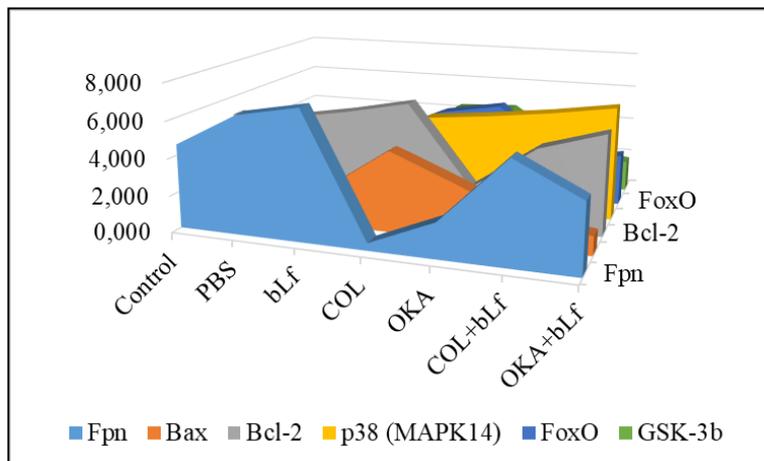


Figure 3. Gene expression differences of groups.

Ferroportin is a transmembrane protein that transports iron from inside the cell to the outside of the cell [6]. Fpn is a membrane protein that transports intracellular iron out of the cell. It is the only known iron exporter [7]. *Fpn* is downregulated in AD models and upregulated after treatment. Its downregulation during the disease process may increase intracellular iron accumulation and death after the cell's iron load increases. Upregulation after bLf treatment is associated with the protein gaining its function and thus ensuring cell survival by reducing the iron load in the cell. BAX is a pro-apoptotic protein [8]. Its expression is present in almost all tissues [9]. Expression changes of BAX in some cases may be related to disease onset, progression, and therapeutic efficacy. BAX is associated with neuronal cell death [10]. Neuronal losses are an expected process in the normal aging brain. What matters are severe and permanent losses. BAX is upregulated in the AD brain [11]. Both AD models in this study support upregulation. Behavioral experiments supported by MWM and OFT have also shown that downregulation with bLf can reduce neuronal losses. On the other hand, BCL2 is

downregulated in the AD brain and causes neuronal degeneration [12]. Upregulation of BCL2, which is downregulated in AD models, under the influence of bLf, was also supported by cognitive recovery. Mitogen-activated protein kinases (MAPKs) are members of the serine/threonine protein kinase family and are involved in signaling pathways that regulate various cellular functions in response to stimuli [13]. One of the most widespread members among these is p38, which is induced by proinflammatory cytokines and environmental stress [14]. p38 dysfunction is associated with various diseases that involve neuroinflammation and cognitive impairment [15]. p38 is a therapeutic target in AD and there is no definitive biological or chemical agent for its inhibition. p38 is upregulated in the AD brain [16]. In our study, p38 was downregulated in the treatment groups. The ability of bLf to regulate the activity of p38 indicates its therapeutic potential in AD as a natural agent. Aging is a natural process. Maintaining healthy aging is very difficult. FoxO is a transcription factor. It is involved in many metabolic pathways and also plays a role in the aging process. Its evolutionary conservation makes the protein even more important. Its dysfunction is often linked to age-related pathologies [17]. FoxO, a potential target in the treatment of AD, is upregulated in the patient's brain. The regulation of *FoxO*, which is downregulated by bLf, was supported by oxidative metabolism data and behavioral results. GSK-3 $\beta$  is also a serine/threonine kinase. Its increased activity in AD is related to the pathology of the disease via *A $\beta$*  and tau toxicities [18]. *GSK-3 $\beta$*  is upregulated in the hippocampus of our AD models. There is cognitive decline as demonstrated by behavioral tests. Cognitive gain was also achieved by the downregulation of bLf. As a result, bLf treatment may be an alternative for AD.

bLf, TAS, and TOS states in hippocampal tissue show the antioxidant nature of bLf, which is already used as a nutritional supplement ( $P < 0.05$ ). Therefore, its contribution to regulating oxidative metabolism is important in AD, where the ROS process is actively experienced. The fact that ferritin levels are high in the AD hippocampus and low after bLf shows that tissue and neuronal iron load can be reduced. Biomarkers in AD are *A $\beta$*  and tau in CSF. It is a clinically supportive example that can be diagnosed while the patient is alive [19]. In this study, *A $\beta$*  and tau protein levels were high in CSF samples from AD models. The decrease in levels after bLf indicates treatment response ( $P < 0.05$ ).

In this study, in which 2 different pathologies of AD were modeled, the data show that bLf treatment can be effective on many processes in the pathology of AD and has cognitive and angiogenic potential.

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**COVID-19 VACCINATION DYNAMICS AND PUBLIC PERCEPTIONS: IMPLICATIONS FOR POST-PANDEMIC PLANNING**

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**ABSTRACT**

As the world transitions into the post-pandemic era, understanding vaccination behaviors, motivations, and concerns during COVID-19 can provide valuable insights for public health initiatives, future vaccination campaigns, and potential strategies for managing other infectious diseases. Thus, the aim of this study is to assess vaccination patterns and attitudes within the Albanian community through a comprehensive survey conducted from May 2022 to January 2023. Our study involved 1004 participants, with a majority being females (79.6%) and falling within the age groups of 20 to 30 years (42.8%) and 31 to 40 years (41.2%). 83.4% of participants had received the COVID-19 vaccine at the time of the survey, while 16.6% were unvaccinated. Reasons for vaccination varied, with 45.1% citing workplace or travel requirements and 40.0% expressing trust in vaccine safety. 53.1% of vaccinated participants reported experiencing side effects, predominantly fever (42.4%) and injection site pain (42.1%). Of those experiencing side effects, 40.3% used drugs such as antipyretics (79.8%) to manage symptoms. Among those who remained unvaccinated, a spectrum of concerns and beliefs emerged. For instance, 28% of participants doubted vaccine efficacy, 34.8% feared safety issues, 8.8% opposed vaccines, 7.6% perceived COVID-19 as manageable, 4% feared injections, 3.2% preferred traditional medicine, and 2% had past vaccine issues. In conclusion, our study offers significant insights into COVID-19 vaccination patterns and attitudes within the Albanian community, highlighting a predominantly favorable disposition towards vaccination. However, significant barriers to vaccination persist, including concerns about efficacy, safety, and distrust in vaccines. Addressing these challenges through targeted interventions is crucial for fostering widespread immunization coverage and effectively managing infectious diseases in the post-pandemic landscape.

**Keywords:** vaccination patterns, attitudes, COVID-19, Albanian community.

NEONATAL ENDOCRINE DYSFUNCTION AND DISEASES

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**ABSTRACT**

Many transient endocrinologic disorders are frequently seen in newborn period. Early diagnosis and treatment is important for babies. Here we review the transient endocrinopathy of newborn. Blood sugar problems, especially adrenal insufficiency due to adrenal problems, thyroid problems such as transient hypotiroptropinemia, are frequently encountered by physicians. Genital and urinary problems should be evaluated differently according to gender. Problems related to calcium metabolism, problems associated with water metabolism and endocrine skin problems are other problems.

The physiology and regulation of bone minerals in the fetus and the newborn is significantly different from children and adults. The bone minerals calcium, phosphate and magnesium are all maintained at higher concentrations *in utero* to achieve adequate bone accretion. This is an integral component of normal fetal development which facilitates safe neonatal transition to post-natal life. When deciphering the cause of bone mineral disorders in newborns, the potential differential diagnosis list is broad and complex, including several extremely rare conditions. Also, significant discoveries including new embryological molecular genetic transcription factors, the role of active placental mineral transport, and hormone regulation factors have changed the understanding of calcium and phosphate homeostasis in the fetus and the newborn. Endocrine disorders develop commonly in preterm neonates and critically ill neonates. Preterm newborns have immature endocrine system as well as immature organs. Their adaptation to extrauterine life might be more challenging and more unfavorable. The most common endocrine disorders in the sick and preterm newborn are thyroid disorders, hypocalcemia, adrenal insufficiency and disorders of glucose metabolism. To detect the endocrine problems appropriately and to find best approaches to them, pediatric neonatologists and endocrinologists should be well aware of the epidemiology, pathophysiology, clinical characteristics and effective management of common endocrine disorders in the sick and preterm newborns. The thyroid axis is a prime example of the physiologic interactions between the mother, the fetus, and their environment. Congenital hypothyroidism is one of the most common preventable causes of mental retardation. The discovery of the crucial role of maternal iodine intake for the normal development of the fetus also led to the first successful intervention in preventive medicine. The use of iodized salt at the population level resulted in a marked decrease in the prevalence of goiter in children and the disappearance of “endemic cretinism” in the industrialized world. The newborn screening program for congenital hypothyroidism is hailed as an unqualified success. At present, most severe cases of congenital hypothyroidism are caused by developmental defects of the thyroid and, albeit much less frequently, to defective pituitary control of thyroid function. It is essential to know the normals of the hormones in the neonatal period in order to recognize them properly, to evaluate them properly and to interpret the tests correctly.

**Keywords:** diagnosis, management, newborn, transient endocrinologic problems

**UNDERSTANDING THE IMPACT OF DEREGULATED IMMIGRATION POLICIES ON SKILLED HUMAN CAPITAL FORMATION BY STUDY MIGRANTS IN OVERLAPPING GENERATIONS ECONOMIES**

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**ABSTRACT**

This study deals with skilled human capital formation under the mobility of students and workers. Specifically, it attempts to clarify whether study migrants are motivated to build skilled human capital in the dynamic context as host countries increase the acceptance of unskilled non-native workers, i.e. those who come to host countries to work as unskilled workers and those who come to study and become unskilled workers. The analysis assumes an overlapping generations economy and solves maximisation problems to derive solutions analytically. Countries pursue to increase domestic skilled human capital by attracting skilled labour migrants and promoting the retention of study migrants as skilled workers after their education. Simultaneously, some countries admit unskilled non-natives to address unskilled labour shortages. When an unskilled job is a viable option for study migrants after graduation, they might diminish their incentive to build skilled human capital. This study reveals that, in the short run, study migrants are inclined to accumulate more skilled human capital, even when host countries embrace more unskilled non-native workers. It also uncovers that these policies can coexist harmoniously in steady state. Specifically, the skilled human capital of study migrants is likely to increase in steady state with the simultaneous increases in an increase of unskilled non-native workers. These findings suggest that seemingly inconsistent policies are compatible and can achieve their respective objectives temporarily and permanently. They also justify immigration policies actually conducted by many countries.

**Keywords:** immigration policies, deregulation, human capital, study migration, labour migration, skilled labour, unskilled labour, overlapping generations economy

**TÜKETİCİLERİ PLANSIZ SATIN ALMA DAVRANIŞINA İTEN NEDENLER  
REASONS THAT LEAD CONSUMERS TO UNPLANNED BUYING BEHAVIOR**

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**ÖZET**

Her tüketicinin satın alma kararları verirken dikkate aldığı kriterler aynı değildir. Bazı tüketiciler rasyonel davranarak ürün/hizmetin fonksiyonel özelliklerini dikkate alırken bazıları ise daha duygusal kararlar vermektedir. Benzer şekilde kararlar planlı bir şekilde gerçekleşirken bazen de anlık, plansız olarak gerçekleşmektedir. Bu davranış literatürde plansız satın alma davranışı olarak yer almaktadır. Plansız satın alma davranışı tüketicinin ürün/hizmetten ziyade kendisiyle ilgili bir durumdur. Tüketici bir satın alma planı yapmadan hissettiği kuvvetli dürtülerle anlık olarak satın alma yapmaktadır. Bu davranışı mağaza ortamlarından, kendisine sağlanan kolaylıklardan, anlık duygu durumlarından etkilenerek veya sahip olduğu kişilik özellikleri gibi çeşitli nedenlerle gerçekleştirmektedir. Bu çalışmada da tüketicileri plansız satın alma davranışına iten nedenler araştırılmaktadır. Bu doğrultuda Dergipark ve Google Akademi’de tüketici davranışlarıyla bağlantılı olarak konu ile ilgili ele alınan 25 adet çalışma incelenmiştir. İncelemeler sonucunda tüketicilerin hedonik ve faydacı tüketimden, mağaza ortamlarından, kendilerine sağlanan kolaylıklardan, deneyimlerden, anlık duygu durumlarından, işletmelerin reklamlarından ve sahip oldukları kişilik özelliklerinden etkilenerek plansız satın alma davranışlarında bulunduğu görülmüştür.

**Anahtar Kelimeler:** Tüketici davranışları, Plansız satın alma davranışı, Dergipark, Google Akademi

**Abstract**

The criteria that each consumer considers when making purchasing decisions are not the same. Some consumers take into account the functional characteristics of the product/service by acting rationally, while others make more emotional decisions. Similarly, decisions are made in a planned way and sometimes they happen instantly and without a plan. This behavior is included in the literature as unplanned buying behavior. Unplanned purchasing behavior is a situation that concerns the consumer rather than the product/service. The consumer is buying momentarily with the strong impulses he feels without making a purchase plan. This behavior is carried out by being affected by the store environments, the conveniences provided to it, instant feelings or for various reasons such as personality traits it has. In this study, the reasons that drive consumers to unplanned purchasing behavior are investigated. In this direction, 25 studies on the subject in connection with consumer behavior in Dergipark and Google Academy have been examined. As a result of the reviews, it has been seen that consumers are in unplanned purchasing behavior, influenced by hedonic and utilitarian consumption, store environments, convenience provided to them, experiences, instant feelings, advertisements of businesses and personality traits they have.

**Keywords:** Consumer behavior, Unplanned buying behavior, Dergipark, Google Academy

## Giriş

Tüketiciler satın alma davranışlarında bulunurken kararları zaman zaman çok basit bir şekilde alabilirken bazen de bu kararlar çok karmaşık bir hal alabilmektedir. Bu nedenle de tüketicilerin satın alma kararları çeşitli araştırmalara konu olmaktadır. Tüketiciler kararlarını verirken ürünün kendisine sağlayacağı fayda ve sahiplik gibi her zaman rasyonel kararlar değil duygusal veya deneyime dayalı olarak da kararlar verirler.

Plansız satın alma, Tüketicilerin ürün veya hizmetleri tercih etmelerinin altında yatan nedenler araştırılırken dikkate alınması gereken bir satın alma davranışıdır. Bu davranış biçimi tüketicinin bir alışverişi önceden planlamadan, mağaza içerisinde anlık olarak hissettiği güçlü ve ısrarlı bir dürtü ile gerçekleşir (Altunışık, 2007). Plansız satın alma davranışı ürün/hizmetlerle ilgili değil tüketicinin kendisiyle ilgidir ve tüketicinin düşünmeden gerçekleştirdiği bir davranıştır (Beatty & Ferrell, 1998).

Plansız satın alma davranışı genel olarak tüketicinin, alışverişe dair aklında hiçbir satın alma düşüncesi bulunmazken, mağaza içerisinde çeşitli faktörlere bağlı olarak ani bir karar vererek yapmış olduğu alışveriş türüdür (Altunışık, 2007, s. 124). Yani plansız satın alma davranışı tüketicinin satın alma işleminden önce bir ürün veya hizmete karşı duyduğu ihtiyaç üzerine gerçekleşmez (Beatty & Ferrell, 1998).

Plansız satın alma davranışı hedonik ve faydacı tüketim, zaman baskısı, işletmelerin pazarlama iletişimleri, tüketicilere alışveriş sırasında sağlanan kolaylıklar, memnuniyetler vb. çeşitli konularla bağlantılı olarak açıklanmaktadır. Bu çalışmada da literatürde ilgili konuda yapılan çalışmalar ele alınarak tüketicileri genel olarak plansız satın alma davranışına iten nedenler açıklanmaya çalışılmaktadır. Bu doğrultuda Dergipark ve Google Akademi'de yer alan plansız satın alma ve tüketici ilişkileri ile ilgili toplamda 25 çalışma ele alınarak incelenmiştir. İncelemeler sonucunda tüketicileri plansız satın almaya iten nedenler arasında çoğunlukta hedonik ve faydacı tüketimin yer aldığı görülmektedir. Bunun dışında mağaza atmosferleri, tüketicilere alışveriş ve ödeme işlemlerinde sağlanan kolaylıklar, deneyimler, işletmelerin pazarlama iletişimleri ve bazı kişilik özellikleri tüketicilerin plansız satın alma davranışlarında etkilidir.

## Plansız Satın Alma Davranışı

Plansız satın alma davranışı ile ilgili ilk çalışmalar 1950'li yıllarda gerçekleştirilmiştir. Çalışmalarda plansız davranma herhangi bir şey satın alma niyetinde olmadan satın alma davranışının gerçekleşmesi olarak açıklanmıştır. Bu dönemdeki araştırmalar tüketiciden ziyade tüketicinin satın alma davranışları üzerinde durmuştur (Piron F. , 1991). Ancak ilerleyen zamanlarda plansız satın alma davranışının ürün/hizmetten kaynaklı değil tüketicinin bu davranışına eğiliminde kaynaklı olduğu araştırmalarla ortaya konulmuştur. Tüketiciler bu eylemi beklemedikleri bir anda bazı faktörlerin etkisiyle güçlü satın alma dürtüsü ile gerçekleştirirler (Verplanken & Herabadi, 2001).

Plansız satın alma kavramı ile ilgili çeşitli açıklamalar bulunmaktadır. Genellikle de tüketicinin, alışverişe dair herhangi bir satın alma planı bulunmazken, mağaza içerisinde ani bir kararla yaptıkları alışveriş olarak tanımlanmaktadır (Altunışık, 2007, s. 124). Yani plansız satın alma davranışı tüketicinin satın alma işleminden önce bir ürün veya hizmete karşı duyduğu ihtiyaç üzerine gerçekleşmez (Beatty & Ferrell, 1998). Alışveriş sırasında tüketicinin kendisinde hissettiği ani, ısrarlı ve kuvvetli bir satın alma dürtüsü ile gerçekleşir. Tanım olarak da “Tüketicinin güçlü ve sürekli olarak bir şey satın alma isteğiyle aniden bir ürünü satın alması” şeklinde tanımlanmaktadır (Rook, 1987).

Plansız satın alma davranışı genellikle hedonik tüketim ile bağlantılı olarak araştırılmaktadır. Piron da (1991) gerçekleştirdiği çalışmasında plansız satın alma davranışını hedonik tüketim ile bağlantılı olarak “Hedonik duygularla veya bir uyarıcıya maruz kalarak gerçekleştirilen plansız satın alma” olarak tanımlamaktadır.

Plansız satın alma eğilimi tüketicilerin kişiliklerinden kaynaklı olduğu için bireysel bir farklılık olarak kavramsallaştırılmıştır (Verplanken & Herabadi, 2001). Bununla birlikte plansız satın alma davranışı ruh hali, dürtü, duygular ve hisler gibi durumları içeren duygusal boyut; tüketicide bilişsel düşünememeyi, satın alma davranışını planlayamamayı ve plansız bir şekilde anlık hareket etmeyi etkileyen bilişsel boyuttan oluşmaktadır (Coley & Burgess, 2003).

Tüketiciler satın alma kararı verirken hangi ürünün nereden, ne zaman, nasıl ve ne kadar alacakları gibi çeşitli faktörleri hesaba katarlar. Ancak plansız satın almada tüketiciler bu faktörlerin hepsini düşünmezler. Plansız satın alma süreci normal satın alma sürecinden farklıdır ve genellikle de duygular ön plandadır. Plansız satın almada tüketiciler genellikle davranışlarını kontrol edemezler, psikolojik çatışma yaşarlar ve ürünleri değerlendirme yetilerinde de azalmalar meydana gelir (Özoğlu & Bülbül, 2017).

Tüketiciler tercihlerini etkisinde kaldıkları birçok iç ve dış faktörlere bağlı olarak ilginim düzeylerine göre gerçekleştirirler. Bu noktada da ürün/hizmetlerle ilgili kısa süreliğine bilgi depolarlar. Klasik satın alma sürecinde tüketiciler alternatiflerin değerlendirilmesi aşamasında plansız satın alma sürecine göre daha fazla zaman harcarlar. Yani plansız satın almada tüketiciler alternatiflerin değerlendirilmesine odaklanmazlar. Bunun nedeni kısa süreli hafızalarında depoladıkları bilgileri çeşitli faktörlerin etkisi altında geri çağırarak anlık karar vermeleridir (Kotler, 2004). Plansız satın alma tüketicilerin ürün/hizmetlerle ilgili yeterli bilgiye sahip olmadan, satın almanın öncesine ve sonrasına odaklanılmadan ve satın almaya dair bir plan yapılmadan gerçekleşmektedir. Bu nedenle de tüketiciler genellikle sosyal, psikolojik, fiziksel ve finansal etmenlere odaklanmaktadır (Elmaz, 2017).

Plansız satın alma davranışı dört kategoriden oluşmaktadır. Bunlar: Tamamen plansız satın alma, hatırlatıcı plansız satın alma, önerici plansız satın alma ve planlanmış plansız satın alma (Stern, 1962).

- Tamamen Plansız Satın Alma: Saf plansız satın alma davranışı olarak da adlandırılan bu davranış türünde tüketici normal alışverişlerinden farklı davranmaktadır. Pazara yeni giren bir ürünün satın alması ya da tüketicinin bir ürünü ilk defa görmesi üzerine ihtiyacının olup olmadığını düşünmeksizin satın alma davranışının gerçekleştirilmesidir.
- Hatırlatıcı Plansız Satın Alma: Tüketici alışveriş listesinde olmadığı halde mağazada ürünü görerek ihtiyacı olduğuna karar vermesi ve ürünü satın almasıdır. Örnek olarak ceket ihtiyacı üzerine alışveriş yapan tüketicinin kravat gördüğünde ona da ihtiyacı olduğunu hatırlaması ve kravat da satın almasıdır.
- Önerici Plansız Satın Alma: Tüketicilerin mağazaların, pazarlama stratejilerinin etkisi altında gerçekleştirdikleri davranıştır. Tüketicinin ürüne ihtiyacı yoktur ancak ürünü gördüğünde renginden, kalitesinden vb. etkilenebilir ya da ürüne işlevselliğinden dolayı ihtiyacı olduğunu düşünebilir.
- Planlanmış Plansız Satın Alma: Tüketicinin alışveriş yapmak amacıyla mağazaya gidip alışveriş listesinin dışındaki ürünleri satın almasıdır. Tüketici alışveriş için evden çıktığında planından tamamen uzaklaşmış ve kendine yeni amaçlar belirlemiştir. Örneğin kişi pembe bir kazak almak amacındadır. Ancak mağazaya gittiğinde mavi kazak tercih etmektedir.

Tüketicileri plansız satın alma davranışlarına iten nedenleri araştıran birçok çalışma ve bunların sonuçları vardır. Beatty ve Ferrel (1998) yaptıkları araştırma sonucunda tüketicilerin plansız satın alma davranışlarını kullandıkları ürünün bitmesi üzerine değil, bir etkileşim sonucunda gerçekleştirdiklerini ortaya koymuştur. Bununla birlikte tüketicilerin ürünü gördüklerinde hissettikleri duyguların da satın alma üzerinde etkili olduğunu vurgulamaktadırlar. Başka bir araştırma sonucunda ise mağazadaki uyarıcıların plansız satın alma kararlarının büyük bir kısmında etkili olduğu ortaya konmuştur (Willett & Kollat, 1968). Bayley ve Nancarrow (1998) plansız satın alma kararının tüketicinin ürünü gördüğünde gerçekleştiğini ileri sürmektedir. Tüketici ürünü gördüğünde eksikliğini hisseder ve ürüne ihtiyacı olduğunu düşünerek satın alma davranışında bulunur. Yapılan başka bir araştırma sonucunda da plansız satın almanın herhangi bir alışveriş listesi olmadan, bir uyarılma veya önceden plan yapılmadan tamamen plansız, içgüdüsel ve karşı konulmaz bir istekle gerçekleştiği ortaya konulmaktadır (Baumeister, 2002).

Ürünün az yer kaplaması ve fiyatını düşük olması gibi özellikler de tüketicileri plansız satın almaya iten nedenler arasındadır (Kezer, 2012). Bununla birlikte tüketicinin yaşadığı ruh hali de plansız satın alma üzerinde etkilidir. Kişi alışveriş sırasında çok mutluyse veya tam tersi depresif ruh halindeyken de plansız satın alma davranışında bulunabilmektedir (Ebrahimi, 2013). Bununla birlikte tüketicinin zaman ve bütçesi de onun satın alma davranışlarında etkilidir. Tüketicinin alışveriş yapmak için kısıtlı bir zamanı varsa ve alışveriş emek gerektiriyorsa tüketici plansız satın alma davranışından kaçınabilir. Benzer şekilde eğer ürünün fiyatı yüksek ve bütçesi de kısıtlı ise tüketici yine plansız satın alma davranışından kaçınmaktadır (Bayley & Nancarrow, 1998).

Aşağıda da ülkemizde tüketicileri plansız satın alma davranışlarına iten nedenleri araştıran toplamda 25 çalışma ele alınmıştır. Çalışmaların sonuçlarından hareketle tüketicilerin hangi şartlarda, hangi nedenlere ve faktörlere dayalı olarak plansız satın alma davranışlarında buldukları ortaya konulmaya çalışılmıştır.

## **Tüketicileri Plansız Satın Alma Davranışına İten Nedenler**

Plansız satın alma davranışı üzerine sıklıkla yapılan çalışmalardan biri hedonik tüketimin plansız satın alma ile arasındaki ilişkinin ortaya konması üzerinedir. Tüketim davranışı faydacı ve hedonik tüketim olmak üzere iki boyuttan oluşmaktadır. Faydacı tüketim davranışında tüketici rasyonel bir tüketim davranışında bulunarak tüketimi bir görev olarak görür (Arnold & Reynolds, 2003). Hedonik tüketimde ise tüketim davranışı bir eğlence olarak görülür ve tüketim duygular, algılamalar, fanteziler gibi duygularla bağlantılı olarak gerçekleşir. Kişileri tüketime iten nedenler tüketicinin ürünü kullanmaktan aldığı keyif ve eğlencedir (Holbrook & Hirschman, 1982). Hedonik tüketimin plansız satın alma eğilimine etkisini inceleyen Akturan (2010) hedonik tüketimin plansız satın alma eğiliminde özellikle duygusallık ve bilişsellik boyutları üzerinde etkili olduğu sonucuna varmıştır. Benzer bir çalışmada da sosyal medyanın aracılık rolü ile hedonik tüketim ve plansız satın alma davranışları incelenmiştir. Öğrenciler üzerinde yapılan araştırmada sosyal medya bağımlılığının öğrencilerin hedonik tüketimi ile plansız satın alma davranışında aracılık ettiği yani bir köprü görevi gördüğü sonucuna ulaşılmıştır. Bununla birlikte elde edilen bir diğer sonuç da sosyal medya bağımlılığı arttıkça öğrencilerin hedonik tüketim eğilimi artmakta ve beraberinde plansız satın alma eğilimi de artmaktadır (Yiğit & Yiğit, 2019). Hedonik tüketimin plansız satın almaya etkisini araştıran Kara da (2020) diğer çalışma bulgularında olduğu gibi hedonik tüketimin plansız satın alma davranışı üzerinde etkili olduğu sonucuna varmıştır. Faydacı ve hedonik tüketimi birlikte inceleyen çalışma sonuçlarında her iki tüketim türünün de plansız satın alma kararlarında etkili olduğu sonucuna varmıştır. Ancak hedonik tüketim eğiliminde olan tüketicilerin plansız satın alma davranışının daha yüksek oranda gerçekleştirdiği görülmüştür (Türk, 2018). Faydacı tüketimi ele alan başka bir çalışmada plansız satın alma davranışında marka deneyiminin aracılık rolü incelenmektedir. Çalışma sonucunda diğer çalışmalarda olduğu gibi faydacı tüketimin plansız satın almayı etkilediği görülmüştür. Bununla birlikte marka deneyiminin de bu etkileşimde aracı rolüne sahip olduğu ortaya konulmuştur (Sayan & Sürücü, 2024).

Eskişehir'deki üniversite öğrencilerini kapsayan bir araştırmada öğrencilerin yaşamlarındaki zaman baskısının plansız satın almaya etkisi incelenmiştir. Araştırma sonucunda algılanan zaman baskısının üniversite öğrencilerinde plansız satın almaya sebep olduğu görülmüştür. Cinsiyet bakımından ele alındığında ise kız öğrencilerin erkek öğrencilere göre algıladıkları zamana bağlı olarak plansız satın alma eğilimleri daha yüksektir (Torlak, Doğan, & Özkara, 2013).

Plansız satın alma davranışlarının nedenleri üzerine yapılan çalışmada duygusallık ve bilişsellik faktörleri ele alınmıştır. Çalışma sonucunda plansız satın alma davranışının bilişsel değil tamamen duygusal olduğu sonucuna varılmıştır. Aynı çalışmada demografik faktörlerin plansız satın alma üzerindeki etkileri incelendiğinde ise plansız satın almanın demografik özelliklerle bir ilişkisi olmadığı sonucuna varılmıştır (Dinçer, 2010). Ancak plansız satın alma davranışını tamamen demografik faktörlerle (yaş, cinsiyet, medeni hal, eğitim durumu ve gelir seviyesi) inceleyen bir çalışmada da plansız satın alma davranışının cinsiyete ve yaşa göre farklılık gösterdiği görülmüştür. Yani yapılan araştırmanın sonucunda cinsiyetin ve yaşın plansız satın alma davranışı üzerinde etkili olduğu görülmüştür (Akçay & Özdemir, 2019). Duygusallık üzerine yapılan çalışmaya benzer bir araştırmada da anlık duygu durumunun ve mutluluğun plansız satın alma üzerindeki etkisi incelenmiştir. Yapılan analizler sonucunda da anlık duygu durumunun ve mutluluğun plansız satın alma davranışını etkilediği görülmüştür (Yemez & Karaca, 2019).

Tüketicileri plansız satın almaya iten çeşitli faktörlerden biri de mağaza atmosferleridir. Geleneksel mağaza atmosferi ve mağaza düzeni gibi çeşitli unsurların plansız satın alma üzerindeki etkilerinin araştırıldığı çalışmada mağaza düzeninin plansız satın almada etkili olduğu sonucuna varılmıştır (Beytulova & Yaşın, 2018). Fiziksel mağaza atmosferlerinin dışında e-ticaret sitelerinin yani e-atmosferlerin plansız satın alma üzerindeki etkilerini araştıran çalışma sonuçlarında e-atmosferlerin de tüketicilerin plansız satın alma davranışlarında etkili olduğu görülmüştür (Bayramoğlu, Özata, Korkut

Altuna, & Arslan, 2019). Benzer bir çalışmada da mağaza atmosferinin yalnızca raf yönetimi ele alınmıştır. Raf yönetimi boyutlarının plansız satın alma üzerinde etkilerinin incelendiği çalışmada boyutlardan yalnızca mağaza içi raf yerleşimi boyutunun etkili olduğu görülmüştür (Kahraman & Kırbıyıklıoğlu, 2021).

Teknolojik gelişmeler işletmelerin kendilerini değiştirmeleri ve geliştirmelerinde etkili olmaktadır. Tüketicilerin yaşamlarını kolaylaştıracak, alışverişlerini kolaylıkla yapabilecekleri yenilikler meydana getirmektedirler. Tek tuşla ödeme kolaylığı ve tüketicileri indirim ve kupon kazanma arzusuna iten çevrimci kuponlar yeniliklere örnektir. Bu uygulamaların plansız satın alma davranışı üzerindeki etkilerini araştıran bir çalışmada işletmelerin tüketicilerine sunduğu online (çevrimiçi) kuponların tek tuşla ödeme kolaylığı ve plansız satın alma üzerinde etkili olduğu görülmektedir (Öztürk, Kırmızıyaka, & Akın, 2021). Teknoloji ile bağlantılı olarak dijitalleşme de markaları değişime zorlayan bir faktördür. Alışverişlerin online ortamlarda var olması ve tüketicilerin genellikle bu ortamlarda alışveriş yapmaları işletmeleri bunlara uyum sağlamak ve pazarlama iletişimi ve reklamlarına online kanalları dahil etmek zorunda bırakmaktadır. Reklamların gelenekselden ziyade çevrimiçi olmaları araştırmacıları yeni konularda çalışmalar yapmaya yönlendirir. Çevrimiçi reklamların tüketiciler üzerindeki plansız satın alma davranışlarına etkilerini araştıran çalışmalar buna örnektir. Yapılan araştırmalar sonucunda tüketicilerin çevrimiçi reklamlardan etkilendiği, ihtiyaç duymadığı veya bir alışveriş planı olmadığı halde reklamlarda gördükleri ürün/hizmetleri satın aldıkları ortaya konulmuştur (Kaplan Ergül & Başar, 2023). Benzer bir çalışmada da reklam değerinin plansız satın alma üzerinde etkili olduğu sonucuna varılmıştır (Dağıstan & Akgül, 2023).

Plansız satın alma davranışlarını kişilik özellikleri ile ele alan bir çalışmada kişilik özellikleri A ve B tipi kişilik özellikleri olarak ele alınmıştır. A tipi kişilik özellikleri daima hareketli, sabırsız, agresif, rekabetçi; B tipi kişilik özellikleri ise daha sabırlı, dinlenmeyi seven, aceleci olmayan şekilde ele alınmaktadır. Araştırma sonuçlarında B kişilik özelliklerine sahip tüketicilerin daha fazla plansız satın alma davranışında buldukları görülmüştür (Bora Semiz, 2017). Kişilik özelliklerini dışadönüklülük, duygusal denge, sorumluluk, açıklık ve uyumluluk boyutları ile ele alan çalışmada plansız satın alma davranışında yalnızca dışa dönüklülük ve duygusal denge boyutlarının etkili olduğu görülmüştür (Gümüş & Onurlubaş, 2021). Benzer bir çalışmada da sorumluluk, uyumluluk, dışadönüklülük ve yeniliklere açık olma boyutlarının plansız satın alma üzerinde etkili olduğu görülmüştür (Yılmazoğlu & Topal, 2019). Kişilik özellikleriyle bağlantılı olarak keşfedici/yenilikçi tüketicilerin plansız satın alma davranışlarını inceleyen bir çalışmada yenilikçi tüketicilerin plansız satın alma davranışlarında buldukları ortaya konulmuştur (Okutan, Bora, & Altunışık, 2013). Yeniliği tüketicilerin moda giyim trendlerini takip etme ve yeniliği kabul etme olarak ele alan bir çalışma da yenilikçi tüketiciler üzerine yapılan çalışmaların bulgularını destekler niteliktedir. Çalışma sonuçları ürün temelli yenilikçiliğin tüketicilerin plansız satın alma davranışları ile arasında bir ilişki olduğunu göstermektedir (Tekin, Öztürk, & Selek, 2021). Tüketicilerin kişilik özelliklerini riskten kaçınma düzeyleri olarak inceleyen çalışmada sanal alışveriş risk algısı ile sanal plansız tüketim davranışları ele alınmıştır. Çalışma sonucunda riskten kaçınma düzeyleri yüksek olan tüketicilerin sanal alışveriş risk algılarının da yüksek olduğu ve buna bağlı olarak da sanal plansız satın alma eğilimlerinin de düşük olduğu görülmüştür (Yeniçeri, Yaraş, & Akın, 2012).

Plansız satın alma davranışını tüketicilerin algıladıkları kitleyle açıklamaya çalışan bir çalışmada kadınların, erkeklerin, Y kuşağı ve Z kuşağı tüketicilerin algıladıkları içsel ve dışsal kitlelerin plansız satın alma davranışına etkisi incelenmiştir. İncelemeler sonucunda tüketicilerin algıladıkları içsel ve dışsal kitlelerin onları plansız satın alma davranışına yönelttiği görülmüştür (Tor Kadioğlu, 2021). Deneyimsel pazarlama kapsamında tüketiciden tüketiciye e-ticaret olanağı sağlayan işletme müşterilerinin sağlanan deneyimler karşısında plansız satın alma davranışlarında bulunup bulunmadıkları incelenmiştir. Araştırma sonucunda müşterilerin bu işletmelerden yaptıkları alışverişlerde plansız satın almada bulunmadıkları ancak deneyimsel pazarlama kapsamında davranışsal-sosyo deneyimlerin plansız satın alma üzerinde etkili olduğu görülmüştür (Şahin & Kaya, 2019).

Tüketicilerin özellikle günümüzde sık sık başvurduğu ödeme yöntemlerinden biri kredi kartıdır. Kullanım nedenleri çeşitli olmakla birlikte tüketicileri bazı istemsiz davranışlarında bulunmaya da itmektedir. Konu ile ilgili yapılan birçok çalışmada tüketicilerin kredi kartı kullanımının kendilerine

para harcamıyor hissi yarattığı bilinmektedir. Bununla bağlantılı olarak tüketicilerin plansız satın alma davranışında etkili olup olmadığı üzerine gerçekleştirilen bir çalışmada da kredi kartı kullanımının plansız satın alma davranışında doğrudan etkisinin olduğunu ve sonrasında da tüketicilerin bu davranıştan pişmanlık duyduğu ortaya konulmuştur (Özdemir, Kılıç, & Çakırcı, 2021).

Plansız satın alma davranışını sosyal medya kullanımı ve gelişmeleri kaçırma korkusu ile birlikte inceleyen bir çalışmada gelişmeleri kaçırma korkusu yaşayan bir tüketicinin aktif bir şekilde sosyal medya kullandığı ve bunun da onları plansız satın alma davranışına yönelttiği görülmüştür (Pelenk Özel & Ağca, 2022).

## Sonuç ve Tartışma

Plansız satın alma davranışları tüketicilerin genellikle alışverişe dair herhangi bir plan yapmadıkları, alışveriş listelerinin bulunmadıkları veya var ise listenin dışına çıkılarak anlık olarak gerçekleştirdikleri alışveriş türüdür. İçinde bulunulan ortamlar, ürünler veya tüketicinin anlık olarak duygu durumları, kişilikleri bu davranışa etki edebilmektedir.

Bu çalışmanın amacı da tüketicilerin plansız, anlık olarak gerçekleştirdikleri plansız satın alma davranışlarında etkili olan faktörlerin ortaya konmasıdır. Bu doğrultuda plansız satın alma davranışı ve tüketicileri bu davranışa iten nedenleri araştıran ve Dergipark ile Google Akademi'de yer alan çalışmalar ele alınmıştır. Çalışmalar detaylı olarak incelenerek tüketicileri plansız satın alma davranışına iten nedenler ortaya konulmuştur. Araştırma konularında genel olarak plansız satın alma davranışının hedonik ve faydacı tüketim ile ele alındığı görülmüştür. Bununla birlikte tüketiciler bu tüketim türlerinden, zaman baskısından, kıtlıktan, pazarlama iletişimlerinden, mağaza atmosferlerinden, kendilerine alışveriş sırasında sağlanan kolaylıklardan, deneyimlerden, anlık duygu durumlarından ve sahip oldukları bazı kişilik özelliklerinden etkilenecek plansız satın alma davranışlarında bulunmaktadır.

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TÜKETİCİ DAVRANIŞLARI BAĞLAMINDA SOSYAL MEDYA ÜZERİNE YAPILAN  
ARAŞTIRMALARIN LİTERATÜR TARAMASI  
LITERATURE REVIEW OF RESEARCH ON SOCIAL MEDIA IN THE CONTEXT OF  
CONSUMER BEHAVIOR

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## ÖZET

Teknolojinin ve internetin gelişmesi hemen her kesimden ve yaştan insanı çeşitli konularda etkisi altına almayı başarmıştır. Bu konulardan biri de tüketici davranışlarıdır. Sosyal medyanın tüketicileri etkilemesi araştırmacılar tarafından merak uyandırmakta ve araştırmaya değer kılmaktadır. Bu nedenle satın alma öncesi, satın alma sırası ve sonrası şeklinde tüketici davranışlarında meydana gelen değişiklikler birçok araştırmacı tarafından ele alınmaktadır. Bu çalışmanın amacı da ele alınan bu çalışmalarını inceleyerek bir derleme makalesi hazırlamak ve nelerin araştırıldığını ve hangi sonuçlara ulaşıldığını ortaya koymaktır. Google Scholar, Dergi Park ve Ulusal Tez Merkezi'nden konuyla ilgili 2020-2022 yıllarında yapılan makale ve tez çalışmaları ele alınarak incelenmiştir. İncelemeler sonucunda sosyal medya ile ilgili çalışmaların daha çok üniversite öğrencilerine yapıldığı, tüketicilerin genel çerçevede sosyal medyadan etkilendiği ancak güven problemlerinin yaşandığı görülmüştür.

**Anahtar Kelimeler:** Tüketici, Tüketici Davranışları, Sosyal Medya

## ABSTRACT

The development of technology and the internet has managed to influence almost every segment and age-to-man on a variety of topics. One of these issues is consumer behavior. The impact of social media on consumers is intriguing by researchers and makes research worth investigating. Therefore, changes in consumer behavior in the form of pre-purchase, order of purchase and post-purchase are addressed by many researchers. The purpose of this study is to review these studies and to prepare a compilation article and to identify what has been researched and what results have been achieved. Google Scholar, Magazine Park and the National Thesis Center were examined in 2020-2022 and discussed the articles and thesis work on the issue. As a result, studies on social media were mostly done by university students, consumers were affected by social media in the general context, but there were trust issues.

**Keywords:** Consumer, Consumer Behaviors, Social Media

## Giriş

Modern dünya olarak adlandırılan günümüz dünyasında ekonomi, iktisat, sosyal, teknoloji, bilişim vb. alanlarda yaşanan değişim ve gelişmeler beraberinde tüketici davranışlarında da birtakım değişiklikler meydana getirmişlerdir. Özellikle internetin hızla gelişmesi yeni bir iletişim, etkileşim ve sosyalleşme

aracı olan sosyal medyanın gelişmesinde de etkili olmuştur. Sosyal medya yapısı gereği kullanıcılara anlık iletişim sağlaması, zaman ve mekandan bağımsız ve maliyetinin düşük olması gibi özellikleri sayesinde geleneksel pazarlama stratejilerinin yerini almıştır.

Sosyal medya kullanıcı sayısını her geçen gün daha da fazlaştırarak neredeyse tüm tüketicileri etkisi altına almayı başarmıştır. Bu durum hem tüketiciler hem de işletmeler açısından yeni fırsatlar yaratmaktadır. Tüketiciler zamanlarının çoğunu aktif olarak sosyal medya araçlarında geçirmektedirler. Bu da işletmelere ürünlerini tanıtmaya, yaratıcı iletişim geliştirmeye, daha geniş kitlelere ulaşabilme, tüketicilerle anında iletişim kurabilme ve sorunlarına çözüm geliştirebilme gibi birçok konuda kolaylık sağlamaktadır. Tüketiciler için ise satın almak istedikleri ürün ya da hizmet ile ilgili araştırmalar yapmalarına, kullanıcı yorumlarına erişebilme, firmalardan konuyla ilgili hızlı bilgiler alabilme, ürünlerle ilgili fırsatları takip edebilme, şikayetlerini dile getirebilme gibi birçok konuda kolaylık sağlamaktadır. İşletmelerin tüm bu konuları dikkate alarak doğru pazarlama stratejileri oluşturmak için hangi tüketicilerin hangi mecraları kullandıklarını iyi analiz etmesi ve o mecralarda aktif olması gereklidir. Böylelikle doğru pazarlama stratejileri oluştururken mevcut müşteriler korunmuş ve yeni müşteriler de elde edilmiş olacaktır.

Bu çalışmanın amacı sosyal medyanın tüketiciler üzerindeki etkisini vurgulayarak hem ileride bu konuda araştırma yapacak olan araştırmacılara hem de işletmelere yararlı olabilecek bilgileri sunmaktır. Bu nedenle sosyal medyanın tüketiciler üzerindeki etkisini araştıran makale ve tez çalışmaları incelenmiştir. Araştırma kapsamına Google Scholar, Dergi Park ve Ulusal Tez Merkezi'nde 2020-2022 yıllarında var olan çalışmalar dahil edilmiştir.

## 1. KAVRAMSAL ÇERÇEVE

### 1.1. Tüketici ve Tüketici Davranışları

Tüketici, ürün veya hizmetleri satın alan ve kullanan kişiler olarak tanımlanmaktadır (Odabaşı & Barış, 2003). Tüketicinin satın alma işlevini gerçekleştirmesi için ilk olarak bir ihtiyacının doğması gereklidir. Bu nedenle tüketici daha geniş bir anlamda; karşılanacak bir ihtiyacı olan, bu ihtiyacı giderme gücü ve isteği olan şahıs ya da kurumlardır (Mucuk, 2014). İnsanların, günlük hayatlarında genellikle tüketici ve müşteri kavramlarını karıştırdıkları görülmektedir. Ancak tüketici, nihai olarak ailesinin veya kendisinin istek veya ihtiyaçlarını karşılamak amacıyla ürün/hizmet satın alan ve kullanan kişilerdir. Müşteri ise, belli bir mağazadan sürekli olarak alışveriş yapan kişilerdir (Odabaşı & Barış, 2003).

İşletmeler, varlıklarını sürdürebilmek, rekabetçi pazarlarda üstünlük elde edebilmek için tüketici taleplerine önem vererek ürün ve hizmetlerini bu talepler doğrultusunda gerçekleştirmelidir. Bu nedenle tüketicilerin ne istediklerini ve davranışlarını iyi analiz etmek, anlamak ve bunlara doğru cevaplar verebilmek işletmeler için oldukça önemlidir (Odabaşı & Barış, 2003). Tüketici davranışı, yalnızca tüketicinin ürünleri satın almasını değil satın almaya dair tüm fiziksel faaliyetleri (kişilerin ürün veya hizmetleri arama, değerlendirme, satın alması, kullanması ve elden çıkarması gibi) kapsamaktadır. Bu fiziksel faaliyetleri etkileyen karar süreçleri de tüketici davranışları arasında yer almaktadır (Yağcı & İlarıslan, 2010). Tüketici davranışları tanımda da belirtildiği gibi zihinsel, duygusal ve fiziksel niteliklerde olabilir. Aynı zamanda tüketicilerin tüketime yönelik olarak zaman, enerji ve para gibi kısıtlı kaynaklarını nasıl kullandıklarını incelemeye çalışır. Bu nedenle de davranışları bazı özellikler altında toplamaktadır. Bu özellikler (Odabaşı & Barış, 2003) ;

- Tüketici davranışları çeşitli faaliyetlerden oluşur ve güdülenmiş bir davranıştır.
- Çevre faktörlerinden etkilenir ve farklı rollerle ilgilenir.
- Karmaşıktır ve zamanlama açısından da farklılıklar gösterir.
- Dinamik bir süreçtir.
- Farklı kişiler için de farklılıklar gösterebilir.

Günümüzde tüketicilerin davranışları çeşitli faktörlerden etkilenmekte ve istek ve ihtiyaçları da buna bağlı olarak sürekli değişmektedir. Bu faktörlerden biri sosyal medyadır. Sosyal medya tüketicilerin davranışlarını etkilemekte, tüketiciler de hem satın alma süreçlerinde hem de satın alma aşamasından önce bilgi edinme süreçlerinde sosyal medyayı kullanmaktadır. Yapılan çeşitli araştırmalarda da tüketicilerin ürünü daha önce kullanmış ve buna ilişkin sosyal medya araçlarında yorum yapmış

kişilerin yorumlarına, ürünün satıcısı tarafından verilen bilgilere göre daha fazla güvendikleri görülmektedir (Özcan & Akıncı , 2017). Tüketiciler sosyal medyada aracısız bir şekilde iletişim kurarak birbirini etkilemekte ve bu sürece firmalar müdahale edememektedirler. Bu nedenle tüketicilerin ayrılmaz bir parçası haline gelen sosyal medyanın, satın alma karar süreçlerine de dahil olması firmalar için hem risk hem de yeni fırsatlar getirmektedir (Constantinides & Stagno, 2011). Günümüzün rekabetçi piyasalarında başarılı olmak, müşterileri etkilemek, pazar portföyünü geliştirmek ve asıl amaç olan kar edebilmek için firmaların hedef kitlelerinin özelliklerini dikkate almaları ve sosyal medyada da aktif olarak yer almaları kaçınılmaz hale gelmektedir (Arslan & Yavuz, 2020).

## 1.2. Sosyal Medya Kavramı

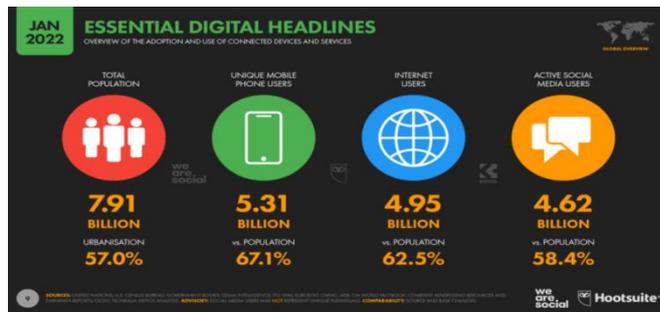
İnsanlar var oluşlarından bugüne kadar hem yaşamlarını sürdürebilmek hem de güvenliklerini sağlayabilmek amacıyla bir araya gelmişler ve sosyalleşmişlerdir (Safko & Brake, 2010). Günümüzde de iletişim kurmak, kişisel ve toplumsal meselelerde paylaşımlarda bulunmak vb. gibi çeşitli amaçlarla insanları bir araya getiren ve yaygın olarak kullanılan platform sosyal medyadır.

Sosyal medya tanımlarına bakıldığında farklı tanımların geliştirildiği görülmektedir. Bilgisayar tabanlı bir teknoloji olan sosyal medyada sanal ağlar ve topluluklar oluşturulmakta ve kullanıcılar fikirlerini, düşüncelerini, konuyla ilgili bilgilerini ve yorumlarını kolayla paylaşmaktadırlar (Dollarhide & Drury, 2021). İnternetin gelişmesi kişilere zaman ve mekan sınırlaması olmadan iletişim kurmalarına, müzik, video ve fotoğraf gibi paylaşımlar yapmalarına imkan tanımaktadır.

Sosyal medya, Web 2.0 teknolojisinin ortaya çıkışıyla birlikte onun teknolojik temelleri üzerine kurulmuş, kullanıcılar tarafından içeriklerin oluşturulduğu internet tabanlı uygulamadır (Albarran , Mierzejewska, & Jung, 2018). Başka bir tanımda da sosyal medya “Bireylerin ve toplulukların bilgi ve görüşlerini paylaşması ve içeriği birlikte oluşturması için geliştirilen çeşitli web tabanlı platformları tanımlamak için kullanılan genel bir terim” olarak tanımlanmaktadır (Kietzmann, Hermkens, Maccarthy, & Silvestre, 2011).

Sosyal medyanın kullanım amaçları kişiden kişiye değişiklik göstermektedir. Bazı insanlar sosyal ihtiyaçlarını karşılamak yani sosyalleşmek amacıyla kullanırken bazıları da gerçek hayattan kaçış amaçlarıyla kullanmaktadırlar. Ucuz, hızlı ve kolay ulaşılabilir gibi özelliklere sahip olmasından dolayı insanlar tarafından çok fazla tercih edilmekte ve teknoloji, siyaset, spor gibi birçok konuda gündemin oluşturulmasında etkili rol oynamaktadır (Erol & Hassan, 2014). İçerisinde ülke liderleri, ünlüler, şirketler, ürünler ve her dinden, yaştan, ırktan insanlar barındıran (Gürsakal, 2009) sosyal medya pazarlamaya ilişkin uygulamalarda da yenilikler meydana getirdi. İşletmelerin ürün ve hizmetlerini tanıtmaya ve reklamlarını yapma biçimlerini değiştirdi. Tüketicilerin satın almadan önce, satın almada ve sonrasında davranışlarında değişiklik yaşamalarına sebep oldu (Safko & Brake, 2010). İnternet ve sosyal medyanın tüketiciler tarafından kullanımının her geçen gün artması işletmeleri tüketicileri doğrudan etkilemek için bu platformları etkin kullanmaya itmektedir (Keller, 2013). İşletmelerin ürün/hizmetlerini geniş bir kullanıcı kitlesine tanıtmaya artık zaman ve mekanla sınırlı değildir. Bunu internet ve sosyal medya kullanımına yönelik yayımlanan raporlar da göstermektedir.

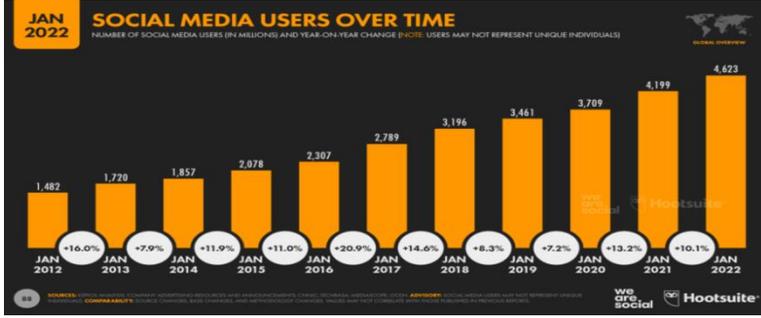
Şekil 1: Dünya Nüfusu İçinde Mobil Telefon, İnternet ve Sosyal Medya Kullanımı



Kaynak: (We Are Social, 2022)

Yukarıdaki şekilde de görüldüğü gibi küresel nüfus 7,91 milyardır. Bunun içerisinde %67,1 oranla mobil telefon, %62,5 oranla küresel internet ve %58,4 oranla da sosyal medya kullanıcısı mevcuttur.

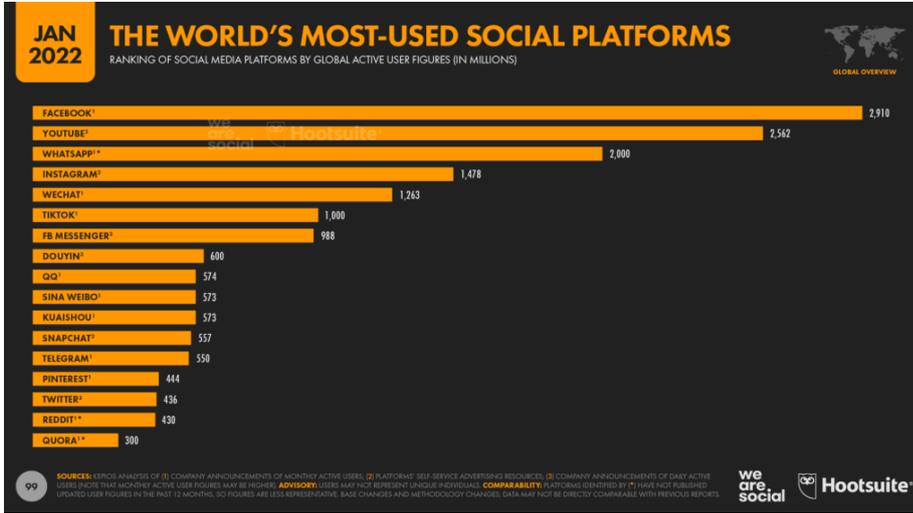
Şekil 2: 2012-2022 Yılları Arasında Sosyal Medya Kullanımı



Kaynak: (We Are Social, 2022)

Şekil 2’de 2012 ile 2022 yılları arasında sosyal medya kullanımı gösterilmektedir. Şekilde de görüldüğü üzere sosyal medyanın kullanımı her yıl artış göstermektedir.

Şekil 3: En Popüler Sosyal Medya Araçları



Kaynak: (We Are Social, 2022)

Şekil 3’te insanlar tarafından en çok tercih edilen sosyal medya araçları yer almaktadır. İşletmeler, rekabetçi Pazar piyasasında üstün olmak, pazarda farklı konumlanmak, hedef kitlesine ve daha geniş kitlelere ulaşmak, müşterileri memnun etmek ve onlarla daha sağlıklı iletişim kurmak için sosyal medyanın gücünü dikkate almalı, sosyal medya araçlarında aktif olarak yer almalıdır. Sosyal medya, işletmeler ile müşteriler arasındaki etkileşimi artırmaktadır.

## 2. YÖNTEM

Çalışma, nitel araştırma deseni ile oluşturulmuştur. Nitel araştırmalar, 21. Yüzyılın başlarından itibaren eğitimden sağlığa, işletmeden psikolojiye birçok alanda olayları, olguları ve durumları yorumlamaya ve anlamlandırmaya yönelik yapılan bir araştırma türüdür (Denzin & Lincoln, 1998). Çalışma için gerekli olan veriler ise doküman analiz yapılarak elde edilmiştir. Doküman analizi, araştırmanın amacına yönelik olarak kaynakları bulma, okuma, not alma ve değerlendirme işlemlerini kapsamaktadır (Karasar, 2005).

Derleme makale olarak hazırlanan bu çalışmada 2020-2022 yılları arasında tüketici davranışları bağlamında sosyal medya ile ilgili yapılmış olan makaleler ve tezler ele alınmıştır. Makale ve tezler Google Scholar, Dergi Park ve Ulusal Tez Merkezi (YökTez)’den “tüketici davranışları, sosyal medya” anahtar kelimeleri girilerek elde edilmiştir. Toplamda 10 makale ve 8 tez çalışması incelenerek, verilerin nasıl toplandığı, hangi yöntemlerle analiz edildiği, araştırmanın amacı ve elde

edilen bulgular özetlenerek bilgi verilmiştir. Konu ve tarih aralığı dışında olan makale ve tezler çalışmaya dahil edilmemiştir.

### 3. BULGULAR

Bu çalışmada elde edilen 10 makale ve 8 tez çalışması çalışmasının amacı, yöntemi ve elde edilen bulguları özetlenerek çalışmalar hakkında kısa bilgilere yer verilmiştir. İlk olarak makale sonrasında da tez çalışmaları yer almaktadır.

Sosyal medyanın tüketici davranışları üzerindeki etkilerini araştıran Aksoğan ve Türel (2021) anket yönetimini kullanarak bir devlet üniversitesi öğrencilerinden konuyla ilgili veriler elde etmişlerdir. Yapılan analizlerin sonucunda sosyal medya ile tüketici davranışları arasında bir ilişki olduğu görülmüştür. Bununla birlikte tüketiciler sosyal medyayı ürün/hizmet satın alımında önemli ve sosyal medyada yer alan reklamları da ilgi çekici bulmaktadır.

Sosyal medya fenomenlerinin online tüketici davranışları üzerine etkilerini araştıran bir çalışmada tüketiciler ile fenomenler arasındaki parasosyal etkileşim incelenmiştir. Araştırma sonucunda sosyal medya fenomenlerinin online tüketici davranışları üzerinde etkili olduğuna varılmıştır. Bunun yanı sıra gelir ve meslek grubu gibi değişkenlerin de online tüketici satın alma tutumlarında farklılık gösterdiği, daha düşük gelirli kişilerin, öğrencilerin, serbest meslek çalışanlarının ve emekli gruplarının online satın alma tutumlarının olumsuz olduğu sonuçlarına ulaşılmıştır (Gümü, Karaca, & Onurlubaş, 2021).

Kavramsal makale niteliğinde olan bu çalışmada sosyal medyanın tüketiciler üzerindeki etkileri incelenmiş ve bu doğrultuda işletmelere önerilerde bulunulmuştur. Dünyada ve Türkiye’de internet ve özellikle sosyal medya kullanımları WeAreSocial raporlarından yararlanılarak ortaya konulmuştur. Araştırma, tüketicilerin sosyal medyada ürün ya da hizmete yönelik yapılan yorumları güvenilir bulduğunu, satın alma sonrasında ise memnuniyet veya memnuniyetsizliklerini burada dile getirdiklerini ortaya koymaktadır. Bu nedenle işletmelerin sosyal medyada bulunmaları, ürün ve hizmetlerini tüketicilere uygun olarak bu platformlarda sunmaları gerekliliği de vurgulanmaktadır(Aslan & Arık Aybar, 2020).

Farklı kültürel ve demografik yapılaraya sahip bireylerin satın alma davranışlarında sosyal medyanın etkisini ölçmek isteyen bu çalışmada Türkiye ve İran’daki üniversite öğrencileri örneklem olarak kullanılmıştır. Elde edilen bulgularda iki ülke arasında sosyal medya kullanımında farklılıklar olduğu tespit edilmiştir. İran’lı öğrenciler sosyal medyayı daha fazla kullanmakta, ürün ya da hizmet hakkındaki yorumları daha fazla dikkate almakta, satın alma öncesi sosyal medyada daha fazla araştırma yapmakta ve ürünü satın almasa dahi bilgilerini sosyal medyada paylaşmaktadırlar (Ertürk & Aktepe, 2020).

Çalışmada sosyal medya yorumlarının tüketici satın alma niyetine etkisi incelenmiştir. Veriler, Bartın ilinde yaşayan tüketicilerden elde edilmiştir. Yapılan analizlerle tüketicilerin tanıdığı, arkadaşı veya uzman kişilerin yorumlarına daha çok güvendiği ortaya konulmuştur. Güvenin artmasıyla birlikte tüketicilerin satın alma niyeti de artmaktadır. Bu bağlamda araştırma sonucunda sosyal medya yorumlarının tüketici satın alma niyeti üzerinde etkili olduğu sonucuna varılmıştır (Başkol & Kıranoglu, 2020).

Sosyal medya sunduğu birçok imkan ile tüketicilere çok fazla konuda kolaylık sağlamaktadır. Bunlardan biri de reklamlar aracılığıyla tüketicilere ürün ya da hizmet hakkında bilgi vermektir. Bu doğrultuda yapılan çalışmada kullanıcı sayısı fazla olan ve görselliğe dayanan bir sosyal medya aracı olan Instagram’ da yer alan sponsorlu reklamların tüketici davranışları üzerindeki etkileri araştırılmıştır. Veriler, anket yöntemi ile üniversite öğrencilerinden elde edilmiştir. Yapılan analizler sonucunda sponsor reklamlarının katılımcılar tarafından güvenilir bulunmadığına ulaşılmıştır. Yani katılımcılar sponsorlu reklamlardan olumlu yönde etkilenmemektedirler (Yalınız & Hülür, 2021).

Sosyal medya araçlarının kullanımı üzerine yapılan bu çalışmada Türkiye ve Lübnan tüketicileri karşılaştırılmıştır. Çalışmanın amacı farklı ekonomik, demografik ve kültürel özelliklere sahip tüketicilerin sosyal medya kullanım alışkanlıkları arasındaki farkları tespit etmektir. Bunun yanı sıra satın alma öncesi ve sonrası davranışlarının nasıl gerçekleştirildiği de araştırma amacını oluşturmaktadır. Araştırmada her iki ülkeden de anket yöntemi ile veriler elde edilmiştir. Verilerin analiz edilmesiyle her iki ülke tüketicilerinin de bir ürün ya da hizmet satın almadan önce sosyal

medyada ürünle ilgili arařtırmalar yaptıđı ancak Lübnan tüketicilerinin sosyal medyayı daha aktif kullandıđı sonuçlarına varılmıřtır. Lübnan'lı tüketiciler satın alma sonrasında da ürünle ilgili duygu ve düşüncelerinin sosyal medyada dile getirirken; Türk tüketiciler özellikle memnuniyetsizliklerinin firmalar tarafından fark edilerek kendileri ile iletiřime geçmelerini beklemektedirler (Kılıç & Kartal, 2022).

Sosyal medya üzerinden firma ile tüketici arasındaki iliřkileri analiz eden bu çalışmada Türkiye'de çok tercih edilen sosyal medya aracı olan Facebook kullanılmıřtır. Çalışmanın amacı, Facebook sosyal medya ađında firmaların tüketicilerle iletiřim kurabilmek amacıyla oluřturdukları iletiřim kanallarına yönelik tüketici algılarını, firmaya yönelik bađlılıklarını ve firma ürünlerini satın alma ve viral olarak yayma niyetlerini ortaya çıkarmaktır. Arařtırma sonucunda viral pazarlamanın satın alma davranıřı üzerinde etkili olduđu, firmaların oluřturduđu iletiřim kanallarında firma ile tüketiciler arasında iletiřim kurulduđundan, sorulara yanıt alınabildiđinden, firmaya ait detaylı bilgilere ulařılabildiđinden tüketicilerin bu kanalları olumlu algıladıđı görülmüřtür (Biçer & Erciř, 2020).

Sosyal medya pazarlamanın tüketici satın alma niyetine etkisini arařtıran benzer bir çalışmada da Teknoloji Kabul Modeli kullanılmıřtır. TKM, yeni uygulamaların kabulünü etkileyen faktörleri ortaya koymak amacıyla geliřtirilmiřtir. Çalışmanın amacı sosyal medya pazarlamanın tüketici satın alma davranıřına etkisini TKM ile ortaya koymaktır. Bu bağlamda yapılan analizlerin sonucunda sosyal medya pazarlaması faaliyet boyutları olan bilgilendirici ve eğlendirici olma boyutlarının tüketici satın alma niyetine pozitif yönde etki ettiđi görülmüřtür (Demirci Orel & Arık, 2020).

Sosyal medya üzerine yapılan başka bir çalışmada da tüketicilerin satın alma davranıřları sadece demografik özellikler bakımından analiz edilmiřtir. Veriler Instagram, Facebook ve Twitter kullanıcılarından anket yöntemi ile elde edilmiřtir. Arařtırmanın sonucunda demografik özelliklerden yalnızca gelir düzeylerine göre anlamlı farklılıklar olduđu; cinsiyet, yař, meslek ve eğitim düzeylerine göre ise anlamlı farklılıklar olmadıđı tespit edilmiřtir (Cevher, 2020).

Yapılan tez çalışmaları incelendiđinde ilk olarak sosyal medya pazarlama çabalarının tüketici davranıřları üzerindeki etkisini arařtıran doktora tezi yer almaktadır. Çalışmada İstanbul'da yařayan ve sosyal medya araçlarını kullanan 754 kiřiye anket yapılarak veriler toplanmıřtır. Verilerin analiz edilmesi sonucunda sosyal medya pazarlama çabalarının çalışmanın deđiřkenleri olan iliři deđeri, marka deđeri ve tüketici davranıřları üzerinde anlamlı bir etkisinin olduđuna ulařılmıřtır (Ardahanlıođlu, 2021).

Sosyal medya üzerine yapılan çalışmalarda günümüzde tüketiciler üzerinde etkili olduđu düşünölen sosyal medya fenomenleri de sıkça yer almaktadır. Bu yüksek lisans çalışmasında da tüketici davranıřlarında algılanan risk faktörleri ve risklerin azaltılmasında sosyal medya fenomenlerinin etkilerini ortaya çıkarmak amaçlanmaktadır. Veriler, İstanbul'da farklı üniversitelerde lisans ve lisansüstü öğrenim gören 400 öğrenciden anket yöntemi ile elde edilmiřtir. Verilerin analiz edilmesiyle tüketicilerin satın alma kararını ve satın alma davranıřlarını etkileyen en önemli faktörlerden birinin algılanan risk olduđu sonucuna ulařılmıřtır. Riskin azaltılmasında en çok ihtiyaç duyulan konular ise daha fazla güven, itibar ve bilgidir. Arařtırmanın diđer bir odak noktası olan fenomenlerin tüketicilerin risk algılarını azaltmada bir etkisi olmadıđı görülmüřtür (Karimov, 2020).

Farklı yař gruplarının sosyal medya kullanımını ve tüketici davranıřları arasındaki farklılıkları analiz eden bu yüksek lisans tez çalışmasında örneklem olarak ergen ve yetiřkin bireyler ele alınmıřtır. Veriler, İzmir'de yařayan 15-25 ve 16-45 yař aralıđındaki bireylerden anket yöntemi ile toplanmıřtır. Elde edilen bulgularda sosyal medya kullanımının eğitim durumuna, medeni duruma, kullanım amaçlarına ve cinsiyete göre farklılık gösterdiđi görölmektedir. Sosyal medyanın tüketici davranıřlarına pozitif etkisinin yanı sıra bekar katılımcıların sosyal medyayı daha fazla kullandıđı, ortaokul ve lise mezunlarının lisans-önlisans mezunlarına oranla daha fazla kullandıđı, kullanım amaçlarında da daha çok arkadař edinmek amacıyla kullanıldıđı sonuçlarına varılmaktadır (Çalışır, 2020).

Viral pazarlamanın önemini ve sosyal medya araçlarında gerçekleştirilen viral reklamların tüketici davranıřlarına etkilerini saptamak amacıyla gerçekleştirilen yüksek lisans tezinde nitel ve nicel içerik çözümlemesi yöntemi kullanılmıřtır. Viral reklamlardan da sadece kamu spotu reklamları üzerinde durulmuřtur. Elde edilen bulgular sonucunda tüketicilerin sosyal medya paylařımlarından

etkilendikleri, davranışlarını buna göre şekillendirdiği, sosyal konulara ve problemlere duyarlı olan markaları tercih ettikleri görülmektedir (Güven, 2021).

Sosyal medya üzerinden alışverişlerin gerçekleşmesinde önemli rol oynayan sosyal medya butikleri, tüketicilerin kolayca çok fazla ürüne, girişimcilerin ise hedeflerine ulaşmasını sağlamaktadır. Bu yüksek lisans çalışmasında da sosyal medya butiklerine yönelik tüketici tutumları araştırılmaktadır. Araştırmada kullanılan veriler Kırklareli’nde yaşayan 450 tüketiciden anket yöntemi ile elde edilmiştir. Verilerin analizi sonucunda daha önce sosyal medya butiklerinden alışveriş yaparak deneyim kazanan tüketicilerin daha yüksek algısal değerlendirmelere sahip olduğuna varılmaktadır. Ayrıca butiklerin daha çok tüketici kitlesine ulaşabilmesi ve güvenilirliği artırabilmesi için pazarlama çabalarına ihtiyaç olduğu elde edilen bulgular arasında yer almaktadır (Çil, 2022).

Bu çalışmada sosyal medyanın ağız ve diş hijyen ürünleri üzerine tüketici davranışlarına etkisi incelenmektedir. Araştırmanın örneklemini Eskişehir Osmangazi Üniversitesi Hastanesi’ne başvuran hastalar oluşturmaktadır. Veriler anket yöntemi ile elde edilmiştir. Sosyal medyada ağız ve diş sağlığı ilgili tavsiyelere önem verme cinsiyet açısından farklılık göstermektedir. Kadınlar, takipçi sayısı yüksek olan kullanıcıların tavsiyelerine erkeklere oranla daha fazla önem vermektedir. Sonuç olarak ağız ve diş sağlığı ürünlerinin satın alınmasında sosyal medya reklamları tüketiciler üzerinde etkili olmaktadır (Kılıç N. B., 2021).

Sosyal medyanın tüketiciler üzerindeki etkisini araştıran diğer bir çalışmada da Sakarya Üniversitesinde öğrenim gören Endonezyalı ve Türk öğrencilerden anket yöntemi ile veriler elde edilmiştir. Araştırma sonucunda katılımcıların sosyal medyayı eğitim amaçlı, tanıma ve tanınma, etkileşim ve iletişim kurma gibi çeşitli amaçlarla kullandığı görülmüştür. Genel anlamda bakıldığında sosyal medya tüketicileri kullandıkları sosyal içeriklerden etkilenmektedir (Yalçınkaya, 2021).

Bu çalışmada Yeni Normal olarak adlandırılan Covid-19 döneminde en çok etkileyen ve en çok etkilenen sosyal medyanın tüketiciler üzerindeki etkileri araştırılmıştır. Araştırmanın amacı; Yeni Normal döneminde değişen sosyal medya pazarlama aktivitelerinin tüketici davranışları üzerinde etkili olup olmadığını ortaya koymaktır. Verileri elde edebilmek amacıyla 421 kişiye anket çalışması yapılmıştır. Yapılan analizlerin sonucunda tüketicilerin en çok markaların bilgilendirme içeriklerinden en az ise eğlendirici içeriklerden etkilendikleri görülmüştür. Yani tüketiciler, markalardan bu dönemde kendilerini eğlendirmelerini değil bilgilendirmelerini beklemektedirler. Ayrıca tüketiciler, kendileri ile iletişim halinde olan, sordukları sorulara cevap alabildikleri markaları tercih etmektedirler (Aprilia, 2021).

### SONUÇ ve TARTIŞMA

Teknolojinin her gün biraz daha gelişmesiyle iletişim ağları da gelişmekte ve bunlara paralel olarak tüketici davranışlarında da birtakım değişiklikler meydana gelmektedir. İnternette geçirilen zamanın artması ve tüketicilerin davranışlarında meydana gelen değişimler sosyal medya pazarlamasına da önem kazandırmaktadır. Sosyal medyada tüketiciler ürün ve hizmetler ile ilgili bilgilere, kullanıcı yorumlarına rahatça ulaşabilirken; işletmeler de hedef kitlelerine ve daha geniş kitlelere de ulaşarak ürün ve hizmetlerinin tanıtım ve reklamlarını yapabilmektedirler.

Günümüzde neredeyse her yaşı içinde barındıran sosyal medya, araştırmacıların da ilgisini çekmekte ve çeşitli araştırmalara konu edilmektedir. Bu çalışmada da tüketici davranışları bağlamında sosyal medya ile ilgili yapılan çalışmaları incelemek ve sosyal medyanın tüketiciler üzerindeki olumlu-olumsuz etkilerinin neler olduğunu saptamaktır.

Elde edilen makale ve tezler incelendiğinde ilk olarak sosyal medya ile ilgili yapılan araştırmaların daha çok üniversite öğrencilerine yönelik olduğu görülmüştür. Araştırmalarda veri toplama yöntemi olarak anket tercih edilmektedir. Genel anlamda bakıldığında tüketiciler gelenekselliğin yerini internetin gücüne bıraktığı sosyal medyadan etkilenmekte, ürün ve hizmet tercihleri sosyal medya doğrultusunda şekillenmektedir. Sosyal medyanın tüketiciler üzerindeki güçlü etkisi yadsınamaz olduğundan işletmelerin bu durumu fırsata çevirerek bu platformları tüketiciyi kazanacak, anlayacak, dertlerine çözüm bulacak ve güvenilirlik sağlayacak şekilde kurması gereklidir.

Son yıllarda sosyal medyayı hayatının bir parçası haline getiren tüketiciler, boş zamanlarının çoğunu buralarda geçirmekte, sürekli maruz kaldığı reklamlardan, yorumlardan etkilenmekte ve satın alma

davranışlarında bulunmaktadır. İncelenen makale ve tez çalışmalarında tüketicilerin sosyal medya reklamlarını ilgi çekici bulduğu ancak sponsor reklamlarının kendilerine güven vermediği sonuçlarına ulaşılmıştır. Tüketiciler ürün/hizmet satın alımından önce sosyal medyada araştırmalar yapmaktadırlar. Dikkate aldıkları konulardan biri ise tüketici yorumlarıdır. Ürün ya da hizmeti daha önce kullanmış olan kişilerin yorumları tüketici davranışlarını etkilemekte ancak tüketiciler bu konuda da güven sorunu yaşamakta ve sadece tanıdığı, arkadaşı veya uzman kişilerin yorumlarını dikkate almaktadırlar. Sosyal medyada kurulan ve alışveriş mecralarından biri olan sosyal medya butikleri üzerine yapılan bir araştırmada da daha önce bu platformları kullanmamış tüketicilerin platformlara güvenmedikleri ortaya konulmuştur. Yapılan başka bir çalışmada da tüketicilerin satın alma davranışına etki eden önemli faktörlerden birinin algılanan risk olduğu görülmüştür. Bu nedenle işletmelerin devamlılığını sağlayabilmesi için güven unsurunu daha fazla dikkate almaları ve pazarlama çabalarını tüketicilere güven verecek şekilde geliştirmeleri gerekmektedir.

Makale ve tezlerin incelenmesi sonucunda karşılaşılan diğer bir konu tüketicilerin satın alma sonrası duygularını sosyal medyada dile getirmeleridir. Tüketiciler ürün/hizmetten memnuniyet ya da memnuniyetsizliklerini sosyal medya araçlarında işletmelerle ya da yorumlarda diğer tüketicilere bilgi sağlamak amacıyla paylaşmaktadır. Bunun üzerine yapılan araştırmalarda bazı tüketicilerin satın alma sonrası duygularını paylaştıklarını bazılarının ise bunları paylaşmadan işletmeler tarafından fark edilerek kendisi ile ilgilenilmesini beklediği görülmüştür. Sosyal medya tüketici gruplarını aktif olarak birbirine bağlamakla birlikte tüketici ve işletmeleri de anlık ve düşük maliyetli olarak birbirine bağlamaktadır. Tüketici ve işletme arasındaki iletişimi araştıran çalışmalarda tüketicilerin kendilerine cevap verdiği, sorunlarıyla ilgilendiği ve çözüm bulduğu işletmeleri tercih ettikleri görülmektedir. Bununla birlikte sadece kendi sorunlarına değil, toplumsal problemlere karşı duyarlı olan işletmeleri de daha fazla tercih ettikleri yapılan araştırmalar sonucunda ortaya konulmuştur. Bu nedenle işletmeler sosyal medyanın ucuz, interaktif ve doğrudan iletişim kurabilme gibi faydalı özelliklerini göz ardı etmemelidir. Dijital tüketicilere uygun dijital pazarlama çabaları ile sosyal medyada marka tutumları ve güçlü bir marka imajı oluşturularak rakiplerinden farklılaşabilir.

İşletmeler, sosyal medyada yaptıkları reklamların yanı sıra sosyal medya fenomenlerinden de yararlanmaktadırlar. Tüketicilerin internet ve sosyal medya bağılılıklarını kullanarak onları sosyal medya fenomenleri ile manipüle ederek satın alma davranışlarını etkilemeye yönelik pazarlama çabaları geliştirmektedirler. Bunun üzerine yapılan araştırmalarda da tüketicilerin genelde fenomenlerden etkilendikleri görülmüştür. Ancak algılanan risk konusunda sosyal medya fenomenlerinin tüketicilerin algıladığı riski azaltmada etkili olmadığı da araştırma sonuçlarında görülmektedir.

Sosyal medyanın kullanımı yaş, cinsiyet, eğitim ve medeni durum ve gelir düzeyi gibi demografik özelliklere göre değişiklikler gösterdiği yapılan araştırmalar sonucunda elde edilmiştir. Yoğun rekabet ortamında başarılı olmak isteyen işletmelerin tüm bu hususları dikkate alarak hedef kitlelerini doğru belirlemeleri, tüketicilerin istek ve ihtiyaçlarını iyi analiz etmeleri, müşterilerin beklediği gibi kendilerine özel, müşteriye göreleştirilmiş pazarlama çabaları geliştirmeleri kaçınılmazdır.

Bu çalışmada sosyal medyanın tüketiciler üzerindeki etkileri genel çerçeve olarak ortaya konulmaya çalışılmıştır. Çalışmanın, ileride sosyal medya ve tüketici davranışları üzerinde yapılacak araştırmalarda literatürde neler yapıldığını ve nelerin eksik olduğunu görebilmesi açısından yardımcı olacağı düşünülmektedir. Ayrıca sosyal medyanın tüketicileri etkilediği ve işletmeler için de kaçınılmaz bir durum olduğu bir kez daha çeşitli araştırmalara değinilerek vurgulanmaktadır. Bu nedenle bu çalışmanın, işletmelerin sosyal medyanın pazarlamadaki önemini kavramalarına, pazarlama çabalarını nasıl geliştirmeleri gerektiği konularında yardımcı olacağı da düşünülmektedir.

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**BİR KARIYER ENGELİ OLARAK YAPIŞKAN ZEMİN SORUNU**  
**THE STICKY FLOOR PROBLEM AS A CAREER BARRIER**

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**ÖZET**

Kadınların erkekler kadar sık terfi ettirildiği ancak daha düşük ücret aldıkları ve bu düşük ücretlerde takılıp kaldıkları (Booth vd., 2003) durum yapışkan zemin sorununu ifade eder. Bu sorun sadece üst kademelerde kadınlarla erkekler arasındaki ücret farklılıklarını değil ayrıca alt pozisyonlarda çalışan kadınların erkeklerden daha düşük ücret almalarını da ifade etmektedir (Mohan, 2014; Fang ve Sakellariou, 2010). Kadınların erkeklerden daha az ücrete razı olmalarının temel nedenlerinden birisi kadınların ailevi ya da buna benzer nedenlerden dolayı buldukları coğrafyaya bağlı kalmaları ve dışarıdan gelen iş tekliflerine çok sıcak bakmamalarıdır. Bundan dolayı kadınlar buldukları alt pozisyonlarda uzun süre kalabilirler. Erkekler kadınlara nazaran çalışmak için başka coğrafyalara gidebilme konusunda daha esnek oldukları için iş verenler erkek çalışanların dışarıdan gelen iş tekliflerine olumlu bakmamaları için erkek çalışanlarına daha yüksek ücret teklif ederler (Yap ve Konrad, 2009).

Booth vd. (1998) kadınların erkekler kadar terfi etme imkanına sahip olduklarını ancak aynı pozisyondaki erkeklere nazaran daha düşük ücretlerde sıkışıp kaldıklarını ifade etmektedirler. Bu durum kadınların cam tavan engelini aşsalar bile daha düşük ücretlere sıkışarak yapışkan zemin olarak adlandırılan engele takıldıklarını ortaya koymaktadır.

Arulampalam vd. (2004) Avusturya, Belçika, İngiltere, Danimarka, Fransa ve İspanya’da kamu çalışanları arasında, buna karşılık Fransa, Almanya, İtalya ve İspanya’da özel sektör çalışanları arasında en alt kesimde kadınlarla erkekler arasındaki ücret farklılıklarının daha geniş olduğunu; Fang ve Sakellariou (2010: 36) Güney ve Güney Doğu Asya ülkelerinde yapışkan zemin olgusunun yaygın bir şekilde görüldüğünü ortaya koymuştur.

**Anahtar Kelimeler:** Kariyer engeli, yapışkan zemin, ücret farklılıkları

**ABSTRACT**

The situation where women are promoted as frequently as men but receive lower wages and are stuck at these lower wages (Booth et al., 2003) represents the sticky floor problem. This problem refers not only to the wage differences between men and women at upper levels, but also to the fact that women working in lower positions receive lower wages than men (Mohan, 2014; Fang and Sakellariou, 2010). One of the main reasons why women are willing to pay less than men is that they remain loyal to their geography due to family or similar reasons and are not very keen on job offers from outside. For this reason, women can stay in their lower positions for a long time. Since men are more flexible in terms of going to other geographies to work compared to women, employers offer higher wages to their male employees so that they do not view job offers from outside positively (Yap and Konrad, 2009).

Booth et al. (1998) state that women have the same opportunity to be promoted as men, but they are stuck with lower wages than men in the same position. This situation reveals that even if women overcome the glass ceiling barrier, they are stuck in lower wages and stuck on the so-called sticky floor.

Arulampalam et al. (2004) found that wage differences between men and women were wider at the bottom among public employees in Austria, Belgium, England, Denmark, France and Spain, whereas among private sector employees in France, Germany, Italy and Spain; Fang and Sakellariou (2010: 36) revealed that the sticky soil phenomenon is widely seen in South and South East Asian countries.

**Keywords:** Career barrier, sticky ground, wage differences

**PSYCHOLOGICAL ASPECTS AFFECTING THE FORMATION OF MANAGEMENT SKILLS AMONG STUDENTS**

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**ABSTRACT**

The article talks about psychological aspects affecting the formation of management skills among students. Educational psychology offers many frameworks to apply in management work, focusing on some of the psychological techniques used in the classroom, such as motivation, reinforcement, and teacher-student relationships.

New considerations on the development of students' management skills, comparative analyzes of theories investigating psychological aspects are necessary. Effective new theoretical-psychological knowledge for teachers will allow them to build a management style that combines proactive and reactive elements.

It is a very important factor that the training is based on expectations, that is, it serves the interests and satisfaction of the students. Students' self-management and metacognitive management skills based on this should first be reflected in the learning outcomes.

The study of the presented theoretical psychological models allows to come to the conclusion in the perspective of the research work that the variability of behavioral models in training and a new form of training ultimately necessitates the presence of different psychological approaches in the management of student-centered training.

In addition to all this, the study of various psychological aspects in the internal self-management of students as an individual considers it important to study important elements in the management of training.

**Keywords:** student, teacher, pedagogy, psychology

**INTRODUCTION**

Educational psychology offers many frameworks to apply in management work, focusing on some of the psychological techniques used in the classroom, such as motivation, reinforcement, and teacher-student relationships. When analyzing the psychological effects of management habits in students, the following research questions should be explored.

- How do psychological techniques help students focus on results?
- What are the main psychological problems behind students' behavior disorders?

New considerations on the development of students' management skills, comparative analyzes of theories investigating psychological aspects are necessary.

**METHOD**

Effective new theoretical-psychological knowledge for teachers will allow them to build a management style that combines proactive and reactive elements.

B.F. Skinner's Model of Behavior Formation American psychologist, research scientist claims that students' self-management is formed according to behavioral results.

Here, the systematic use of any reinforcement mechanism is required and it forms the behavior of students in any direction. Teachers first define desired behaviors and shape students' behaviors by selecting appropriate reinforcement techniques to encourage them to repeat these desired behaviors, showing the evolution of instructional management:

- metacognition and critical thinking;
- effective time management;
- active learning environment [5, p.183].

Skinner argues that management is a function of organizing teamwork in training and bringing about changes in behavior:

- ✓ According to Skinner, changes in behavior describe students' reactions to events or stimuli in their environment;
- ✓ Team work is rewarded according to the stimulus-response (S-R) pattern;
- ✓ Skinner's theory is an approach that reinforces or reinforces any response.

Sometimes in training, students need to control their own behavior and acquire new behaviors suitable for them. In this theory, V. Glesser supports the self-management of students, proposes to reduce inappropriate behaviors that meet their basic needs, and evaluates the following control mechanisms [4, p. 83]:

- ✓ Helping students make appropriate behavioral choices that ultimately lead to personal success in self-management;
- ✓ Helping students learn to make good behavioral choices;
- ✓ Cultivate responsible individuals who can meet needs in the real world according to their behavioral choices;
- ✓ Guide students to make rational choices and control their behavior;
- ✓ Seeing the consequences of their choices to ensure that students make good choices.

A key idea from Choice Theory is that the need for discipline imposed by teachers should be removed in order for students to exercise self-control and thus control the audience. Students should actively participate in the creation of rules for the audience, explore the concepts that motivate them to learn and are interesting to them, accept the teacher's guidance to understand their choices [4, p. 95].

It is a very important factor that the training is based on expectations, that is, it serves the interests and satisfaction of the students. Students' self-management and metacognitive management skills based on this should first be reflected in the learning outcomes.

The study of the presented theoretical psychological models allows to come to the conclusion in the perspective of the research work that the variability of behavioral models in training and a new form of training ultimately necessitates the presence of different psychological approaches in the management of student-centered training.

In addition to all this, the study of various psychological aspects in the internal self-management of students as an individual considers it important to study important elements in the management of training.

Each individual participating in the training differs according to the type of internal stresses, pathologies and dysfunctions, and the degree to which this condition arises varies. Sometimes in training, each learner needs to manage their own personal stressors of their own origin. In many cases, failure to manage personal stress in training hinders the achievement of goals and objectives. Observations show that when each learner uses his or her own approach to managing stress, it can be found to be effective. The best way for students to manage stress during interaction or individual activities is to use strategies that will minimize or eliminate stress based on activities. Effective strategies are those that create or implement a new positive learning environment to manage stressors. At the root of students' management skills is the ability to cope with stress.

Social and emotional self-regulation as a critical part of instruction, inculcating independent skills among students ensures that they have confidence in the effects of their actions. Self-regulation is the most important expectation for students in learning. Here, self-regulation is the ability to monitor attention, thoughts, and emotions. Students who have the ability to regulate their emotions and behavior are better able to relate to other students and respond to the various activities of the day.

### RECOMMENDATIONS

A. Alizadeh, H. Alizadeh, N. Ahmadov, T.S. Kabachenko, A.B. Karpov point out that the investigation of every contradiction between students is a valuable activity from a functional point of view. Sometimes in conflict resolution, having comprehensive information about the problems, deeply understanding the problem and finding more meaningful solutions leads to a successful outcome of the conflict. In many cases, indifference appears in the formation of conflicts between students in training or outside of training. Since the field of pedagogical education is a field that creates more polemics, it is often possible to encounter conflicts and disagreements of students in various situations. When conflicts occur, it is important for students to participate in peaceful conflict resolution. Here, mainly the type of conflicts, their management, knowing the responsibilities of the mediator, choosing activities to reduce the conflict are considered important stages. The goals of clarifying the situation on conflict resolution among students are emphasized, areas of resolution are defined, and understanding of different cultures is taught even in conflict situations. Asking questions develops a constructive orientation among students, indifferent to those who are protecting personal values and ethical rules.

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**İNFERTİLİTE TEDAVİSİNDE EKSOZOMLARIN KULLANIMI**  
**EXOSOME USE IN INFERTILITY TREATMENT**

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**ÖZET**

İnfertilite tedavisinde eksozomların kullanımı, son yıllarda giderek artan bir araştırma alanı haline gelmiştir. Eksozomlar, hücreler arası iletişimi sağlayan küçük keseciklerdir ve içerdikleri proteinler, nükleik asitler ve diğer biyomoleküller aracılığıyla çeşitli biyolojik süreçlere katkıda bulunurlar. İnfertilite tedavisinde, üreme sistemi hücrelerinden elde edilen eksozomlar, yumurta gelişimi, sperm kalitesi, implantasyon ve gebelik başarısını artırma potansiyeline sahip olabilirler. Bu araştırmanın amacı, infertilite tedavisinde eksozomların kullanım alanlarının ve etkilerinin incelenmesidir.

Yumurta gelişimi ve ovulasyon sürecinde, foliküler sıvıda bulunan eksozomlar, oositlerin sağlığı ve olgunlaşması üzerinde önemli bir rol oynayabilirler. Endometriyal hücrelerden salgılanan eksozomlar ise implantasyon sürecini destekleyebilir ve gebelik başarısını artırabilirler. Erkek infertilitesi durumunda, seminiferöz tubüllerden elde edilen eksozomların spermatogenez sürecini düzenleyerek sperm kalitesini iyileştirmesi beklenmektedir.

Eksozomlar ayrıca, hücreSEL yeniden yapılanmayı teşvik edebilir ve immün sistem üzerinde düzenleyici etkilere sahip olabilirler. Bu özellikler, implantasyon başarısını artırabilir ve gebelik sırasında fetüsün annenin bağışıklık sistemine kabul edilmesini kolaylaştırabilir.

Ancak, infertilite tedavisinde eksozomların kullanımıyla ilgili olarak henüz klinik denemelerin az olması ve mekanizmaların tam olarak anlaşılmaMıŞ olması nedeniyle, bu alandaki çalışmaların daha fazla bilgi ve kanıt gerektirdiğini belirtmek önemlidir. Gelecekte, infertilite tedavisinde eksozomların kullanımıyla ilgili daha fazla araştırma ve klinik çalışma yapılması beklenmektedir. Bu çalışmaların sonuçları, infertilite tedavisinde yeni ve etkili yaklaşımların geliştirilmesine katkıda bulunabilir.

**Anahtar Kelimeler:** Eksozom, infertilite, eksozom tedavisi

**ABSTRACT**

The use of exosomes in infertility treatment has become an increasingly explored area in recent years. Exosomes are small vesicles that facilitate intercellular communication and contribute to various biological processes through their cargo of proteins, nucleic acids, and other biomolecules. In infertility treatment, exosomes obtained from reproductive system cells hold potential in enhancing egg development, sperm quality, implantation, and pregnancy success. *The aim of this research is to examine the uses and effects of exosomes in infertility treatment.*

During egg development and ovulation, exosomes present in follicular fluid may play a crucial role in supporting oocyte health and maturation. Similarly, exosomes secreted by endometrial cells could aid in the implantation process and enhance pregnancy success. In cases of male infertility, exosomes derived from seminiferous tubules may regulate spermatogenesis and improve sperm quality.

Exosomes also have the potential to promote cellular remodeling and exert regulatory effects on the immune system. These properties could enhance implantation success and facilitate the acceptance of the fetus by the mother's immune system during pregnancy.

However, it is important to note that despite promising findings, the use of exosomes in infertility treatment is still in its early stages. Limited clinical trials and incomplete understanding of mechanisms necessitate further research and evidence gathering. Future studies and clinical trials in infertility treatment involving exosomes hold the promise of developing novel and effective approaches.

**Key Words:** Exosome, infertility, exosome treatment

## 1. EKSOZOMLAR

### 1.1. Eksozomların Keşfi ve Tanımı:

"Eksozom" terimi, Yunanca "exo" (dış) ve "soma" (vücut) kelimelerinden türetilmiştir. Bu terim, bu keseciklerin hücre dışına salgılandığını ve vücudun dışındaki iletişimi kolaylaştırdığını ifade etmektedir. Eksozomlar, ilk olarak 1980'lerde ve 1990'larda hücre kültürü çalışmaları sırasında keşfedilmiştir. İlk kez, hücre kültürü ortamında hücrelerin salgıladığı küçük veziküllerin varlığı gözlemlenmiştir. Hücre zarından dışarı doğru salgılanan ve içerdikleri proteinler, lipitler ve nükleik asitler aracılığıyla hücreler arası iletişimi sağlayan küçük keseciklerdir. Eksozomlar ilk olarak hücreler arası iletişimi düzenleyen araçlar olarak tanımlanmıştır. Ancak, son yıllarda yapılan araştırmalar, eksozomların hücreler arası iletişimin yanı sıra doku yenilenmesi, immün sistemi düzenleme, kanser yayılması ve nörolojik hastalıklar gibi birçok biyolojik süreçte önemli rol oynadığını göstermektedir. Eksozomların keşfi ve karakterizasyonu için kullanılan yöntemler sürekli olarak gelişmektedir (Théry, Clotilde,2006). Son yıllarda, eksozomların tıbbi araştırmalarda ve klinik uygulamalarda potansiyel olarak önemli bir rol oynayabileceği keşfedilmiştir. Özellikle kanser tedavisi, nörolojik hastalıkların tedavisi ve doku yenilenmesi gibi alanlarda eksozom tabanlı terapötik yaklaşımların geliştirilmesi üzerinde yoğun çalışmalar yapılmaktadır. Eksozomların keşfi, hücreler arası iletişimin anlaşılmasına ve yeni tıbbi uygulamaların geliştirilmesine büyük bir katkı sağlamıştır. Bu küçük kesecikler, hücre biyolojisi ve tıp alanında giderek daha fazla ilgi çeken bir araştırma konusu haline gelmiştir. Eksozomların biyolojik özellikleri, fizyolojik işlevleri ve tıbbi uygulamalar dikkat çekicidir. Özellikle, kanser tedavisi, doku yenilenmesi, immün modülasyon ve diğer sağlık alanlarındaki potansiyel uygulamaları incelenmektedir. (Yáñez-Mó, María,2015).

### 1.2. Eksozomların yapısı temel bileşenleri ve özellikleri

Eksozomlar, hücrelerden salgılanan ve dış ortama yayılan küçük keseciklerdir. Genellikle çapları 30 ila 150 nanometre arasında değişir ve çeşitli biyolojik sıvılarda bulunabilirler, örneğin kandan, idrardan, tükürükten ve hücre kültürü ortamlarından izole edilebilirler. Eksozomlar, lipid bir zarla çevrili olup, bu zar içerisinde çeşitli proteinler, lipitler, nükleik asitler ve diğer biyomoleküller bulunur. İçerdikleri proteinler, lipitler, nükleik asitler ve diğer biyomoleküllerden oluşurlar. Lipid çift tabakalı zar yapısı: Eksozomların zarları, hücre zarı gibi çift tabakalı bir lipid yapıya sahiptir. Eksozomlar, hücreden hücreye değişebilen proteinler, RNA ve DNA gibi nükleik asitler içerirler. Hücreye özgü proteinlerin yanı sıra eksozomların biyolojik işlevlerini yerine getiren özel proteinleri de içerirler. Bu proteinler arasında sinyal verme, hücre içi iletişim ve hücre dışı sinyal iletimi için önemli olanlar bulunur. Nükleik Asitler bakımından; eksozomlarda, RNA ve DNA gibi çeşitli nükleik asitler genellikle hücreden eksozoma transfer edilir ve eksozomlar aracılığıyla hücreler arası iletişimde rol oynarlar (Van Niel, Guillaume, 2018). Ayrıca, doku onarımı için yeni bir potansiyel terapötik araç olarak kök hücre kaynaklı hücre dışı veziküller olarak etkinlik gösterebilirler (Chen B, 2017; *Bjerge IM,2017*).

Eksozom oluşumunda, 2 farklı mekanizma söz konusu olmaktadır: Hücre içi oluşum süreci ve mekanizmalarında eksozomlar, hücre içinde endositoz ve eksositoz süreçleriyle oluşur. İçerikleri hücre içi veziküllerden gelir ve hücre zarından dışarı salınır. Endositoz ve eksositoz yoluyla salgılanmasında hücreler, endositoz yoluyla hücre içine materyal alır ve bu materyal, hücre zarından dışarı salgılanarak eksozomları oluşturur (Colombo,2014).

## 1.3. Eksozomların İşlevleri:

- Hücre iletişimi ve sinyal iletimi: Eksozomlar, hücreler arasında sinyal iletimini sağlarlar. Biyolojik bilgi alışverişi ve hücreler arası iletişimde önemli bir rol oynarlar.
- Genetik materyal ve protein transferi: Eksozomlar, genetik materyal ve proteinleri hücreler arasında taşıyabilirler. Bu, hücreler arası genetik bilginin transferini ve genetik materyalin modülasyonunu sağlar.
- Hücreler arası etkileşim ve modülasyon: Eksozomlar, hücreler arasında etkileşimi ve sinyal iletimini düzenler. Bu, hücreler arası işbirliği ve organizasyon için önemlidir.
- Bilgi ve Materyal Transferi: Eksozomlar, hücre içeriğini diğer hücrelere aktarabilirler. Bu, genetik materyal (RNA ve DNA), proteinler, lipitler ve diğer biyolojik bileşenlerin hücreler arasında transfer edilmesini sağlar. Bu şekilde, eksozomlar genetik bilgi ve diğer önemli moleküllerin hücreler arası alışverişini kolaylaştırır.
- İmmün Modülasyon: Eksozomlar, immün sistemin işlevlerini düzenleyebilir ve bağışıklık yanıtını modüle edebilirler. Bu, inflamatuvar yanıtları düzenleme, immün tolerans oluşturma ve enfeksiyonlarla mücadelede önemli bir rol oynar.
- Doku Yenilenmesi ve Onarımı: Eksozomlar, doku yenilenmesi ve onarımı süreçlerine katkıda bulunabilirler. Özellikle, eksozomlar hücre çoğalmasını teşvik edebilir, doku rejenerasyonunu destekleyebilir ve yaralı veya hasarlı dokuların onarılmasını kolaylaştırabilirler.
- Kanser Yayılmasının Düzenlenmesi: Eksozomlar, kanser hücrelerinin yayılmasını ve metastazını etkileyebilir. Kanser hücreleri tarafından salınan eksozomlar, tümör mikroçevresini değiştirme, metastatik süreçleri teşvik etme ve immün yanıtları modüle etme yeteneğine sahiptir.

Bu işlevler, eksozomların çeşitli biyolojik süreçlerde önemli bir rol oynadığını göstermektedir. Eksozomlar, hücreler arası iletişimi sağlamak, dokuların sağlığını ve işlevselliğini korumak ve hastalıkların gelişimini etkilemek için kritik bir araç olarak kabul edilirler (Tkach, 2016; Antonyak,2011).

## 1.4. Eksozomların Biyolojik Süreçlerdeki Rolü ve Klinik Uygulamalar

- Bağışıklık sistemi: Eksozomlar, bağışıklık sistemi üzerinde etkilidir. İmmün yanıtların modülasyonunda rol oynarlar ve immün hücreler arasında iletişimi sağlarlar.
- Tümör oluşumu ve metastaz süreci: Eksozomlar, tümör hücrelerinin büyümesi, invazyonu ve metastazı üzerinde etkilidirler. Tümör hücrelerinden salgılanan eksozomlar, çevredeki dokuları modüle edebilir ve metastazı kolaylaştırabilirler.
- Nöronal iletişim ve nörodejeneratif hastalıklar: Eksozomlar, nöronal iletişimde önemli bir rol oynarlar. Sinapslardan salgılanarak nöronlar arasında sinyal iletimini sağlarlar. Nörodejeneratif hastalıklarda, eksozomlar potansiyel olarak patolojik proteinlerin yayılmasına katkıda bulunabilirler.

## 1.5. Eksozomların Klinik Uygulamaları

- Biyobelirteç olarak kullanımı: Eksozomlar, biyobelirteçler olarak kullanılabilirler. Hastalıkların teşhisinde ve takibinde potansiyel olarak kullanılabilirler.
- Hastalık teşhisi ve takibi: Eksozomlar, hastalıkların teşhisinde ve tedavi takibinde kullanılabilirler. Özellikle kanser gibi hastalıkların tanısında ve prognozunda potansiyel olarak yararlıdır.
- İlaç taşıyıcı sistemler olarak potansiyel uygulamaları: Eksozomlar, ilaç taşıyıcı sistemler olarak kullanılabilirler. İlaçların hedefe taşınmasını sağlayarak tedavi etkinliğini artırabilirler.

## 1.6. Eksozom Araştırmalarında Yenilikler ve Gelecek Projeksiyonları

- Eksozomların moleküler içeriğinin anlaşılması: Eksozomların içeriği hakkındaki bilginin artmasıyla, hücreler arası iletişim ve sinyal iletimi hakkında daha derinlemesine anlayış elde edebiliriz.

- Yeni izolasyon ve analiz tekniklerinin geliştirilmesi: Eksozomların izolasyon ve analiz yöntemlerindeki gelişmeler, daha hassas ve verimli çalışmalara olanak tanır.
- Klinik uygulamalarda potansiyel ilerlemeler: Eksozomların klinik uygulamalarda kullanımıyla ilgili araştırmaların artması, hastalıkların tanı ve tedavisinde daha etkili ve yenilikçi yaklaşımların geliştirilmesine olanak sağlar.
- Eksozomlar, hücre biyolojisinde önemli bir rol oynarlar ve birçok biyolojik süreçte etkilidirler. Hücreler arası iletişimden klinik uygulamalara kadar geniş bir yelpazede önemli işlevlere sahiptirler ve hücre biyolojisindeki önemi ve geleceği hakkında vurgulananlar önemlidir.
- Eksozomlar, hücre biyolojisi ve tıp alanında giderek daha fazla ilgi çeken bir araştırma konusudur. Gelecekteki araştırmaların eksozomların işlevlerini ve uygulamalarını daha da derinlemesine anlamamıza yardımcı olacağına inanılmaktadır.

### 2. EKSOZOMLARIN İNFERTİLİTE TEDAVİSİNDEKİ ROLÜ

Son yıllarda infertilite (kısırlık) tedavisi için eksozomların kullanımıyla ilgili birçok araştırma yapılmıştır. Eksozomlar, üreme sistemi hücreleri arasında iletişimi ve sinyal iletimini düzenleyerek üreme fonksiyonları üzerinde etkilidirler. İnfertilite tedavisinde, özellikle endometriyal dokunun kalitesinin artırılması, yumurtalık rezervinin iyileştirilmesi ve embriyo gelişimi gibi alanlarda eksozomların potansiyel kullanımı araştırılmaktadır.

**Foliküler Sıvı Eksozomları ve Oosit Gelişimi:** Bir çalışmada, foliküler sıvıdan elde edilen eksozomların, oosit gelişimi ve sağlığı üzerindeki etkileri incelenmiştir. Foliküler sıvı eksozomlarının, oositlerin gelişimini destekleyici faktörler içerdiği ve üreme başarısını artırabileceği öne sürülmüştür (Sfakianoudis K,2019; Da Silveira, 2012).

**Endometriyal Eksozomlar ve İmplantasyon:** Başka bir çalışmada, endometriyal hücrelerden salgılanan eksozomların, implantasyon sürecindeki rolü araştırılmıştır. Endometriyal eksozomların, embriyonun rahme yerleşmesi ve gebeliğin başlaması üzerinde olumlu etkileri olabileceği düşünülmektedir (Rekker,2018; Becker,2020).

**Yumurtalık Dokusu Eksozomları ve Yumurtalık Rezervi:** Bazı çalışmalarda, yumurtalık dokusundan elde edilen eksozomların, yumurtalık rezervinin korunması ve artırılması üzerindeki etkileri araştırılmıştır. Yumurtalık dokusu eksozomlarının, yumurta hücrelerinin gelişimini desteklediği ve yaşlanma sürecini yavaşlatabileceği öne sürülmektedir. Bu çalışmalar, infertilite tedavisinde eksozomların potansiyel kullanımını daha derinlemesine araştırmaktadır. Ancak, bu alandaki araştırmaların halen deneysel aşamada olduğunu ve klinik uygulamaya geçiş sürecinde daha fazla çalışma ve kanıt gerektiğini unutmamak önemlidir (Farsinejad,2020;Chen, 2019).

**Seminiferöz Tübül Eksozomları ve Spermatogenez:** Erkek infertilitesi üzerine yapılan çalışmalarda, seminiferöz tübüllerden salgılanan eksozomların, spermatogenez sürecini düzenlediği ve sperm kalitesini artırabileceği öne sürülmüştür. Bu çalışmalar, erkek infertilitesinin tedavisinde eksozomların potansiyel kullanımını araştırmaktadır (Huang,2018; Kharazi, 2019).

Bir çalışmada insan blastokistlerinde (embriyonun gelişiminin erken aşamalarından biri) gen ekspresyonunun dinamiklerini, histon modifikasyonlarını ve RNA bağlayıcı proteinlerin hücre içi konumunu anlamayı amaçlanmıştır. Blastokist, döllenmiş yumurtanın gelişiminin 5-6 gün sonunda ulaştığı bir aşamadır ve embriyonun implantasyonu için hazırlık yapar. Araştırmacılar, bu çalışmada insan blastokistlerinde gen ekspresyonunun nasıl düzenlendiğini ve bu sürecin yumurtalıktaki folikül gelişimi ve ovulasyon gibi önemli üreme olayları için nasıl kritik olduğunu anlamaya çalışmışlardır. Ayrıca, histon modifikasyonlarının ve RNA bağlayıcı proteinlerin blastokist içindeki belirli hücresele konumlarını belirlemişlerdir. İnsan embriyonunun erken gelişimini daha iyi anlamamıza ve potansiyel olarak infertilite tedavileri ve üreme teknolojilerinin geliştirilmesine katkıda bulunabilecek temel bilgiler sağlamaktadır. (Vilella,2016). Diğer çalışma (Machtinger,2016) granüloza hücrelerinin dışsal veziküllerinin (eksozomlar gibi) oositin yetkinliği ve IVF (in vitro fertilizasyon) sonuçları üzerindeki olası etkilerini araştırmayı amaçlamaktadır. Granüloza hücreleri, yumurtalığın foliküllerinin iç kısmını kaplayan hücrelerdir ve yumurta gelişimi ve olgunlaşması sürecinde önemli rol oynarlar. Bu çalışmada, granüloza hücrelerinin salgıladığı dışsal veziküllerin içeriği ve işlevi incelenmiştir.

Araştırmacılar, granüloza hücrelerinin salgıladığı dışsal veziküllerin oositin yetkinliği üzerindeki etkilerini incelemişlerdir. Bu veziküllerin içeriğinin, oositin sağlığı ve döllenme yeteneği üzerinde önemli olduğu öne sürülmüştür. Çalışma, in vitro fertilizasyon (IVF) tedavisi gören hastalardan elde edilen granüloza hücrelerinden dışsal veziküllerin izole edilmesi ve analiz edilmesi üzerine yapılmıştır. Bu şekilde elde edilen bulgular, IVF tedavisi sonuçlarını anlamak ve iyileştirmek için potansiyel yeni bir hedef sunabilir (Machtinger,2016).

Başka bir çalışma, kök hücre kaynaklı eksozomların stromal destekleyici dokuda yeniden yapılanma, tümör ilerlemesi ve kanser immünoterapisi üzerindeki rollerini araştırmayı amaçlamıştır. Kök hücrelerden elde edilen eksozomlar, hücrel sinyal iletiminde ve doku yenilenmesinde önemli bir rol oynarlar. Bu çalışmada, eksozomların stromal dokunun yapısal ve fonksiyonel özelliklerini nasıl etkilediği ve kanser gelişimindeki rolü incelenmektedir. Araştırmacılar, kök hücre kaynaklı eksozomların kanser hücrelerinin büyümesini, yayılmasını ve bağışıklık sistemi ile etkileşimini araştırmışlardır. Ayrıca, bu eksozomların kanser immünoterapisi üzerindeki potansiyel etkileri de değerlendirilmiştir. Çalışma, kök hücre kaynaklı eksozomların kanser biyolojisi ve kanser tedavisi üzerindeki etkilerini anlamamıza yardımcı olabilir. Bu bilgiler, kanser tedavisinde yeni yaklaşımların geliştirilmesine ve kanserle mücadelede yeni stratejilerin belirlenmesine katkıda bulunabilir(Fatima,2017).

### 3. SONUÇ

Birçok çalışmada, infertilite tedavisinde eksozomların potansiyel kullanımı incelenmektedir. Özellikle, foliküler sıvı, endometriyal hücreler, seminiferöz tubüller ve yumurtalık dokusu gibi üreme sistemi bileşenlerinden elde edilen eksozomların infertilite tedavisindeki etkileri üzerinde odaklanılmaktadır.

- **Üreme Fonksiyonlarını Destekleme:** Bazı araştırmalar, infertilite tedavisinde kullanılan eksozomların, yumurta gelişimi, sperm kalitesi, implantasyon ve gebelik başarısını artırabileceğini öne sürmektedir.
- **Hücrel Yeniden Yapılanma ve İmmün Modülasyon:** Eksozomlar, hücrel yeniden yapılanmayı teşvik edebilir ve immün sistem üzerinde düzenleyici etkilere sahip olabilirler. Bu özellikler, implantasyon başarısını artırabilir ve gebelik sırasında fetüsün annenin bağışıklık sistemine kabul edilmesini kolaylaştırabilir.
- **Üreme Sistemi Hücrelerini Hedefleme:** Yumurtalık, endometriyum, sperm ve diğer üreme sistemi hücrelerinden elde edilen eksozomlar, doğrudan üreme sistemi hücrelerini hedefleyebilir ve bu hücrelerin işlevlerini modüle edebilirler.
- **Sperm Kalitesinin Artırılması:** Bazı çalışmalar, eksozomların sperm fonksiyonlarını ve kalitesini artırabileceğini göstermektedir. Bu, erkek infertilitesi tedavisinde potansiyel olarak faydalı olabilir.
- **Potansiyel Yenilikçi Bir Yaklaşım:** Eksozomlar, hücreler arası iletişimi düzenleyen ve hücrel sinyal iletimini sağlayan önemli araçlardır. Bu özellikleri nedeniyle, infertilite tedavisinde kullanılmaları yeni bir yaklaşım olabilir.
- **Üreme Fonksiyonlarını Destekleme:** Bazı araştırmalar, infertilite tedavisinde kullanılan eksozomların, yumurta gelişimi, sperm kalitesi, implantasyon ve gebelik başarısını artırabileceğini öne sürmektedir.

Ancak, eksozomların infertilite tedavisindeki kullanımı hala deneysel aşamadır. Daha fazla araştırma ve klinik çalışma yapılması gerekmektedir. Ayrıca, eksozomların kullanımının etkinliği, güvenilirliği ve uzun vadeli etkileri hakkında daha fazla bilgiye ihtiyaç vardır. Bu nedenle, eksozomların infertilite tedavisindeki son durumu tam olarak belirtmek için daha fazla zaman ve araştırma gerekmektedir.

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**EĞİTİM BİLİMLERİNDE YAPAY ZEKANIN ETKİSİ: MEVCUT DURUM VE GELECEK PERSPEKTİFLERİ. ÖĞRETMEN - EĞİTİM DENETİMİ VE YÖNETİMİ**

**THE INFLUENCE OF ARTIFICIAL INTELLIGENCE IN EDUCATIONAL SCIENCES: CURRENT STATUS AND FUTURE PERSPECTIVES. TEACHER - EDUCATIONAL INSPECTION AND MANAGEMENT**

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**ÖZET**

Eğitim bilimlerinde yapay zekanın etkisi giderek artmaktadır. Yapay zeka, öğrenme ve öğretme süreçlerini optimize etmek, öğrenci performansını izlemek ve kişiselleştirilmiş öğrenme deneyimleri sunmak gibi alanlarda önemli bir rol oynamaktadır. Günümüz mevcut şartlarında yapay zeka teknolojileri öğrenim materyallerinin geliştirilmesinden öğrenci değerlendirmesine kadar geniş bir yelpazede kullanılmaktadır ve kullanımı arttıkça bu etkiler daha belirgin şekilde özlenebilecektir.

Yapay zeka destekli öğrenme yöntemleri, öğrencilerin ihtiyaçlarına göre özelleştirilmiş içerik sağlama yeteneği ile dikkat çekmektedir. Bu, öğrencilerin öğrenme hızlarını ve tercihlerini dikkate alarak onlara en uygun öğrenme deneyimini sunma potansiyeline sahiptir. Ayrıca, yapay zeka tabanlı öğrenci izleme sistemleri, öğretmenlere öğrenci ilerlemesi hakkında daha derinlemesine bilgi sağlayarak öğrenci başarısını artırma konusunda önemli bir rol oynamaktadır.

Gelecek perspektiflerine bakıldığında ise yapay zeka destekli öğrenme teknolojilerinin daha da gelişeceği ve eğitimdeki önemli bir değişim ve dönüşümü tetikleyeceği öngörülmektedir. Bu teknolojiler, öğrencilerin bireysel öğrenme ihtiyaçlarını daha etkili bir şekilde karşılayarak eğitimdeki eşitsizlikleri azaltabilir ve daha kapsayıcı bir eğitim ortamı sunabilir.

Ancak yapay zeka teknolojilerinin eğitimde kullanımıyla ilgili bazı endişeler de bulunmaktadır. Örneğin, veri kullanımı, veri gizliliği ve etik konuları yapay zeka destekli sistemlerin güvenliğini ve doğruluğunu sağlamak için ele alınması gereken önemli konulardır.

Sonuç olarak, eğitim bilimlerinde yapay zekanın etkisi oldukça fazladır ve giderek daha da artmaktadır. Bu teknolojilerin dikkatli bir şekilde kullanılması ve etik standartlara uygun olarak yönetilmesi, eğitimde daha etkili ve kapsayıcı bir öğrenme ortamı oluşturmak başta eğitim paydaşları olmak üzere herkese büyük potansiyel sunmaktadır.

**Anahtar kelimeler:** Yapay zeka, eğitim, teknoloji, veri.

**ABSTRACT**

The influence of artificial intelligence in educational sciences is steadily increasing. All technologies play a significant role in optimizing learning and teaching processes, monitoring student performance, and providing personalized learning experiences. Currently, AI-powered learning methods are utilized in a wide range of areas from developing instructional materials to student assessment.

AI-supported learning techniques attract attention with their ability to provide customized content tailored to the needs of students. This has the potential to offer students the most suitable learning experience by taking into account their learning pace and preferences. Additionally, AI-based student monitoring systems play a vital role in enhancing student success by providing teachers with more-in-depth insights into student progress.

Looking towards future perspectives, it is anticipated that AI-enabled learning technologies will further evolve and trigger significant change and transformation in education. These technologies have

the potential to reduce educational inequalities and create a more inclusive learning environment by more effectively addressing individual learning needs of students.

However, there are also some concerns regarding and ethics are significant considerations that need to be addressed to ensure the security and accuracy of AI-supported systems.

In conclusion, the influence of artificial intelligence in educational sciences is significant and steadily growing. Careful utilization of these technologies and management in accordance with ethical standards offer great potential for creating a more effective and inclusive learning environment in education.

**Keywords:** Artificial intelligence, education, technology, data.

**AUTOMATIC DISTRIBUTION SYSTEM FOR METAL SHEET HANDLING IN THE  
FACTORY FLOOR**

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**ABSTRACT**

Raw material handling is a key process in production. In all sectors of the industry, most companies spend much of resources and time handling the material inefficiently to the post where it will be transformed. Industry 4.0 and automated processes have given companies every means to increase their productivity. These new tools lead to lower labor costs, decrease production times, divert resources to more critical parts of the process, and increase the quality of the final product. However, the transition to these means is not easy. It is necessary to adapt the existing production line to a smooth transition without stopping production. In the production of air conditioning machines, often production lines heavily depend on human labor. The integration of automated processes is a necessary step for the companies to grow in the market and face the large multinationals in the sector. So, it was with this in mind that this project was developed.

The objective of this work is to design a solution capable of transporting the plates, necessary to produce the machines, for the puncher. The company requires that this equipment is compact due to space limitations. This solution will have to be easily adapted by the company using the resources already used today. To achieve the main objective, an analysis was made of the company, the current solution, and the problem of handling existing sheet metal in the production chain, to discover the solution that meets the required requirements. Then, the various preliminary design solutions were analyzed until the solution that meets all the requirements and finally the various components were dimensioned. This solution allowed to reduce the labor and time spent handling the raw material, which consequently increased the efficiency of the production line and reduced the cost of production of the final product.

**Keywords:** Mechanical Design, Distribution System, Automation, Automated Warehouses, Sheet Handling.

**DEVELOPMENT OF QUALITY ASSURANCE PROCEDURES FOR FIXING  
COMPONENTS IN THE AUTOMOTIVE INDUSTRY**

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**ABSTRACT**

The incorporation of polymeric materials in car structure components, over the years, has been playing a key role in the automotive sector, enabling the production of more efficient and ecological vehicles. Among the many options for fixing these components, there are clips and snap-fits, which not only facilitate assembly and disassembly, but also contribute to reduce the total mass of the car. This work was developed in an industrial environment, and arises from the need for a more rigorous control involving some internal standardized fixings, incorporated in the components developed by the company, to comply with customer specifications. In an initial phase, and after the selection of the standardized fastenings to be studied, experimental tests were carried out according to the directions that the specifications of the automotive brands stipulate for the strength of the fastenings to be incorporated into their components. Using the Finite Element Method (FEM), numerical simulations were performed in the Abaqus<sup>®</sup> software, where the conditions of the physical tests were replicated to correlate both tests. In a final phase, considering the relative difference of the numerical results in relation to the real results, the respective geometric validation was carried out, making changes in the areas that were identified as critical, in cases where the results obtained from the simulations so dictate. With the elaboration of the present work, it was possible to study different approaches to numerical calculation and to understand which one is best suited to the problem in question, including the use of shell elements to approximate the test models or the use of tetrahedral solid elements, performing static or dynamic simulations and realizing which one provides better results, and also studying the influence that mass scaling has on the dynamic analyses performed. From the work carried out, it was possible to validate the geometry of the study fixtures.

**Keywords:** Snap-fits, Clips, Polymeric components, Automotive Industry, Finite element method, Correlations, Physical tests.

PRODUCTION OF HOLLOW PLA/PBS NANOFIBERS INCLUDE PROPOLIS BY  
COAXIAL ELECTROSPINNING METHOD  
ÇİFT BESLEMELİ ELEKTROÇEKİM YÖNTEMİ İLE PROPOLİS İÇEREN İÇİ BOŞ  
PLA/PBS NANOLİFLERİN ÜRETİMİ

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**ABSTRACT**

Nowadays, nanofibers that can meet the requirements of modern wound dressings are produced by electrospinning. Polylactic acid (PLA), which is frequently used as a nanofiber in biomedical applications, is a biodegradable polymer. In addition to being environmentally friendly and having high tensile strength, it has low elongation and high brittleness. In this study, PLA to increase its flexibility was used by mixing it with 7% (w/w) polybutylene succinate (PBS). polyvinylpyrrolidone (PVP)/Propolis was used in the core of the prepared bicomponent nanofiber. Propolis was added to PVP at the rates of 5% and 15%, depending on the total solid amount of PLA/PBS. Nanofibers with PLA/PBS in the sheath and PVP/Propolis in the core were obtained by the coaxial electrospinning method. PVP in bicomponent nanofibers was removed with distilled water, thus hollow pure PLA/PBS nanofibers and hollow PLA/PBS nanofibers including propolis were produced. Fourier transform infrared spectroscopy (FTIR), differential scanning calorimetry (DSC), and liquid absorption capacity (LAC), analyses were performed on nanofibers. In the FTIR spectrum of the hollow PLA/PBS nanofibers with propolis, a very small peak intensity of PVP was observed at 1655  $\text{cm}^{-1}$ , so it was reported that the core of these nanofibers was partially hollow. The absence of characteristic values of PVP in the DSC curve of the hollow pure PLA/PBS nanofiber showed that its interior was successfully completely emptied. According to DSC results, the placement and distribution of propolis in the core of the PLA/PBS nanofibers increased the crystallinity. The highest LAC (%) was observed in hollow pure PLA/PBS nanofiber with a value of 611.90%. As the amount of propolis in nanofiber structures increased, some decreases were observed in LAC as propolis continued to take up space in nanofiber core. It is suggested to evaluate whether hollow PLA/PBS nanofibers with propolis can be used as a modern wound dressing material with an antibacterial effect by performing advanced tests such as antibacterial and cytotoxicity.

**Keywords:** Propolis, Hollow, PLA/BPS nanofiber, Wound dressing.

## ÖZET

Günümüzde modern yara pansumanlarının gereksinimlerini karşılayabilecek nanolifler elektroçekim yöntemiyle üretilmektedir. Biyomedikal uygulamalarda nanolif olarak sıklıkla kullanılan polilaktik asit (PLA), biyolojik olarak parçalanabilen bir polimerdir. Çevre dostu olması ve yüksek çekme dayanımına sahip olmasının yanı sıra uzama oranı düşük ve kırılabilirliği yüksektir. Bu çalışmada esnekliğini arttırmak için PLA ağırlıkça %7 polibütülen süksinat (PBS) ile karıştırılarak kullanıldı. Hazırlanan iki bileşenli nanolifin çekirdeğinde Polivinilpirolidon (PVP)/Propolis karışımı kullanıldı. PVP'ye PLA/PBS'nin toplam katı miktarına bağlı olarak %5 ve %15 oranlarında propolis eklenmiştir. Kabuğunda PLA/PBS ve çekirdeğinde PVP/Propolis bulunan çift bileşenli nanolifler, koaksiyel elektroçekim yöntemiyle elde edildi. Çift bileşenli nanoliflerdeki PVP, damıtılmış su ile çözülerek yapıdan uzaklaştırıldı. İçi boş saf PLA/PBS nanolifi ve propolis içeren içi boş PLA/PBS nanolifleri elde edildi. Nanolifler üzerinde Fourier dönüşümü kızılötesi spektroskopisi (FTIR), diferansiyel taramalı kalorimetri (DSC) ve sıvı emme kapasitesi (SEK) analizleri gerçekleştirildi. Propolisli içi boş PLA/PBS nanoliflerinin FTIR spektrumunda 1655  $\text{cm}^{-1}$ 'de çok küçük bir PVP pik yoğunluğu gözlemlendi, dolayısıyla bu nanoliflerin çekirdeğinin kısmen içinin boş olduğu bildirildi. İçi boş saf PLA/PBS nanolifin DSC eğrilerinde PVP'nin karakteristik değerlerinin bulunmaması, iç kısmının başarıyla boşaltıldığını gösterdi. DSC sonuçlarına göre propolisin PLA/PBS nanoliflerinin çekirdeğine yerleştirilmesi ve dağıtılması kristallliği arttırmıştır. En yüksek SEK, %611,90 değeriyle içi boş saf PLA/PBS nanolifde gözlemlendi. Nanolif yapılarında propolis miktarı arttıkça propolis nanolif çekirdeğinde yer kaplamaya devam ettiğinden SEK'de bir miktar azalmalar görüldü. Propolisli içi boş PLA/PBS nanoliflerin antibakteriyel ve sitotoksikite gibi ileri testler yapılarak antibakteriyel etkiye sahip modern bir yara pansuman malzemesi olarak kullanılıp kullanılmayacağını değerlendirilmesi önerilmektedir.

**Anahtar Kelimeler:** Propolis, İçi Boş, PLA/PBS Nanolif, Yara Örtüsü.

## GİRİŞ

Teknolojinin hızla gelişmesinin getirmiş olduğu yenilikler malzeme bilimi alanındaki araştırma ve geliştirmeleri de beraberinde getirmiştir. Nanoteknolojinin ilerlemesiyle, nanometre boyutunda materyaller tıp, doku mühendisliği, kimya, gıda ve tarım gibi çeşitli disiplinlerde yaygın bir şekilde kullanılmaktadır. Deri, insan vücudu için bariyer görevine sahip en büyük organdır ve yaralanması yaşamı tehdit eden bir duruma sebep olabilir [1]. Yanık, kesik ve tıbbi nedenlerden dolayı oluşabilecek yaralar cilt devamlılığını bozar. Mikroorganizmalar yara üzerine yerleşerek doku hasarını artırabilir. Yara örtüsü oksijen ve nem geçişi ile eksüda sıvısının uzaklaştırılması, mikroorganizmalardan korunması ve hücre üretiminin hızlandırılmasını sağlamaktadır. Günümüzde bandaj ve sargı bezi gibi geleneksel yara örtüleri yara iyileşmesi için ideal koşulları yeterince sağlamadığından yerini modern yara örtülerine bırakmaktadır. Modern yara örtüleri doğal ve sentetik polimerlerden oluşan; köpük, film, hidrojel ve nanolif yapıda olabilmektedir [2, 3]. Elektroçekim yöntemi ile elde edilen nanolifler modern yara örtüsü üretiminde sıklıkla tercih edilmektedir. Elektroçekim yöntemi, belirli konsantrasyondaki polimer çözeltisinin, belirli akış hızında ve kV biriminde bir elektrik kuvveti uygulanmasıyla polimerlerin nanoliflere dönüşmesi esasına dayanır.

Poli (laktik asit) (PLA), yenilenebilir kaynaklardan elde edilen bir alifatik termoplastik polyesterdir. PLA yüksek şeffaflığa, yüksek mukavemete, düşük erime sıcaklığına, düşük ısı özelliklerine, düşük bozunma hızına sahip hidrofobik, biyobozunur ve biyoyumlu bir malzemedir [4, 5]. Oda sıcaklığında gevrek, kırılabilir ve düşük uzama oranına sahip olması PLA'nın kullanım alanlarını sınırlamaktadır. PLA'nın eksikliklerinin ortadan kaldırılması için biyobozunur, toksik olmayan ve gelişmiş mekanik özelliklere sahip bir polimer olan Polibütülen süksinat (PBS) ile katkılandırılabilir [6]. PBS, esnekliği nedeniyle PLA'nın mekanik özelliklerini iyileştirebilmektedir. PLA içerisine plastikleştirici olarak görev yapan PBS eklenmesiyle dayanımı ve kristallliği artırılmaktadır. Polivinilpirolidon (PVP), biyoaktif maddelerle biyoyumlu ve yüksek viskoziteli hidrojen bağları oluşturabilen hidrofilik bir

polimerdir. Yapısındaki hidrofobik ve hidrofilik fonksiyonel grupları sayesinde pek çok organik çözücüde çözünebilmektedir [7, 8].

Propolis, arılar tarafından üretilen önemli bir antimikrobiyal üründür. Yapısında reçineler dışında mumlar, polifenoller (fenolik asitler, flavonoidler) ve terpenoidler bulunmaktadır. Arıların bulunduğu kıtalar, bölgeler ve reçinelerin toplandığı bitkiler farklılık gösterdiğinden her propolis farklı kimyasal bileşime sahiptir. Birçok aktif bileşenin kombinasyonu ve bunların çeşitli oranlarda bulunması, bakteriyel direncin oluşmasını engellemektedir. Propolisin antibakteriyel aktivitesi sahip olduğu kimyasal bileşimin değişmesiyle ülkeden ülkeye farklılık göstermektedir [9]. Propolis, cilt dokusunun yeniden şekillenmesini ve hücrelerin çoğalmasını artırıcı etkiye sahiptir [10].

Bu çalışmanın gerçekleştirilmesine yol gösteren ilgili literatür çalışmaları aşağıda özetlenmiştir. Li ve Xia'nın çalışmalarında, iki bileşenli elektrospinning işlemi kullanılarak iki kılcal iğnenin uçlarından karışmayan iki polimer çözeltisinin akıtılmasıyla kabuk ve çekirdek kısmından oluşan nanolifler elde ettiler. Sonrasında sadece duvar kabuğunu içeren içi boş nanolifler üretmek için çekirdekleri seçici olarak çıkardılar [11]. Zhang ve diğerleri araştırmalarında dikey elektroçekim düzeneği ile sentezlenmiş tek ve çift içi boş PAN mikro/ nanoliflerin üretiminde değişkenlerin ürünün morfolojisini nasıl etkilediği üzerine araştırmalar yapılmıştır. PVP çekirdek olarak kullanılmıştır. Kabuk ve çekirdek yapılarının ayrılabilmesi için 24 saat oda sıcaklığında saf su içerisinde bekletilerek içi boş nanolifler elde etmişlerdir [12]. Monika ve arkadaşları yaptıkları çalışmada reaktif ekstrüzyon yoluyla 80/20 ağırlık oranında PLA/PBS karışımından dengeli mekanik özelliklere sahip nanobiyokompozitler üretmişlerdir. PLA'ya PBS ilavesinden sonra kopma uzaması artarken çekme modülü ve dayanımı düşmüştür. Bu bulgu, çekme testi sırasında PLA'nın sünekliğindeki iyileşmeyi doğrulamaktadır [13]. Ergüven ve arkadaşları yaptıkları çalışmada kapsamında PLA çözeltisi içerisine farklı oranlarda propolis ekleyerek, diğer bir gruba da hem propolis hem de boyacı sumağı özütü ekleyerek geleneksel elektro-çekim yöntemi ile nano/mikro lif yapılı yara örtüleri elde etmişlerdir. [14]. İşgen ve arkadaşları yaptıkları çalışmada, geliştirilmiş mekanik özelliklere sahip biyolojik olarak parçalanabilen nanomalzemeler içi boş PBS/Termoplastik Poliüretan (TPU) nanoliflerin üretimi koaksiyel elektrospinning yöntemi ile gerçekleştirilmiştir. Nanoliflerin çekirdek yapısı damıtılmış suda çözüldü. Böylece PVP'NİN yapıdan uzaklaştırılmasıyla içi boş nanolifler elde edilmiştir. Üretilen içi boş nanoliflerin biyomedikal alanda biyolojik olarak parçalanabilen ve nefes alabilen bir yara örtüsü olarak kullanılabilirliği görülmüştür [6].

Bu çalışmada, biyobozunur PLA polimeri ağırlıkça %7 (a/a) PBS ile karıştırılarak mekanik özellikleri artırılmıştır. PLA/PBS çözeltisi (kabuk) ve PVP/Propolis çözeltisi (çekirdek) hazırlanarak çift beslemeli elektroçekim yöntemiyle eş eksenli düzeden çift bileşenli lif üretimi yapılmıştır. Üretilen liflerin çekirdeğindeki PVP saf su ile çözülmüş ve propolisli içi boş PLA/PBS nanolifleri elde edilmiştir. Literatürde çift bileşenli elektroçekim yöntemi ile dışta PLA/PBS ve içte PVP/Propolis kullanılarak bireysel özelliklerini koruyan tek bir nanomalzemenin üretildiği bir çalışmaya rastlanmamıştır.

## **MALZEME VE YÖNTEM**

### **Malzeme**

Çalışmada ticari ismi 4043D olan PLA kullanılmış ve NatureWorks firmasından temin edilmiştir. Polibütilen süksinat (PBS-BioPBS FZ71PM) PTT MCC Biochem CO. Ltd. firmasından satın alınmıştır. PVP, Sigma-Aldrich firmasından temin edilmiştir. Çözücülerden dimetilformamid (DMF) ve kloroform (CF) Merck firmasından, Dimetil sülfoksit (DMSO) Carlo Erba firmasından ve etanol Tekkim Kimya firmasından temin edilmiştir. Propolis Tekirdağ/Türkiye bölgesinden temin edilmiştir.

### **Çözeltilerin Hazırlanması ve Elektroçekim İşlemi**

PLA ve PBS granülleri 80 °C'de 24 saat etüvde kurutulduktan sonra çözelti hazırlamada kullanılmıştır. PLA/PBS karışım çözeltilerinin hazırlanması için toplam katı miktarına göre ağırlıkça (a:a) 93:7 oranı kullanılmıştır [15]. PLA/PBS çözeltisi, %10 konsantrasyonlu olacak şekilde DMF/CF/DMSO hacimce (1.5: 7: 1.5 v/v/v) çözücü karışımı kullanılarak hazırlanmıştır. Çözücü içindeki PLA ve PBS polimerleri, beherin ağzı önce alüminyum folyo ardından parafilm ile örtülerek 10 dakika oda sıcaklığında, 10 dakika 30 °C'de, 10 dakika 40 °C'de, 1 saat 50 °C'de, 1,5 saat 60 °C ve 30 dakika 80

°C'de olmak üzere toplam 3,5 saat manyetik karıştırıcıda çözülmüştür. Propolisler elektroçekim işleminde kullanılabilmeleri için öğütücü ile öğütülmüştür. Propolis, PLA/PBS toplam katı miktarına göre %5 ve %15 oranlarında PVP polimerinin içine katılarak çözelti hazırlanmıştır. Tüm çözeltiler homojen bir şekilde çözüldükten sonra bekletilmeden elektroçekim işlemine alınmıştır. Elde edilen elektroçekim içi boş (IB) nanoliflerin kodları, polimer çözeltilerinin kodları ile aynı verilmiştir (Tablo 1.). Bu çalışmada Inovenso markalı elektroçekim cihazı kullanılmıştır. Elektroçekim işlemi kapalı ortamda 24 °C (±2) ortam sıcaklığı ve %65 (±5) bağıl nem koşullarında gerçekleştirilmiştir. İçi boş kesitli nanolif eldesi için, iç içe çift bileşenli elektroçekim yöntemi kullanılarak üretim gerçekleştirilmiştir. PLA/PBS karışımı polimer çözeltisi nanolif kabuk kısmına beslenirken; nanolif çekirdek (öz) kısmına PVP/propolis polimer çözeltisi beslenmiştir. Elektroçekim proses koşulları, 1.5mL/h besleme hızı, 18 cm mesafe ve 19 kV uygulanan gerilim olarak belirlenmiştir. Elektroçekim işlemi 2 saat sürmüş ve bu çalışma koşulları tüm nanolif üretimlerinde sabit tutulmuştur çünkü süreç koşullarının değişimi nanolifin fiziksel, kimyasal ve mekanik özelliklerine etki edebilmektedir. Üretilen nanoliflerin çekirdeğindeki PVP'nin iç yapıdan uzaklaşması için saf su ile çözdürülerek lifin içinin boşaltılması sağlanmıştır. Su ile çekirdeğindeki PVP çözülen nanolif, kuru ve serin bir ortamda 24 saat kurumaya bırakılmıştır. PLA/7PBS-IB numunesi çekirdeğinde propolis yüklü olan içi boş nanoliflerin karakteristik özelliklerini belirlemek için kontrol numunesi olarak kullanılmıştır.

Tablo 1. Hazırlanan polimer çözeltilerinin bileşimleri

Numune Kodu	Kabuk	Çekirdek
	PLA/PBS (a/a)	Propolis (%)
7PBS-PLA-IB	(93:7)	-
%5 Propolis IB		5
%15 Propolis IB		15

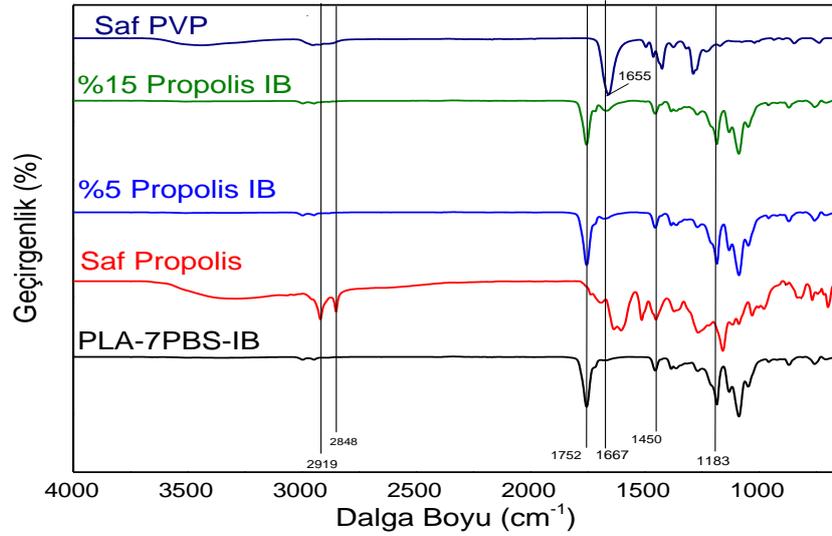
### Karakterizasyon

Üretilen nanoliflerin FTIR analizi için Perkin Elmer Spectrum 100 Marka cihazı kullanılmıştır. Bu analizde, 650-4000  $\text{cm}^{-1}$  dalga boyları aralığında nanoliflerin kimyasal bağ yapıları incelenmiştir. Nanoliflerin termal özellikleri ise Mettler Toledo DSC 1 markalı diferansiyel taramalı kalorimetri (DSC) cihazında 25 °C ile 300 °C sıcaklık aralığında, ısıtma hızı 10 °C/dk olmak üzere tek kademeli olarak analiz edilmiştir. Test sırasında ortama 30 ml olacak şekilde azot gazı gönderilmiştir. Standart atmosfer şartlarında 1.0 cm x 1.0 cm boyutlarında içi boş nanolif numuneler hazırlanarak EDANA 10.3.99 standardına uygun sıvı emicilik kapasitesi testi gerçekleştirilmiştir. Ayrıca nanoliflerin kuruma süresi de test edilmiştir.

### BULGULAR VE TARTIŞMA

Nanoliflerin kimyasal bağ yapılarını incelemenin yanı sıra nanoliflerin içinin boşaldığını kanıtlayan analizlerden biri FTIR analizidir. Propolis, Saf PVP, 7PBS-PLA-IB ve Propolisli içi boş PLA/PBS nanoliflerinin FTIR spektrumları Şekil 2'de verilmiştir. Saf PVP nanolifinde 1423  $\text{cm}^{-1}$ 'de görülen (O-H) bükülmesine ait olan pik 7PBS-PLA-IB nanoliflerinde görülmemiştir [2]. 1655  $\text{cm}^{-1}$ 'de görülen C=O karbonil grubuna ait olan pik saf PVP nanolifine aittir; saf PLA veya saf PBS'te gözlenmez. Ancak, bu pikin 7PBS-PLA-IB nanolifinde çok küçük bir yoğunluğa sahip olmakla birlikte 1667  $\text{cm}^{-1}$ 'ye kayarak ortaya çıktığı görülmüştür. Ayrıca, bu pik %5 Propolis IB ve %15 Propolis IB nanoliflerde de az yoğunlukta da olsa görülmüştür. Bu pikin varlığı dolayısıyla, nanoliflerin içinin %100'e yakın olmakla birlikte kısmen boşaldığı bildirilmiştir.

1752  $\text{cm}^{-1}$ 'de C=O stres titreşimi, 1183  $\text{cm}^{-1}$  gözlenen (-OH) piki PLA'ya ait piklerdir [2]. C=O ester karbonil gruplarının esneme titreşimini gösteren 1710  $\text{cm}^{-1}$ 'de görülen pik PBS'in karakteristik pikidir [16]. 2916  $\text{cm}^{-1}$ 'de  $\text{CH}_2$  asimetrik gerilmesi ve 2848  $\text{cm}^{-1}$ 'de  $\text{CH}_2$  simetrik gerilmesi propolise ait karakteristik pikleri göstermektedir [17]. 1450  $\text{cm}^{-1}$ 'de saf propolis ve propolisli nanoliflerde gözlenen pik  $\text{CH}_2$ 'ye aittir.

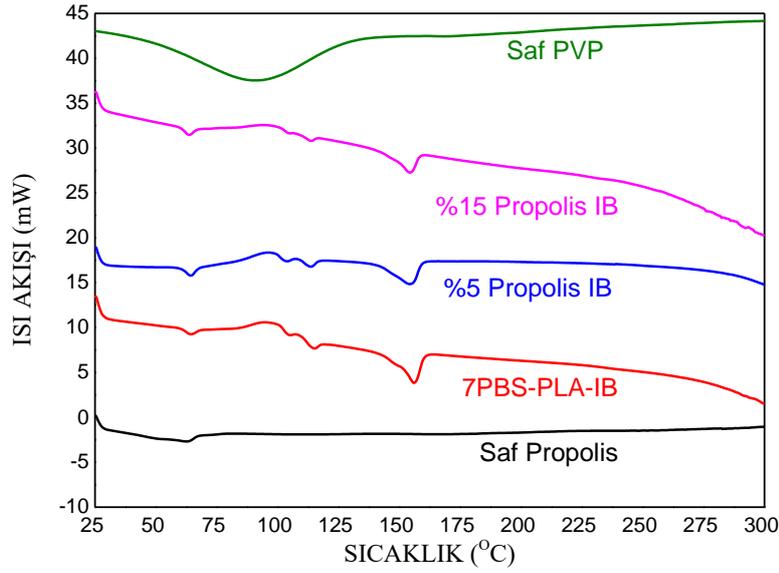


Şekil 1. Propolis, Saf PVP, 7PBS-PLA-IB ve Propolisli içi boş PLA/PBS nanoliflerinin FTIR spektrumları

Propolis, Saf PVP, 7PBS-PLA-IB ve Propolisli içi boş PLA/PBS nanoliflerinin DSC eğrileri Şekil 2’de verilmiştir. Nanoliflerin ısıl özelliklerine ait sayısal değerlerde Tablo 2’de özetlenmiştir. PVP nanolifine ait olan geniş pik, nanolifinin ortamdaki nem ve PVP’nin karakteristik yapısı dolayısıyla oluşmuştur [18].

7PBS-PLA-IB nanolifinde ve propolisli PLA/PBS nanoliflerin PVP’ye ait karakteristik DSC pikleri gözlemlenmemiştir. Bu sonuç PVP’nin yapıdan uzaklaştığını bildirmektedir. 7PBS-PLA-IB nanolifte görülen  $T_g$  değeri  $62,71^\circ\text{C}$ ’dir. Liflerin içinin boşaltılması  $T_g$  değerlerinde bir değişikliğe sebep olmamıştır, literatürdeki saf yapıların  $T_g$  değeri ile uyumlu bulunmuştur. İçi boş nanolifler birbirine yakın  $T_g$  değerleri sergilemiştir. % 5 Propolis IB nanolifinin  $T_g$  değeri  $62,6^\circ\text{C}$  iken, %15 Propolis IB nanolifinin  $T_g$  değeri  $61,13^\circ\text{C}$  olarak raporlanmıştır. 7PBS-PLA-IB nanolifte görülen  $T_c$  değeri  $96,24^\circ\text{C}$  olarak bulunmuştur. Yapıya yüksek oranlı propolisin girmesi ise  $T_c$  sıcaklığını arttırmıştır. Ancak, propolise ait  $T_c$  değeri görülmemiştir. Propolisli içi boş nanoliflerde  $T_c$  sıcaklık değeri artarken kristallenme entalpi değerlerinde keskin düşüş gözlemlenmiştir.

Literatürde yapılan bir çalışmada saf PBS için erime sıcaklığı  $114-117^\circ\text{C}$  ve saf PLA için  $155^\circ\text{C}$  olarak verilmiştir [19]. 7PBS-PLA-IB nanolifte PBS için görülen erime sıcaklığı  $114,62^\circ\text{C}$  ve PLA için  $155,58^\circ\text{C}$  olarak belirtilmiştir. Propolisli nanoliflerde de PLA ve PBS’e ait olmak üzere iki ayrı erime sıcaklığı piki gözlemlenmiştir. Liflerin içinin boşaltılması, PLA ve PBS kaynaklı  $T_m$  değerlerinde herhangi bir değişikliğe sebep olmamıştır. 7PBS-PLA-IB nanolifin (%) kristalinite değeri 12,10 olarak bulunmuştur. Liflerin içinin bir tüp şeklinde boşaltılması polimer zincirlerinin daha düzenli yerleşimini sağlayarak kristallenme eğilimini arttırmıştır [20]. Nanoliflerin içi boşaldıktan sonra kristallenme ve erime entalpilerindeki değişim dolayısıyla propolisli içi boş PLA/PBS nanoliflerinin kristalinite değerlerinde propolis miktarı arttıkça düzenli bir artış gözlemlenmiştir. Çekirdekdeki propolis yerleşiminin ve dağılımının %kristaliniteyi arttırdığı bildirilmiştir.

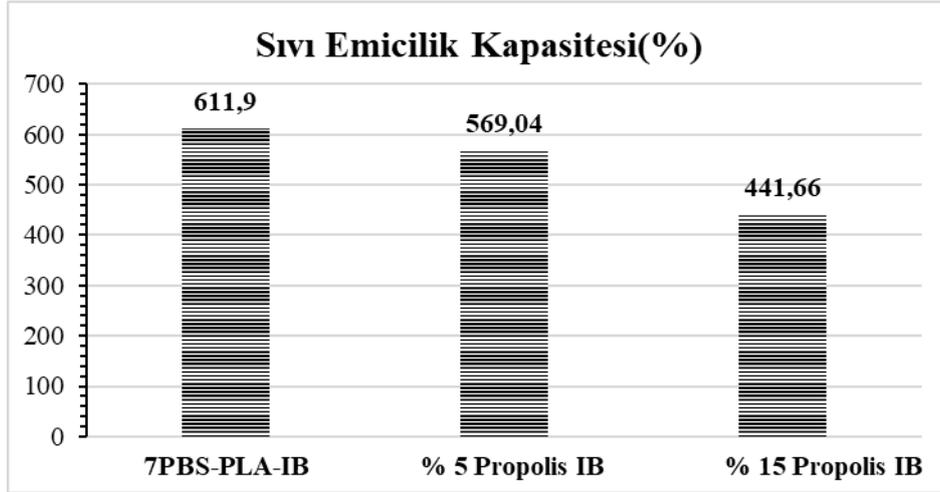


Şekil 3. Propolis, Saf PVP, 7PBS-PLA-IB ve Propolisli içi boş PLA/PBS nanoliflerinin DSC eğrileri

Tablo 2. Hazırlanan PLA/PBS nanoliflerinin ısıl özellikleri

Numune Adı	$T_g$ (°C)	$T_c$ (°C)	$\Delta H_c$ ( $Jg^{-1}$ )	$T_{m\text{ PBS}}$ (°C)	$\Delta H_{m\text{ PBS}}$ ( $Jg^{-1}$ )	$T_{m\text{ PLA}}$ (°C)	$\Delta H_{m\text{ PLA}}$ ( $Jg^{-1}$ )	Kristalinite e PLA (%)
<b>7PBS-PLA-IB</b>	62.7	96.2	10.93	114.62	3.13	155.58	21.47	12.10
<b>%5 Propolis IB</b>	61.9	96.1	7.83	113.58	2.54	153.98	19.49	13.38
<b>%15 Propolis IB</b>	62.2	98.2	4.66	113.32	2.39	153.80	18.54	15.93

İçi boş nanoliflerin sıvı emicilik kapasitesi (%) Şekil 3'te verilmiştir. Emicilik kapasitesi, nanoliflerin iç boşluğu, nanoliflerin yüzey özellikleri ve yapıya eklenen katkı maddeleri ile ilgilidir [2]. En yüksek sıvı emicilik kapasitesi %611,9 değeriyle içi boş 7PBS-PLA-IB nanolifinde sağlanmıştır. %5 Propolis IB ve %10 Propolis IB nanoliflerinin emicilik kapasiteleri sırasıyla %569,1 ve %441,7 olarak bulunmuştur. Nanolif yapılarındaki propolis miktarı arttıkça sıvı emicilik kapasiteleri azalmaktadır. Bunun sebebi nanoliflerin içindeki PVP yapıdan uzaklaşırken, artan propolis katkı oranları ile çekirdekte propolis parçacıkların yer kaplamasıyla açıklanmıştır.



Şekil 3. İçi boş nanoliflerin sıvı emicilik kapasitesi (%)

İçi boş nanoliflerin kuruma süreleri birbirine yakın değerlerde bulunmuştur. Ancak en yüksek kuruma süresi 5 dakika olarak %5 Propolis IB nanolifinde görülmüştür. 7PBS-PLA-IB nanolifi 4.75 dakikada kururken, %15 Propolis IB nanolifi 3 dakikada kurummuştur. Nanoliflerin kuruma süresi absorpladıkları sıvı miktarı ile ilgilidir. Çekirdekdeki propolis miktarı arttıkça boşluklar azalmış, bu doğrultuda sıvı absorplama kapasiteleri de azalmış ve nanoliflerin kuruma süresi de kısalmıştır.

## SONUÇ

Bu çalışmada, ilk kez çift bileşenli elektroçekim yöntemi kullanılarak çekirdekte propolis parçacıkları ve kabukta PLA/PBS polimer karışımı olan içi boşluklu nanolifler başarılı bir şekilde üretilmiştir. FTIR ve DSC analizleri ile nanoliflerin içinin tamamına yakın olmakla birlikte kısmen boşaldığı kanıtlanmıştır. Propolisli içi boş nanoliflerin  $T_g$  değerlerinde ve (%) kristalinite değerlerinde artış meydana gelmiştir. Propolis miktarının artmasıyla çekirdekte kapladığı yer artmış ve sıvı emicilik kapasitesi ile kuruma süresi azalmıştır. Propolis içeren içi boş PLA/PBS nanoliflerin katma değeri yüksek üstün bir nanoteknoloji ürünü olarak biyomedikal uygulamalarda yara örtüsü amacıyla kullanılabilmesi için ileri testlerin yapılması önerilmektedir.

## TEŞEKKÜR

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POLİVİNİL ALKOL/SODYUM KAZEİNAT KARIŞIMININ LAKTİK ASİT İLE ÇAPRAZ BAĞLANMASI

CROSSLINKING OF POLYVINYL ALCOHOL/SODIUM CASEINATE WITH LACTIC ACID

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**ÖZET**

Saf kazeinat filmleri yüksek su buharı geçirgenliğine, yüksek hidrofilik özelliklere ve düşük mekanik özelliklere sahiptir. Doğal kaynaklardan elde edilen kazeinat filmlerinin bu dezavantajlarını ortadan kaldırmak ve yeni malzemeler hazırlamak için polivinil alkol (PVA) ile filmleri hazırlanmaktadır. Ancak bu filmlerin hidrofilik özelliği ambalajlamada kullanımlarını sınırlamaktadır. Ambalaj filmlerinin sulu ortamlarda kullanılabilmesi için filmlerin çapraz bağlanması gerekmektedir. Bu çalışmada, PVA ve sodyum kazeinat (NC) karıştırılarak çözelti döküm yöntemiyle filmler elde edilmiştir. Filmler farklı miktarlarda laktik asit (LA) kullanılarak çapraz bağlanmıştır. Daha sonra, PVA-NC (60/40, w/w) filmleri için %0,5 ve %4 LA'nın çapraz bağlanma etkisi araştırılmıştır. Elde edilen film örnekleri üzerinde nem testi, Fourier transform infrared spektroskopisi (FTIR) ve diferansiyel taramalı kalorimetri (DSC) analizleri gerçekleştirilmiştir. LA katkılı PVA-NC filmlerinin FTIR spektrumunda  $1043\text{ cm}^{-1}$  de gözlenen yeni pik, çapraz bağlanmayı kanıtlamıştır. DSC analizi sonuçlarına göre, 4LA-PVA-NC filminin entalpi değerinde bir artış gözlenmiştir. Entalpi değerlerindeki değişim kristaliniteyi artırmıştır. Saf PVA-NC, 05LA-PVA-NC ve 4LA-PVA-NC filmlerinin kristalinite değerleri sırasıyla %10,25, %9,13 ve %13,38 olarak bulunmuştur. LA çapraz bağlanırken, doğası gereği kristalinite üzerinde de artırıcı bir etkiye sahip olmuştur. 05LA-PVA-NC filminin kristalinitesi en düşük olduğu için çapraz bağ yoğunluğunun yüksek olduğu düşünülmüştür. Nem testinden elde edilen veriler de bu sonucu doğrulamıştır. Saf PVA-NC film %9,41 nem içeriğine sahipken, 05LA-PVA-NC film ve 4LA-PVA-NC film sırasıyla %7,19 ve %7,23 nem içeriği değerleri sergilemiştir. Değerlendirilen sonuçlara göre, LA'nın PVA-NC filmleri için çapraz bağlama ajanı olarak kullanılması gelecekteki çalışmalar için umut vermektedir.

**Anahtar Kelimeler:** Laktik asit, Çapraz Bağlama, PVA, Sodyum Kazeinat

**ABSTRACT**

Pure caseinate films have high water vapor permeability, high hydrophilic properties, and low mechanical properties. To eliminate these disadvantages of caseinate films obtained from natural sources and to prepare new materials, films are prepared with polyvinyl alcohol (PVA). However, the hydrophilic feature of these films limits their use in packaging. For packaging films to be used in aqueous environments, the films need to be cross-linked. In this study, PVA and sodium caseinate

(NC) were mixed to obtain films by solution casting method. The films were cross-linked using different amounts of lactic acid (LA). Then, the crosslinking effect of 0.5%, and 4% LA for PVA-NC (60/40, w/w) films was investigated. Moisture testing, Fourier transform infrared spectroscopy (FTIR), and differential scanning calorimetry (DSC) analyses were performed on the obtained film samples. The observed new peak at  $1043 \text{ cm}^{-1}$  in the FTIR spectrum of LA doped PVA-NC films proved that the structure was crosslinked. According to the results of the DSC analysis, an increase in the enthalpy value of the 4LA-PVA-NC film was observed. The change in enthalpy values improved the crystallinity. The crystallinity values of pure PVA-NC, 05LA-PVA-NC and 4LA-PVA-NC films were found 10.25%, 9.13%, and 13.38%, respectively. While LA cross-linking, it also had an increasing effect on crystallinity due to its nature. Since the crystallinity of 05LA-PVA-NC film was the lowest, it was thought that the crosslink density was high. The data obtained from the moisture test also confirmed this result. Pure PVA-NC film had a moisture content of 9.41%, while 05LA-PVA-NC film and 4LA-PVA-NC film exhibited moisture content values of 7.19% and 7.23%, respectively. According to the evaluated results, the use of LA as a crosslinking agent for PVA-NC films gives hope for future studies.

**Keywords:** Lactic acid, Cross-linking, PVA, Sodium Caseinate.

## GİRİŞ

Günümüzde gıda ambalaj malzemeleri çoğunlukla çevre kirliliğine neden olabilen petrol türevi polimerik malzemelerden üretilmektedir [1]. Petrol türevi malzemelerin doğaya verdiği zararı azaltmak amacıyla çevre dostu biyobozunur malzemelerin üretimi için farklı biyopolimerlerin araştırılması ve kullanılması yönünde çalışmalar yürütülmektedir [2]. Ancak biyomalzemeler genellikle düşük mekanik dirence ve çevre koşullarına duyarlı bir yapıya sahiptir [3].

Polivinil alkol (PVA), endüstride biyolojik olarak parçalanabilen malzemelerin üretiminde sıklıkla tercih edilen sentetik bir polimerdir [2]. PVA'nın ambalaj malzemesi (film, kompozit filmlerde katman, farklı yapıdaki filmler için kaplama), gıda takviyeleri için kaplama maddesi, çeşitli tıbbi uygulamaların yanı sıra kağıt ve tekstil endüstrileri de dahil olmak üzere çok sayıda kullanım alanı vardır [4]. Bununla birlikte, PVA'nın yüksek nem emilimi ve yüksek hidrofilitik özellik gibi bazı dezavantajları vardır. PVA'nın, çevre dostu olma özelliğini ve performansını artırmak için genellikle diğer biyopolimerler ile ve/veya biyo-bazlı takviyelerle karışımı harlanır [3]. Bir süt proteini olan kazeinin suda çözünür formunu oluşturan sodyum kazeinat (NC), PVA ile karıştırılarak kullanılabilir ([5],[6],[7]). NC'nin rastgele spiral yapısı iyi film oluşumu sağlar [8]. Bununla birlikte, hidrofilitik özellikleri nedeniyle NC filmler, yüksek su buharı geçirgenliği ve düşük mekanik dayanım özellikleri gibi dezavantajlar gösterir. Birçok doğal üründen bulunan laktik asit (LA), kaslarda oksijenin azalmasına bağlı olarak insan vücudunda oluşabilen doğal bir organik hidroksi asittir [9]. Aynı zamanda bir süt asidi olan LA'nın bir süt proteini olan NC ile uyumlu olacağı öngörülmüştür.

u çalışmada PVA'nın dezavantajlarını ortadan kaldırmak için doğal bir protein kaynağı olan NC ile karıştırılarak yeni çevre dostu biyobozunur malzemeler üretilmiştir. Değişen LA katkı oranlarına sahip PVA-NC karışımlarından elde edilen filmlerin çapraz bağlanma davranışlarına etkisi bu çalışmada incelenmiştir. Farklı LA katkı oranlarının PVA-NC filmlerinin karakterizasyonu üzerindeki etkisi analiz edilmiştir. Böylece, çözelti dökme yöntemiyle hazırlanan çapraz bağlı PVA-NC-LA filmlerinin yapılacak ileri testler ile gıda ambalaj malzemesi olarak kullanılması amaçlanmıştır.

## İLGİLİ ÇALIŞMALAR

Çiçekçi, plastiğin ambalajlarda kullanılması konusunda bir derleme çalışması yayınlamıştır. Çalışmasında gıda paketlemesinde kullanılan polimerik malzemeler hakkında bilgi vermiştir. Polimerlerin dünya üzerine bölgesel kullanım miktarlarından söz etmiştir. Plastiklerin fiziksel ve kimyasal özelliklerine değinmiştir [10].

Özfidan Şahin, çalışmasında ambalaj malzemesi olarak kullanılabilen PVA/(Sodyum Kazeinat)NC karışımının özelliklerinin iyileştirilmesi için selüloz liflerle güçlendirilmiş biyokompozit filmleri çözelti döküm yöntemi ile hazırlamıştır. PVA-NC-Selülozik Lif karışımı filmlerin optimum özelliklere sahip biyobozunur bir ambalaj malzemesi olarak kullanılabilceğini raporlamıştır [11].

Samatya ve arkadaşları çalışmalarında, glüteraldehit (GLA) ile daldırma yöntemiyle çapraz bağlama işlemi gerçekleştirmiştir. Bu yöntemde, kurutulan filmler GLA çapraz bağlama çözeltisine atılarak 24 saat oda sıcaklığında tutuldu ve çaprazlama işlemi gerçekleştirilmiştir. GLA daldırma yönteminin çok fazla basamağa sahip olduğu görülmüştür [2]. Bununla birlikte bu yöntemde toksik kimyasal madde kullanımının yüksek miktarda bulunduğu bildirilmiştir [12].

Suganthi ve arkadaşları çalışmasında, gıda paketlenme için kullanılan çözelti dökme yöntemini kullanarak hazırladıkları PVA filmleri ile çapraz bağlama ajanı olarak organik asitleri kullanmıştır. Katkı oranı %1 olarak sabit tutulan Malik, Tartik ve Laktik asitlerinin ayrı ayrı PVA'ya eklenmesiyle PVA'nın fizikokimyasal ve biyolojik özellikleri üzerindeki etkileri araştırılmıştır. PVA/LA çapraz bağlı numunelerin temas açısı ölçülerek %83.34 oranında bir değer elde edilmiştir. Suda çözünen PVA bu sayede hidrofobik karakterde su iticilik davranışı göstermiştir. Ayrıca PVA/LA filmleri büyük ölçüde bakteri-substrat etkileşimini bozarak mikrobiyal katmanın geçirgenliğini yerel pH'da değiştirme kapasitesinden dolayı en yüksek bakteriyel inhibisyonu sergilemiştir. Suganthi ve arkadaşlarının yaptığı bu çalışma dışında literatürde saf PVA polimerinin LA ile çapraz bağlanma çalışmasına rastlanmamıştır [13]. Bu nedenle bu çalışmada farklı LA katkı oranlarının PVA-NC karışımı filmlerinin özellikleri üzerine etkisi çalışılmıştır.

## MALZEME VE YÖNTEM

### Malzeme

PVA (Viskozitesi: 45.0-52.0 mPa.s) (Hidroliz derecesi: 87.0-89.0% mol) (Uçucu olmayan içeriği: 97.5 ± 2.5%) (Kül içeriği: ≤0.4%) (pH 5.0-7.0) Kuraray Poval firmasından temin edildi. NC Acros Organics firmasından tedarik edildi. Laktik asit (LA) (Yoğunluk: 1.20) (Acidimetric: %88.0-92.0) (Moleküler Ağırlık: 90.08 g/mol) Carlo Erba Reagents firmasından, sülfürik asit (SA) (Alkalimetric: %95-98) (Moleküler Ağırlık: 98.08 g/mol) Merck firmasından tedarik edildi.

### Saf PVA-NC Çözeltilerinin LA ile Çapraz Bağlanma İşlemiyle Çapraz Bağlı Film Elde Edilmesi

Bu çalışmada PVA-NC karışımından film elde etmek için yüzey uyumu göz önüne alınarak (60:40, w:w) oranı belirlenmiştir [2]. Belirlenen oranda PVA-NC çözeltileri, %10 konsantrasyonda %100 damıtılmış su içerisinde, 10 dk oda sıcaklığında karıştırıldıktan sonra sıcaklık kademeli olarak artırılarak 30°C'de 10 dk, 40 °C' de 10 dk, 50 °C'de 10 dk ve 60 °C' de 15 saat olacak şekilde karıştırılmaya devam edilmiştir. Böylece çözeltiler ağız sıkıca kapatılmış bir beherde toplam 15 saat 40 dk boyunca karıştırılarak homojen bir şekilde çözülmüştür.

LA ile çapraz bağlama işlemi literatürden alınan reçeteye uygun olarak gerçekleştirilmiştir [13]. Literatürde elde edilen bilgilere göre, çapraz bağlanacak saf PVA-NC çözeltileri 15 saat 40 dk sonunda 2 saat boyunca dinlendirilmiştir ve reaksiyonu katalize etmek için dinlendirilmiş çözeltilere 3 damla sülfürik asit eklenmiştir [13]. LA katkı maddesi, çözeltideki toplam katı madde miktarına göre ağırlıkça %0,5 ve %4 oranlarında ilave edilmiştir. Karışım bekletilmeden hemen bir kaşıkla 10 dakika boyunca elle karıştırılmıştır ve ardından 40 °C manyetik karıştırıcıda 750 rpm hızda 10 dakika daha karıştırılmıştır. Daha sonra çözeltiler oda sıcaklığında 1500 rpm hızda toplam 2,5 saat boyunca manyetik karıştırıcı üzerinde homojen bir şekilde karıştırılmaya devam edilmiştir. Çapraz bağlanma tepkimesi tamamlandıktan sonra çözeltiler yarım saat bekletilmiştir ve ardından 8,5 cm çapındaki petri kaplarına 13 mL olarak çözelti döküm yöntemiyle dökülmüştür. Daha sonra 48 saat boyunca oda sıcaklığında kurumaya bırakılmıştır. Hazırlanan filmlerin kodları Tablo 1'de verilmiştir.

Tablo 1. Elde Edilen Filmlerin Kodları

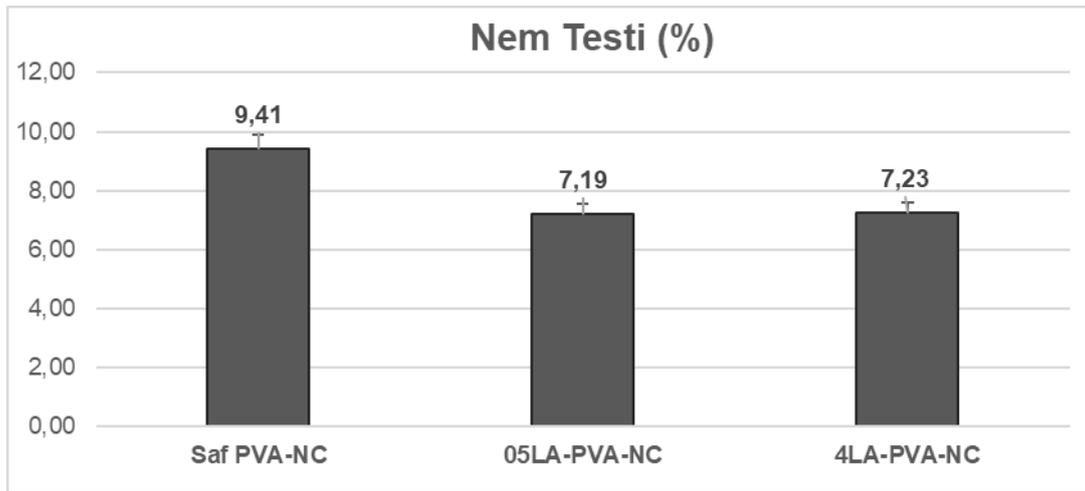
Numune Kodu	PVA-NC Karışım (w/w)	LA (%)
Saf PVA-NC		-
05LA-PVA-NC	60:40	0.5
4LA-PVA-NC		4

## KARAKTERİZASYON

Yapılan çalışmada, kurutulmadan önce tartılan filmler 1 cm x 1 cm olmak üzere üçer adet kesilerek tartımları yapılmıştır. Filmler etüvde 24 saat 105 °C sıcaklıkta Rhim Metoduna uygun olarak kurutulup tekrar tartımları alınmıştır [14]. Rhim metodu formülüne göre nem içeriği (%) olarak hesaplanmıştır. FTIR analizi için Perkin Elmer Spectrum 100 Marka cihazı kullanılmıştır. Bu analizde, 650-4000 cm<sup>-1</sup> dalga boyları aralığında filmlerin kimyasal bağ yapıları incelenmiştir. Elde edilen filmlerin DSC analizi, Mettler Toledo DSC cihazında gerçekleştirilmiştir. Analizler için 25-210 °C sıcaklık aralığı çalışılmıştır ve ısıtma hızı 10 °C/dk olarak uygulanmıştır. Analizler sisteme 30 mL/dk akış hızında beslenen nitrojen atmosferinde gerçekleştirilmiştir. DSC analizi ile filmlerin camsı geçiş sıcaklığı (T<sub>g</sub>) ve erime sıcaklığı (T<sub>m</sub>) ile ilgili veriler elde edilmiştir. Ayrıca %100 PVA'nın erime entalpi değerine (138.6 J/g) göre filmlerin yapısındaki yüzde kristalinite değerleri hesaplanmıştır [15].

## BULGULAR VE TARTIŞMA

Tüm filmler için nem testi sonuçları Şekil 1'de gösterilmiştir. Saf PVA-NC filmin nem testi sonucu %9,41 olarak bulunmuştur. Saf PVA-NC filmi, higroskopik yapısı nedeniyle nemi çekebilir ve tutabilir. 05-PVA-NC-LA ve 4-PVA-NC-LA filmlerinin nem değerleri sırasıyla %7,19 ve %7,23 olarak hesaplanmıştır. Çapraz bağlama işlemi filmlerdeki nem tutma oranını azaltmıştır. Bu durum 05-PVA-NC-LA filminin çapraz bağ yoğunluğunun 4-PVA-NC-LA filmine göre daha fazla olduğunu göstermektedir.



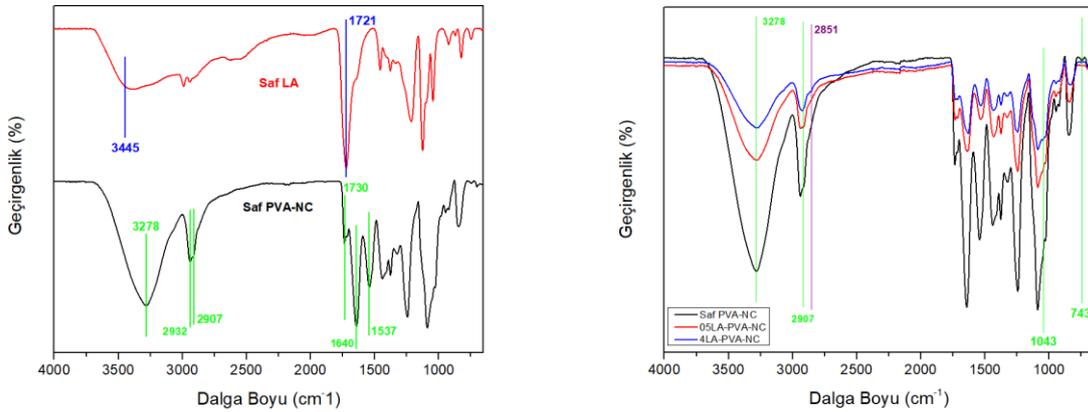
Şekil 1. Filmlerin Nem Testi Sonuçları

Saf PVA-NC ve saf LA'nın FTIR spektrumları Şekil 2a'da verilmiştir. Saf PVA-NC filmde görülen 3278 cm<sup>-1</sup> dalga sayısındaki hidroksil grubu (-OH) piki PVA'nın karakteristik pikidir [16]. 3445 cm<sup>-1</sup> dalga boyundaki pik, saf LA'nın karakteristik piki olan hidroksil grubuna (-OH) aitken, 1721 cm<sup>-1</sup> dalga boyundaki pik (C=O) gerilmesine aittir [17].

Çapraz bağlı filmlerin ve saf PVA-NC filminin FTIR analiz sonuçları Şekil 2b'de verilmiştir. Ayrıca, FTIR pikleri ve kimyasal bağlar Tablo 2'de verilmiştir. Saf PVA-NC filmde görülen 3278 cm<sup>-1</sup> dalga boyundaki karakteristik hidroksil grubu (-OH) pikinin geçirgenliği çapraz bağlama maddesi ilavesiyle azalmış ve 2097 cm<sup>-1</sup> dalga boyundaki CH piki kaybolmuştur. Kaybolan CH grupları, özellikle 4LA-PVA-NC filmde 2851 cm<sup>-1</sup> dalga boyunda belirgin olan yeni aldehit gruplarına (-CHO) dönüşmüştür. Saf PVA-NC filmde, benzen halkasının (-CH=CH) gerilmesinden kaynaklanan 743 cm<sup>-1</sup> dalga boyundaki pikin çapraz bağlanma sonucu kaybolduğu tespit edilmiştir. C-O gerilmesine atanabilecek 1043 cm<sup>-1</sup> dalga boyunda keskin bir pik bulunmaktadır [18]. Bu bilgiler ışığında filmlere LA eklenmesi sonucu çapraz bağlanmanın gerçekleştiği yorumu yapılabilir [19].

Tablo 2. FTIR Pikleri ve Kimyasal Bağlar

Tepe Noktası (cm <sup>-1</sup> )	Kimyasal Bağ	Numune Kodu
3278	O-H	Saf PVA-NC, 05LA-PVA-NC
3445	O-H	Saf LA
1721	C=O	Saf LA
2097	CH <sub>2</sub>	Saf PVA-NC
2851	C-O-H	4LA-PVA-NC
743	-CH=CH-	Saf PVA-NC
1043	C-O-H	05LA-PVA-NC, 4LA-PVA-NC



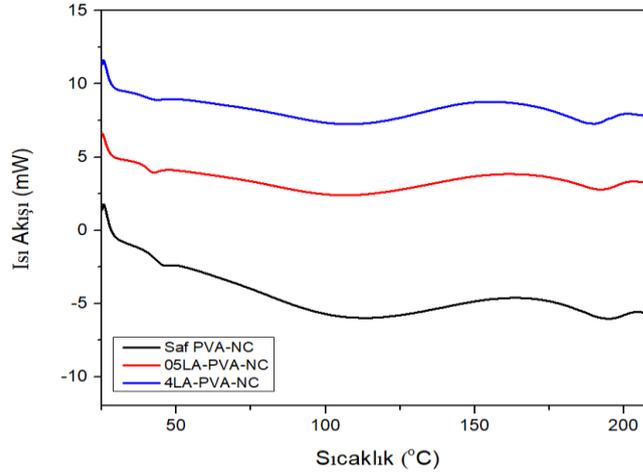
Şekil 2. a) Saf PVA-NC film ve Saf LA'nın FTIR spektrumları b) Saf PVA-NC ve çapraz bağlı filmlerin FTIR spektrumları

Hazırlanan filmlerin termal özelliklerini gösteren DSC eğrileri Şekil 3'te gösterilmiştir. Ayrıca, filmlerin camsı geçiş sıcaklığı, erime sıcaklıkları ve hesaplanan % kristallik değerleri Tablo 3'te paylaşılmıştır.

Bu çalışmada elde edilen  $T_{m1}$  sıcaklığının PVA ve NC'in higroskopik yapısından dolayı nem ile ilişkili olduğu belirtilmiştir. Bu sonuç, nem testinde de doğrulanmıştır. Ayrıca, PVA filminin erime sıcaklığı literatürde 196 °C olarak bulunmuştur [20] Dolayısıyla, bu çalışmada  $T_{m2}$  sıcaklığının PVA filminden kaynaklandığı literatür tarafından doğrulanmıştır. PVA'nın NC ile karışımı nedeniyle erime sıcaklığı bir miktar düşmüş ve saf PVA-NC filminin  $T_{m2}$  sıcaklığı 193.37 °C olarak kaydedilmiştir. Yapıdaki LA miktarının artmasıyla filmlerin  $T_{m2}$  sıcaklıklarında orantılı bir düşüş gözlenmiştir. Elde edilen sonuç, polimer zincirlerinin değişen yapısına bağlı olarak azalan kristalinite değeri ve artan çapraz bağ yoğunluğunun varlığı ile ilişkilendirilmiştir. 05LA-PVA-NC, 4LA-PVA-NC filmlerin  $T_{m2}$  sıcaklıkları sırasıyla 191.66°C ve 188.49°C olarak bulunmuştur. 4LA-PVA-NC filmin entalpi değeri 11.13 j/g ile en yüksek olarak rapor edilmiştir. Buna bağlı olarak, 4LA-PVA-NC film %13,38 ile en yüksek kristallik değerini göstermiştir. Kristalinite arttıkça yapıların çapraz bağlanma kabiliyetinin azaldığı bilinmektedir [21]. Literatürden elde edilen bilgilere göre saf PVA filminin  $T_g$  değerinin 42 °C olduğu belirtilmektedir [22]. Karışımın etkisi altında saf PVA-NC filmde 43,34 °C'lik tek bir  $T_g$  sıcaklığı gözlemlenmiştir. Polimer karışımlarında yakın veya tek  $T_g$  gözlemlenmesi yüzey uyumluluğunu göstermektedir.

Tablo 3. Hazırlanan filmlerin  $T_g$ ,  $T_m$ , entalpi ve kristallik değerleri

Numune Kodu	$T_g$ (°C)	$T_{m1}$ (°C)	$T_{m2}$ (°C)	$\Delta H_{m2}$ (Jg <sup>-1</sup> )	% Kristalinite
Saf PVA-NC	43.34	109.94	193.37	8.52	10.25
05LA-PVA-NC	40.64	106.68	191.66	7.59	9.13
4LA-PVA-NC	40.36	107.36	188.49	11.13	13.38



Şekil 3. Filmlerin DSC Eğrileri

## SONUÇLAR

Bu çalışmada, PVA-NC çözeltilerinin LA ile karıştırılmasıyla başarılı bir şekilde çapraz bağlı filmler elde edilmiştir. Filmlerin çapraz bağlandığı, FTIR spektrumunda fark edilen aldehit grupları ile kanıtlanmıştır. Saf PVA-NC film, higroskopik yapısı nedeniyle yüksek nem emme davranışı göstermiştir. Çapraz bağlama işlemi hazırlanan filmlerde nem tutma özelliğini azaltmıştır. DSC testi sonuçlarına göre yapıdaki LA miktarının artmasıyla filmlerin  $T_{m2}$  sıcaklıklarında orantılı bir düşüş gözlenmiştir. Saf PVA-NC ve 05LA-PVA-NC çapraz bağlı filme göre 4LA-PVA-NC filmi en yüksek kristallik değerini göstermiştir. Dolayısıyla fazla LA katkısının çapraz bağ yoğunluğunu düşürdüğü yorumlanmıştır.

## TEŞEKKÜR

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**KURUM İÇİ İLETİŞİMDE ÇAPRAZ İLETİŞİM KULLANIMI: HİZMET SEKTÖRÜNE  
YÖNELİK NİTEL BİR ARAŞTIRMA**

**USE OF CROSS COMMUNICATION IN INTERNAL COMMUNICATION: A  
QUALITATIVE RESEARCH FOR THE SERVICE SECTOR**

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**Özet**

Kurumsal iletişim, bir kurumun iç ve dış çevreyle kurduğu iletişim sürecinden oluşmaktadır. Kurumun iç sistemini oluşturan insanlar, formel ve informal olarak birbirleriyle iletişim içinde olmaktadır. Kurumun formel yapısıysa dikey, yatay ve çapraz iletişim olmak üzere üç biçimsel iletişim kanalından oluşmaktadır. Kurumların bu üç biçimsel iletişim kanalının her birini gerekli ve doğru bir biçimde kullanmaları kurumlar açısından hayati önem taşımaktadır, çünkü kurumsal başarı önce iç iletişim ile başlamaktadır. Kurum içi iletişim yapıları bozuk ve doğru işlemeyen kurumların kaliteli ürün ve hizmet üretmeleri mümkün olmadığı için kurum dışına yansıyan kimlik, itibar, imaj ve iletişim biçimleri de bozuk olmaktadır. Bu bağlamda, kurum içi iletişim üzerine yapılan araştırmalar genelde dikey ve yatay iletişim üzerine yoğunlaşmakta, çapraz iletişimi ele alan ve bu iletişim biçiminin gerekliliğini açıklayan neredeyse hiçbir çalışma bulunmamaktadır. Bu kapsamda çalışmada çapraz iletişimin önemine değinerek çapraz iletişim eksikliğinde kurumların karşılaştığı sorun ve problemleri tanımlamak, kullanımının kuruma getirdiği faydaları ele almak amaçlanmaktadır. Bu faydalar, empati, motivasyon, sorun çözme, yardımlaşma olmak üzere dört kategoriden oluşmaktadır. Bu dört kategoriye yönelik veriler nitel araştırma yöntemlerinden “derinlemesine görüşme” tekniği kullanılarak toplanmış bulunmaktadır. Bu amaçla hizmet sektörü kapsamında faaliyet gösteren bir kurumun dokuz departmanında yapılan mülakatlarda toplam otuz kişiyle görüşülmüş olup, araştırmanın sonucunda çalışanların diğer departmanlarla iş birliği içinde olduğu, gerektiğinde yardımlaştıkları bu durumda empati kurabilen, sorun çözen ve işlerine karşı motivasyonları yüksek olduğu tespit edilerek kurumda çapraz iletişimin desteklendiği sonucuna varılmış bulunmaktadır.

**Anahtar Kelimeler:** Kurum İçi İletişim, Formel İletişim, Çapraz İletişim

**Abstract**

Corporate communication consists of the communication process a corporation establishes with its internal and external environments. The people comprising the internal system of the organization are engaged in communication with each other formally and informally. The formal structure of the organization consists of three formal communication channels: vertical, horizontal, and diagonal communication. It is vital for organizations to utilize each of these three formal communication channels appropriately and effectively because corporate success begins with internal communication. Since organizations with dysfunctional internal communication structures cannot produce quality products and services, the reflected identity, reputation, image, and communication styles of these organizations to the outside world also become distorted. In this context, research on internal communication generally focuses heavily on vertical and horizontal communication, with almost no studies addressing diagonal communication and explaining its necessity. Within this scope, this study aims to emphasize the importance of diagonal communication, identify the problems and issues organizations face due to the lack of diagonal communication, and discuss the benefits it brings to the organization. These benefits consist of four categories: empathy, motivation, problem-solving, and cooperation. Data related to these four categories were collected using the qualitative research method

of in-depth interviews. For this purpose, interviews were conducted with a total of thirty individuals across nine departments of a service sector organization. As a result of the research, it was determined that employees collaborate with other departments, assist when necessary, demonstrate empathy, solve problems, and maintain high motivation towards their work, indicating that diagonal communication is supported within the organization

**Keywords:** Internal Communication, Formal Communication, Diagonal Communication

## GİRİŞ

Kurum içi iletişim, iş ve işlev bölümü yaparak bir otorite hiyerarşisi içinde ortak bir amacı gerçekleştirmek için bir araya gelmiş insanların koordinasyonundan oluşmakta buna bağlı olarak en genel ifadeyle kurum içi iletişim kurumun sistemlerini birbirine bağlama ve kendi aralarındaki uyumu sağlama süreci olarak tanımlanmaktadır. Bu kapsamda kurum içi iletişim formel yapısı, dikey, yatay ve çapraz iletişim olmak üzere üç biçimsel iletişim kanalından oluşmaktadır. Bu bağlamda kurumlar hiyerarşik bir yapılanmada ayrı ayrı departmanlara ayrılrsa da dışardan bir bütün olarak algılanmakta içerde de bu sistemler zincir halkası gibi birbirlerine bağlı olarak işlemektedir. Bir departmanda aksaklık yaşanması bütün birimlerde aksaklık çıkmasına neden olmaktadır. Bundan dolayı kurum içi iletişim, bu sistemleri birbirine bağlayarak kurumların başarılı olmasını sağlamaktadır.

Kurumların kurum içi iletişim yapılarını oluşturan dikey, yatay ve çapraz iletişim biçimlerinin her birini gerekli ve doğru bir biçimde kullanmaları kurumlar açısından hayati önem taşımaktadır. Yapılan araştırmalar kurumların kurum içi iletişim yapılarında en çok dikey iletişime önem verdikleri ya da herhangi bir aksaklıkta dikey iletişim sistemlerinin sorgulandığını ortaya koymaktadır. Oysa dikey iletişimin mükemmel işlediği kurumlarda da çoğu zaman sıkıntılar oluşmakta ve kurumlar bu sıkıntılarının nereden kaynaklandığını anlamakta ciddi güçlük çekmekte, çözmek için ise, ciddi zaman kayıpları yaşamaktadır. İşte bu noktada kurumların çapraz iletişim biçimlerinin doğru işleyip işlemediğini kontrol etmeleri gerekmektedir.

Departmanları birbirine bağlama ve kendi aralarındaki uyumu sağlama sürecinde çapraz iletişim yapısının kurumlar tarafından kullanılıyor olması büyük önem taşımaktadır, fakat çapraz iletişimi ele alan ve bu iletişim biçiminin gerekliliğini açıklayan neredeyse hiçbir çalışma bulunmamasıysa çalışmanın sorunsalını oluşturmaktadır.

Bu kapsamda çalışmanın amacını, çapraz iletişimin önemi ve eksikliğinde oluşabilecek sıkıntı ve problemlere yer vererek faydaları açısından alana katkı yapmak oluşturmaktadır. Bu bağlamda çalışmanın birinci aşamasında kurum ve kurum içi iletişim kavramsal çerçeveye değinerek ikinci aşamada kurum içi iletişim ve çapraz iletişim kavramı açıklandıktan sonra üçüncü aşamadaysa çalışmanın asıl amacı olan kurum içi iletişimde çapraz iletişim kullanımı ele alınmaktadır. Son aşamadaysa çapraz iletişim kullanımının faydaları olarak belirlenen, empati, motivasyon, sorun çözme, yardımlaşma kategorilerini nitel araştırma yöntemlerinden “derinlemesine görüşme” tekniği kullanılarak elde edilmiş verilerin analizine yer verilmektedir.

## KURUM VE KURUMSAL İLETİŞİM KAVRAMSAL ÇERÇEVE

Kurum, bir sosyal grup ya da toplumda belli amaçları gerçekleştirmeye yönelik temel işlevleri karşılayan, süreklilik kazanmış, diğer kurumsal yapılar ile ilişkili, ancak kendi alanında tek olan ve kendine özgü değerler taşıyan bir sistemden oluşmaktadır (Vural ve Bat, 2015, s.15). Buna bağlı olarak kurumlar, birbirleriyle iletişim kurabilecek insanlar olduğunda, bunların katkıda bulunmaya gönüllü olarak, ortak bir amacı gerçekleştirmeye başlamaları sonucunda oluşmaktadır. Böylelikle bir kurumun öğeleri iletişim, hizmet etmeye gönüllülük ve ortak amaç olarak karşımıza çıkmaktadır. Bu nitelikleri ile kurum, bir işbirliği sistemi olarak da açıklanabilmektedir (Karakoç, 1989, s. 81-82).

Bu açıklamalar temelinde kurumsal iletişim, kurumun işleyişini sağlamak ve onu hedeflerine ulaştırmak amacıyla gerek kurumu oluşturan çeşitli bölüm ve öğeler, gerekse kurum ve çevre arasında girilen devamlı bir bilgi ve düşünce alışverişine veya bölümler arasında gerekli ilişkilerin kurulmasına olanak tanıyan toplumsal bir süreçten oluşmaktadır (Aytaç, Balay vd. 2003, s. 135).

Van Riel, ayrıca kurumsal iletişimi, iç ve dış iletişimin bilinçli kullanılan tüm türlerinin, kurumun ilişki içinde olması gereken gruplar ile olumlu bir temel yaratacak şekilde olabildiğince etkin ve verimli bir şekilde uyumlaştırıldığı bir yönetim aracıdır şeklinde tanımlamakta ve kurumsal iletişimin, yönetimin tüm basamaklarında uygulanması gereken bir süreç olduğunu ileri sürmektedir (Cornelissen, 2014, p.5).

Goodman ise kurumsal iletişimi, güçlü iç ve dış ilişkilerin yaratılması ve sürdürülmesidir, şeklinde tanımlamaktadır (Goodman, 2000, p. 69). Bu bağlamda kurumsal iletişim, çalışanlar arasındaki koordinasyonu sağladığı gibi, kurumun dış çevre ile olması gereken uyumunu da etkin bir şekilde gerçekleştirmektedir. Kurumların işleyebilmesi için, kurumda nelerin nasıl yapıldığı, nelerin nasıl yapılacağına doğru bilinmesi gerekmektedir. Bununla beraber kurumda görevler ne kadar iyi düzenlense, görev tanımları ne kadar açık olsa da görevi gerçekleştirecek iş görenler arasındaki iletişim, kilit bir rol oynamaktadır (Ölçer ve Koçer, 2015, s.342).

Bu kapsamda kurum içinde etkin bir iletişim sistemi kurulamadığında, kurum üyeleri faaliyetlerini birbirinden bağımsız ve kopuk bir şekilde gerçekleştirmeye çalıştığından kurumsal amaçlara ulaşılması zorlaşmaktadır (Çalık, 2010, s.3).

### KURUM İÇİ İLETİŞİM VE ÇAPRAZ İLETİŞİM

Kurum içi iletişim, kurumun sistemlerini birbirine bağlama ve kendi aralarındaki uyumu sağlama süreci olarak tanımlanmaktadır. Kavram ayrıca insanlar arasında koordinasyonu sağlayan ve dolayısıyla organize davranışa katkıda bulunan merkezi bir bağlayıcı güç şeklinde de açıklanabilmektedir. Kurumdaki bireylerin davranışları en iyi iletişim ile anlaşılabilir (Dzamtoska, Margarita, vd., 2013, p. 98). Bu bağlamda kurumun iç sistemini oluşturan insanlar, formel ve informal olarak birbirleriyle iletişim içinde olmaktadır. (Tutar ve Yılmaz, 2012, s. 191).

Formel (biçimsel) iletişim, kurumsal pozisyonlar arasında resmi olarak belirlenmiş, mesaj akışı kanalları aracılığıyla yapılan iletişimi ifade etmektedir (Papa, Daniels vd., 2008, s. 51-52). Kurumun çeşitli organ, unsur ve görevleri arasında gerekli ilişkilerin kurulmasına ve koordinasyon sağlanmasına yardım eden iletişim biçiminden oluşmaktadır (Arklan ve Taşdemir, 2010, s.93). Fonksiyonla ilişkilidir ve işyerlerinin biçimsel yönleriyle ilgilidir ve genellikle hiyerarşi yetki çizgisini izlemektedir (Tutar ve Yılmaz, 2012, s. 216). Bu sebeple de kurumsal iletişim alanının önemli bir yönünü oluşturmaktadır. Biçimsel iletişim, hiyerarşi içinde akan, belirlenen normları takip eden, amaç odaklı, açıkça ifade edilmiş, işlevle ilgili iletişim olarak tanımlanabilmektedir (Gömez & Dailey, 2017, s. 1).

Biçimsel iletişimin amacı, kurum üyeleri için gerekli bilgi ve anlayışı sağlamak, çalışanların işten tatmin olmaları için istenen tutumu oluşturmak ve ilgililere gerektiğinde bilgi aktarmaktır (Vural ve Bat, 2015, s.144). Bu kapsamda formel (biçimsel) iletişim, dikey iletişim, yatay iletişim ve çapraz iletişim olmak üzere üç iletişim kanalından oluşmaktadır.

**Dikey İletişim Kanalları:** Kurumun hiyerarşik düzeninde, üst kademelerle alt kademeler arasında emir ve bilgi akışını sağlayan bir köprüden oluşmaktadır. Yukarıdan aşağıya (üstlerden astlara veya yöneticiden çalışanlara) doğru ve aşağıdan yukarıya (astlardan üstlere ya da çalışanlardan yöneticilere) doğru olmak üzere iki şekilde gerçekleşmektedir. Yukarıdan aşağıya doğru iletişim; mesajların kurum hiyerarşisinin üst seviyelerinden alt seviyelerine (yöneticiden-çalışana, üstten-asta) iletilmesini içermektedir. Kurumlarda en sık tercih edilen iletişim biçimini oluşturmaktadır. Aşağıdan yukarıya doğru iletişim; mesajların kurumun alt düzeylerinden üst düzeylerine iletilmesini kapsamaktadır. Başka bir deyiş ile çalışanların yöneticileriyle kurdukları iletişim olarak da tanımlanabilmektedir (Papa, Daniels and Spiker, 2008, s. 51-52).

Üstler ve astlar arasındaki iki yönlü iletişimi vurgulaması, kurum üyelerinin entegrasyonu ve karar alma süreçlerinin iyileştirilmesi açısından oldukça gerekli bir iletişim biçimini oluşturmaktadır. Ayrıca çalışanların karar alma, problem çözme ve prosedürlerin geliştirilmesine katılımı için bir ön koşul oluşturmaktadır. Bu kapsamda Katz ve Kahn, yukarı doğru iletişimin üstlere, işteki performans ve iş ile ilgili sorunlar, astların çalışma arkadaşları ve sorunları, çalışanların kurumsal politika ve

uygulamalara ilişkin algılamaları hakkında bilgi sağlayabileceğini belirtmektedir. Katz ve Kahn tarafından belirtilen kullanımlara ek olarak Planty ve Machaver da aşağıdan yukarıya doğru iletişimin, çalışanlardan değerli fikirler sağlayabileceğini, aşağı yönlü mesajların kabulünü ve genel olarak çalışanların karar verme sürecini kolaylaştırabileceğini söylemektedir (2008, s. 53-54).

**Yatay İletişim:** Hiyerarşik sistemde aynı düzeyde olan departmanlar ya da kişiler arasında gerçekleşen iletişimi oluşturmaktadır (Çağlar, Kılıç, 2014, s. 69). Başka bir deyişle kurumsal hiyerarşinin aynı basamaklarındaki çalışanların birbirleriyle olan iletişimine yatay iletişim denmektedir. Aynı kademelerin üst kademeye başvurmadan, diğer bir anlatımla üst kademenin emrine gerek kalmadan kendilerini ilgilendiren konularda iş birliği yapmaları sırasında kurulan iletişim olarak da tanımlanabilmektedir (Tutar ve Yılmaz, 2012, s. 223-224). Bu tür bilgi alışverişi, etkinliklerin koordinasyonu açısından faydalı olduğu gibi belli bir işlevin yerine getirilmesi için teknik bilgilerin iletilmesini de sağlamaktadır (Çağlar, Kılıç, 2014, s. 69).

Kurumlarda planlama ve kontrol fonksiyonu yerine getirilirken, daha çok dikey iletişim kurulurken, yönlendirme ve kontrol fonksiyonunda yatay iletişim kullanılmaktadır (Tutar ve Yılmaz, 2012, s. 223-224). Yatay iletişimin temel amacı kurumsal koordinasyon ve problem çözme için kanal sağlamaktır. Yatay iletişimin bir başka yararı kurum üyeleri arasında fonksiyonel ilişki geliştirmektir. Yatay iletişim, kurumsal faaliyetleri koordine etmek, aynı seviyedeki diğer yöneticileri ikna etmek, faaliyetler ve duygular konusunda bilgi edinmek amacıyla kurulmaktadır (Ölçer ve Koçer, 2015, s.344).

**Çapraz İletişim:** Farklı hiyerarşi seviyelerindeki departmanlar ve çalışanlar arasında kurulan bir iletişim biçiminden oluşmaktadır. Kurumdaki bilgilerin çeşitli düzeyler arasında iletilmesi için bir yol sağlamaktadır. Bu sistemdeki iletişim yolu, bir departman veya kişilerden, farklı seviyelere uzanan bir hat boyunca ilerlemektedir. Kurumun her basamağına gidebilmekte ve iletişim, astlardan, üstlere ve farklı seviyelerdeki kişiler arasında gerçekleşmektedir. Başka bir deyişle farklı hiyerarşi seviyelerindeki departmanlar veya çalışanlar arasında kullanılmaktadır. Bu sadece bireyler arasında meydana gelmemekte aynı zamanda bölümler arasında da kapsamaktadır (Rayudu, 2010, s. 277-278).

Aynı şekilde Koontz, Donnell ve Weichrich'de çapraz iletişimi hiyerarşinin aynı çizgisinde veya seviyesinde olmayan bireyler veya bölümler arasında kurulan iletişim olarak tanımlamaktadır. Koontz, Donnell ve Weichrich'a göre çapraz iletişimin amacı bilgi akışını hızlandırmak, anlayışı geliştirmek ve kuruluşun ortak hedeflerine ulaşma çabalarını koordine etmektir (2010, s. 277-278).

Karmaşık ve çoğu kez uzun olan dikey kanalların sakıncalarını giderme ve olağandışı durumlarda zaman kazanmaya olanak vermesi ve emir komuta zincirini aşarak zamandan ve emekten tasarruf sağlaması nedeniyle çapraz iletişim kurumsal iletişimin etkinliğini arttıran bir özelliğe sahip bulunmaktadır (Tutar ve Yılmaz, 2012, s. 224-225). Bu bağlamda işlevsel yetkililer genellikle çapraz iletişimi kullanmaktadır. Örneğin, Muhasebe bölümünün departman şefi, olağan ve rutin uzun kanallardan geçmek yerine, satış konusuna ilişkin bilgi raporları gibi evrakları pazarlama ve satış departmanından, doğrudan kendisine iletilmesini talep edebilmektedir. Böylece çapraz iletişim sayesinde dikey, katı, emir komuta zincirine takılmadan iletişim süreci hızlanmaktadır. Bilginin doğrudan iletilmesiyle ciddi miktarda zaman, para ve emek tasarrufu sağlamaktadır (Rayudu, 2010, s.278).

Bununla birlikte kuruma yönelik uzmanlaşmayı farklı birimlerin birbirlerine olan sorumluluklarını daha iyi kavramalarını ve yardımlaşmalarını kolaylaştırıcı bir etki yaratmaktadır. Özellikle ekip çalışmalarında kurumsal katılımı sağlamak ve işlerin koordinasyonunu kolaylaştırmaktadır (Tutar ve Yılmaz, 2012, s.225). Ayrıca çapraz iletişim kullanımı, etkili görev koordinasyonu veya işle ilgili karmaşık ve zorlu sorunların çözümünde gerekli olan istişareler için de gerekli olabilmektedir. Grup üyeleri, dikey iletişimi karakterize eden bazı kurumsal engellerin üstesinden gelmek için mücadele etmek yerine, problem çözmek için gerekli bilgiye sahip olabilecek kişilerle doğrudan temasa geçmek için çapraz iletişim bağlantılarını kullanmayı daha kolay bulabilmektedir (Wilson, 1992, p. 130).

Ancak birçok kurumda çapraz iletişimin kullanılmadığı gözlemlendiği gibi bu konuda yapılan araştırmalarda yok denecek kadar az sayıda bulunmaktadır. Oysa çapraz iletişim, sorun çözme ve süreç geliştirme amaçlı çalışan grupların ele aldıkları konuyu tam olarak analiz edebilmeleri, çözüm üretebilmeleri ve sorunu çok yönlü görebilmeleri ve buna bağlı olarak da başarılı olabilmeleri için

gerekli olmaktadır. Çapraz iletişimin varlığı, kurum içinde empatik iletişim kurma yeteneğini de geliştirmektedir. Çalışanların empatik iletişim kurma yetenekleri geliştikçe de hem çalışanlar arasında iletişim ve iş birliği hem de yöneten-yönetilen iletişimi ve etkileşimi daha olumlu bir konuma gelmektedir (Sabuncuoğlu, Gümüş, 2016, s. 129).

### **KURUM İÇİ İLETİŞİMDE ÇAPRAZ İLETİŞİM KULLANIMI**

Günümüzde kurumlar daha etkili ve esnek hale gelebilmek için, iletişimlerini birçok kanalı kullanarak, her yöne iletişim akışının sağlandığı bir yapı içerisinde yürütmektedir. Bu noktada da, geleneksel dikey iletişim kanallarının yanında, yatay ve çapraz iletişim önemini arttırmaktadır. Yeni iletişim teknolojileri, yatay ve çapraz iletişimi destekleyen birçok araç sunmaktadır. Yatay ve çapraz iletişim, bürokratik süreçlerin ataletini engellemekte, koordinasyon, dayanışma ve işbirliği sağlamaktadır. Sunulan araçlar sayesinde, çalışanlar arasında iş birliği ve takım çalışması desteklenmekte, bir arada çalışmanın sinerjik etkisi ile daha etkin iş sonuçlarına ulaşılabilir (Vural ve Maden, 2011, s. 198).

Bu kapsamda yukarıda yapılan tanımlar ışığında kurumların kurum içi iletişim yapılarını oluşturan dikey, yatay ve çapraz iletişim biçimlerinin her birini gerekli ve doğru bir biçimde kullanmaları kurumlar açısından hayati önem taşımaktadır. Kurumsal başarı önce iç iletişim ile başlamaktadır. Kurum içi iletişim yapıları bozuk ve doğru işlemeyen kurumların kaliteli ürün ve hizmet üretmeleri mümkün olmadığı için kurum dışına yansıyan kimlik, itibar, imaj ve iletişim biçimleri de bozuk olmaktadır. Bu bağlamda, kurumların kurum içi iletişim yapılarında en çok dikey iletişime önem verdikleri ya da herhangi bir aksaklıkta dikey iletişim sistemlerinin sorgulandığı gözlemlenmektedir.

Oysa dikey iletişimin mükemmel işlediği kurumlarda da çoğu zaman sıkıntılar oluşmakta ve kurumlar bu sıkıntıların nereden kaynaklandığını anlamakta ciddi güçlük çekmekte, çözmek için ise, ciddi zaman kayıpları yaşamaktadır. İşte bu noktada kurumların çapraz iletişim biçimlerinin doğru işleyip işlemediğini kontrol etmeleri gerekmektedir.

Kurumların sitemlerini birbirine bağlama ve kendi aralarındaki uyumu sağlama süreci olarak tanımlanan kurum içi iletişim tanımı referans alındığında kurumlar hiyerarşik bir yapılanmada ayrı ayrı departmanlara ayrılrsa da dışardan bir bütün olarak algılanmakta içerde de bu sistemler zincir halkası gibi birbirlerine bağlı olarak işlemektedir. Bir departmanda aksaklık yaşanması bütün birimlerde aksaklık çıkmasına neden olmaktadır. Bundan dolayı kurum içi iletişim bu sistemleri birbirine bağlayarak kurumların başarılı olmasını sağlamaktadır.

Departmanları birbirine bağlama ve kendi aralarındaki uyumu sağlama sürecinde çapraz iletişim yapısının kurumlar tarafından kullanılıyor olması büyük önem taşımaktadır, çünkü her bir departmanın çalışma biçimi ve dinamikleri birbirinden farklı olmaktadır. Her bir departmanın işleyiş biçimi, mesai saatleri, çalışma şekli, yoğunluk zamanları uzmanlık alanlarından kaynaklı farklı özellikler taşımaktadır.

Bundan dolayı çalışanlar, diğer departmanlardaki çalışma şekillerini, onların ne yaptıklarını, nasıl çalıştıklarını bilmediklerinde kurum içinde ciddi karışıklıklar ve sıkıntılar ortaya çıkmaktadır. Çalışanlar diğer departmanlarda çalışan kişilere ayrıcalık tanındığını, onlara daha esnek davranıldığını sanki başka bir kurumun çalışanlarıymış gibi farklı şartlar altında çalıştıklarını düşünebilmekte ve bu senaryolar kurumun kültürü, yapısına göre de çoğaltılabilmektedir.

Çapraz iletişimin kullanıldığı kurumlarda çalışanlar, diğer departmanda bulunan çalışma arkadaşlarının çalışma biçimi, yoğunlukları ve iş süreçleri hakkında bilgi sahibi olmakta, birbirleri ile empati kurma yetenekleri gelişmekte ve bundan dolayı yardımlaşma artarak kurum içi eşgüdüm veya uyum oluşarak işlerin koordinasyonu kolaylaşmaktadır. Böylece çalışanların performansı ve çalışma hızı yükselerek kuruma, kaliteli ürün ve hizmet üretimi sağlanmaktadır. Departmanlar arasındaki uyum önemsenmediğinde bir zincir gibi birbirine bağlı olan bu sitemlerin işleyişi bozulmakta sorun çözüme ya da süreç geliştirme durumlarında bir konuyu tam olarak analiz edebilme ve çözüm üretebilme güçleşmektedir. Buna bağlı olarak çalışanların çalışma hızı ve motivasyonu düşerek verimlilikleri azalmaktadır.

Bu kapsamda sorun çözüme ya da süreç geliştirme amacıyla, çalışanların konuyu tam olarak analiz edebilmeleri ve çözüm üretebilmeleri, sorunu çok yönlü görebilmelerine ve tanımlayabilmelerine bağlı

olmaktadır. Bu nedenle, çapraz iletişim ne kadar doğru kullanılırsa çalışanlar arasındaki koordinasyon ve uyum artmakta, çalışanlar diğer departmanların işleyiş ve süreçlerini bildikleri için herhangi bir sorun çıktığında birbirleri ile yardımlaşarak sorunu bir üst yönetime ulaştırmadan sorunu çok yönlü görebilmekte ve analiz edebilmektedir. Bu durumda birbirleri ile empati kurabilen, yardımlaşan, sorun çözen, birbirleri ile koordine olmuş bunun sonucunda da yüksek performans ile çalışan, kaliteli ürün ve hizmet üreten mutlu bir çalışan hedef kitle oluşmaktadır. Bu durum da kurumları başarıya ulaştırma da önemli bir süreci oluşturmaktadır.

### AMAÇ VE YÖNTEM

Çalışmada kurum içi iletişim yapısını oluşturan iletişim biçimlerinden çapraz iletişimi kullanmanın önemine değinerek çapraz iletişim eksikliğinde kurumların karşılaştığı sorun ve problemleri tanımlamak, kullanımının kuruma getirdiği faydaları ele almak amaçlanmaktadır. Bu amaçla araştırma yöntemi nitel araştırma olarak belirlenmiştir. Bunun nedeniyse nitel araştırma gözlem, görüşme ve doküman analizi gibi nitel veri toplama yöntemlerinin kullanıldığı, algıların doğal ortamda gerçekçi ve bütüncül bir biçimde ortaya konmasına yönelik nitel bir sürecin izlendiği araştırma olarak tanımlanmaktadır (Yıldırım ve Şimşek, 2018, s.41). Ayrıca “ne kadar” gibi nicel soruların cevaplarının yerine “neden ve “nasıl” gibi niteliksel soruların cevaplarını arayarak çalışmaya derinlemesine bilgi sağlamaktadır. “Nitel araştırmalar geleneksel araştırma yöntemleriyle ifade edilmesi zor olan sorulara cevap bulmak için gerekli” olmaktadır (Çapraz, 2018, s. 245).

Bu kapsamda çapraz iletişim kullanımının faydaları, empati, motivasyon, sorun çözüme ve yardımlaşma olmak üzere dört kategori altında incelenmektedir. Bu dört kategoriye yönelik veriler nitel araştırma yöntemlerinden “derinlemesine görüşme” tekniği kullanılarak toplanmış bulunmaktadır. Görüşme yoluyla, deneyimler, tutumlar, düşünceler, niyetler, yorumlar, zihinsel algılar ve tepkiler gibi gözlenemeyen durumlar anlaşılmaya çalışılmaktadır. Nitel veri toplama türlerinin temel veri toplama tekniklerinden biri olan derinlemesine görüşme “araştırma konusu ile ilgili kişilerle belirli bir amaç doğrultusunda konuşma yapılmasını” kapsamaktadır (2018, s. 245).

Bu amaçla hizmet sektörü kapsamında faaliyet gösteren bir kurumun dokuz departmanında yapılan mülakatlarda toplam otuz kişiyle görüşülmüş olup, araştırmanın örneklemini oluşturan bu görüşmecilere, kurumun, kurum içi iletişimde çalışanların kurumda kaç departman olduğunu bilip bilmedikleri, bu departmanlarda çalışan kişileri tanıyıp, tanımadıkları, bu departmanlardan destek alıp, koordineli çalışıp çalışmadıkları, bu departmanların iş süreçleri ve işleyiş yapılarını bilip bilmedikleri, kurumun, departmanlarının birbirleriyle kaynaşmaları adına özel gün yemekleri, gezi ve kutlama gibi faaliyetleri düzenleyip düzenlemediği, birimlerde yaşanan bir sorun ya da ihtiyaç noktasında diğer departmanlardan destek alınıp alınmadığı, diğer departmanlardan daha çok çalışan ya da daha katı kurallar uygulanan bir departman olduğunun düşünülüp düşünülmediği, kurum içi iletişim sisteminin nasıl işlediği, bölümler arasında bilgilendirme sürecinin nasıl işlediği, departmanların kuruma olan katkıları konusunda çalışanların bilgisi olup olmadığı, herkesin eşit şartlarda mı çalıştığı, bir sorun olduğunda sorun çözüme stratejisinin nasıl işlediği, yönetici-çalışan ilişkilerinin nasıl işlediği, gerektiğinde birim amiri ya da şef dışında en tepe yöneticiyle iletişime geçilebilip geçilemediği ya da geçme ihtiyacına ilişkin toplam on beş adet açık uçlu soru yöneltilmiştir.

Sorulara verilen yanıtlar ışığında çapraz iletişim kullanımının faydaları olarak belirlediğimiz empati, motivasyon, sorun çözüme ve yardımlaşma kategorilerinin kurum içi iletişim kullanımı kapsamında hayata geçirilmesine yönelik görüşmecilerin yanıtları yorumlanmıştır.

### BULGULAR

Kurumun dokuz departmanında uyguladığımız görüşmelerde bütün departmanlardaki çalışanlar, kurumda kaç departman olduğunu isimleriyle sayarak bu departmanlarda çalışan kişileri tanıdıklarını, iş süreçleri gereği bazı departmanlardan zaten mecburi destek almak zorunda olduklarını, gerektiğinde de diğer departmanlarla koordineli çalıştıklarını, kurumun, departmanların birbirleriyle kaynaşmaları adına özel gün yemekleri, gezi ve kutlama gibi faaliyetleri düzenlediğini fakat pandemiden sonra bu faaliyetlerin durduğunu ve yapılmadığını ama bu faaliyetler yapılmasa da ortak kantin ve yemekhanede birbirlerini tanıdıklarını ve tanıştıkları, bazı kişilerinse dışarda da görüştiklerini ve dost oldukları, kurum içi iletişim ve bölümler arası bilgilendirme süreçlerinde ihtiyaca yönelik olarak hem mail ve whatsApp gibi araçları kullandıklarını hem de yüz yüze iletişime de sıklıkla başvurdukları

bilgilerini aktarmaları yukarıda çapraz iletişim kullanımını bölümünde açıkladığımız “çapraz iletişimin kullanıldığı kurumlarda çalışanlar, diğer departmanda bulunan çalışma arkadaşlarının çalışma biçimi, yoğunlukları ve iş süreçleri hakkında bilgi sahibi olmaktadır”, bilgisini doğrularak bu aşamada ilk izlenim olarak çapraz iletişimin desteklendiği düşüncesini oluşturmaktadır.

İlerleyen sorularda bütün departmanlardaki çalışanlar, birimlerinde yaşanan bir sorun ya da ihtiyaç noktasında diğer departmanlardan destek aldıklarını, sorun çözme noktasında diğer departmanların müdür yardımcılarıyla istişare ettiklerini ya da kendi birim amirleriyle sorunu çözümlediklerini ifade ederek kurumların çapraz iletişim kullanımına yönelik olarak literatürde aktardığımız “çapraz iletişim ne kadar doğru kullanılırsa çalışanlar arasındaki koordinasyon ve uyum artmakta, çalışanlar diğer departmanların işleyiş ve süreçlerini bildikleri için herhangi bir sorun çıktığında birbirleri ile yardımlaşarak sorunu bir üst yönetime ulaştırmadan sorunu çok yönlü görebilmekte ve analiz edebilmektedir” açıklamasını doğruladığı görülmektedir.

Diğer sorulara baktığımızda iki departmanın çalışanları, diğer departmanlardan daha çok çalışan ya da daha katı kurallar uygulanan bir departman olduğunu düşündüklerini fakat bu durumun birimlerinin işleyiş biçimlerinin olması gereken bir durum olduğunu aksi halde ciddi sıkıntılar oluşabileceğini, bu duruma profesyonel baktıklarını ve bu durumun farkında oldukları için bu sürecin asla şikayet edilecek bir duruma gelmediğini, yaptıkları işi severek, aşkla ve en doğru şekilde yaparak nasıl daha fazla kazanımlar sağlarız diye düşünerek yaptıklarını ifade ederken diğer birimlerdeki çalışanlar ise bu soruya her departmanın işleyiş sistemine göre dönem, dönem yoğunlukları olduğunu bu sebeple böyle bir düşünce içine girmediklerini belirleterek, çalışanlar, diğer departmanlardaki çalışma şekillerini, onların ne yaptıklarını, nasıl çalıştıkları konusunda bilgi sahibi olduğunu göstermektedir.

Bu soruya bağlı olarak bütün departmanlardaki çalışanlar, herkesin eşit şartlarda çalışmadığını çünkü her departmanın kendine göre iş yapış şekillerinin farklı olduğu kimi departmanın sistemsel kimi departmanın daha manuel çalıştıklarını bu sebeple de eşit çalışma imkanının olmadığını belirterek çapraz iletişim kullanımına yönelik, “çapraz iletişimin kullanıldığı kurumlarda çalışanlar, diğer departmanda bulunan çalışma arkadaşlarının çalışma biçimi, yoğunlukları ve iş süreçleri hakkında bilgi sahibi olmakta” ve bu durumsa birbirleri ile empati kurma yeteneklerini geliştirerek, kurum içi eşgüdüm veya uyum oluşturmakta ve böylece işlerin koordinasyonu kolaylaşmakta ve çalışanların motivasyonu artarak kaliteli ürün ve hizmet üreten bir hedef kitle oluşmaktadır, literatürünü doğruladığı görülmektedir.

### TARTIŞMA VE SONUÇ

Kurumların sitemlerini birbirine bağlama ve kendi aralarındaki uyumu sağlama süreci olarak tanımlanan kurum içi iletişim, yeni iletişim teknolojilerinin yatay ve çapraz iletişimi destekleyen birçok araç sunmasından kaynaklı günümüzde her geçen gün önemini arttırmaktadır. Bilgi toplumu içerisinde kurumsal iletişimin gerekli koşullara uygun hale gelmesi için kurumların tüm bileşenlerinde kurum içi iletişim yapılarını oluşturan dikey, yatay ve çapraz iletişim biçimlerinin her birini gerekli ve doğru bir biçimde kullanmaları gerekmektedir, fakat kurumlar daha çok dikey kanallara odaklanmakta ve çapraz iletişim biçimi ihmal edilmektedir. Bu durum ise kurum içi iletişim sistemlerinin doğru bir biçimde işleminin önüne geçerek bozulmasına neden olmaktadır. Kurumsal başarı önce iç iletişimle başlamaktadır ve çapraz iletişim kullanımı çalışanlar arasında empati, motivasyon, sorun çözme ve yardımlaşma becerilerini harekete geçirerek bu sürece önemli bir katkı sağlamaktadır.

Bu kapsamda araştırmanın sonuçları göz önüne alındığında ortaya konan bulguların çapraz iletişim kullanımına yönelik olarak ileri sürülen kurumsal varsayımları ve ön görülen faydaları destekler nitelikte olduğu sonucuna ulaşılmış bulunmaktadır. Buna bağlı olarak kurumlarda çapraz iletişim kullanımının ve desteklenmesinin kurumsal başarı da önemli olduğu söylenebilmektedir.

Çapraz iletişim kullanımının faydaları olarak belirlediğimiz empati, motivasyon, sorun çözme ve yardımlaşma kategorilerinin kurum içi iletişim kullanımı kapsamında hayata geçirilmesine yönelik görüşmecilerin yanıtlarının analizi sonucunda; bir kurumda çapraz iletişim ne kadar doğru kullanılırsa çalışanlar arasındaki koordinasyon ve uyum artmakta, çalışanlar diğer departmanların işleyiş ve süreçlerini bildikleri için herhangi bir sorun çıktığında birbirleri ile yardımlaşarak sorunu bir üst yönetime ulaştırmadan sorunu çok yönlü görebilmekte ve analiz edebilmektedir. Bu durumda birbirleri

ile empati kurabilen, yardımlaşan, sorun çözen, birbirleri ile koordine olmuş ve yüksek performans ile çalışan, kaliteli ürün ve hizmet üreten bir hedef kitle olduğu ortaya çıkmış bulunmaktadır.

Bu araştırmanın dışında literatürde konuyla ilgili yok denecek kadar az çalışma bulunmaktadır. Bu bağlamda yapılan birkaç araştırmanın sonuçlarına bakıldığında da kurumlarda çapraz iletişim kullanımının kurumsal iletişim başarısı açısından faydalı sonuçları desteklediği görülmektedir. Bu araştırmalardan biri olan “Diagonal Communication Links Within Organizations (Organizasyonlar içinde çapraz iletişim bağlantıları) adlı çalışmada; etkili görev koordinasyonu veya işle ilgili karmaşık ve zorlu sorunların çözümünde gerekli olan istişarelerde, yüksek performans gösteren gruplar için, çevresel çalkantıların işle ilgili sorunların çözülmesini zorlaştırdığı ve kurumsal iklimin yeniliği desteklediği durumlarda çapraz etkileşimlerin gerekli olabileceğini göstermektedir. Diğer bir çalışma olan “Strengthening Of Diagonal Communication To Lock In Customer Satisfaction Shopping At Indomaret Cianjur District West Java (Indomaret Cianjur Bölgesi Batı Java'da Müşteri Memnuniyetini Yükseltmek İçin Çapraz İletişimin Güçlendirilmesi) araştırması sonuçlarındaysa çapraz iletişim uygulamasının, Batı Java'nın Cianjur bölgesindeki Indomaret mağazalarında iş sürekliliğini sağlamada müşteri memnuniyetini sağlama konusunda önemli bir güce sahip olduğu sonucuna ulaşılmış bulunmaktadır.

Bu kapsamda kurumların kurum içi iletişim yapılarını oluşturan dikey, yatay ve çapraz iletişim biçimlerinin her birini gerekli, doğru ve dengeli bir biçimde kullanmaları kurumların başarılı olmaları açısından hayati önem taşımaktadır. Kurumlar, dikey ve yatay iletişim kanallarının yanı sıra çapraz iletişim kanallarını etkin hale getirerek, çalışanların gerek birim içerisinde gerekse bölümler arasında birbirleriyle uyumlu bir şekilde hareket etmesini, sağlıklı ve karşılıklı anlayışa dayanan ilişkiler geliştirmesini, yardımlaşma ve dayanışma içerisinde görevlerini yürütmelerini sağlayabilmektedir. Böylece çalışanlar arasında dostlukların oluşması ekip çalışmalarında daha fazla başarı sağlanması, çalışanlar arasında olumsuzlukların en aza indirilmesi mümkün hale gelebilmektedir.

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RECOVERY OF ZINC METAL FROM ELECTRIC ARC FURNACE FLUE DUST BY  
HYDROMETALLURGICAL METHODS

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**ABSTRACT**

Nowadays, the rapid increase in industrialization, negative environmental effects of industrial wastes, and economic losses require the recycling of these wastes. Lead, iron, cadmium, zinc, arsenic, etc. are contained in flue dust, which is the waste of electric arc furnaces in the iron and steel industry. There are transition metals with high economic value. The environmental damage of these heavy metals contained in chimney dust has led to their use as raw materials in many industrial facilities and the increase of studies in the field of economic value recovery.

Thermal (pyrometallurgical) and chemical (hydrometallurgical) methods are widely used in the recovery of metals. In this study, it is aimed to obtain zinc as pure metal from electric arc furnace flue dust by hydrometallurgical methods. To determine the appropriate solvent in the leaching process to release the zinc present in the flue dust using the appropriate solvent,  $\text{NH}_4\text{Cl}$ ,  $\text{NH}_4\text{Cl}-\text{NH}_3$  under the same conditions. Leaching was carried out with  $\text{H}_2\text{O}$ ,  $(\text{NH}_4)_2\text{CO}_3$ ,  $(\text{NH}_4)_2\text{SO}_4$  solutions at a temperature of  $80^\circ\text{C}$ , 1 atm pressure, 300 rpm mixing speed, and 60 min. After filtration for 24 hours, spectrometric analysis of leaching solutions was performed in the ICP device. As a result of the analysis of leaching solutions,  $(\text{NH}_4)_2\text{SO}_4$  was determined as the leaching agent in which the most zinc was dissolved. The zinc dissolved in the leaching solution is intended to be obtained as a pure metal by accumulating at the cathode by the electro-recovery process applied using Pb as the anode and Al as the cathode.

**Keywords:** Electric Arc Furnace, Flue Dust, Zinc, Leaching, Recycling.

**1.INTRODUCTION**

The need for raw materials has increased in direct proportion to the increase in production along with global development in the world, while the rapid depletion of natural resources has led to an increase in studies in the field of recycling. Using natural resources with high efficiency and recycling waste provides countries with sustainable development. Zinc has a significant place in industry and many areas of human life. Many enzymes that play a role in biochemical activities require zinc to show maximum catalytic activity. Because it is chemically active and can easily alloy with other metals, zinc is used in the production of many alloys and compounds in industry. Studies on zinc production have accelerated in recent years due to its wide area of use (Kania H. and Saternus M., 2023). Zinc metal can be produced from ore, as well as zinc oxide, which is a secondary zinc source; It is also produced from steel scraps, alloy scraps, galvanizing wastes, die-casting wastes, and scrap zinc material wastes. Türkiye is one of the world's largest steel-producing and exporting countries. Recycling chimney dust, which is one of the steel production wastes, is classified as hazardous, and whose storage and transportation are harmful to both the country's economy and human and environmental health, will contribute greatly to the economy, human and environmental health, and the steel and zinc industry (Kurama H., 2023). Our country, with its high steel production capacity, has the potential to produce a significant portion of our metal zinc needs, which we import from flue

dust, which is production residue. The fact that zinc is completely recyclable without changing its physical and chemical properties and that its products can be used for many years due to their high durability makes zinc recycling ideal.

Pyrometallurgical and hydrometallurgical methods are widely used in zinc recovery. Pyrometallurgical Method is one of the extractive metallurgy methods applied using high temperatures to change the physical and chemical properties of the ore (Murugappan R.M. and Karthikeyan, M., 2021). In metal production by hydrometallurgical methods, the ore is dissolved in a suitable solution such as water, acid, base, or salt solution, and the base metal is taken into solution. The leach solution is filtered and separated from the insoluble gangue minerals in the solid phase. Apart from the main metal dissolved in the filtered solution, the solution is cleaned to remove ions that contaminate the other dissolved solution from the solution. The free metal or metal compound of the main metal ion in the solution is separated from the solution as a solid phase.

Pyrometallurgical processes are high-cost and pose a danger to human and environmental health. Since hydrometallurgical processes take place at low temperatures, they consume much less energy and offer a production opportunity that respects human and environmental health at a cheaper cost (Rocchetti L. et al., 2013). The steel industry, one of the developed sectors in our country, is the fifth largest sector contributing to the country's economy. 71.8% of the steel produced in the world was produced in integrated iron and steel facilities, 28.1% was produced in electric arc furnaces, and the remaining 0.4% was produced by alternative production methods. In Turkey, 71.5% of the 33.7 million tons of steel production was carried out in electric arc furnaces, the remaining part in integrated iron and steel facilities (worldsteel.org). While iron ore is used as the main raw material source in crude steel production in EAF, production residues of steel users (automotive industry, etc.) are used as a secondary raw material source (Nicholas P et al., 2008). In steel production in the electric arc furnace, 14-25 kg per 1 ton of steel is formed, approximately 500,000 tons of EAF flue dust per year. The proportion of zinc, which has the highest metallic value in flue dust, which is the production residue in liquid steel production, varies between 25-52% depending on the structure of the processed scrap. Figure 1 shows the concept of smelting reduction process.

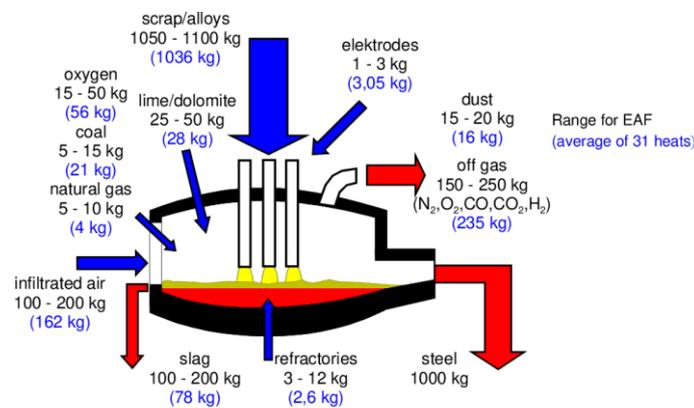


Fig. 1. Concept of smelting reduction process (Pfeifer H. and Kirschen M., 2002).

In this study, it is aimed to develop a feasible process for the recovery of zinc, which is found in high amounts in EAF flue dust, by hydrometallurgical methods under laboratory conditions.

## 2- MATERIALS AND METHODS

Hydrometallurgical methods were preferred, and ammonium salts with high zinc selectivity, providing cleaner dissolution, lower cost, and less harmful to human and environmental health were preferred during the leaching stage. EAF flue dust was supplied from Çolakoğlu Metalurji, which has a steel mill in Kocaeli. In the first stage of the study, dimensional analysis and XRF analysis were carried out to determine the physical and chemical structure of EAF flue dust. In the characterization of EAF flue dust, no pre-treatment was applied to the dust since the moisture content and grain size were under the optimum values determined in the literature. To determine the leaching solvent that can dissolve the

zinc in the dust with high efficiency during the leaching stage of EAF flue dust, ammonium salts, and aqueous ammonia solution were used under the optimum conditions determined in previous studies (1-hour leaching time, 80 °C temperature, 300 rpm magnetic stirring speed, and 10 g/L L/S) (Wang et al.,2008). Filtration was performed and the leaching solutions were analyzed qualitatively and quantitatively with ICP-OES.

Ammonium sulfate solution, which was found to absorb the highest amount of zinc in the leaching solution and had high leaching efficiency, was used as the leaching solution. Ammonium sulfate leaching at different concentrations was carried out for 1 hour at 80 °C and 300 rpm magnetic stirring speed with a 10 g/L L/S ratio, and the ammonium sulfate concentration that provided the highest leaching efficiency was determined. Then, systematic leaching processes were carried out with aqueous ammonium sulfate solution at the determined concentration to determine the optimum conditions (temperature, time, mixing speed, and solid-liquid ratio) that would provide high efficiency in the leaching process.

### 3-RESULTS AND DISCUSSION

To determine the processes to be applied and the chemicals to be used, the characterization of the flue dust was made using XRF. Table 1 shows the XRF results of EAF Dust.

**Table 1.**XRF results of EAF Dust

Element	Zn	Fe	Cl	Ca	Pb	K	Mn	Si	Mg	S
% wt	51.4	22.0	7.31	4.49	3.45	3.22	2.30	1.66	1.28	1.03
Component	ZnO	Fe <sub>2</sub> O <sub>3</sub>	CaO	K <sub>2</sub> O	SiO <sub>2</sub>	PbO	MnO	SO <sub>3</sub>	MgO	Cl
% wt	47.9	24.3	4.94	3.07	2.89	2.73	2.29	2.07	1.75	5.84

As a result of the analysis, since the moisture level of EAF flue dust was appropriate, drying was not applied before the leaching process. According to the sieve analysis, it was seen that the EAF flue dust had a particle size below 90 microns, so grinding was not applied.

NH<sub>3</sub>, NH<sub>4</sub>Cl, (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub>, (NH<sub>4</sub>)CO<sub>3</sub>, H<sub>2</sub>O<sub>2</sub> chemicals were used to investigate the effect of leaching solution for zinc recovery from EAF flue dust. A heater, magnetic stirrer and three-necked glass leaching reactor were used in leaching experiments. A spiral condenser was used to prevent losses due to evaporation during heating. Table 2 shows the properties of the solutions used at this experiments.

**Table 2.**Chemical properties of the leaching agent used (Lide,David R., 2006)

Leaching Agent	NH <sub>3</sub>	NH <sub>4</sub> Cl	(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	(NH <sub>4</sub> ) <sub>2</sub> CO <sub>3</sub>	H <sub>2</sub> O <sub>2</sub>
Density (kg/L)	0,73	1.5274	1,77	1,5	1,45
Molar Weight (g/mol)	17,031	53,491	132,14	96,09	34,0147

To decide the most effective solvent for leaching processes, EAO flue dust was mixed with NH<sub>4</sub>Cl-NH<sub>3</sub>-H<sub>2</sub>O, NH<sub>4</sub>Cl, (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> and (NH<sub>4</sub>)CO<sub>3</sub> solutions under optimum conditions determined according to the literature (1/10 solid-liquid ratio, 60 min, 80 °C, 7.5 M and 300 rpm stirring speed) was subjected to leaching processes. Table 3 shows the concentration values of solutions used in leaching processes.

**Table 3.** Concentration of leaching agent.

Leaching Agent	$\text{NH}_4\text{Cl-NH}_3\cdot\text{H}_2\text{O}$	$\text{NH}_4\text{Cl}$	$(\text{NH}_4)_2\text{SO}_4$	$(\text{NH}_4)\text{CO}_3$
Concentration	7.5 M (2.5 M $\text{NH}_3\cdot\text{H}_2\text{O}$ , 5 M $\text{NH}_4\text{Cl}$ )	7.5 M	7.5 M	7.5 M

L/S=10 g/ml,  $V_{\text{Solution}}=400$  ml,  $m_{\text{chimney dust}}=40$  g. The leaching process was carried out at 80 °C with 300 rpm stirring speed for 60 minutes. The resulting leach solution was filtered, and the amount of zinc was determined by using ICP-OES analysis. Table 4 shows the dissolution of zinc metal in leach solutions obtained by ICP analysis.

**Table 4.** Dissolution of zinc metal in leach solution

Leach Solution	$\text{NH}_4\text{Cl-NH}_3\cdot\text{H}_2\text{O}$	$\text{NH}_4\text{Cl}$	$(\text{NH}_4)_2\text{SO}_4$	$(\text{NH}_4)\text{CO}_3$
Zn (mg/L)	1507	1988	3370	1744

According to the results, it was observed that zinc was dissolved the most in the leaching process with  $(\text{NH}_4)_2\text{SO}_4$ . Subsequent leaching processes were carried out to determine the concentration of the  $(\text{NH}_4)_2\text{SO}_4$  solution using 2.5 M, 5 M, 7.5 M and 10 M  $(\text{NH}_4)_2\text{SO}_4$  under fixed optimum conditions determined in the literature. The leach solutions were analyzed with ICP-OES after filtration and the amount of dissolved zinc was determined. Table 5 shows the dissolution of zinc in leach solution at different concentrations of  $(\text{NH}_4)_2\text{SO}_4$ .

**Table 5.** Dissolution of zinc in leach solution at different concentrations of  $(\text{NH}_4)_2\text{SO}_4$ 

Concentration of $(\text{NH}_4)_2\text{SO}_4$ (mol/L)	2.5 M	5 M	7.5 M	10 M
Zn (mg/L)	1194	1538	3370	3711

#### 4- CONCLUSIONS

To determine the leaching agent to be used in this study, continuous leaching experiments were carried out under optimum conditions obtained as a result of literature research, and by ICP-OES analyses of these leaching solutions, ammonium sulfate solution was determined as the leaching agent that took the most zinc metal into the leaching solution under the experimental conditions as seen at (Table 4).

To determine the concentration of ammonium sulfate, ammonium sulfate solutions were prepared at 2.5 M, 5 M, 7.5 M and 10 M concentrations and leaching experiments were carried out. Spectrometric analyzes of these experiments are in (Table 5). Accordingly, as the concentration of the leaching agent increases in the leaching process, the amount of zinc metal dissolved in the leaching solution increases.

In addition to these preliminary studies, it is predicted that parameters such as temperature, mixing speed, and leaching time will be effective in the studies to be continued as a result of the literature review.

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**YÖNETİMDE GRUPLARARASI ALGI VE ETKİLEŞİMDE KİMLİK KAVRAMININ  
SOSYO-PSİKOLOJİK ANALİZİ**

**SOCIO-PSYCHOLOGICAL ANALYSIS OF THE CONCEPT OF IDENTITY  
IN INTERGROUP PERCEPTION AND INTERACTION IN MANAGEMENT**

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**Özet**

Sosyal bir olgu olan gruplararası algı ve etkileşim daha geleneksel olarak insanların başkalarını etkileme ve onlardan etkilenme yollarının incelenmesi olarak tanımlanır (Allport, 1954). Bu perspektiften bakıldığında gruplararası algı ve etkileşimdeki özdeşleşme, empati, sosyal normlar ve uyum gibi zengin ve dinamik sosyal bağlamlar aracılığıyla analiz edilir. Sosyal normlar ve adaptasyon sayesinde sosyal etkileşimi öğrenme koşulları yaratılır. Sosyal normlar ve empatinin yanı sıra sosyal etki, algılama ve etkileşim sırasında özdeşleşmeyi etkilemenin bir yolu olarak hareket edebilir. Sosyal etkinin, insanların başkalarının düşünce, duygu ve davranışlarını etkileme yeteneği olduğu bilinmektedir. Sosyal etki sosyal psikolojinin geleneksel ve temel bir konusu olup aynı zamanda yol göstericidir. Sosyal ilişkiler ikna etmeyle yani kişinin önce algılaması, anlaması ve karar vermesiyle başlar. Sosyal etki grup öğrenmesiyle yakından ilişkili olduğundan dinamik boyutları ve etkileme ilkeleri sosyal gruplarda daha güçlü tezahür etme özelliğine sahiptir. Uyumun en yaygın sosyal etki biçimi olduğu ve bir kişinin itici gücü olabileceği unutulmamalıdır. Bir gruptaki algı ve etkileşim esas olarak oymunluğu, birlik, statü ve bağlılık gibi koşullara dayanır ve insanların gruba uyum düzeyini belirler.

Empati, diğer insanların duygusal durumlarını anlamayı içerdiğinden, onun karakterize edilme şekli özdeşleşme sürecine benzer. Duyguların, kişinin fiziksel olarak yaşadığı duygularla karakterize edildiğini belirtelim. Başka bir deyişle, duygular inanç ve arzuların birleşimiyle karakterize edildiğinden, başkalarını "anlamak" empatiyi daha doğru şekilde karakterize eder. Kendini başka bir kişinin durumunda hayal etmek karmaşık bir süreçtir ve başkalarının duygularını tanımak bilgece bir yetenek olarak kabul edilir.

Sosyal psikolojide özdeşleşme kavramı, gruplar arası ilişkilerin analizi için bir perspektif ve geniş tabanlı bir araç olarak görülmektedir. Böylece bilişsel ve kavramsal düzenliliklere dayanan özdeşleşme bir takım sosyal kategorilere ayrılarak gerekli olayların sosyal algı bağlamındaki önemi yorumlanır. Gruplararası algı ve gruplar arası etkileşim süreçlerinin bileşenleri, ilgili bir alt teori olarak kavramsal ve modern teorilerin ön değerlendirmelerinin ortaya çıkmasına yol açmaktadır.

Özdeşleşmenin grup üyeliği ve grup algısı ile ilişkisi son zamanlarda giderek daha fazla tartışılmaktadır. Son zamanlarda daha fazla ve daha açık bir şekilde çalışıldıkça özdeşleşme kavramının keşfedilmesi ve yeni şekillerde kavramsallaştırılması ilginçtir.

**Anahtar Kelimeler:** tanımlama; empati; sosyal etki; gruplar arası algı; gruplar arası etkileşim; yönetim

**ABSTRACT**

Intergroup perception and interaction, which is a social phenomenon, is more traditionally defined as the study of the ways in which people influence and are influenced by others (Allport, 1954). From this perspective, intergroup perception and interaction are analysed through rich and dynamic social contexts such as identification, empathy, social norms and harmony. Thanks to social norms and

adaptation, conditions for learning social interaction are created. In addition to social norms and empathy, social influence can act as a way to influence identification during perception and interaction. It is known that social influence is the ability of people to influence the thoughts, feelings and behaviours of others. Social influence is a traditional and basic concept of social psychology, and it is also a guide. Social relations begin with persuasion, that is, with a man's first perception, understanding and decision-making. Since social influence is closely related to group learning, its dynamic dimensions and principles of influence have the ability to manifest more strongly in social groups. It should not be forgotten that harmony is the most common form of social influence and can be the driving force of a man. Perception and interaction in a group mainly depends on conditions such as consensus, unity, status and affiliation and determines the level of people's adaptation to the group.

Since empathy involves understanding the emotional states of other people, the way it is characterized is similar to the process of identification. Let's say that emotions are characterized by the emotions that a man experiences physically. In other words, since emotions are characterized by a combination of beliefs and desires, "understanding" others more accurately characterizes empathy. Imagining yourself in the shoes of another man is a complex process, and recognizing the emotions of others is considered a wise skill.

In social psychology, the concept of identification is seen as a perspective and a broad-based tool for the analysis of intergroup relations. Thus, the identification based on cognitive and conceptual regularities is divided into a number of social categories and the significance of the necessary events in the context of social perception is interpreted. The components of intergroup perception and intergroup interaction processes lead to the emergence of preliminary evaluations of conceptual and modern theories as a relevant sub-theory.

The relationship of identification with group membership and group perception has been increasingly discussed recently. Recently, it is interesting to discover the concept of identification and to conceptualize it in new ways as it is studied more and more clearly.

**Keywords:** identification; empathy; social impact; intergroup perception; intergroup interaction; management

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**AZERBAIJAN'IN HAZAR ÇEVRE İLLERİNDE TATİL BÖLGELERİNİN TARİHSEL GELİŞİMİ**

**HISTORICAL DEVELOPMENT OF HOLIDAY REGIONS IN THE CASPIAN SURROUNDING PROVINCES OF AZERBAIJAN**

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**ÖZET**

**Giriş ve Amaç:** Azerbaycan Cumhuriyeti'nin rekreasyon için nadir doğal koşullara sahip sahil bölgesi, rekreasyonun gelişimi açısından büyük ilgi görmektedir. Cumhuriyet sınırları içindeki kıyı şeridinin uzunluğu 800 km'den fazladır ve bu alanın 600 km'den fazlası tatil amaçlı rekreasyon için uygundur. Plaj sezonu 5-6 ay sürer. Deniz suyunun sıcaklığı kuzeyde 22 dereceye, güneyde ise 26 dereceye kadar değişmektedir. Kuzeydoğu kısmının kıyı şeridi daha yüzeysel bir rahatlamaya sahiptir.

**Gereç ve Yöntem:** XIV-XVIII. yüzyıllarda Azerbaycan'ın Büyük İpek Yolu üzerinde bulunan sahil şehirlerinin önemi daha da arttı. İpek Yolu güzergahında deniz veya sahil yoluyla seyahat edenler mutlaka Azerbaycan'dan geçmiştir. Uluslararası ticarete konu olan kıyı kentlerinin tamamında kervansaraylar inşa edildi. Çoğu şu ana kadar hayatta kaldı. Bu tür sivil yapılar arasında Bakü kalesinde inşa edilen Buhara, Multani gibi iki katlı ve küçük kervansaraylar örnek olarak gösterilebilir. 1920'li yıllara kadar Azerbaycan'ın Hazar bölgelerinde tatil ve dinlenme kaynakları kendiliğinden kullanıldı.

**Bulgular:** Bazı rekreasyon alanlarında girişimciler mineral kaynaklarını basit araçlar kullanarak elde edip kullanıyorlardı. Lenkeran'ın mineral kaynaklarında 1828 yılında şifa havuzları inşa edildi. 19. yüzyılın 50'li yıllarından başlayarak Azerbaycan'ın çeşitli kıyı yerleşimlerinde çeşitli hastaların tedavisi için konut binaları inşa edildi. Bu binalar hafif ve sağlamdı. Çoğu durumda hastalar ahşaptan yapılmış çadırlarda veya komalarda barındırılıyordu. Tatilciler ve turistler yöre halkının evlerini kiraladı.

**Tartışma ve Sonuç:** 1958 yılında kabul edilen "Tesis kaynaklarının kullanımının iyileştirilmesi ve tatil yeri inşaatının daha da geliştirilmesi hakkında" kararnameye göre Nabran, Lenkeran, Masallı gibi tedavi yerlerinin nazım planları hazırlandı. Deniz kıyısında düzenlenen rekreasyon ve turizmin önemi dünya çapında sürekli artmakta ve birçok ülkenin (Türkiye, Yunanistan, İspanya, Portekiz, Fransa, İtalya, Kıbrıs vb.) ekonomisine olumlu etki yapmaktadır. Bütün bunlar, Azerbaycan'ın Hazar kıyısındaki turizm ve rekreasyon kaynaklarının, modern uluslararası ve bölgesel gereksinimlerin yanı sıra ülkenin doğal ve iklim koşullarını da karşılayan uygun bir kentsel planlama politikasına dayalı olarak tahsis edilmesine yönelik acil ihtiyacı doğrulamaktadır.

**Anahtar Kelimeler:** Hazar çevresi, tatil yeri-rekreasyon, Lenkeran, Abşeron, Yalama Nabran, İpek Yolu, doğa

## ABSTRACT

**Introduction and purpose:** The coastal region of the Republic of Azerbaijan with rare natural conditions for recreation is of great interest in terms of recreation development. The length of the coastline within the borders of the republic is more than 800 km, of which more than 600 km of this area is suitable for holiday recreation. The beach season lasts 5-6 months. The temperature of the sea water varies up to 22 degrees in the north and 26 degrees in the south.

**Materials and methods:** The coastline of the northeastern part has a more superficial relief. In the 14th-18th centuries, the importance of Azerbaijan's coastal cities on the Great Silk Road increased even more. Those who traveled by sea or coast along the Silk Road route definitely passed through Azerbaijan. Caravanserais were built in all coastal cities that were subject to international trade. Most of them have survived so far. Among such civil structures, two-storey and small Caravanserais such as Bukhara and Multani built in the Baku Castle can be given as examples. Until the 1920s, holiday and recreational resources were used spontaneously in the Caspian regions of Azerbaijan.

**Results:** In some recreation areas, entrepreneurs were obtaining and using mineral resources using simple tools. Healing pools were built in the mineral springs of Lankaran in 1828. Starting from the 50s of the 19th century, residential buildings were built in various coastal settlements of Azerbaijan for the treatment of various patients. These buildings were light and strong. In most cases, patients were housed in tents or comas made of wood. Holidaymakers and tourists rented the houses of local people.

**Discussion and Conclusion:** According to the decree "On the improvement of the use of resort resources and the further development of resort construction" adopted in 1958, the master plans of treatment places such as Nabran, Lankaran, Masalli were prepared. The importance of seaside recreation and tourism is constantly increasing worldwide and has a positive impact on the economies of many countries (Turkey, Greece, Spain, Portugal, France, Italy, Cyprus, etc.). All this confirms the urgent need to allocate tourism and recreation resources on the Caspian coast of Azerbaijan based on an appropriate urban planning policy that meets modern international and regional requirements, as well as the natural and climatic conditions of the country.

**Key Words:** Around the Caspian, resort-recreation, Lankaran, Absheron, Yalama-Nabran, Silk Road, nature

## GİRİŞ

Azerbaycan'ın Hazar çevre illerinin elverişli coğrafi konumu ve zengin doğal kaynakları, farklı tarihi dönemlerde bu bölgelerde zengin ve müreffeh devletlerin gelişmesini teşvik etmiştir. Hazar kenarı bölge eski çağlardan beri Büyük İpek Yolu'nun kavşak noktasıydı. Çin ve Hindistan'dan Orta Asya'ya, oradan da Uzbay Nehri üzerinden Hazar Denizi'ne giden bu yol, Azerbaycan topraklarından geçiyor ve burada iki kola ayrılıyordu. Bunlardan biri Kura Nehri boyunca Kolheti ve İberya'ya doğru ilerlemiş, diğeri ise Hazar Denizi'nin batı kıyısı boyunca Derbend ve Kafkas ovalarından geçerek kuzeye doğru ilerlemiştir. İpek Yolu olarak adlandırılan "Strabon yolu"nun bu iki kolu üzerinde Azerbaycan'ın pek çok eski Hazar kenti yeniden inşa edilmiş ve aktif olmuştur. [1]

Orta Çağ'ın başlarında Hazar Denizi kıyısında yer alan Azerbaycan şehirleri Büyük İpek Yolu'nun faaliyetinde önemli konumunu korumaya devam etmiş, Hazar bölgesi ise önemli bir geçiş noktası olmayı sürdürmüştür. O dönemde kıyı kentleri, Uzak Doğu ve Orta Asya'dan Bizans'a, oradan da kuzeydeki ülkelere malların ulaştırılmasında eşsiz depolar görevi görüyordu. Hazar Denizi kıyısındaki kervan yolunun güney kısmı Güney Azerbaycan, İran ve Hindistan'a gidiyordu. Bu yolun oldukça hareketli bir hattı üzerinde, Hazar Denizi körfezinde yer alan Bakü şehri, 8. – 10. Yüzyıllarda Orta Doğu ve Transkafkasya bölgesinin önemli bir sanat merkezi haline geldi. Orta Çağ'da ülkeye turist olarak gelen tüccarlar, gezginler, coğrafyacılar vb., geldikleri bölgelerdeki şehirlerin ve yerleşim yerlerinin mimarisini ve kültürünü tanıyarak turizmin ilk tohumlarını oluşturmuşlardır. Antik ve Orta Çağ'ın ünlü gezginleri, çeşitli amaçlarla Azerbaycan'a yaptıkları yolculuğu tamamlayıp

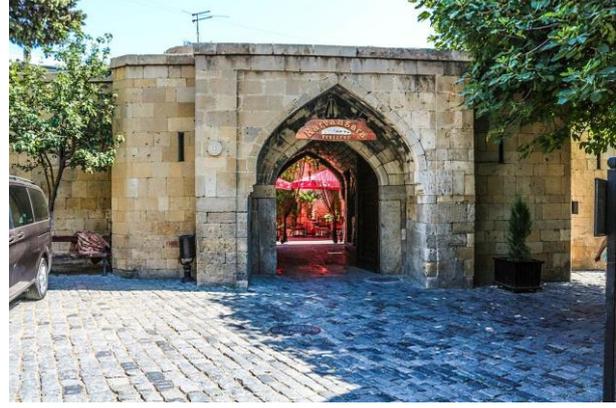
memleketlerine döndükten sonra, ülkemizin mutlaka görülmesi gereken yerleri ve doğası hakkında bilgiler verdiler. Bu da şehirlerin ve mimarinin gelişimini etkiledi. İslam mimarisinin kurulmasıyla bağlantılı olarak Hazar kıyı kentlerinde dini yapılar – camiler ve medreseler – inşa edildi. Bakü’de ateşe tapınma tapınakların üzerine camiler inşa edildi. Bunların örnekleri Muhammed, Aşur ve Cuma camileridir. [2]

14-18. yüzyıllarda Azerbaycan’ın Büyük İpek Yolu üzerinde yer alan sahil şehirlerinin önemi daha da arttı. Bu, Rus ve İngiliz tüccarlar tarafından fethedilen Volga-Hazar ticaret yolunun gelişmesi sayesinde gerçekleşti. Örneğin bu dönemde Darbend, Bakü, Lenkeran gibi şehirler, Doğu ve Avrupa’dan getirilen malların depolandığı deniz ticaretinin merkezi haline geldi. Rusya’dan, Avrupa’dan, Türkiye’den, Orta Asya’dan ve Uzak Doğu’dan tüccarlar burada toplandı. İpek Yolu güzergahında deniz veya kıyı yoluyla seyahat edenler mutlaka Azerbaycan’dan geçiyorlardı. Uluslararası ticaretle uğraşan tüm kıyı kentlerinde kervansaraylar inşa edildi. Çoğu şu ana kadar hayatta kaldı. Bu tür sivil yapılar arasında Bakü kalesinde inşa edilen Han, Küçük, Buhara, Multani gibi iki ve tek katlı kervansaraylar örnek olarak gösterilebilir.(res.1.2.3.4.)



**Resim1.** Han kervansarayı/Bakü 12.yüzyıl

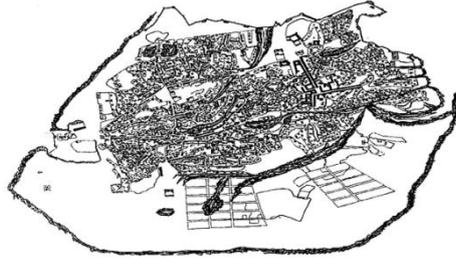
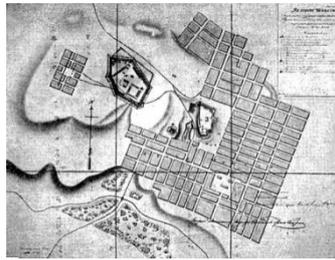
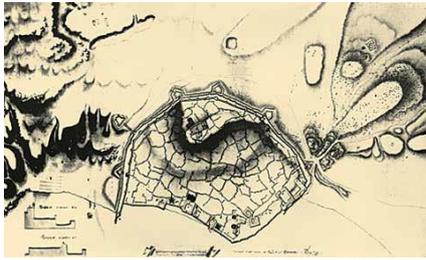
**Resim2.** Küçük kervansaray/Bakü 12.vüzyıl



**Resim3.** Buhara kervansarayı/Bakü 15.yüzyıl **Resim4.** Multani kervansarayı/Bakü 15.yüzyıl

buğışın tarımında ne Bakü civarındaki köylerde mi buğışınla ilgili kervansaray inşaatı yaygındı. Nardaran, Fatmayı, Balakhani gibi köylerde günümüze kadar gelebilmiş kervansaraylar bulunmaktadır. Yukarıdakileri analiz ederek Azerbaycan'ın Hazar bölgelerinde turizmin eski çağlardan beri geliştiği sonucuna varabiliriz.

20. yüzyılın başlarında Kuzey Azerbaycan Rusya'nın bir parçası haline geldi ve bu dönemden 20. yüzyılın sonuna kadar ülkenin tarihi Rusya'nın tarihiyle yakından bağlantılıydı. 19. yüzyılın sonu ve 20. yüzyılın başında Azerbaycan'ın tüm kıyı kentleri kapitalist gelişme yoluna girmiştir. Bakü dahil birçok şehrin master planları Rus askeri uzmanları tarafından geliştiriliyordu. 18. yüzyılda Hanlığın merkezleri olan Bakü, Şamahı, Lenkeran, Şuşa, Şeki, Gence gibi şehirler nazım plana uygun olarak gelişmeye başladı. (res.5.6.7.)



**Resim 5.** Bakü qalasının planı, 1796 yıl

**Resim 6.** Şamahı şehrinin planı, 1844 yıl

**Resim7.**Şuşanın Baş planı, 1855 yıl

19. yüzyılın başlarından 20. Yüzyılın başlarına, yani Halk Cumhuriyeti dönemine kadar olan tarihi kapsamaktadır. Bu aşama, Azerbaycan'da turizmin organizasyonu için, çoğunlukla gezi düzeyinde, ilk özel dernek ve toplulukların oluşturulmasıyla karakterize edildi. 1908 yılından itibaren Azerbaycan'da modern turizm gelenekleri kendini göstermeye başlamıştır. Gezgin-turistler Ateşgah'ı, ortaçağdan kalma Bakü'yü, Ajami Abubekir'in Nahçıvan'daki mirasını, Şaki Hanları Sarayını, Kafkas Arnavutluk'unun eski yerleşim yerlerinden Hınalık köyünü ve diğer ilginç yerleri ziyaret etti.

Azerbaycan'ın Hazar bölgelerinde dinlenme ve dinlenme kaynaklarının tahsis edilmesi 1920'li yıllara kadar daha körü körüne gerçekleşti. Azerbaycan'ın bir takım rekreasyon alanlarında özel girişimciler

maden kaynaklarını elde etmiş ve en basit ekipmanlarla bunları işletmişlerdir. 19. yüzyılın 50'li yıllarından itibaren Azerbaycan'ın bazı kıyı yerleşimlerinde çeşitli hastaların tedavisi için konut binaları inşa edildi. Sosyo-ekonomik bir alan olarak turizm, esas olarak 19. yüzyılın ortalarından itibaren gelişmeye başlamıştır. Bu döneme kadar turizm bireysel seyahat ve seyahat niteliğindedir.

1920-1991 yıllarında Azerbaycan'da turizm organize bir faaliyet alanı haline geldi. O dönemde Azerbaycan eski SSCB topraklarında önde gelen turizm rotalarından biri olarak biliniyordu. 1922 yılında Bakü'de ilk gezi kulüpleri faaliyete geçti. 1950 yılında Bakü Turist Üssü kuruldu ve bir

süre sonra bu kurum Azerbaycan Turizm ve Gezi Dairesi adını aldı. 1960'lı ve 1970'li yıllarda Cumhuriyet'te turizm üsleri ve yeni dinlenme merkezleri kuruldu. Bu alanda ülkemizin mimari mirası ve kültürüyle yakından bağlantılı olan "kültür turizmi" veya "tanıma" turizmi özel bir yer işgal etti. Rekreasyon ve sağlık turizmi Sovyet ve bağımsızlık yıllarında özel bir ivme kazandı. Bu durum ülkede Naftalan, Nahçıvan'da Tuz Dağı, Lenkeran'da Sıcak Su gibi tedavi merkezlerinin kurulmasına yol açmıştır. 1915 yılında Bakü-Dağıstan Arazi ve Devlet Mülkiyet Dairesi tarafından kurulan komisyon, Lenkeran'ın maden sularının büyük tedavi edici değere sahip olduğunu doğrulamış ve bu nedenle buldukları bölgenin iyileştirilmesi gerektiğine karar vermiştir. [3]

### SONUÇ VE TARTIŞMA

Azerbaycan'ın Hazar bölgesindeki tatil beldesi-rekreasyon ağının planlı gelişimi geçen yüzyılın 60'lı yıllarında başladı. 1961'den 1971'e kadar olan dönemde, cumhuriyetin sanatoryum-tatil kurumlarında 1961 yılı başındaki toplam tedavi yerleri kapasitesinin 2 katından fazla olan 7 binden fazla yer açıldı. Azerbaycan'ın bağımsızlığı ve piyasa ekonomisine geçişi, Hazar Denizi'nin kıyı bölgelerinde mevcut turizm endüstrisi ağının gelişmesini teşvik etti. Şu anda eğlence ve turizm endüstrisi, uluslararası hizmet ticaretinin en dinamik olarak gelişen şeklidir. Son 20 yılda dünya genelinde yabancı turist sayısında yıllık ortalama artış hızı %5,1; bu bölgeden elde edilen döviz gelirlerinin büyüme oranı ise %14 oldu. Deniz kıyısında düzenlenen rekreasyon ve turizmin önemi dünya çapında sürekli artmakta ve birçok ülkenin (Türkiye, Yunanistan, İspanya, Portekiz, Fransa, İtalya, Kıbrıs vb.) ekonomisine olumlu etki yapmaktadır. [3] Bütün bunlar, Azerbaycan'ın Hazar kıyısındaki turizm ve rekreasyon kaynaklarının, ülkenin doğal ve iklim koşullarının yanı sıra modern uluslararası ve bölgesel gereksinimleri karşılayan uygun bir kentsel planlama politikasına dayalı olarak tahsis edilmesine yönelik acil ihtiyacı doğrulamaktadır.



**Resim 8.** Abşeron "Sea Breeze" otel ve dinlenme merkezi



**Resim 9.** Lenkeran "Springs" otel

Abşeron, Nabran ve Lenkeran kıyı şeritlerinde modern gereksinimleri karşılayan otel ve dinlenme merkezlerinin geliştirilmesi turizmin gelişmesine katkıda bulunmaktadır. (res.8.9.)

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**FRACTIONAL NON-LINEAR PROBLEM WITH NONHOMOGENEOUS BOUNDARY  
CONDITIONS(EXISTENCE AND UNIQUENESS)**

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**Abstract**

We investigate a new class of boundary value problems of nonlinear fractional differential equations whose nonlinear  $f$ -term depends on a lower-order fractional derivative with separate fractional boundary conditions given by:

$$\begin{cases} c_{D_0^+}^\alpha x(t) = f(t, x(t), c_{D_0^+}^\beta x(t)) , t \in [0, T], 1 < \alpha \leq 2, 0 < \beta \leq 1 \\ a_1 x(0) + b_1 (c_{D_0^+}^\gamma x(0)) = c_1 \\ a_2 x(T) + b_2 (c_{D_0^+}^\gamma x(T)) = c_2 \quad 0 < \gamma < 1 \end{cases}$$

Where  $c_{D_0^+}^\alpha$  is the fractional derivative in the sense of Caputo,  $f : [0, T] \times \mathbb{R}^2 \rightarrow \mathbb{R}$  is a function continues and  $a_i, b_i, c_i, i = 1, 2$  are real constants with:  $a_1 \neq 0$  and  $T > 0$ .

The main objective of this work is the study of the existence and uniqueness of the solutions of a problem with fractional limits separated by application of Banach's fixed point theorem which is also known as: the contracting application theorem, this last is a simple theorem to prove, which guarantees the existence of a fixed point for any contracting map, applies to complete spaces, and has many applications.

And finally, we will present an example of application to illustrate the result of this theorem.

**Keywords:** fractional differential equation, fractional separated boundary conditions, Banach fixed point theorem, existence

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**THE IMPACT OF EXERCISES ON SPINAL INJURIES OF YOUNG VOLLEYBALL PLAYERS. (LITERATURE SUMMARY)**

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**ABSTRACT**

In volleyball players, there is thought to be overload due to the repetitions of unilateral body movements. This leads to postural changes. For this reason, postural asymmetry in sports, especially in people who train regularly and use one hand over head, is thought to be the overload from the repetitions of one-sided body movements. Purpose: Thus, the main focus of this paper was identification and selection of different exercises that can affect the improvement of postural asymmetries, described in the literature until 2023. Methods: The literature search was carried out in different databases to determine those elements that serve to improve physical coordination skills and possible spine irregularities in volleyball players. Summary studies of exercise programs that have been used to improve spinal irregularities were selected. Mainly, the literature used refers to electronic data sources, on websites such as: PubMed, Research Gate, Google Scholar, Scopus and mainly belongs to the last 10 years. A large number of articles were reviewed, among which about 34 articles were selected after passing the selection and exclusion criteria. Conclusions: Examining the literature, we observed that different authors have reached various results and conclusions regarding the asymmetry of the spine in athletes. Considering that the cited works in this material are among the qualitative ones addressing the phenomenon of postural asymmetry, balance, and force, both in the service of scientific research and in the service of the development of quality and sustainable training programs for the development of volleyball for youth and adults, we have formulated and organized theoretical concepts and testing and intervention protocols for the purposes and objectives of our study.

**Keywords:** volleyball, postural asymmetry, exercise, spinal injuries.

**INTRODUCTION**

According to the statistics of the International Volleyball Federation (FIVB), approximately 500 million people play volleyball worldwide. Volleyball is a widely popular team sport enjoyed by millions of people, as those who engage in it benefit from both physical and psychological skills. It is a sport with aerobic-anaerobic characteristics that involve a combination of explosive movements with short recovery periods and well-coordinated technical skills. To play volleyball, players need good technical skills, including serving, passing, setting, spiking, blocking, and defense. Each of these skills involves specific techniques for improvement during regular, scientifically based training processes, supervised by experts in the field. This has made the training of these parameters a standard practice in high-level volleyball. Adaptations in the neuromuscular-skeletal system to professional sports training are crucial for achieving better performance. The volleyball players are always at risk of

musculoskeletal injuries, with most injuries related to repeated jumps and hitting the ball above head height. Several body parts, including the ankle, knee, shoulder, and back, are susceptible to injuries, and even fingers are vulnerable. It is necessary to take measures for the prevention and correction of these postural anomalies through dedicated training programs to ensure physically healthy athletes.

Issues related to the spinal column have become a serious problem among today's youth. The reasons for this vary, ranging from physiological, morphological, gender-related factors, etc., to other external influences. In general, among children, a reduction in physical activity, rapid growth, and lifestyle lead to weakness in the core muscles and dysfunctional deformities of the spinal column during rapid growth (Bansal et al., 2014). The slight curvature of the spinal column, asymmetry of selected skeletal points and joints such as the shoulders, scapulae, iliac crests, knees, and feet in relation to each other are all essential elements to consider when evaluating whether the body posture is correct. Correct posture can also be characterized by the symmetric positioning of the head in relation to the longitudinal axis, a slight curve of the chest, equal length of the upper and lower limbs, and an accurate curvature of the legs (Rosa et al., 2013). This problem has been recently observed to be present in volleyball players, and for this reason, there has been a growing research interest regarding the issues of young athletes with the spinal column. The correct sports posture, respecting the techniques that a certain sports discipline educates and requires for athletes, is an area of interest for many researchers. In general, these researchers have discovered that specific physical training affects the balanced posture of the body. However, there is no consensus on the regulation of this effect, which may be due to the fact that studies usually involve quite diverse groups of athletes in terms of age and the sports they practice. The development of posture, whether normal or defective, also depends on the sports discipline practiced by an individual. Postural defects are defined as asymmetries in the frontal and horizontal planes with abnormal, i.e., deepened or leveled, anteroposterior curvatures (Grabara, 2012). In our country, a study has also been conducted by the National Institute of Public Health in collaboration with the Ministry of Education and Sport, where the Final Report of the National Conference "Functional and Motor Assessment of Elite Athletes in Albania" NIHP – Mo ES, January 2019, among other things, noted that young and elite volleyball players in our country have pronounced posture deviations (see figures below). This study has shown that young and elite volleyball players in our country face serious issues with spinal column deformation. Athletes are prone to musculoskeletal diseases such as kyphosis (Challoumas et al., 2017). It is believed that practicing a sport results in a better body posture, and in this logic, sports individuals should not exhibit postural asymmetries. However, this belief has been both supported and refuted by many researchers in the past and present, who have conducted studies on various athletes (volleyball players, gymnasts, table tennis players, basketball players, football players, tennis players, etc.) (Grabara, 2010). Therefore, observing shoulder balance is one of the most important components of physical examination for athletes with dominance in using one hand above head level (Burkhart et al., 2003).

A systematic literature review on relevant issues showed a positive correlation between postural stability and athletic performance level (Kiers et al., 2013). Asymmetry problems may put a volleyball player at risk of injury. This would hinder them from achieving full capacity in training, ensuring improvement in techniques, ultimately elevating their sports level. Going further, it is suggested that possible changes in per scapular muscle electromyography (EMG) activity due to asymmetric scapular position may alter movement kinematics, leading to undesirable shoulder pathologies (Karagiannakis et al., 2017).

Since physical activity is accepted to influence spinal deviations, the athlete's body posture has become an area of interest for many scientific researchers (Zaina et al., 2015). According to Grabara, specific training in a certain sports discipline causes numerous changes in the body structure and postural attitudes of an athlete, leading to the adoption of adaptive strategies, even if they are not necessarily beneficial (Grabara, 2014).

### **METHODOLOGY**

Studies of exercise programs that have been used to improve spinal irregularities have also been selected. Mainly, the literature used refers to electronic data sources, on websites such as: PubMed,

Research Gate, Scopus and Google Scholar, and mainly belongs to the last 10 years. The key words that were used for this research were volleyball, postural asymmetry and balance strength. A large number of articles were reviewed, among which about 25 articles were selected after passing the selection and exclusion criteria. The most frequently studied capacities in the literature are volleyball balance (N=4), postural asymmetries (N=11) as well as the improvement of postural asymmetry through exercises (N= 10). Studies that do not directly include spinal column deviations are excluded.

### RESULTS AND DISCUSSION

It is reported that the types of injuries among world-class volleyball players vary between player positions, suggesting the potential impact of specific volleyball movements in each position on injury development (Bere et al., 2015). Therefore, the nature of specific volleyball movements (spiking, serving, blocking, and passing) may be a factor in the development of mid-back, shoulder, arm, etc., pain. It is impossible for a coach to conduct a good training session with injured players. Some athletes continue to report unresolved chronic shoulder injuries, indicating potential fundamental dysfunction away from the primary anatomical site where pain is generated (Pogetti et al., 2018). These underlying pathologies suggest the necessary use of alternative treatment for athletes who do not respond to traditional treatment methods. Many studies have shown that athletes with these problems can improve them through various specific exercises.

According to a case study, interventions based on Postural Restoration (PR) address postural asymmetries in the kinetic chain that appear as movement dysfunction. By treating scapular position with exercises and PRI® theories, shoulder pain and range of motion issues in athletes who use one hand for rotational movements above head height improved (Waldron et al., 2020).

As many authors mentioned earlier have made known, these pains can be caused by postural asymmetry issues. In theory, if these postural adjustments are corrected, then dysfunction is reduced in all other body systems. Despite the increasing use of PRI theories by sports medicine practitioners, there is limited but promising evidence published on the results of treatment with PRI-type exercises (Robey & Boyle, 2013).

According to Schmidt, specific asymmetric exercises increase the EMG amplitudes of paraspinal muscles in their concavity. If confirmed by long-term studies measuring postural deficit improvements, these exercises may precede problems for patients with scoliosis (Schmid et al., 2010).

Another author who has studied this issue, after experimentation, concluded that strengthening the paraspinal muscles on the concave side using ASSE protocols can improve scoliosis severity (Ko et al., 2018).

Finally, based on this information, we aim to propose a new exercise protocol that can be personalized based on the curve model. Below, we have listed conclusions from several other authors regarding the improvement of spinal column problems through exercises, such as:

- Previous upper extremity rehabilitation programs propose stabilizing training only for shoulder muscles (Litchfield et al., 1993).
- A comprehensive rehabilitation program for injured athletes' shoulders may include modalities to reduce pain, mobility exercises, and manual therapy to address a range of movement deficits, as well as stability exercises with many connecting stops (harmoniously following each other) and multi-planes. However, it should be noted that compromised neuromuscular control of the scapula humeral relationship may have pathological implications (Tripp et al., 2007).
- Volleyball training may have negative effects on the body posture of adolescent girls. However, the sagittal profile of the spinal column is also determined by individual characteristics - genetic, psychomotor, functional, habitual, etc. Asymmetric loads during training and seemingly progressive kyphosis in young female volleyball players may require corrections at different times where yoga exercises, etc., are recommended (Grabara & Hadzik, 2009).
- Specific exercises that activate hamstring/abdominal muscles seem to immediately improve Ober's Test measurements and reduce pain as measured by NPS in people with lumbopelvic pain. Physical exercises for hamstring/abdominal muscles, instead of placing the iliotibial band, may be an

effective intervention for the treatment of lumbopelvic pain and a positive "Ober" test (Tenney et al., 2013).

- Correct correction of shoulder orientation during extreme extension and outward rotation exercises can be used to increase activation in the trapezius sections in high-level athletes with scapular dyskinesia (De Mey et al., 2013).
- The study findings inspired the development of a compensatory training program adapted to reduce and prevent the mentioned deformities of the spinal column and musculoskeletal pain (Gawel & Zwierzchowska, 2021).
- A variety of methods are used for the treatment of kyphosis, including manual therapy, posture exercises, taping, surgery, and therapeutic exercises (Kamali et al., 2016).
- Randomized controlled observational studies have shown that exercises for muscle strengthening alone are less effective than corrective exercises in improving thoracic kyphosis (Feng et al., 2018).
- The positive effects of a 12-week program, including spinal mobility, strengthening, and stretching to improve issues in athletes with kyphosis, were confirmed in this study (Tarasi et al., 2019).
- A comprehensive corrective exercise program provided effective improvement in kyphosis and postural alignment to a considerable extent. This study aimed to improve postural alignment with perceptual postural training, and results could be observed after 12 weeks of training in the CCEP group (Comprehensive Corrective Exercise Program) (Elpeze & Usgu, 2022).
- However, further studies are needed to demonstrate the effectiveness of a CCEP in different populations and the long-term effects of PPT. Corrective exercises involving PPT may improve individuals' posture and thoracic kyphosis. (Elpeze & Usgu, 2022).

A more thorough examination of these works that these authors have conducted will serve us in constructing a training program as effective as possible with various exercises to address spinal column issues in young volleyball players.

### CONCLUSIONS

Considering that the cited works in this material are among the qualitative ones addressing the phenomenon of postural asymmetry, balance, and force, both in the service of scientific research and in the service of the development of quality and sustainable training programs for the development of volleyball for both youth and adults, for both males and females, we have formulated and organized theoretical concepts and testing and intervention protocols for the purposes and objectives of our study. Fortunately, it is clearly evidenced and supported by ample literature that addressing these issues through specific physical exercises guarantees success.

Considering the frequent asymmetric loads on the spinal column during sports training, authors strongly recommend evaluating posture in young athletes. If necessary, exercises that help maintain good posture should be included in training sessions. Despite the importance of postural assessment in physical examination, there is little research on shoulder postural asymmetry.

This literature review will serve us in constructing a training program, taking into account the issues related to spinal problems in our volleyball players. We believe that this program will benefit coaches primarily, but also the athletes themselves, positively impacting the improvement of their problems and consequently enhancing individual sports performance overall.

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**YÜKSEK PARLAKLIĞA SAHİP SU BAZLI YAĞLI BOYA GELİŞTİRİLMESİ  
DEVELOPMENT OF WATER-BASED ULTRA HIGH GLOSS TRIM PAINT**

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**ÖZET**

Solvent bazlı boyalar, boyanın koruma ve estetik sağlama amacıyla kullanıldığı boya sanayisinin önemli bir bölümünü oluşturur. Ancak, çevresel zararları ve teknolojik ilerlemeler nedeniyle, solvent bazlı boyaların alternatifi olabilecek su bazlı boyalara olan talep artmaktadır. Bu çalışmada, çevre dostu, daha sürdürülebilir, tek komponentli, su bazlı ve parlak bir boya formülü geliştirmek hedeflenmiştir. Formül, yüksek fiziksel ve kimyasal dayanıklılık sağlayan, kendiliğinden çapraz bağlanan stiren akrilik kopolimer teknolojisi kullanılarak hazırlanmıştır. Proje, bağlayıcı, çözücü, pigment-dolgular ve katkı maddeleri olmak üzere dört ana bileşene odaklanır. Özellikle, stiren akrilik kopolimer bağlayıcının kullanımı, sertlik ve su direnci ile esneklik ve yapışma özelliklerini bir araya getirerek, çevresel faktörlere karşı dirençli bir boya filmi oluşturulmasını sağlar. Bu proje ile geliştirilen ürün, çeşitli yüzeylerde iyi yapışma özelliği gösterir ve bazı durumlarda astar ihtiyacını azaltabilir veya ortadan kaldırabilir, böylece maliyet ve zaman tasarrufu sağlar. Stiren akrilik kopolimerle geliştirilen su bazlı boyalar, geleneksel solvent bazlı boyalara kıyasla önemli çevresel avantajlara sahiptir. Bu boyalar, çok düşük Volatile Organic Compound (VOC) seviyelerine sahiptir, bu da onları daha çevre dostu ve sağlık açısından tercih edilir hale getirir. Ayrıca, katkı maddelerinin doğru türde ve oranlarda kullanılması, istenilen esneklik, film sertliği ve yüzeylere yapışma özelliklerinin sağlanmasında kritik öneme sahiptir. Projede incelenen katkı maddeleri arasında, reolojiyi, yapışmayı, bloklamayı ve esnekliği iyileştiren Hydrophobically Modified Ethoxylated Urethane (HEUR), boya filminin dış etkilere dayanıklılığını artıran Non-ionic PE Wax ve sıvıların yüzey gerilimini azaltarak kaplamaların yayılmasını ve ıslanmasını iyileştiren sodyum sülfosükat bulunmaktadır. Bu hammaddelerin self-crosslinking stiren akrilik bağlayıcı ile farklı oranlarda kombinasyonları araştırılarak en uygun kombinasyonun performans analizi gerçekleştirilmiştir.

**Anahtar Kelimeler:** Sürdürülebilir boya, su bazlı, adezyon

## ABSTRACT

Solvent-based paints, which are used in the paint industry for protection and aesthetic purposes, constitute an important part of the sector. However, due to environmental harms and technological advancements, the demand for water-based paints, which could be an alternative to solvent-based paints, is increasing. This study aims to develop an environmentally friendly, more sustainable, single-component, water-based, and glossy paint formula. The formula is prepared using self-crosslinking styrene acrylic copolymer technology, which provides high physical and chemical durability. The project focuses on four main components: binders, solvents, pigment-fillers, and additives. Specifically, the use of styrene acrylic copolymer binder combines hardness and water resistance with flexibility and adhesion properties, creating a paint film resistant to environmental factors. The product developed in this project shows good adhesion properties on various surfaces and, in some cases, can reduce or eliminate the need for a primer, thus saving cost and time. Water-based paints developed with styrene acrylic copolymer have significant environmental advantages compared to traditional solvent-based paints. These paints have very low levels of Volatile Organic Compound (VOC), making them more environmentally friendly and preferable for health. Furthermore, the correct types and ratios of additives are critical for achieving the desired flexibility, film hardness, and adhesion properties to surfaces. Among the additives studied in the project are Hydrophobically Modified Ethoxylated Urethane (HEUR), which improves rheology, adhesion, blocking, and flexibility; Non-ionic PE Wax, which increases the resistance of the paint film to external factors; and sodium sulfo-succinate, which reduces the surface tension of liquids, enhancing the spread and wetting of coatings. The combinations of these raw materials with the self-crosslinking styrene acrylic binder were researched in different ratios to perform a performance analysis of the optimal combination.

**Keyword:** Interior paint, cleanability, gloss, opacity.

**EMPIRICAL EVIDENCE OF 30% WOMEN ON BOARD REPRESENTATION  
REQUIRED OF PUBLIC LISTED COMPANIES BY THE MALAYSIAN CODE ON  
CORPORATE GOVERNANCE**

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**ABSTRACT**

Gender diversity on corporate boards has garnered significant attention worldwide due to its potential benefits for corporate governance (CG), decision-making, and financial performance (FP). In Malaysia, regulatory efforts to enhance board gender diversity (BGD) have been implemented, including the requirement for public listed companies (PLCs) to achieve a minimum of 30% women on board (WOB) representation. This study investigates the compliance of Malaysian PLCs with this regulatory mandate and explores factors influencing their adherence to or deviation from the prescribed BGD threshold. The study found that Malaysian Top 500 PLCs only had 15% (71/464) and 21% (98/466) WOB in 2018 and 2021, respectively. Using a comprehensive dataset of Malaysian PLCs spanning multiple industries and sectors except financial intermediaries, this study employs empirical analysis to assess the extent to which companies have achieved the 30% WOB representation target. The research findings reveal that most Malaysian PLCs still need to meet the mandated level of BGD on their boards, with many companies falling short of the 30% threshold (2018: 393 PLCs, 2021: 368 PLCs). In addition, the study identified various factors contributing to this shortfall, including cultural norms, traditional gender roles, a limited pool of female candidates, and resistance to change within corporate structures. The study revealed that Malaysian PLCs are not meeting the 30% WOB representation requirement despite regulatory efforts to promote gender equality. This highlights the challenges in achieving female representation in corporate leadership positions. The study suggests that a more inclusive corporate culture requires collaboration from regulatory bodies, corporate leadership, and advocacy groups. The findings underscore the importance of promoting gender equality and inclusivity in corporate boardrooms for organisational performance, stakeholder trust, and societal progress.

**Keywords:** Women On Board, Public Listed Companies, Malaysian Code On Corporate Governance

**INTRODUCTION**

The campaign for increased female representation on corporate boards in Malaysia has been a prominent emphasis in recent years. The Malaysian government set a target in 2010 for PLCs to have at least 30% female board members by 2016. This requirement was further supported by a gender policy passed by the Malaysian Cabinet in 2011, demanding that corporate entities reach a minimum of 30% women representation on boards of directors (BODs) by 2016 (1). However, studies have revealed that progress towards this aim has been modest, with data indicating that in 2012, female representation on boards in Malaysian corporations was just approximately 8% (2). Despite the hurdles in obtaining the 30% target, empirical data suggests that having a critical mass of at least 30% WOB can improve organisational outcomes. Research has demonstrated that a higher ratio of women on corporate boards can minimise the probability of fraud (3). Additionally, research has highlighted

the association between BGD and firms' risk, demonstrating a positive relationship between gender diversity on boards and reduced equity risk (4).

It is crucial in shaping CG, decision-making processes, and organisational performance. Research indicates that having women on corporate boards can produce various positive outcomes for companies. Studies have shown that firms with more effective corporate social responsibility (CSR) strategies exhibit better environmental and social performance; BGD can negatively moderate the relationship between CSR strategies and environmental performance, underscoring the significance of BGD in enhancing overall corporate sustainability (5). Moreover, women directors in board-level positions have been associated with improved firm outcomes, demonstrating that BGD can positively impact corporate performance (6). While some studies suggest that homogeneous boards may be preferred due to concerns about agency costs and potential negative effects on FP (7), other research highlights the benefits of BGD in improving CSR practices and fostering eco-innovation (8). Additionally, the positive relationship between BGD and corporate financial investment indicates that increasing BGD can lead to more effective utilisation of financial resources (9). Overall, empirical evidence supports that BGD is critical in driving corporate success. Companies with diverse boards will likely experience enhanced decision-making processes, improved FP, and strengthened CSR practices. By advocating for BGD, organisations can establish a more inclusive and effective governance structure that contributes to long-term sustainability and value creation.

While Malaysia expected to accomplish the 30% target by 2016, the deadline was extended to 2020 due to obstacles in meeting the earlier goal (10). The Malaysian Code on Corporate Governance (MCCG) has since specified that the proportion of female directors in PLCs shall be 30% (11). However, research has found that the mean value of women's representation on boards in Malaysia was only around 10%, with the highest proportion of women's representation on banks' BODs topping 30%. The journey towards obtaining 30% female representation on corporate boards in Malaysia has been a work in progress. While the government has set policy measures and targets, the actual presence of WOB still falls short of the desired aim. Empirical research demonstrates that increasing gender diversity on boards can have good impacts on organisational outcomes, stressing the necessity of continuous efforts to achieve gender equality in corporate leadership positions in Malaysia.

### **RELATED WORKS**

This chapter comprehensively analyses the factors influencing BGD in Malaysian PLCs and its impact on organisational effectiveness and societal progress. It synthesises literature on BGD, FP, regulatory frameworks, and cultural contexts.

#### *Justification And Significance Of Board Gender Diversity*

The rationale behind the study emphasises its relevance for CG practices, regulatory compliance, and gender equality initiatives in Malaysia. The growing recognition of the importance of BGD within corporate boards, specifically the mandate for 30% female representation in PLCs in Malaysia, is gaining traction. This is primarily driven by the potential benefits it can bring to FP, CG practices, regulatory compliance, and advocacy for gender equality. Research has shown a notable and favourable correlation between board diversity, namely the presence of women, and the value of a company (12). The need to attain a 30% participation of women on corporate boards is emphasised in the MCCG 2017 (13), indicating a shift towards more inclusive corporate frameworks. This study provided empirical evidence to support the rationale behind BGD (14). The findings suggest that the Malaysian government's mandating a minimum representation of 30% of WOB aligns with improving FP. Furthermore, scholarly research indicates that an increased concentration of women in leadership positions might lead to enhanced financial outcomes and less long-term underperformance (15). Additionally, a study emphasised the moderating influence of BGD on the association between

corporate sustainability practices and FP (16). The research underscores the significance of regulatory entities in guaranteeing BGD to promote long-term sustainability and mitigate financial risks. The promotion of BGD, notably the attainment of a 30% representation of WOB in Malaysian PLCs, is substantiated by empirical evidence. This research is essential in complying with regulatory obligations and promoting enhanced CG, improving FP, and furthering gender equality advancements within Malaysia's business environment.

### *Theoretical Perspectives On Board Gender Diversity*

The Agency Theory (AT) explains how, by strengthening monitoring and oversight responsibilities, gender-diverse boards can reduce agency issues and better align managers' interests with shareholders. While the Resource Dependency Theory (RDT), gender-diverse boards can make it easier for people to access a variety of networks, information, and resources, which will increase a company's ability to adapt and endure changing conditions, Social Identity Theory (SIT) looks at how BGD promotes inclusive workplace cultures and lessens prejudice and stereotyping among groups in boardrooms, AT posits that gender-diverse boards can mitigate organisational agency problems by enhancing monitoring and oversight functions. This enhancement leads to aligning the interests of managers with those of shareholders (17). On the other hand, RDT argues that gender-diverse boards can provide firms with improved access to diverse networks, knowledge, and resources. This access enhances firms' adaptability and resilience in dynamic environments (18). Moreover, SIT emphasises the importance of BGD in fostering inclusive organisational cultures and reducing group biases and stereotypes within boardrooms (19). Women directors on boards are seen as beneficial from the AT perspective, as it enhances board dynamics and efficiency, thereby reducing agency costs (17). Additionally, the monitoring function of the board derived from AT is crucial in protecting shareholders' interests and ensuring high-quality financial reporting. Furthermore, this study (20) supported the idea that the board's monitoring function, rooted in AT, is essential for mitigating agency problems and safeguarding shareholders' interests. In summary, AT emphasises the value of BGD in enhancing board effectiveness and dynamics and bringing management interests into line with shareholders. While the RDT highlights how BGD gives businesses access to various networks and resources that improve their agility, SIT emphasises the importance of BGD in fostering inclusive workplace cultures and eliminating prejudice in boardrooms. These theoretical stances help us comprehend how BGD improves governance and organisational success.

### *Regulatory Initiatives And Policy Measures*

An overview of regulatory initiatives promoting BGD on corporate boards globally, including legislative mandates, voluntary targets, and disclosure requirements are discussed. The rationale behind these regulatory interventions, the evolution of BGD policies, and their effectiveness in changing boardroom composition and gender equality are necessary.

Several regulatory measures support female diversity on corporate boards, such as disclosure requirements, voluntary aims, and legislative mandates. These initiatives have changed over time to address the underrepresentation of women in boardrooms and advance gender equality. In many nations, quotas and other legislative requirements have been implemented to demand BGD (21). According to the researchers, these coercive restrictions aim to improve gender representation and level the playing field. Voluntary targets and disclosure requirements have mainly driven changes in boardroom composition. Studies have indicated that an increasing percentage of voluntary disclosures is linked to excellent governance practices and a more significant percentage of independent and female directors (22). These regulatory actions are justified by the need to eliminate long-standing labour and social grievances that have impeded women's advancement in corporate environments (23). These programs seek to increase board performance and improve stakeholder management by promoting BGD (24). Research relating BGD to business social disclosures and FP has shown how successful these rules bring change (25). Furthermore, implementing gender quotas in several nations has effectively augmented BGD on boards (21). The goal of attaining equal participation of women on corporate boards is becoming more critical as these regulatory initiatives continue to influence

boardroom dynamics. The goal of evolving BGD policies is to guarantee that women are treated equally to men and to increase the proportion of female directors (26). The ultimate objective is to establish welcoming boardrooms where women participate equally in decision-making, and BGD is no longer a problem. Regulatory measures that advocate for BGD on corporate boards across the globe have played a pivotal role in mitigating gender disparities within boardrooms. These interventions seek to improve stakeholder management, advance gender equality, and alter the makeup of boardrooms through mandatory laws, voluntary goals, and disclosure obligations.

### *Board Gender Diversity In Malaysian Public Listed Companies*

The issue of BGD on corporate boards has garnered growing attention on a global scale, as evidenced by several studies that examine its impact on company performance and governance. The empirical examination of reaching 30% women on board representation has been studied within Malaysian PLCs. An overview of the BGD landscape in Malaysian PLCs, including the representation of WOB, board composition trends, and compliance with regulatory requirements, is discussed. Several empirical studies examined the relationship between BGD and FP in the Malaysian context, highlighting the unique challenges and opportunities faced by companies operating in the market. Gender diversity in PLCs has been a topic of increasing interest and scrutiny. The representation of WOB in Malaysia has shown improvement over the years, with approximately 54% of Malaysian PLCs having one or more women on their boards (27). However, this percentage is lower than in the US, indicating room for further enhancement in BGD (27). The Malaysian government has addressed this issue by mandating that PLCs have boards comprising at least 30% women, emphasising the business case for BGD (14). Empirical studies have explored the relationship between BGD and FP in Malaysia. Research indicates that WOB can positively impact FP but negatively affect market performance (28). Additionally, the quality of women appointed to boards is highlighted as crucial rather than merely increasing the number of WOBs (1). Studies have also shown that BGD, as measured by the percentage of WOB, can positively influence firm FP (29).

Challenges faced by Malaysian companies in promoting BGD include the need to balance board independence, BGD, and board size to enhance FP (14). The issue of BGD and its role in risk monitoring is relatively unexplored in Malaysia, where firms may need more incentives to increase women's participation in boardrooms (30). Furthermore, the impact of women directors on corporate performance, particularly in terms of return on assets (ROA) and stock volatility, remains an area of ongoing research (10). While progress has been made in enhancing BGD in Malaysian PLCs, there are still challenges to overcome. Companies need to focus on the quality of women appointed to boards, balance board composition, and consider the implications of BGD on FP. Further research is required to explore the nuanced relationship between BGD and company outcomes in the Malaysian context.

Numerous studies have demonstrated that despite concerted endeavours to enhance BGD, the level of female representation on corporate boards in Malaysia continues to be very limited. It has been observed that a significant proportion of PLCs in Malaysia still need to satisfy the 30% criterion for women on board representation (31). Several scholarly investigations have underscored the favourable correlation between BGD within corporate boards and FP. A robust positive correlation exists between BGD on corporate boards and ROA in Malaysian PLCs (32). This finding suggests that an increased representation of WOB can favour FP. Furthermore, the Malaysian government's requirement for PLCs to have a board of a minimum of 30% women has received backing from evidence indicating a viable commercial rationale for such inclusivity (14). Moreover, empirical research has supported the critical mass theory within BGD. This evidence suggests that attaining a specific level of female representation on corporate boards can enhance the efficacy of corporate efforts towards sustainability initiatives (24). The correlation between endeavours to augment women's presence on corporate boards and advancements in FP has been established. Research findings indicate that BGD within corporate boards is correlated with improved FP (33). Although there has been some advancement in promoting BGD among the boards of Malaysian PLCs, there remains scope for

further enhancements to achieve the mandated 30% representation of WOB. The available empirical research indicates that the augmentation of BGD within corporate boards might yield favourable FP and CG outcomes. This underscores the significance of persistent endeavours to improve board diversity in Malaysia.

### *Barriers And Challenges To Gender Diversity*

In the process of attaining the required percentage in WOB, common barriers and challenges to achieving BGD on boards in Malaysia include cultural attitudes, traditional gender roles, lack of access to networks and opportunities, and unconscious biases have been discovered. Strategies and best practices are required to overcome these barriers, including mentorship programs, leadership development initiatives, and diversity training to promote inclusivity and equality in corporate leadership. Achieving BGD on boards in Malaysia faces several barriers rooted in cultural attitudes, traditional gender roles, lack of access to networks, and unconscious biases. Research indicates that the need for more interest in integrating corporate information can be overcome by having women on the board (34). Additionally, firms that engage in environmentally responsible practices are more likely to have gender-diverse boards (35). However, BGD can negatively moderate the relationship between CSR strategies and environmental performance (5). Strategies such as mentorship programs, leadership development initiatives, and diversity training are crucial to address these challenges. Mentorship programs can help women navigate the corporate landscape and access opportunities (36). Leadership development initiatives can empower women to take on board roles and contribute effectively (37). Diversity training efforts are essential in combating unconscious biases and promoting inclusivity (38). Moreover, the research emphasises the importance of achieving a critical mass of women on corporate boards, beyond just numbers, to drive meaningful change (39). Legislation promoting BGD has positively impacted BGD in PLCs (40). Setting equitable targets for WOB can further advance BGD initiatives (26). Promoting BGD on boards in Malaysia requires a multifaceted approach that addresses cultural norms, biases, and access barriers. Organisations can overcome these barriers by implementing mentorship programs, leadership development initiatives, diversity training, setting targets, striving for critical mass representation, and fostering inclusivity and equality in corporate leadership.

### *Contributing Factors That Affect Board Gender Diversity*

Empirical evidence indicates that numerous factors affect the relationship between BGD and FP, and as a result, the findings vary. Some positive relationships are found in these studies: The potential positive impact of BGD on firm FP suggests that age and educational background diversities may negatively influence FP (41). This finding underscores the complexity of the relationship between board diversity and financial outcomes, highlighting the need for a nuanced understanding of how various diversity factors interact within the CG context. Further research is warranted to explore the differential effects of different dimensions of diversity on FP and to develop comprehensive strategies for leveraging diversity to enhance organisational success. When examining the impact of BGD on firm FP, it was found to have a positive and significant effect on FP (42). This study highlights the potential positive influence of BGD on organisational outcomes, emphasising the importance of considering diversity in CG for enhancing FP. The results suggest that promoting BGD within boards can improve FP, underscoring the significance of inclusivity and diversity in corporate decision-making processes. This study supported that board attributes, including BGD, positively impact FP (43). This finding aligns with the notion that BGD can significantly influence firm FP, as suggested in the current study. By highlighting the positive relationship between BGD on boards and FP, this study contributes to understanding the impact of board composition on organisational outcomes. In addition, this study offered an insightful perspective on the relationship between BGD and firm FP (44). The study presents an explanatory framework delineating the diverse channels through which BGD can hinder or enhance its influence on financial outcomes. By mapping heterogeneity in research findings and proposing a future research agenda, this work contributes to a nuanced understanding of the complexities surrounding the impact of BGD on corporate FP.

Another study explored the relationship between BGD, FP, and the moderating effect of CSR in UK financial institutions (45). The study delves into the impact of BGD on firm FP while considering the influence of CSR practices. The findings suggest that promoting BGD and engaging in CSR activities could enhance FP in UK financial institutions. The study provides valuable insights into the relationship between BGD and firm FP, specifically in sub-Saharan Africa (46). By examining how female directors on boards moderate the relationship between earnings management (EM) and FP, the research highlights the significance of BGD in influencing firm outcomes. The findings underscore the importance of considering board diversity as a moderating factor in understanding the dynamics between EM and FP, contributing to the existing literature on agency theory and CG. On the other hand, these researchers investigated the impact of BGD in CG on FP during financial distress in Indonesian public firms (47). The research employs a quantitative approach, analysing data from 467 firms and utilising logistic regression to test hypotheses. The findings suggest that firms with gender-diverse boards of commissioners tend to experience lower levels of financial distress than those with non-diverse boards, contributing to the discourse on BGD and its implications for FP. This finding aligns with the current study by providing insights into the relationship between BGD and firm FP, specifically in firms facing financial distress. The study's methodology, findings, and implications contribute to understanding how BGD in CG structures can influence firm outcomes, supporting the notion that BGD can significantly impact FP. Another study delved into the moderating impact of BGD on the relationship between ownership structure and FP (48). The research uncovers that ownership structure significantly influences FP by analysing non-financial firms listed on the S&P EGX30 ESG index over a specific period. Furthermore, the study reveals that BGD is crucial in moderating this relationship, suggesting that policies empower women in board positions to enhance overall FP. This research contributes valuable insights to the ongoing discourse on BGD and its implications for CG and financial outcomes.

However, some studies found no correlation between BGD and the financial outcomes of PLCs. For instance, this study (49) highlighted the impact of BGD and remuneration on earnings quality in Spanish firms. The study suggests that excessive board compensation can lead to increased opportunistic manipulation of financial reporting, resulting in declining earnings quality. This finding underscores the importance of considering BGD and remuneration practices when assessing the relationship between CG factors and firm FP. On the other hand, the study provided relevant insights into the relationship between board characteristics and FP, explicitly highlighting the impact of BGD on profitability (50). The findings suggest an inverse relationship between BGD and profitability, indicating that BGD may not necessarily lead to improved FP. This contributes to the ongoing discourse on the nuanced effects of board composition on firm outcomes, emphasising the need for further research to understand the dynamics at play in CG structures comprehensively. Similarly, the researchers investigated the influence of BGD on the FP of pension fund administrators in Nigeria (51). The study reveals that BGD does not significantly impact FP contrary to expectations. This finding aligns with the broader literature that presents mixed results regarding the relationship between BGD and firm FP (52–54). The study's results contribute to understanding CG tools and firm characteristics that can enhance FP, providing valuable insights for decision-making by fund contributors, managers, and boards of companies. In addition, another study investigated the impact of board capital on FP, utilising annual reports as the primary data source. The research reveals that BGD on boards is linked to decreased company performance (55). The study indicates that interlocking directorates are not significantly associated with FP. These results provide valuable insights for Malaysian policymakers regarding the board's role in governance mechanisms and emphasise the importance of selecting directors based on relevant knowledge and perspectives rather than solely focusing on meeting board seat quotas.

Furthermore, some studies indicated mixed findings. For instance, this study (56) explored the relationship between BGD and firm FP in the context of European countries, highlighting the

influence of cultural factors on this association. The study suggests that while BGD on the board can enhance FP, this impact is moderated by cultural dimensions such as power distance and masculinity. Specifically, the research indicates that in specific cultural contexts, gender-diverse boards may have a statistically significant negative impact on ROA and return on equity [ROE]. This study contributes to the existing literature by shedding light on the nuanced interplay between BGD, cultural norms, and FP in European settings. On the other hand, the researchers (57) investigated the impact of board characteristics on the FP of listed Deposit Money Banks (DMBs) in Nigeria. While the findings indicate that board size and ethnic diversity negatively influence FP and board independence, which shows a negative but non-significant effect, the study suggests that board diligence and BGD have a positive but non-significant impact. Specifically, the research recommends maintaining board independence, carefully analysing board size, holding a specific number of board meetings annually, ensuring BGD on boards, and promoting ethnic heterogeneity for equity and fair representation. Additionally, the study suggests that a 1% increase in female board representation could lead to a 0.3% increase in bank FP.

When examining the influence of BGD on firm FP, it is crucial to consider the critical mass perspective (40). This research underscores the significance of integrating supply and demand dynamics for BGD in corporate leadership when assessing the effects on both financial and environmental, social, and governance (ESG) performance metrics. By incorporating the critical mass concept, researchers can gain a more nuanced understanding of how BGD within boards may impact firm outcomes comprehensively. The researchers (58) explored the indirect relationship between board diversity, including BGD, and financial distress through the mediating role of CSR activities. The study on nonfinancial firms listed on the Pakistan Stock Exchange from 2010 to 2021 found that BGD, age and nationality diversity positively influenced CSR engagement, which was inversely associated with the likelihood of financial distress. This research highlights the nuanced and indirect impact of BGD on firm FP through the mediating mechanism of CSR activities, providing valuable insights for companies, regulators, and policymakers in emerging economies.

In addition, when examining the impact of BGD on firm FP, emphasise the practical implications of diversifying board and management structures to enhance performance (59). Their study on firm life cycles, asset preferences, and FP underscores the importance of BGD in influencing organisational outcomes. By considering this research's findings, firms can potentially strategically leverage BGD to improve their FP. This study explored the relationship between BGD and FP, offering a unique perspective on this complex issue (60). By examining the impact of BGD on firm FP, the study contributes to the ongoing discourse surrounding diversity in CG and its implications for financial outcomes. This research sheds light on the potential business case for BGD and its influence on FP, adding valuable insights to the existing literature on this topic. Furthermore, when examining the influence of BGD on firm FP, the study provides valuable insights by investigating the impact of BGD, age diversity, and board independence diversity on cash flow return on investment (61). By considering multiple dimensions of board diversity, this research contributes to a more comprehensive understanding of how different aspects of diversity may affect financial outcomes in the context of quoted hospitality firms in Nigeria. This study's findings could offer nuanced perspectives on the relationship between board composition and FP, shedding light on the specific role of BGD alongside other diversity factors in shaping firm success.

### **MATERIALS AND METHODS**

**The details of the research approach are mentioned below.**

#### *Research Design*

The study adopted the quantitative approach, focusing on collecting and analysing data from public sources such as Bursa Malaysia Berhad [BMB] and Securities Commission Malaysia [SCM] to investigate the percentage of WOB for the Top 500 PLCs in Malaysia before and after the COVID-19

pandemic. The primary objective is to determine any changes in gender diversity on boards during these two periods. The research design chosen for this study is well-suited for achieving the research objectives. The study can provide a detailed and systematic analysis of the collected data using quantitative methods. The initial step involved obtaining data on the Top 500 PLCs in Malaysia from BMB. Subsequently, a purposive sampling technique was applied to exclude PLCs under financial institutions due to their distinct regulatory environment. This approach ensured that the sample accurately represented the target population. The sample sizes for 2018 and 2021 were determined to be  $n = 464$  and  $n = 466$ , respectively. The critical variables under investigation in this study include board independence (BIND), board diversity (BGD), board size (BSIZ), and board tenure (BTEN). By focusing on these variables, the study aims to comprehensively understand the composition and dynamics of boards within the Top 500 PLCs in Malaysia. Analysing these variables before and after the COVID-19 pandemic will allow for comparing gender diversity trends and assessing the pandemic's impact on board composition. The quantitative research approach adopted in this study and the specific research design and variables selected will enable a rigorous analysis of the data collected from public sources. By examining the percentage of WOB for the Top 500 PLCs in Malaysia before and after the COVID-19 pandemic, the study aims to contribute valuable insights into gender diversity and board dynamics within the Malaysian corporate sector.

### *Data Collection*

The top 500 PLCs were sourced from BMB. At the same time, financial information, such as Net Profit Margin, Total Asset Turnover, and Financial Leverage, was obtained from the Annual Reports for both periods (2018 and 2021) to determine the ROE. The PLCs are selected based on their market capitalisation determined by the number of shares traded in the Bursa Malaysia Stock Exchange multiplied by the share price at two intervals, i.e., 2018 and 2021. The Annual Reports contain both the audited Annual Reports and the Corporate Governance Reports. However, the SCM provides the secretarial data that forms the independent variables (BIND, BGD, BSIZ, and BTEN). From the population of the Top 500 PLCs, using purposive sampling procedures, the samples of Malaysian PLCs are selected to determine the percentage of WOB of Malaysian PLCs before and after the COVID-19 pandemic.

### *Variables And Measures*

It is imperative to consider the factors that impact these dimensions to establish the key variables being examined within the framework of BGD measures, board composition, company characteristics, and regulatory compliance. The board's makeup is a crucial aspect that spans multiple factors, among which gender diversity holds considerable importance (62). The importance of gender diversity in board composition has been emphasised, as it significantly influences board effectiveness and decision-making processes (63). Additionally, the size and composition of corporate boards are governed by various factors, including firm characteristics and governance difficulties (64). The diversity and independence of boards are crucial factors that significantly impact CG and organisational success (65). Compared to the total board size, the number of female directors on corporate boards is significant when implementing the 30% WOB representation rule. Research has examined the influence of women on corporate boards and the relationship between board composition and profitability in the context of CSR. This research emphasises the interdependence of these factors (66). In addition, adherence to regulatory requirements plays a crucial role in shaping the composition of boards and the features of firms. The efficacy of boards in executing their monitoring obligations is influenced by criteria such as board quality, size, gender diversity, and foreign directorship, all of which are vital for regulatory compliance and governance effectiveness (63). To promote openness and accountability inside businesses, it is imperative to comprehend the interconnections among board composition, regulatory compliance, and firm performance (67). Ultimately, the key factors being examined, such as measures of BGD, board composition, company characteristics, and regulatory compliance, are interrelated and substantially impact CG practices and organisational success. By operationalising the 30% WOB representation mandate and evaluating the

impact of gender diversity on boards, organisations can better their governance structures and decision-making processes to achieve regulatory compliance and improve overall performance.

**Data Analysis**

Researchers apply numerous statistical and analytical approaches to conduct successful data analysis and test research hypotheses. These techniques include regression analysis, descriptive statistics, and content analysis. Regression analysis is performed to understand relationships between variables (68). Descriptive statistics summarise and describe a dataset's key elements (69), while content analysis is applied to analyse textual material systematically (70). At the same time, data cleaning, transformation, and validation are critical to ensure dataset dependability and accuracy. Data cleaning comprises discovering, diagnosing, and modifying problems in the dataset (71). Additionally, data quality is crucial, as poor input data can lead to erroneous conclusions (72). In summary, a combination of statistical methodologies, analytical procedures, and data processing steps is essential for efficiently conducting robust data analysis and testing research hypotheses. Researchers can gain valuable insights and make educated judgments based on the analysed data by utilising these methodologies and assuring data dependability through cleaning, transformation, and validation processes.

**RESULTS AND DISCUSSIONS**

After assessing the goodness of fit using the Multiple Regression Equations Model of the DuPont Analysis and assessing the ROE growth, the study proceeded to regress on the four independent variables (BIND, BGD, BSIZ, and BTEN) and to test how they affect the dependent variable (FP) of the top 500 PLCs in Malaysia. The researcher categorised the data set into relevant independent and dependent variables to understand the companies better (see Table 1). The mode for board diversity (BGD) indicates that most companies have only one female director.

Table 1: Descriptive Statistics Of Variables

Type of variables	Variable	Mode	Mean	Std. deviation
Independent variables	Board independence	3	-	1.125
	Board diversity	1	-	1.111
	Board size	7	-	2.033
	Board tenure	-	8.18	5.049
Dependent variable	Firm financial performance (%)	-	7.68	9.111

For multiple reasons, Malaysia is advocating for more excellent female representation on corporate boards. The objectives of this study include advancing diversity and inclusion, addressing gender disparity, expanding the talent pool, meeting stakeholder expectations, and enhancing decision-making (73). A diverse board can result in improved governance, enhanced performance, and effective risk management. Furthermore, studies have shown that having boards with varied backgrounds and perspectives is associated with improved FP, innovation, and risk management, leading to better decision-making (74). Companies can utilise legal and regulatory frameworks, such as quotas, targets, and disclosure duties, to promote BGD. Promoting BGD in Malaysian organisations can yield

governance, decision-making, and talent acquisition benefits, ultimately leading to more substantial business outcomes (75).

The following variable in Table 2 summarises the number of female directors in the top 500 PLCs in Malaysia for 2018 and 2021. On average, most of the PLCs had at least one female director on the board. For both years, there were almost a similar number of PLCs with 1 to 2 female directors (2018, n = 291, 62.72%; 2021, n = 294, 63.09%). The study found it is encouraging that the PLCs showed a positive response to employing more female directors on the board when the number of PLCs that did not have female directors reduced from 117 to 89, showing a 23.93% decrease. This study utilised Multiple Linear Regression (MLR) to determine if BGD impacts a firm's FP.

Table 2: Number Of Female Directors

Number of female directors in PLCs	2018	2021
0	117	89
1 – 2	291	294
3 – 4	52	78
5 – 6	4	4
7 – 8	-	1
<b>Total</b>	<b>464</b>	<b>466</b>

The study found a statistically significant relationship between BGD and FP, with a p-value of 0.056 [see Table 3], slightly above the conventional threshold of 0.05. This threshold is not arbitrary and may be influenced by the study's context, research design, potential mistakes, and supporting evidence. The study also showed a more significant regression coefficient among all variables ( $\beta = 0.835$ ), indicating that BGD has the most substantial positive effect on FP within the model. This suggests that FP increases as BGD increases, confirming a statistically significant relationship between the two variables.

However, the study's results do not necessarily imply causation, as other factors not included in the model may also influence FP. It is important to interpret these results cautiously, as the p-value is close to the significance threshold. Hence, further research could provide additional insights and confirm these findings.

Table 3: Factors That Influenced Firm Financial Performance Using T-test.

	Beta	Std. Error	t	p-value	95.0% Confidence Interval	
					Lower Bound	Upper Bound
Constant	7.132	1.928	3.700	0.000	3.344	10.920
Board independence	0.329	0.479	0.686	0.493	-0.613	1.271
Board diversity	0.835	0.436	1.913	0.056*	0.023	1.692
Board size	-0.307	0.280	-1.095	0.274	-0.858	0.244
Board tenure	0.051	0.086	0.592	0.554	-0.118	0.220



The SCM aimed to have 30% female directors on the boards of the top 100 PLCs by 2020 (82); however, it fell short by 4.9% (see Figure 1). This study found a positive trend in BGD between 2018 and 2021, with more female directors in the BOD and fewer PLCs having no female directors. This indicates a growing recognition of the value and benefits of diverse leadership and its positive impacts on organisational performance, reputation, and sustainability (83). According to the Corporate Governance Monitor 2022 (84) on January 1, 2024, based on the top 100 PLCs in Malaysia, WOB has achieved 30.9% as mandated by the MCCG; overall, it only showed a women representation of 25.6%.

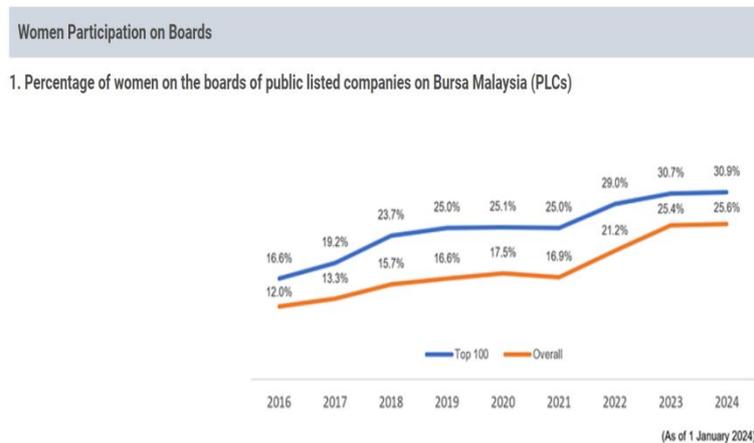


Figure 1: Women's Participation On Boards

The study used MLR to analyse the effects of CG mechanisms on FP based on secondary data sourced from BMB and the SCM of PLCs at two data points, 2018 and 2021. Although several hypotheses were formulated, only one hypothesis related to BGD found empirical support through MLR, indicating a positive correlation was found between BGD and FP. The study also highlighted the need for caution in interpretation due to the complexity of causal relationships and potential unaccounted variables. The MLR analysis revealed intricate relationships between CG mechanisms and FP, prompting the researcher to suggest further studies to expand understanding despite statistical limitations and unidentified factors (85). This study highlights the importance of diversity in the BODs and responsible directors in improving a company's reputation. BGD is a widely researched mechanism across various business disciplines, and researchers have focused on the ratio of female directors serving on BODs, highlighting the need for effective CG practices.

This study confirmed the hypothesis that BGD significantly impacts FP, emphasising the importance of having a more significant number of female directors. Organisations prioritise BGD in leadership teams, as diverse boards bring diverse perspectives, experiences, and abilities, leading to more informed decision-making (74). Diverse teams encourage creativity and innovation, improving an organisation's capacity to negotiate obstacles and capitalise on new possibilities. Beyond the boardroom, gender-diverse leaders contribute to a positive workplace culture (75), impacting overall performance, employee satisfaction, and retention (86). The study also confirmed the importance of BGD, a CG mechanism, in organisational dynamics and governance systems. It highlighted the need for diverse perspectives in governance structures (87). BGD aligns with the growing discourse on diversity's strategic value and role in organisational resilience and success. Even though these IVs were not supported, BIND, BSIZ, and BTEN also have the potential for success in corporate environments. However, the efficiency of these systems depends on contextual elements and the larger organisational environment.

## CONCLUSION

The impact of BGD on the FP of PLCs in Malaysia is subject to ongoing debate and research within academia and in alignment with the MCCG. Studies on the influence of BGD on FP in Malaysia also yield conflicting results. Several studies have indicated a positive association between the variety of genders on a company's board and its financial success. This correlation is likely due to the enhanced diversity of perspectives and decision-making processes. Nevertheless, alternative research discovered no substantial correlation or even negative consequences. Therefore, additional empirical evidence is required to comprehensively comprehend this association's causative mechanisms and contextual aspects.

Conversely, the MCCG promotes BGD and requires a minimum of 30% of board members to be women. Although the purpose of this mandate is to encourage diversity and inclusion, its specific influence on FP is still being debated and assessed. The correlation between the BGD and FP of PLCs in Malaysia is complex, intricate, and contingent on the specific circumstances. Additional research is required to understand better the exact mechanisms and conditions under which larger boards and BGD impact FP, notwithstanding existing data pointing towards possible benefits. Furthermore, continuous assessment and improvement of CG procedures by the MCCG can contribute to the efficient operation of the board and the achievement of long-lasting performance results. The conclusion on the impact of BGD on the FP of PLCs in Malaysia is nuanced since it is based on the current academic literature and the MCCG. Although many studies indicate that BGD might impact FP differently depending on sector and economic cycle characteristics, the correlation could be more precise. In addition, the MCCG highlights the significance of BGD but does not expressly establish a direct relationship between BGD and FP. Thus, it can be deduced that the impact of BGD on the FP of Malaysian PLCs is complex and contingent on the specific circumstances.

### *Recommendations*

Further research is needed to understand the relationship between BGD and FP in Malaysian PLCs, considering contextual factors and mechanisms influencing these relationships. Firstly, companies should prioritise diversity and inclusion efforts, as BGD can enhance decision-making and governance outcomes despite mixed evidence on its impact on FP. Secondly, PLCs should regularly assess their CG practices, including board composition and diversity policies, in line with the MCCG and adjust as needed to improve performance and mitigate risks. Thirdly, companies should foster a culture of inclusion, promoting diversity in all forms beyond BGD and promoting diverse thoughts, backgrounds, experiences, and perspectives throughout the organisation. Fourthly, companies should also actively engage with stakeholders to gather feedback on CG practices and diversity initiatives, fostering trust, enhancing transparency, and ensuring alignment with stakeholder expectations. Finally, PLCs should establish metrics and KPIs to monitor the impact of board composition and diversity initiatives on FP. Regular evaluation helps assess the effectiveness of these initiatives, enabling data-driven decisions for continuous improvement. These recommendations enhance CG practices, promote diversity, and improve FP and sustainability.

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**SOME RESULTS ON NEUTROSOPHIC NORMED SPACES**

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**ABSTRACT**

In this paper, we have studied the convergence problems of sequences having the chaotic pattern in NNS and give some basic properties of these concepts.

**THE SIGNIFICANCE OF PEDAGOGICAL PRACTICE: MENTOR-STUDENT  
DYNAMICS IN TEACHER EDUCATION**

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**ABSTRACT**

A common feature of teacher education programs in OECD countries is the inclusion of field experience or teaching practical training for student teachers. The duration of these teaching practical training varies significantly from country to country. While some programs offer short periods of classroom distribution, others provide year-long practical training where student trainees are assigned regular teaching responsibilities. Many OECD countries are currently reevaluating the role of teaching practical training. Increasingly, student teachers are introduced to in-school experiences earlier in their education programs, and the scope of practical training is expanding to include responsibilities beyond the classroom. This often encompasses areas such as curriculum planning, school development, research, assessment, and collaboration with parents and external partners. Furthermore, in many OECD countries, student teachers are required to spend initial periods observing in classrooms, teaching small groups or individual children, or acting as teaching assistants, before they engage in full teaching duties. This approach aims to provide a more comprehensive and practical foundation in teacher training, reflecting the evolving demands of education systems and the need for adaptability in teaching skills.

**1. Introduction:**

**The Role of Professional teaching practice in Teacher Education Programs in Albanian Universities**

Faculties of Education in Albania offer a diverse array of study programs designed to prepare future educators across various specializations. These programs are integral in shaping the pedagogical approaches and educational philosophies of aspiring teachers. Central to these education programs is the component of Professional teaching practice, which is meticulously integrated into the curriculum to ensure comprehensive teacher training. Professional teaching practice in these programs is not merely a supplementary part of teacher education; it is pivotal to the holistic development of student teachers. It serves multiple critical functions:

- **Pedagogical Practice:** This forms the core of the training process, where theoretical knowledge from classroom learning is applied in real educational settings. This practice is essential for student trainees to acquire practical teaching skills, understand classroom dynamics, and effectively manage student interactions.
- **Structured Implementation:** In bachelor's programs focused on pre-school (AP) and primary education (AF), as well as in professional master's programs (MP), Professional teaching practices are conducted systematically within schools. This hands-on experience is carefully planned according to

the educational curriculum and is spread out across different semesters and academic years. The structure is designed to progressively build the student trainee' confidence and competence in teaching.

- Curriculum Integration: The Professional teaching practice is deeply integrated into the curriculum plans, reflecting a strong emphasis on practical training. The programs ensure that the practice phases are aligned with pedagogical theories and educational methodologies taught in the courses. This alignment helps in reinforcing the theoretical aspects with practical experience, enriching the learning outcomes for the student trainee.

The implementation of these practices within Albanian educational faculties highlights the country's commitment to producing well-rounded, competent, and prepared educators who can meet the challenges of modern educational demands. By embedding practical experience early and throughout the teacher education programs, Albania ensures that its future teachers gain the necessary skills and experiences to thrive in diverse educational environments. This introduction aims to explore these themes further, emphasizing the importance of practical experience in developing effective teaching professionals.

## **2. Configuration of the Three-Phase Practical Training in Teacher Education Programs**

In teacher education programs at Albanian universities, the structuring of Professional teaching practice is designed in three phases, each corresponding to different stages of the student trainee' practical experience:

### *1. First Phase (F1)*

- In this initial phase, student trainee focusses on observation and assistance. This early stage is intended to develop a basic understanding of classroom management and the daily demands of the teaching profession.

### *2. Second Phase (F2)*

- The second phase is a developmental phase, during which student trainee begin to engage more actively in the teaching processes. They gradually take on responsibilities for conducting lesson units and start to accumulate initial teaching experiences under supervision.

### *3. Third Phase (F3)*

- The final expansion phase allows student trainee to fully step into the role of the teacher. They plan and conduct complete lessons independently and take full responsibility for classroom management and learning management.

This three-phase structure corresponds to the three periods of Professional teaching practice in schools: initial practice, developmental practice, and extended practice. The school practical training program is designed to allow student trainee to gradually develop their professional skills. This means:

- Student trainee start with basic observations and assist other teachers before gradually taking responsibility for conducting the first lesson and later leading the complete instruction.
- This approach addresses a process that begins with basic objectives and progresses to more complex competencies, from initial identification to permanent integration into the teacher role.

The primary purpose of the professional teaching practical training in the master's program is to provide student trainee with opportunities to develop skills for planning and conducting effective classroom instruction, including evaluating student trainee, and to help them gain a better understanding of the roles and responsibilities of teachers within the school and classroom culture.

### 3. Internship Components in Teacher Education Programs: A Dual Approach

Teacher education programs in Albania incorporate two closely interconnected components of internships that provide a comprehensive framework for training future teachers:

#### 1. Theoretical Education at the University:

The primary objective of theoretical education is to prepare student trainee for success in classroom settings. This includes providing student trainee with the necessary knowledge and understanding to handle educational challenges effectively. Additionally, the theoretical component is structured to offer ample time for reflection and discussion. This is crucial for enabling student trainee to assimilate what they learn and apply it during their practical experiences in schools.

#### 2. Practical Experience in Schools:

The practical component is designed to help student trainee develop specific knowledge, skills and attitudes essential for teaching at lower secondary education levels. It allows them to implement various strategies that contribute to their development as educators. The nature of the school practice is developmental, starting with observation phases where student trainee progressively engages in supporting different activities. In the final stages, student trainee is expected to take full responsibility for planning, teaching, and assessing.

Initially, the practical learning where the student trainee is required to observe will be overseen by general psych pedagogical educators. As student trainee advance to take on roles in assisting and teaching, these sessions should be supervised by educators specialized in didactics. According to the standards defined in the European higher education area, it is proposed that universities aim for student trainee to acquire competencies that are aligned with their studies. Student trainee should develop these competencies through various learning activities linked to the content of their respective studies. In this context, the reference point for learning is the competencies to be acquired, with the instruments being the learning activities during the study period.

For student trainee nearing graduation, possessing a theoretical knowledge base from the university is not sufficient. They also need to acquire a range of competencies that enable them to transition from the world of higher education to that of the school environment. The internship is a temporary period of professional training that take place in nine-year schools, as defined by agreements between the Universities and the Educational Directorates in Albania, which specifies the conditions. In this dual framework, each student benefits from:

- A tutor (lecturer)
- A mentor teacher as a reference

This structured approach ensures that teacher education not only imparts theoretical knowledge but also provides practical, hands-on experience that is crucial for the effective preparation of future teachers. By integrating both components, the program aims to produce educators who are well-prepared to face the challenges of modern classrooms and contribute positively to the educational outcomes of their student trainee.

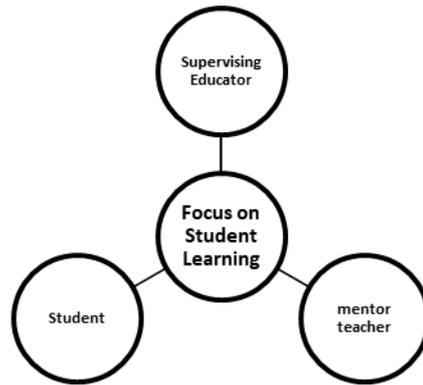


Fig. 1: Principles of Constructing Professional teaching practice

#### 4. The Role of the Host School in professional teaching practice

The host school's role is critical in providing the practical training as part of the agreement. The school welcomes the student and equips them with the necessary tools for success in their teaching mission. When the student trainee begins their teaching practical training, they often have little confidence in their abilities. They may be unsure how to manage a classroom full of student trainee. The first step is to not get discouraged. There are three main reassurances that can be given to boost their confidence in their future teaching endeavours:

- **The Concept of Learning:** This is based on collaboration, combining the teaching styles of both the teacher and the educator. This approach helps student teachers integrate into the classroom environment more smoothly and effectively.
- **Realistic Expectations:** No one expects you to possess all the qualities of an experienced teacher right away. The goal is to familiarize you with the methods of teaching in a school setting. This introduction to practical teaching is designed to gradually build your skills and confidence.
- **Research Insights:** Studies indicate that nearly all student trainee experience similar concerns and challenges during the initial days of their practical training. Knowing that these feelings are common can help alleviate some of the stress associated with stepping into the role of a teacher for the first time.

This partnership aims to provide a supportive and enriching environment where student teachers can develop their skills, learn from real-world experiences, and prepare for a successful career in education. Through understanding and addressing the common challenges faced during initial teaching experiences, the host school plays a pivotal role in shaping the future educators.<sup>1</sup>

#### 5. Teaching in Albania: Challenges, Reforms, and Job Prospects

In Albania, the teaching profession faces a range of challenges as well as opportunities. Teachers often grapple with issues like limited resources, large class sizes, and relatively low salaries compared to other professions, which can affect job satisfaction and the attractiveness of the profession to new entrants.

<sup>1</sup> AEDP. Roli dhe detyrat e studentit. Udhëzues i praktikës profesionale. Tirane 1998

However, education remains a priority for the Albanian government, which has initiated various reforms aimed at improving the quality of education and the status of teachers. These include curriculum updates, professional development programs, and infrastructure improvements in schools. The prospects for employment in teaching vary by region and educational level. Urban areas, especially the capital city of Tirana, typically offer more opportunities due to higher population density and more schools. There is also a growing demand for teachers specializing in foreign languages, STEM subjects (Science, Technology, Engineering, and Mathematics), and special education.<sup>2</sup>

Overall, while the teaching profession in Albania faces significant challenges, there are efforts underway to improve conditions and make teaching a more attractive and rewarding career path.

## 6. Study Objective

The teaching practice in schools provides a real-world context for student teachers' studies and enhances their capacity to connect theory with practice. This integration is crucial for developing effective teaching strategies that are informed by both academic knowledge and practical experience. The objectives of this study are as follows:

1. To describe the distributions of student teachers by referencing the capacity of schools and educational institutions to facilitate high-quality distributions. This involves assessing the resources, support systems, and overall educational environments offered by host institutions. It's essential to evaluate how these elements contribute to successful teaching experiences and enhance the student teachers' learning process.
2. To describe the characteristics of high-quality distributions from the perspectives of mentor teachers and student teachers. This includes examining the criteria that define a quality educational setting, such as the availability of mentorship, the effectiveness of the teaching practice, and the alignment of distribution opportunities with the student teachers' academic and professional goals. Understanding these perspectives helps in identifying the key factors that contribute to a successful practical training and fosters a more supportive environment for student teachers.

By focusing on these objectives, the study aims to provide a detailed analysis of how practical experiences in educational settings contribute to the professional development of student teachers. The research will explore the dynamics between theoretical knowledge and practical application, aiming to identify best practices and potential areas for improvement in teacher education programs. This inquiry will not only benefit current and future cohorts of student teachers but also enhance the overall quality of teacher education by ensuring that the practical components of the curriculum are effectively aligned with the theoretical foundations.

## 7. Study Methodology

This study was conducted over the 2022-2023 academic year and utilized a qualitative research approach to explore the real-world training experiences of student teachers within various educational settings. The following points detail the methodology used in this research:

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<sup>2</sup> Tarusha, F., & Bushi, J. (2024). The Role of Classroom Observation, Its Impact on Improving Teacher's Teaching Practices.

## *1. Data Collection:*

Data were collected from seven schools, selected based on the number of student distributions they accommodated. This approach allowed for a diverse range of data points representing different teaching environments and educational contexts.

## *2. Informal Conversations:*

Informal conversations were employed as a primary method for data generation, engaging both mentor teachers and student teachers. These discussions provided insights into the day-to-day experiences and reflections of the participants, offering a depth of understanding that structured interviews often fail to capture.

## *3. Reflection on Distribution Experiences:*

Participants were asked to reflect on their experiences during their distributions. This reflection helped in generating detailed data concerning the structure of the distribution schemes and the support systems available to the student teachers. Such reflective data are invaluable for understanding the practical aspects of teacher training and the effectiveness of the distribution process.

## *4. Pre- and Post-Distribution Interviews:*

To assess the impact of the distributions on student teachers, interviews were conducted at the beginning and end of their practical training. These interviews aimed to capture changes in the student trainee' perceptions and attitudes towards their teaching experiences and to evaluate the developmental aspect of their professional training.

The methodology outlined seeks not only to gather qualitative insights into the effectiveness of school distributions as a component of teacher education but also to understand how these distributions influence the professional development of student teachers. By analyzing both initial and concluding perceptions of the distributions, the study aims to identify key elements that contribute to successful teaching experiences and potential areas for enhancement in teacher training programs.

## **8. Analysis of Study Findings**

During their distributions in schools, student teachers seek the support of the entire school community as they journey towards professional competence. Welcoming student teachers into school settings enriches the educational experience for all involved: student trainee of the school, the student teachers themselves, the collaborative teaching staff, and the broader school community, including educational institutions of higher learning (HEIs).

Particularly, school student trainee benefit from a broader variety of educational experiences, including more diverse learning and co-curricular activities facilitated by the structured participation of student teachers. This diversity introduces student trainee to different teaching styles and new perspectives, enriching their educational journey. Additionally, the school gains access to fresh instructional approaches and learning strategies through its engagement with student teachers and HEI staff. This involvement brings contemporary and innovative educational practices into the school, which can revitalize curricula and teaching methods. It helps bridge the gap between traditional teaching methods and modern, evidence-based educational practices.

The integration of student teachers into schools fosters a dynamic learning environment that encourages collaboration and professional development among all teaching staff. It also strengthens the school's ties with higher educational institutions, facilitating a continuous flow of new ideas and teaching methodologies that can be adapted to improve student learning outcomes. For student teachers, this distribution is pivotal as it provides them with a real-world context to apply theoretical

knowledge. It also helps them develop critical teaching skills under the mentorship of experienced educators, enhancing their readiness for a professional teaching career.

In conclusion, the distribution of student teachers within school settings not only contributes significantly to their professional growth and competence but also enriches the educational environment for the student trainee and the school community. These partnerships are invaluable for fostering an ecosystem of continuous learning and adaptation to the evolving educational needs.

### 9. Characteristics of Quality Distributions from Student Perspectives:

The study highlights several critical aspects of quality distributions as perceived by student teachers:

Student teachers report feeling welcomed and valued by the school staff where they conduct their practical training. They appreciate the opportunities provided for inclusion, socialization, and collegial exchanges. The most valued aspect of their relationships with the staff is effective communication. They feel positive about their practical training; they attend willingly and view it as an opportunity to apply classroom knowledge in a real-world context.

The majority of student teachers report that the practical training offers them a chance to familiarize themselves with the profession and develops feelings of personal identification:

- *Learning through modeling is the most common type of learning reported.*
- *The practical training marks a phase of strong emotional attachment to the profession.*
- *It is considered a developmental phase both professionally and personally.*

The best place to learn is considered to be the school environment itself, as it allows student trainee to put their ideas into practice within a relevant context.

- *Student trainees are involved in various aspects of school life, especially in activities organized by the school. They express a desire to be actively involved in teaching rather than just observing.*
- *Student trainee acknowledge gaining significant teaching experiences in schools, learning from their mistakes in a supportive environment.*
- *During their practical training, student trainees find support, consultative advice, and didactic counselling, learning from both mentors and tutors.*
- *Comments about mentors reveal that student trainee value mentors as role models in terms of professional preparation and the guidance received in teaching.*

However, there are instances where mentors do not support student trainee, do not welcome them into teaching hours, and show a lack of cooperation. The three dimensions of mentor-student relationships identified are:

- *Communicative vs. Rejecting*
- *Encouraging vs. Discouraging*
- *Collaborative vs. Indifferent*

Student trainee value mentors who are communicative, particularly those who encourage them to work independently and involve them in various aspects of their work, from teaching assistance to completing documentation.

*- When given access to school resources and opportunities to teach in classrooms, student trainees report these experiences as highly beneficial.*

*- Mentors play a crucial role in monitoring and assessing in-class performance, providing feedback that is vital for student teachers' growth and development.*

This study elucidates the multifaceted nature of quality distributions in teacher education, emphasizing the importance of a supportive, communicative, and inclusive school environment that fosters both professional growth and personal development for student teachers.

### **10. Characteristics of Quality School Distributions from the Perspectives of Mentor Teachers**

This study explores the perceptions of mentor teachers regarding student distributions during their teaching practice, revealing several key insights:

- Mentor teachers observe that the practical training offers a holistic experience for student trainee, engaging them intellectually, emotionally, and personally. This immersive experience is crucial for their overall development as future educators. It is challenging to establish high-quality school distributions for a growing number of student teachers. Each year, the number of student trainee increases, and not all schools can adequately accommodate them. This strain can impact the quality of both teaching and learning.
- Despite the challenges, mentor teachers report that all student teachers are generally welcomed by the school staff. This inclusive environment is vital for fostering a positive learning and teaching experience.
- Clear and constructive feedback on performance, including areas for improvement, is consistently provided to student teachers. This feedback is essential for their professional growth and skill development.
- Increased tutor presence in observing student teachers and the necessity for regular and dedicated sessions for discussion and consultation are highlighted. Sharing experiences of teaching in practice is considered beneficial for the professional development of student teachers.
- Working with smaller groups of student teachers could allow for more effective mentoring. Mentor teachers believe that smaller groups would facilitate more personalized guidance and support, enhancing the learning outcomes.
- There is a perceived lack of guidelines regarding the development of the practical training. These guidelines should be informative and directive, assisting student teachers in their daily activities during distributions.
- The need for more flexibility and rationality in the selection of schools is emphasized. Ideally, distributions should be closer to the student trainee's residences, and the practical training hours should be completed in these schools. This logistical consideration could reduce travel burdens and increase the feasibility of completing practical training requirements.

These perceptions from mentor teachers underline the complexity of implementing high-quality practical training and suggest that improving student distributions involves addressing logistical challenges, enhancing mentorship quality, and ensuring supportive and constructive feedback mechanisms. Such improvements are crucial for preparing student teachers to meet the demands of the teaching profession effectively.

### **11. Summary and Recommendations**

The findings of this study highlight several areas where enhancements can be made to optimize the practical training experiences for student teachers:

- It is recommended to reconceptualize the serial practical training to include active observation and the role of the student as an assistant teacher. This would provide a more structured and practical learning experience, allowing student teachers to gradually take on more responsibilities.
- A detailed guide should be drafted that is not only informative but also provides clear directions for daily activities of practical training student trainee during their school distributions. This guide would serve as a crucial resource to help student teachers navigate their tasks and responsibilities effectively.
- Clear criteria should be specified for evaluating every phase of the professional practical training. This ensures transparency and uniformity in how student teachers are assessed, which is essential for their development and fair evaluation.
- Strengthening the collaboration between schools and higher education institutions (HEIs) is essential for facilitating positive and meaningful school distribution experiences. This partnership should focus on continuous improvement of practical training structures and support systems.
- Schools should be encouraged to welcome student teachers for distributions, providing them with opportunities to observe teaching and to conduct classes independently, in collaboration with qualified practicing teachers. This exposure is crucial for practical learning and confidence-building.
- School distributions provide a real-world context that enhances the capacity of student teachers to link theory with practice. The practical experience gained during these distributions is invaluable and should be maximized to benefit the student teachers.

These recommendations aim to improve the quality of practical training experiences for student teachers, ensuring that they are well-prepared to meet the challenges of their future careers in education. By implementing these changes, educational institutions can provide a more supportive and effective environment for the professional development of aspiring teachers.

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**ADVANCEMENTS IN DETECTION METHODS FOR NITROSAMINE DRUG SUBSTANCE-RELATED IMPURITIES**

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**ABSTRACT**

Nitrosamine impurities in pharmaceuticals have raised significant concerns in recent years due to their potential carcinogenicity. The urgent need for sensitive and reliable detection methods has prompted advancements in analytical techniques. This study provides an overview of recent developments in the detection of Nitrosamine Drug Substance-Related Impurities (NDSRIs).

Various analytical methods, including chromatographic techniques coupled with mass spectrometry, have been employed for NDSRI detection. Liquid Chromatography-Mass Spectrometry (LC-MS) and its tandem form LC-MS/MS have emerged as primary tools for their high sensitivity and selectivity. Recent enhancements in LC-MS/MS methodologies, such as improved instrumentation and novel ionization techniques, have significantly enhanced detection limits and analytical performance.

Moreover, innovative sample preparation techniques and data analysis algorithms have been developed to streamline the detection process and improve analytical accuracy. This study discusses the principles underlying these advancements and their applications in NDSRI detection.

Furthermore, regulatory guidelines and requirements for NDSRI detection are addressed, emphasizing the importance of method validation and compliance with regulatory standards.

By comprehensively evaluating recent advancements in NDSRI detection methods, this study aims to provide insights into the current state-of-the-art techniques and future directions for research in this critical area of pharmaceutical analysis. Effective detection methods are essential for ensuring the safety and quality of pharmaceutical products and safeguarding public health.

**Keywords:** Nitrosamines, Impurities, Detection methods, Analytical techniques, Pharmaceutical industry, Regulatory compliance

COMBINING THE PSO AND SVD METHODS IN DIGITAL WATERMARKING

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**Abstract**

Digitization has increased even more the risk of infringement of intellectual property by manipulating or duplicating the author's materials. It has also become possible to acquire them without losing the quality of the original material. For this reason, adding hidden information to images, audio, video or documents is widely used these days. This process is known as digital watermarking. There are some types of watermarks, such as visible watermark, invisible watermark, fragile and robust watermark, public watermark and frequency and spatial watermark.

There are lots of techniques that we can use to watermark information in our documents. Two of those techniques are singular value decomposition (SVD) and particle swarm optimization (PSO). In this work, our aim is to combine those techniques by using the PSO to optimize parameters such as embedding strength, while SVD decomposes matrices for robust watermark insertion.

In the embedding process our aim is that the watermarked image and the original image to be similar to each other. This pursuit of similarity seeks to minimize perceptual differences between the original image and the watermarked image. This minimization ensures us that the embedded watermark does not compromise the visual quality of the original image and makes it robust against possible attacks.

MATLAB programming language, known as MATrix LABoratory, is very suitable for working with matrices and the mentioned techniques. Therefore, here we will use this programming language for all tests and experiments.

**Keywords:** Digital Watermarking, Particle Swarm Optimization, Singular Value Decomposition, MATLAB.

**Introduction**

Fabriano was the first paper mill that introduced a watermark in its papers in 1282. These paper watermarks were created by adding a thin wire pattern to the paper mold. In these documents, watermarks provide information about the country and the people who made the paper. The term “Digital Watermarking” was firstly used by Andrew Tirkel and Charles Osborne in 1992 [1]. Around the eighteenth century, watermarks were used as a measure against the counterfeiting of currency and important documents [2]. Now that we are in the Age of Information it is very important to protect our valuables from theft. Adding hidden information to images, audio, video, or documents is widely used. This process is known as digital watermarking. The watermark can be:

- visible: those types of watermarks that are visible to the human eye.
- invisible: they usually come in the form of embedded code.
- fragile and robust: are those watermarks that are deemed fragile if the slightest modification is detectable?
- public: these types of watermarks can be modified by anyone because they are not secure
- frequency and spatial: in these types of watermarks, the images are defined as pixels.

Nowadays it is very used and some of its applications are represented in the figure 1. The general steps involved in digital watermarking are:

- i. **Choose the image where you want to add a watermark.**
- ii. **Choose a watermark:** decide what type of watermark you want to embed. It may be a text message, a logo, or a pattern. It may be an image generated in a random way.
- iii. **Preprocess the original image:** Before embedding the watermark, preprocess the original image is necessary (you can resize, normalize or color space conversion). For example, in MATLAB you can convert the original image in gray image by using rgb function.
- iv. **Embed the watermark:** Choose your own algorithm.
- v. **Postprocess the watermarked image:** to enhance its quality or make it suitable for specific applications, we may need to postprocess the watermarked image.
- vi. **Add security measures:** it may be used or not. If added, it can make encryption or scrambling techniques more difficult.
- vii. **Save or transmit the watermarked image:** it saves the watermarked image in a suitable format.
- viii. **Extract the watermark:** it is optional.

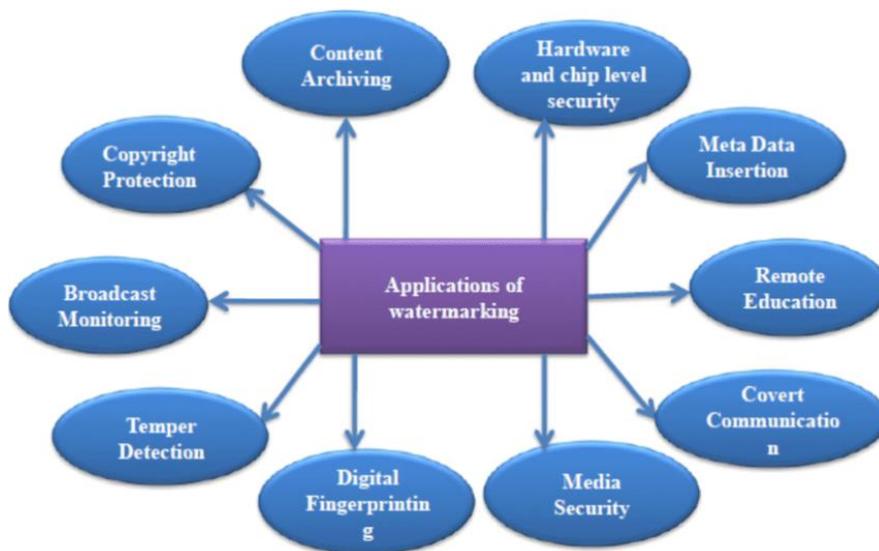


Figure 1: The applications of watermarking

## MATERIAL AND METHODS

### Singular Value Decomposition

Singular Values Decomposition (SVD) is a numerical technique used to diagonalize matrices in numerical analysis. The SVD method was introduced by Eugenio Beltrami at the end of the 19th century, but in the middle of the 20th century it was other mathematicians such as Eduard Helly, Percy John Daniell, who made this method more popular. This method is widely used in machine learning, image and signal processing and data science. In these fields, it is used for dimension and noise reduction, feature extraction etc. SVD method gained more attention in the 1960s and 1970, as computers became more powerful and efficient with numerical implementations. SVD method is utilized to represent a dataset of larger number using fewer dimensions as in possible.

This method is implemented in MATLAB programming language. So, for a given matrix we can decompose it by using the `svd()` function.

### Particle Swarm Optimization

Particle Swarm Optimization is a metaheuristic from the category of swarm intelligence algorithms. It uses many particles that form a swarm. Each particle points to a possible solution. A number of possible solutions coexist and work together at the same time.

The PSO parameters are:

- ❖  $S(n) = \{s_1, s_2, \dots, s_n\}$ : a swarm of  $n$  particles
- ❖  $s_i$ : an individual in the swarm with a position  $p_i$  and velocity  $v_i: i \in [1, n]$
- ❖  $p_i$ : the position of a particle  $s_i$
- ❖  $v_i$ : the velocity of a particle  $s_i$
- ❖  $pbest_i$ : the best solution of a particle
- ❖  $gbest$ : the best solution of the swarm (Global)
- ❖  $f$ : fitness function
- ❖  $c_1, c_2$ : acceleration constants (cognitive and social parameters)
- ❖  $r_1, r_2$ : random numbers between 0 and 1
- ❖  $t$ : the iteration numbers

The steps to implement the PSO are:

- i. Initialize the algorithm constants
- ii. Initialize the solution from the solution space (initial values for position and velocity).
- iii. Evaluate the suitability of each particle.
- iv. Update individual and global records ( $pbest$  and  $gbest$ ).
- v. Update the velocity and position of each particle.
- vi. Go to step 3 and repeat the process until the exit condition is reached.

Several steps that we have to follow in order to combine PSO and SVD are as follows:

- i. Particle Swarm Optimization (PSO): initialize a swarm of particle with positions and velocities in the solution space. The position and the velocities may be random.
- ii. Define a fitness function: this function will evaluate the quality of the solution based on criteria such as for example the similarity between the watermarked and original images.
- iii. Optimization: By using the PSO we have to update the position and velocities of particles based on their own and their neighbors' experiences.
- iv. Embedding Process: Apply SVD to the original image to decompose it into singular vectors and values.

- v. Watermark insertion: Using the SVD decomposition we have to embed the watermark. The watermark will be embedded in the singular values obtained from the decomposition.
- vi. Check the similarity: Assess the similarity between the watermarked image and the original one.
- vii. PSO & SVD: Combine the optimized parameters obtained through PSO with the SVD-based watermark insertion to achieve a balance between embedding strength, imperceptibility, and robustness.

**Fitness function**

In the previous paragraph we emphasized the steps that we have to follow in order to combine the two methods, PSO and SVD. In the second steps we said that we had to define a fitness function. This fitness function is used to evaluate the quality of the watermarked image. To evaluate it we can use different measures. Here we will represent three of them [3-4]:

- i. Mean Square Error (MSE)
- ii. Compression Ratio
- iii. Peak to Signal Noise Ratio

**MSE** is another measure of the difference between the original and watermarked image. It is calculated by taking the average of the squared differences between corresponding pixel value in the original and watermarked image. Lower value of MSE indicates better watermarked image quality.

$$MSE = \frac{1}{N} \sum_{i=1}^N (I_i - K_i)^2$$

$N \rightarrow$  is the total number of pixels in the image

$I_i \rightarrow$  is the intensity of the  $i - th$  pixel in the original image

$K_i \rightarrow$  is the intensity of the  $i - th$  pixel in the compressed image

**PSNR** is a metric that measures the quality of a compressed image by comparing it to the original image. A higher value of PSNR indicates better watermarked image quality. It is calculated using the following formula:

$$PSNR = 10 \log_{10} \left( \frac{MAX^2}{MSE} \right)$$

where:

$MAX \rightarrow$  the maximum possible pixel value of the image (often 255 for 8-bit images)

$MSE \rightarrow$  is the Mean Square Error.

PSNR metric involves the Mean Square Error. Again, we can emphasize that a lower value of MSE indicates better watermarked image quality.

**Compression Ratio** is calculated as the ratio of the size of the original image to the size of the watermarked image. A higher compression ratio indicates that the original image and the watermarked image are similar to each other.

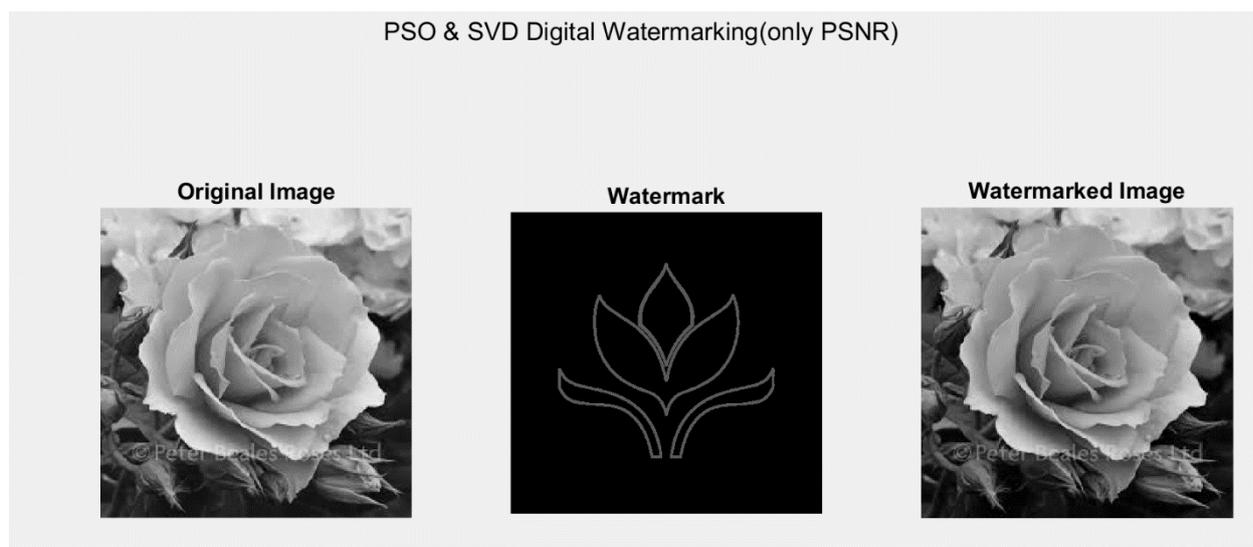
**RESULTS AND DISCUSSIONS**

Depending on the specific requirements and characteristics of our application, we can choose different measures for digital watermarking using SVD and PSO. PSNR and MSE are two measures that we can use. PSNR is mostly used when emphasizing perceptual quality. On other hand, we can use MSE if our primary concern is overall fidelity and the minimization of errors.

In PSO implementation, we can use three variations of the fitness function: only PSNR, only MSE and a combination of those measures.

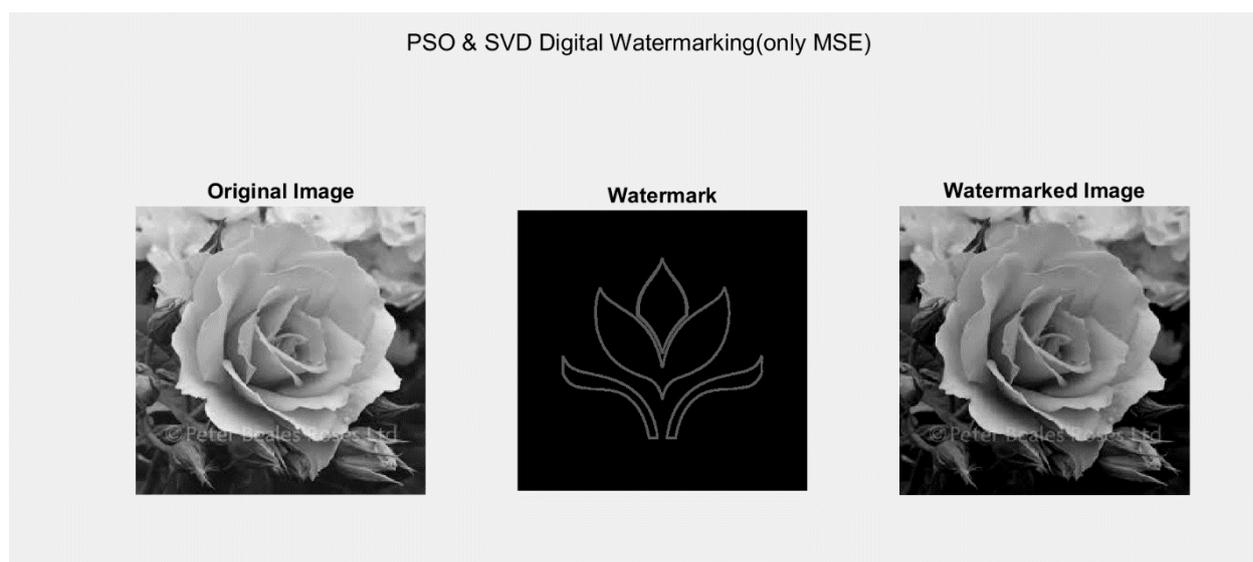
The fitness function in PSO is used as a measure of how well a particular solution performs with respect to the optimization problem at hand. The aim of PSO is to minimize or maximize this fitness function, depending on the nature of the optimization problem.

In Figure 2, we can observe the integration of our watermark into the original image. This integration is achieved by incorporating the PSNR measure into the fitness function.



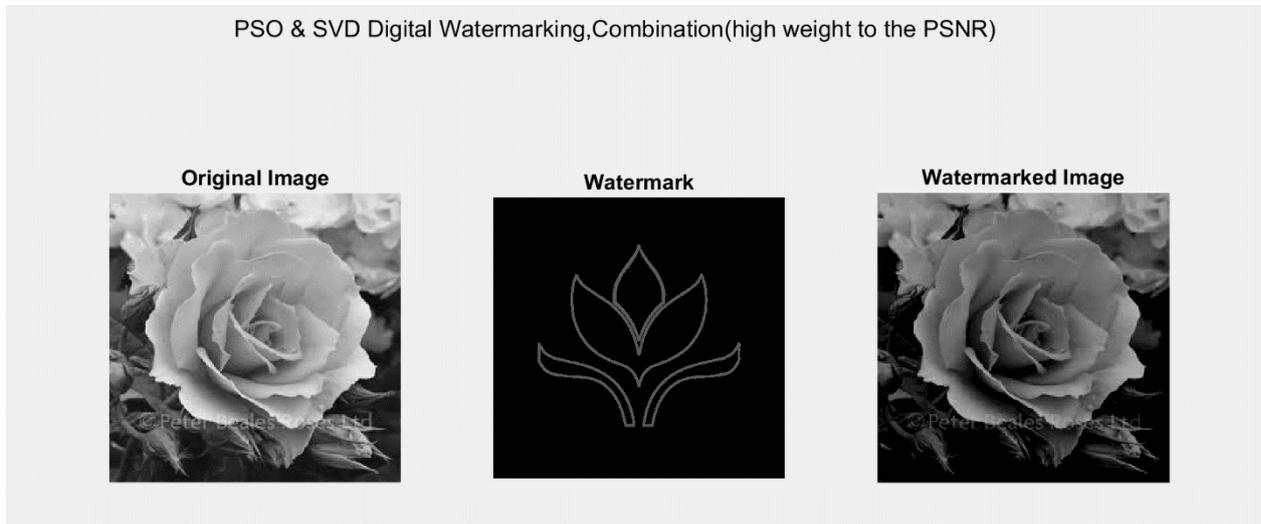
**Figure 2.** Digital Watermarking using as fitness function PSNR

In Figure 3, we can observe the integration of our watermark into the original image by incorporating the MSE measure into the fitness function.



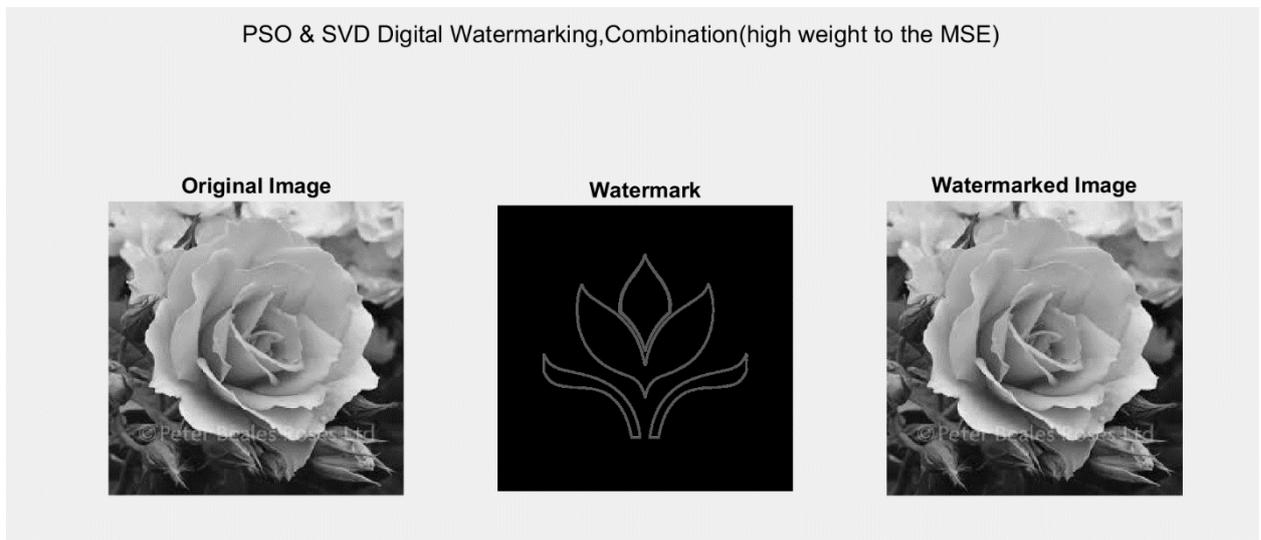
**Figure 3.** Digital Watermarking using as fitness function MSE

In Figure 4, we can observe the integration of our watermark into the original image by incorporating the MSE and PSNR measures into the fitness function. In this case, we assign a high weight to the PSNR measure.



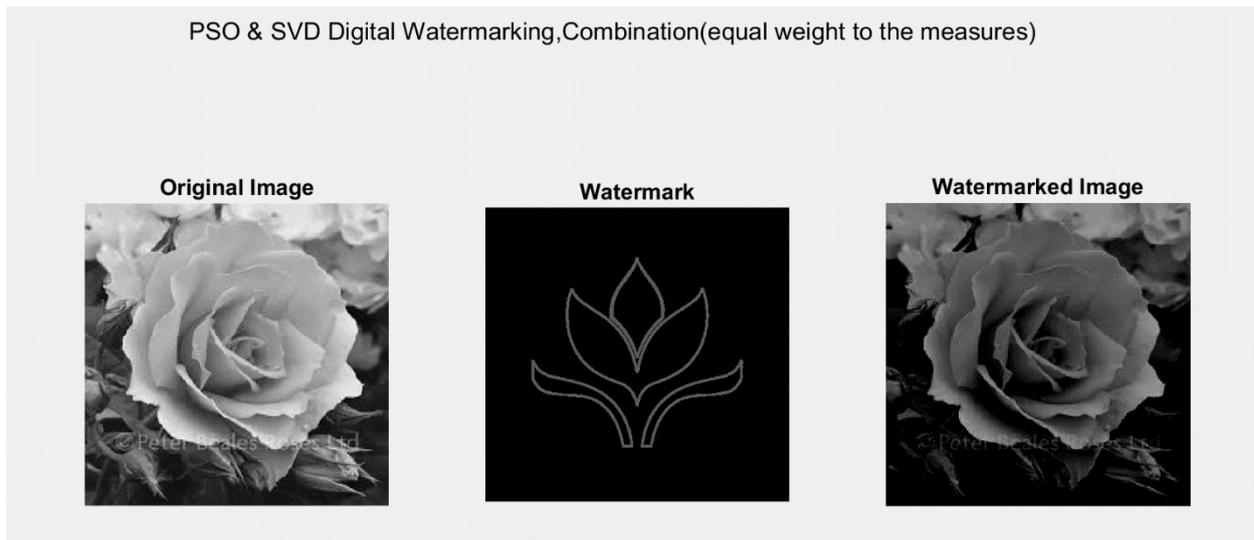
**Figure 4.** MSE and PSNR measures combination (high weight to the PSNR)

In Figure 5, we assign a high weight to the MSE measure.



**Figure 5.** MSE and PSNR measures combination (high weight to the MSE)

In Figure 6, we assign an equal weight to the measures.



**Figure 6.** MSE and PSNR measures combination (equal weight to the measures)

From all approaches, we can notice that when we use only MSE or only PSNR as fitness function our watermark is not very visible. When we combine those measures, MSE and PSNR, we can notice that our watermark becomes more visible especially when we assign the same weight to these measures.

## CONCLUSIONS

In these days when data protection is a challenge for everyone, the use of digital watermarking is becoming increasingly necessary. The combination of PSO and SVD offers us a promising approach in the field of digital watermarking. In the watermark embedding, we can use SVD method to transform the watermark and after that we can use PSO to search the optimal location for embedding the watermark into the original image based on certain criteria. As a certain criteria, we can use some measures such as Mean Square Error, Peak to Signal Noise Ratio and Compression Ratio. Also, we can make a combination of those measures. This hybrid technique may enhance the robustness, security, and perceptual quality of digital watermarking system.

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**IMPLEMENTATION OF THE RAMSEY-CASS-KOOPMANS (RCK) MODEL TO  
UNDERSTAND THE ECONOMIC GROWTH OF ALBANIA**

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**ABSTRACT**

As technology improves, it is important to understand its impact on economic development. The Ramsey-Cass-Koopmans (RCK) model helps us study a country's economic growth by incorporating the role of saving, investment, and human capital accumulation in productivity growth and innovation. Unlike the previous model, the RCK model does not treat technological progress as an external factor in economic growth. For instance, the Solow growth model assumes that the labor force and technology progress at a constant rate of  $n$  and  $g$ , respectively. Additionally, the model assumes that income savings are invested in new capital and that the rate of capital accumulation is a function of depreciation and savings. In the RCK model, technological progress is determined by economic factors such as savings, investment, and human capital accumulation.

The calculation of the labor force takes into account mortality and fertility rates.

Additionally, this model considers the role of savings rates in capital accumulation and economic growth.

Our study focuses on analyzing economic growth in Albania. The implementation of this model will utilize the programming languages MATLAB and Python.

**Keywords:** Ramsey-Cass-Koopmans, Economic growth, Investment, Albania, MATLAB, Python.

**INTRODUCTION**

Since the fall of communism in the early 1990s, Albania has passed through a significant economic transformation. The transition from a centrally planned to a market-oriented economy has brought about dynamic changes. This change was accompanied by challenges and opportunities for sustainable economic growth. To help policy makers, economists or investors make the right decisions, we will use the Ramsey Cass Koopman model to see how the economic situation in Albania is. This model incorporates dynamic equations supervising capital accumulation and consumption. Differential equations are employed to describe the evolution of capital stock and consumption over time, by explaining the economy's growth path and equilibrium dynamics. Also, by exploring the factors which influence the saving rates, capital formation, and the efficiency of resource allocation, we can analyze the investment climate in Albania. Through this model we try to answer some question like:

- What is the role of human capital, technological innovation in the economic growth?
- How do savings and investment decisions shape the country's capital accumulation trajectory?

- How can policy interventions be implemented to encourage sustainable and inclusive economic development in Albania?

By applying the RCK model to Albania data, we aim to shed light on the:

- country's economic trajectory
- the main determinants of economic growth (or economic decline)

This model is easily implementable in a different programming language, but we have chosen to work in Python programming language.

## METHODS

### Ramsey-Cass-Koopman

Ramsey-Cass-Koopman (RCK) model is one of the neoclassical models of economic growth. It differs from Solow Growth model because here the savings rate may be not constant along the transition to the long run steady state. This model was introduced by Frank Ramsey, which was a British economist and mathematician. In 1928, he published a seminal paper "A Mathematical Theory of Saving", which laid the groundwork for dynamic economic modeling and optimal growth theory. His work was focused on the intertemporal decision-making and the implications of consumption and savings decisions over time. The Ramseys work was expanded by David Cass and Tjalling Koopmans. David Cass, an American economist, focused his work in formalizing the dynamic optimization problem of capital accumulation and consumption smoothing. In 1965, he published the paper "Optimum Growth in an Aggregative Model of Capital Accumulation". Tjalling Koopmans, a Dutch-American economist, underlined the role that economic equilibrium has in understanding long term economic growth. With economic equilibrium here we mean steady state where main economic variable (capital accumulation, consumption etc.) stabilize over time.

### Mathematic behind the Ramsey-Cass-Koopman

We said in the previous paragraph, that RCK model aims to analyze intertemporal decision-making and capital accumulation. To achieve this goal, this model involves dynamic optimization techniques and differential equations. So, in this model the key mathematical concepts are:

#### ➤ Dynamic optimization

Here we have to formulate an optimization problem where the objective function represents the agent's utility, and the set of the constraints represents the resource and technology constraints. By optimizing the objective function subject to these constraints, interested parts can derive the optimal path of consumption and investment over time. In a few words, here we aim to solve the intertemporal utility maximization problem inherent in the RCK model. Mathematically it is represented as:

$$\max_{c(t), K(t)} \int_0^{\infty} e^{-pt} (U(c(t))) dt$$

where:

- $c(t)$  is the consumption at time  $t$
- $K(t)$  is capital at time  $t$
- $U(c(t))$  is the utility function representing the agent's preferences
- $p$  is the discount rate. A high value reflects high impatience.

This problem is known as social planner, which is a constrained optimization problem which attempts to maximize some notion of social welfare. Social welfare is a function that ranks a set of social states by their desirability.

#### ➤ Differential equations and production function

A production function helps to represent the relationship between inputs and output in an economy. The inputs are for example capital, labor etc. and the output are good or services. In a few words, the production function describes how much output can be produced from various combinations of input. This function in its general form is represented as:

$$Y = F(K, L)$$

where:

- $Y$  is the level of output produced
- $K$  is the quantity of capital input
- $L$  is the labor force
- $F(\cdot)$  is the production function.

There are some types of production functions such as:

- ❖ Cobb-Douglas Production Function
- ❖ CES Production Function
- ❖ Translog Production Function

Between those three functions, the Cobb-Douglas Production Function, is the most widely used because of its simplicity and tractability. This function is defined as:

$$Y = AK^\alpha L^{1-\alpha}$$

where:

- $A$  is the total factor productivity
- $\alpha$  is the output elasticity of capital

After defining what kind of production function, we will use know we can write the capital accumulation equation and the consumption dynamics. The capital accumulation equation is used to calculate the rate of change of the capital stock ( $K$ ) over time ( $t$ ). It is defined as follows:

$$\dot{K}(t) = \frac{dK}{dt} = sY(t) - \delta K(t)$$

where:

- $\dot{K}(t)$  is the rate of change of capital stock
- $s$  is the savings rate
- $Y(t)$  is the output at time  $t$ .
- $\delta$  is the depreciation rate of capital

The in RCK model we have the following equation:

$$\frac{dC(t)}{dt} = \frac{dU}{dC} \cdot (r(t) - p)$$

that describes the rate of change of consumption ( $C$ ) over time ( $t$ ). In this equation:

- $\frac{dC(t)}{dt}$  is the rate of change of consumption
- $\frac{dU}{dC}$  is the marginal utility of consumption
- $r(t)$  is the interest rate at time  $t$
- $p$  is the rate of time preference.

## RESULTS AND DISCUSSIONS

To implement the Ramsey Cass Koopman model to analyze the economic situation of Albania we have taken the following parameters from the Albanian Institute of Statistics, The Bank of Albania and another public sources[9,10,11]:

- saving rate
- depreciation rate
- consumption
- GDP
- investment
- population growth

For consumption, GDP, investment and population growth, we have taken data from 1997 to 2022 (yearly data). In the Table 1, we can see a part of this database.

Table 1, Albanian data from 1997 to 2022

Data	Consumption	GDP	Investment	Population Growth
1997	-17.5	-10.9	2.1	-0.6
1998	-5.7	8.8	1.8	-0.6
1999	2.6	12.9	1.3	-0.6
2000	4.4	6.9	4.1	-0.6
2001	4.6	8.3	5.3	-0.9
2017	2.5	3.8	7.9	-0.1
2018	2.9	4.0	7.9	-0.2
2019	3.3	2.1	7.8	-0.4
2020	-2.8	-3.3	7.1	-0.6
2021	5.1	8.9	6.8	-0.9
2022	5.5	4.9	7.6	-1.2
2018	2.9	4.0	7.9	-0.2

From 1997 to 1999, it can be observed that GDP and Consumption have increased drastically. We know that this period has been a transitional period for Albania as we moved from a centralized economy to a free market economy. The same trend is with investments, especially they have increased after 2006.

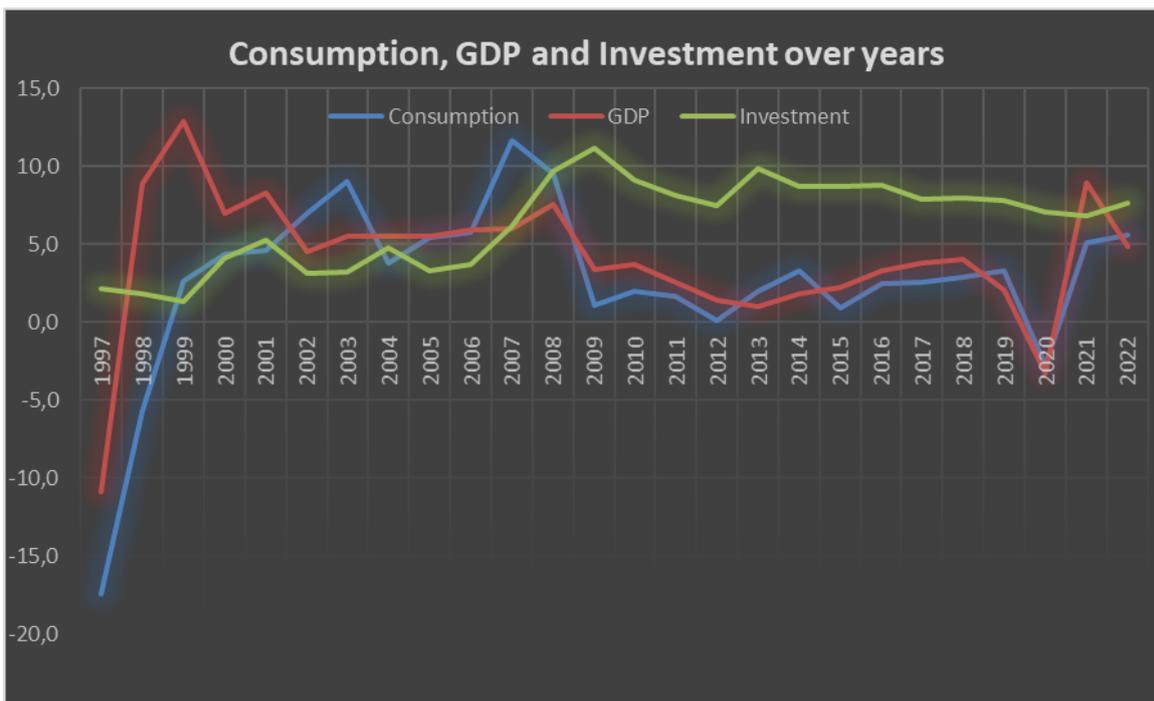


Figure 1. GDP, Consumption and Investment over the years.

By implementing the Ramsey Cass Koopman model using those data we can see that GDP, Consumption and Capital will increase over time. Especially, in GDP and Consumption we can see a rapid growth in the first 3 years. Then the growth is smaller. While for capital, we see that we have a continuous growth. We can expect this because we said before that the investment have been increased over time. Increased investment leads to capital accumulation, fueling economic growth.

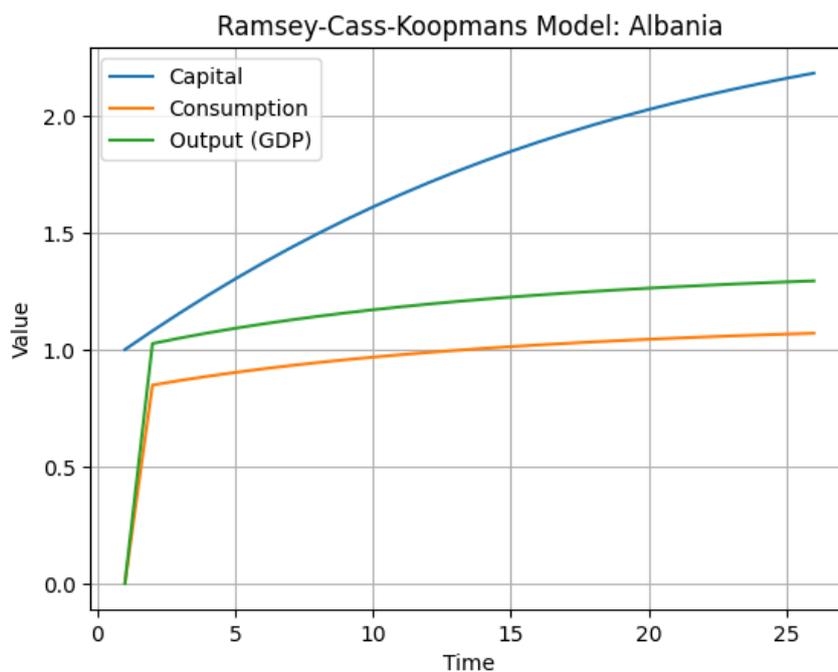


Figure 2. Ramsey-Cass- Koopman Model

## CONCLUSION

In conclusion, Ramsey Cass Koopman, which is a model introduced by Frank Ramsey and extended by David Cass and Tallying Koopmans, aims to to analyze intertemporal decision-making and capital accumulation. In this model we use dynamic optimization, differential equations and production function. As production function, we can use Cobb-Douglas Production Function, CES Production Function or translog Production Function. The Ramsey Cass Koopman model not only helps to understand historical trend but also helps policy makers to take measures to have a sustainable economic situation.

This model is used to analyze the complex dynamic of economic growth, incorporating essential factors that effect the economic growth of a country. We have used saving rate, depreciation rate, consumption, GDP, investment, population growth to see the evolution of Albania economy. We observed that GDP and consumption growth was rapid in the first three years while capital growth was steady. The rapid GDP and consumption growth underscored a period of economic expansion, while steady capital growth demonstrated sustained investment in productive assets.

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THE ROLE OF MODERN TECHNOLOGIES IN THE DEVELOPMENT OF SCIENCE

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**ABSTRACT**

The rapid development of information and communication technologies significantly accelerates the development of society, increasing the role and importance of information and knowledge. At the same time, it turns knowledge into a direct creative force, expands and enriches information exchange channels, the article examines the stages and models of scientific communications, the type of interaction and communication between scientific communications and scientists. The article touched upon the issues of implementing the transition of its communication to multimedia and the formation of modern models of scientific interaction.

This, in turn, makes the topic very **relevant** for today.

The current state of information technology in the development of science is a necessary condition for the transition of society to information civilization. Modern technologies and telecommunications make it possible to change the essence of both the conduct of scientific research and the organization of the educational process, completely involve the researcher in the information and scientific environment, improve the quality of research, stimulate the processes of perception of information and assimilation of knowledge. New information technologies create an environment for computer and telecommunication support for the organization and management of the process in various fields of activity, including science and education.

Integration of information technologies into the conduct of scientific research is carried out at all levels: publication of articles, preparation of books and monographs, implementation of scientific conferences in remote mode, etc.

Therefore, in modern times, information technology is becoming an integral part of the content of science, a means of optimizing and increasing the efficiency of the research process, and also contributes to the implementation of many principles of the development of science.

Thus, successful scientific communication today largely depends on the level of information culture of scientists, researchers, teachers and students and their ability to use the latest information and communication technologies.

**Keywords:** science, knowledge, progress, ICT, global informatization, information resources

**INTRODUCTION**

In modern times, the study of the essence of science, its humanistic, ideological, methodological foundations, ways of development and functioning in various social systems, the problems of its influence on public consciousness and the fate of mankind is of great relevance. And this is primarily

due to the rapid transformation of science into a direct production power, the scientific and technological revolution, which led to an increase in its impact on social life and nature as a result of globalization. It is no secret that today science is experiencing the highest stage in the history of its development for the time being. This historical stage is characterized by the penetration of science into the micro-and macro-world, into the deep foundations of nature and human life. Science and technology are increasingly becoming the foundation of modern civilization. It is from this point of view that it is not so easy to give a single definition of science.

Summing up, it can be noted that science is a type of activity of man aimed at obtaining, refining and disseminating objective, systematic and justified knowledge about nature, society and human thinking.

The basis of this activity is the collection of scientific facts, their constant updating and systematization, critical analysis and, on this basis, the accumulation of scientific knowledge. In general, there are three main concepts of science: science as knowledge, science as activity, and science as a social institution. And modern science has become a single system that combines these three points.

### *The interaction of science and technology.*

Scientific information obtained as a result of scientific knowledge plays an important role in the development of modern society. Of course, for the development of science, its acquisition, dissemination and use are important. Scientific information is distributed in time and space by certain channels, means, methods. Scientific communication occupies a special place in this system.

As you know, science is an important tool for social transformation, ensuring the values and vitality of the whole society. The country can rise to the level of world progress only by relying on science, education, technology and innovation. Therefore, the scientist, researcher, specialist needs powerful information resources, scientific periodicals, scientific literature, databases, etc. through it, fast and convenient access to world scientific data is needed. In the development of science, information resources increase functional properties, as well as strengthen information processing capabilities, making it possible to develop more complex and information-intensive programs. It is from this point of view that, looking at some of the advantages that information resources can provide in the development of science, it becomes clear that since science has the ability to identify specific types of information, information resources are used to identify and process these specific types of information. For example, each individual can create an individual data type from the API (Application Programming Interface) to represent the data received from the Application Programming Interface and has the ability to use information resources to manipulate that data. Science, on the other hand, does not support asynchronous operations to receive and process information from external sources.

However, data sources enable science programs to interact more effectively with external sources by providing asynchronous information processing capabilities. In addition to being useful in scenarios such as sharing information, reducing response waiting times or updating data in the background, This Information Resource Science in error management supports the improvement of programs. It is from this point of view that information resources facilitate many times such operations as obtaining, questioning, changing information in order to achieve an effective solution to scientific problems. For example, nowadays there are more and more opportunities to access electronic resources with the help of translation programs in order to query information from an information source and get the results we want.

The issue of scientific communication, communication of scientists during their activities has been one of the main problems in research carried out in the scientific framework of science since the middle of the twentieth century. The main goal of science, as you know, is to obtain new real scientific knowledge, and scientific communication is one of the conditions for creating such new knowledge. Prominent historian of science C.Bernal noted that: "*Science is not the subject of pure thinking, but a subject of thinking that is constantly involved in practice and is constantly reinforced by experience.*" [1. 26]

The process of scientific knowledge is not least determined by the methods and forms of scientific communication. Therefore, the emergence of new methods and forms of scientific communication qualitatively changes the process of scientific knowledge itself. According to the idea of the American philosopher, one of the leading experts in the philosophy of artificial intelligence, John Rogers Serley, the unit of communication should be considered not a sentence or statement, but an actual act of speech in which intentions are expressed. According to this concept, in communication, the means of the language code are considered not as a set of universal meanings, but as a field of activity in everyday practice, in which people influence the behavior, thoughts and emotions of others.

There are two stages of scientific communication. At the first, internal stage, the subjects of communication are scientists who communicate within the scientific community. When scientific knowledge has already been acquired, the time has come for the second stage - external communication. Here the introduction of scientific knowledge into mass consciousness takes place, that is, the popularization of science. The rapid development of Information Technology, which creates unique opportunities in the dissemination of scientific information, plays a huge role in the development of science as a social institution, which today actualizes the issue of studying the model of scientific communications in the XXI century.

Speaking about the model of scientific communications in the XXI century, of course, one cannot but take into account the rapid development of the latest information technologies, which create unique opportunities in the dissemination of scientific information, and sometimes change the essence of scientific communication. Since scientific communication is a type of interaction and communication between scientists, it can be considered one of the factors that condition the process of scientific knowledge. In the process of scientific communication between scientists, not only the movement of information occurs, but also certain social relations are established.

P.Hills model of scientific communication has 6 components: scientist as a producer and consumer of scientific information; science society; publisher; information product; library worker; new communication technologies. In this model, the process of scientific communication is an integral and complex interaction of all these components. The scientist both produces and uses scientific information; the scientific community provides structure, brings scientists together, and promotes the dissemination of information and effective communication; the publisher is the distributing agent. [2, 101]

Currently, the world is experiencing a new stage in the development of mankind - global informatization is taking place, information activity is becoming a leading factor in the socio-cultural and social development of mankind, and new information technologies are considered as a modern universal and multifunctional tool for the development of scientific communications.

It is difficult to imagine the modern world without highly developed communication technologies, with which we receive operational information, including scientific information, every day. Scientific communications are a complex, multilevel dynamic system, where the totality of connections is constantly changing and transforming. Scientific communication, the essence of which is the exchange of information, also forms the basis of the professional activity of scientists.

In general, in the modern information and communication space, any communication, including scientific ones, acquires a number of new features. This is explained by the fact that the interaction of the subjects of network communication reflects the new quality of information, subject-object relations due to the specific functions of social networks [3, 211]. Communication is adequate when it conveys the information people need in a form they can use. To achieve this goal, the collaboration of scientists with experience in communication processes with scientists who have knowledge of the subject, as well as practitioners who are able to manage this process, is needed.

At the same time, it is very important that scientists and researchers are closely acquainted with new scientific works and studies of other world scientists. All this leads to the creation of national scientific information systems in each country. Scientific information systems should be able to provide the following services to researchers who turn to them:

- scientific and technical literature, data, computer programs, etc. search and acquire,;

- to learn about the latest scientific and technological achievements;
- data processing and calculations;
- use of information systems for teaching and learning;
- development of individual professionalism, establishment of scientific and business relations. [4, 21]

According to the idea of the American philosopher, one of the leading experts in the philosophy of artificial intelligence, John Rogers Serley, the unit of communication should be considered not a sentence or statement, but an actual act of speech in which intentions are expressed. According to this concept, in communication, the means of the language code are considered not as a set of universal meanings, but as a field of activity in everyday practice, in which people influence the behavior, thoughts and emotions of others.

According to the German sociologist Niklas Luhman, the creator of the original theory of society, "what always happens in society is communication." Thus, Luhmann points out that communication does not mean the actions of the individual, but what makes up society. It is communication that creates and maintains the boundaries of society. In general, Luhmann distinguishes three types of systems: social, physical and organic. For Luhmann, the social system is a set of simplifying functions that determine the consequences of events, the expression of social actions and the course of social interaction. Social systems must be for the function of "creating, processing and reducing complexity, making the world in accordance with the needs of man in at least a minimum order " [5, 90] so that man can control it and act in a planned manner.

There are two stages of scientific communication. At the first, internal stage, the subjects of communication are scientists who communicate within the scientific community. When scientific knowledge has already been acquired, the time comes for the second stage - the occurrence of external communication. The rapid development of Information Technology, which creates unique opportunities in the dissemination of scientific information, plays a huge role in the development of science as a social institution, which today actualizes the issue of studying the model of scientific communications in the XXI century.

### RESULT

The main task of modern scientific technologies is the introduction of innovative, efficient solutions in the development of all spheres of human activity, from the everyday life of everyone to industrial production, the agrarian sector and business promotion. In modern scientific technologies, special attention is paid, of course, to information and telecommunication systems that can be applied in human activities, to the creation of new materials. Today, both in society and in the structure of the restructuring of science and education, rapid transformation processes are taking place, which are formed against the background of the growing role of technological innovations in scientific activity. The multiplicity of ideas and approaches to the organization of scientific and practical activities, the identification of possible scenarios for overcoming crisis situations, global problems of mankind require a solution to the problem of successful rational foundations.

Since science is a communicative phenomenon by its nature, its vital activity provides for the exchange of scientific information by scientific universities and academic communities, in scientific publications, conferences, symposia, and during personal communication of scientists. And in order to comprehend new horizons of thinking and scientific activity, to achieve formalization, legalization and dissemination of scientific knowledge, to develop worldview, value, methodological guidelines, the use of modern Information Technologies is extremely important.

The current state of Information Technology in the development of science is a necessary condition for the transition of society to information civilization. Modern technologies and telecommunications make it possible to change the essence of both the conduct of scientific research and the organization of the educational process, completely involve the researcher in the information and scientific

environment, improve the quality of research, stimulate the processes of perception of information and assimilation of knowledge. New information technologies create an environment for computer and telecommunication support for the organization and management of the process in various fields of activity, including science and education. Integration of information technologies into the conduct of scientific research is carried out at all levels: publication of articles, preparation of books and monographs, implementation of scientific conferences in remote mode, etc.

Therefore, in modern times, Information Technology is becoming an integral part of the content of science, a means of optimizing and increasing the efficiency of the research process, and also contributes to the implementation of many principles of the development of science.

Thus, successful scientific communication today largely depends on the level of information culture of scientists, researchers, teachers and students and their ability to use the latest information and communication technologies.

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GENDER COMPARISON FOR MOTOR COORDINATION IN 1<sup>ST</sup> AND 2<sup>ND</sup> GRADE  
ELEMENTARY SCHOOL CHILDREN

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**Abstract**

A specific model that is continuous and constant throughout the early years of development promotes the development of motor abilities from infancy through elementary school. Main objective of this study was to assess first- and second-grade elementary school students' gross motor coordination while they were engaged in after-school activities. Ten elementary schools in Tirana were used for the study, and 214 children, aged 6-8 years old, were randomly selected from each school—103 boys and 111 girls. We have used KTK battery in order to assess gross motor coordination including tests; Jumping Sideways; Walking backwards; Hopping for Height; Moving Sideways. We used SPSS Statistics 27, T-test. Results showed a significant difference between boys and girls in the “Jumping Sideways” test ( $t=2.855$ ,  $p<.05$ ). On the other side, in the “Walking Backward” test there was no significant difference between boys and girls ( $t= -1.204$ ,  $p>0.05$ ). Nonetheless, there was a significant difference between boys and girls in the “Hooping Height” test ( $t=2.113$ ,  $p<.05$ ). In addition, there was significant difference between boys and girls in the Moving Sideways test ( $t=2.209$ ,  $p<.05$ ). The results showed improved coordination skills, power and speed, in the lower limbs. It was not noticed any increase in balance skills test results, both in boys and girls. We concluded that PE teacher should be more focused in balance training, because this ability needs special exercises to be developed.

**Key words:** KTK, coordination, speed, balance, power, Lower Limbs, Afterschool activities.

**Introduction**

Children's development depends on a normal coordination level for both their academic and general health (Vandorpe et al. 2011). In addition to having a detrimental effect on body weight, sedentary lifestyles also cause children to do less well physically. Many kids often avoid physical activity in their daily lives, which puts their health at danger and encourages an inactive lifestyle. Research on motor abilities has revealed that, independent of gender, obese children have worse motor skill values (Dhondt et al., 2009). According to Bar-Haim & Bart (2006), kids with worse motor skills are typically less active in games, friendships, and athletic parks. Owing to a paucity of research on obesity and motor abilities in children under the age of nine (Dhondt et al., 2009), the results for general motor skills are inconsistent. A study on children's motor and coordination skills found that when parents engaged in games with their kids, paying attention to what the kids were doing, and focusing on the object or game themselves, the games became more sophisticated and intellectually stimulating (Bigelow et al., 2004). Research indicates that throughout the early years of a child's development, games and motor skills have an important role in fostering relationships.

**Objectives**

The main objective of this study was to evaluate gross motor coordination in 1<sup>st</sup> and 2<sup>nd</sup> grade elementary school children participating in after-school activities.

## Methodology

From a total of 214 children (103 boys and 111 girls aged 6-8), in the academic school year 2022-2023, from 10 elementary schools of Tirana city Municipality were randomly selected from each school took part in this study. Children and they participated in after school physical activities.

We have used KTK battery in order to asses ross motor coordination (Kiphard and Schilling, 1974, 2007). This battery is used to measure gross motor coordination and has 4 tests.

**Jumping Sideways (Lateral jumping test)** was used to measure coordination and speed in lower limbs where children are asked to jump laterally in two squared spaces (60 cm, 4 cm, 2 cm) as many times as possible along one time 15 seconds.

**Walking backwards, (Balance beam test)**, was used to assess active balance, where the children are asked to walk along of a gymnastics balance beam and maintain balance while walking along. This test is repeated three times and the beams have different width 6.0 cm, 4.5 cm, and 3.0 cm, and where the score for each trial is the average of test overall score

**Hopping for Height (Jumping one leg test)**, was used to asses power of the lower limbs, where children are asked to jump with one leg over an increasing pile of pillows which goes up to 12 level (5cm X 12). The maximum jump performed by each child with both right and left leg is recorded.

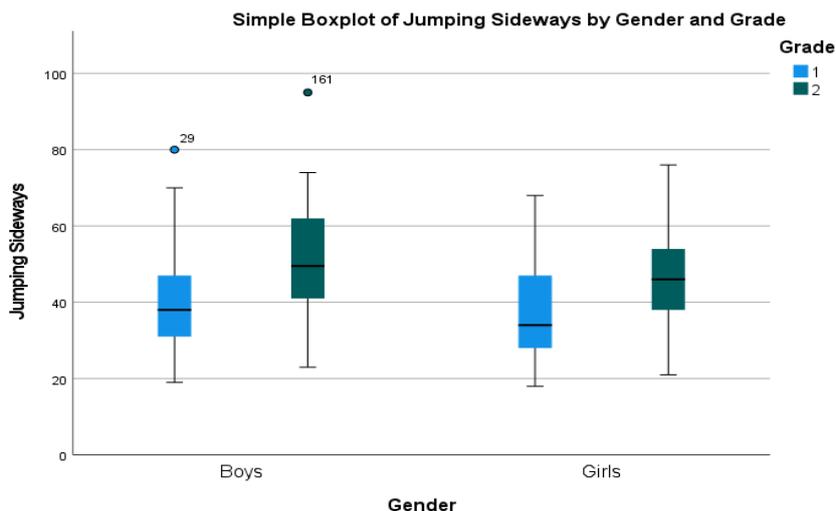
**Moving Sideway (Plate movement test)**, was used to asses coordination of lower limbs where children are asked to move / shift while walking over the two plates laterally as many times as possible. The overall test should be scored over a period of 20 seconds. The children are encouraged to move as much as possible over this period of time, without touching the feet on the floor. To asses this test the number of the moves children do on the plate in 20 second are recorded.

## Statistical analysis

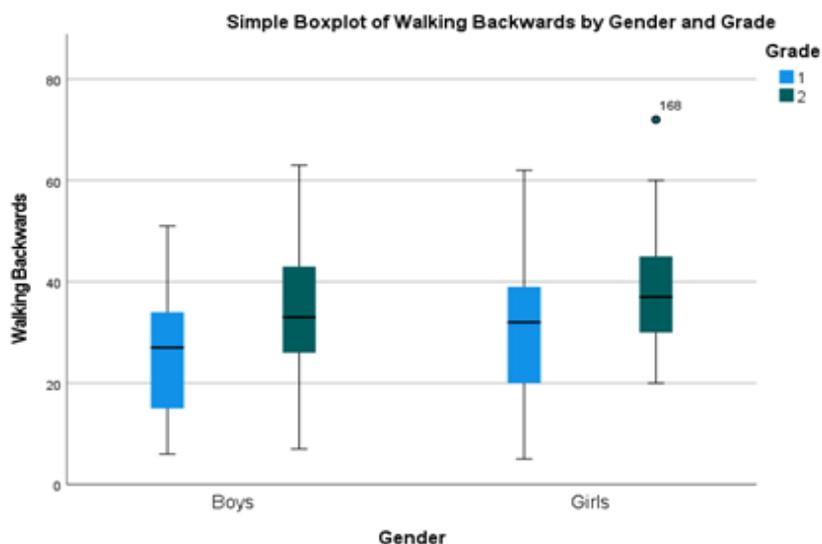
Statistical Analysis was conducted using SPSS Statistics 27. Descriptive statistics was applied and T-test was used to see if there were statistically significant differences between the results of four tests in terms of gender.

## Results

In the Fig.1 we have showed Boxplot with results on Jumping Sideways (lateral jumping) where 214 children were measured and the mean values of first grade boys is 40 jumps while for girls is 37 jumps and in second grade boys performed 51 jumps and girls 46 jumps.

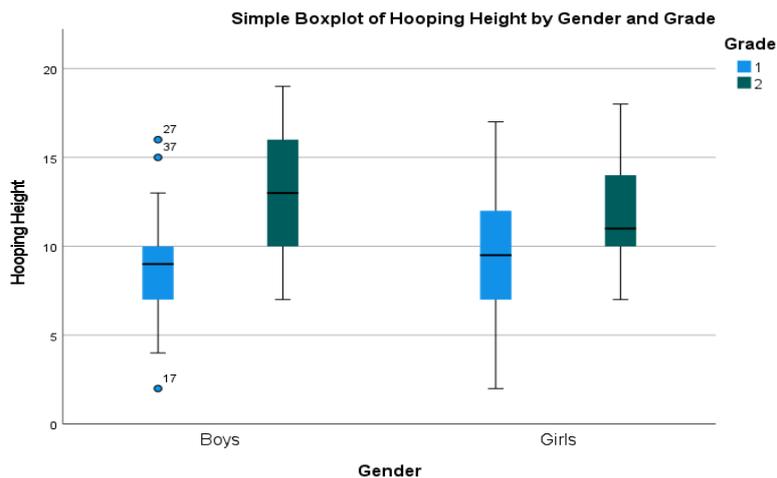


**Figure 1:** Boxplot of Jumping sideways by gender and grade



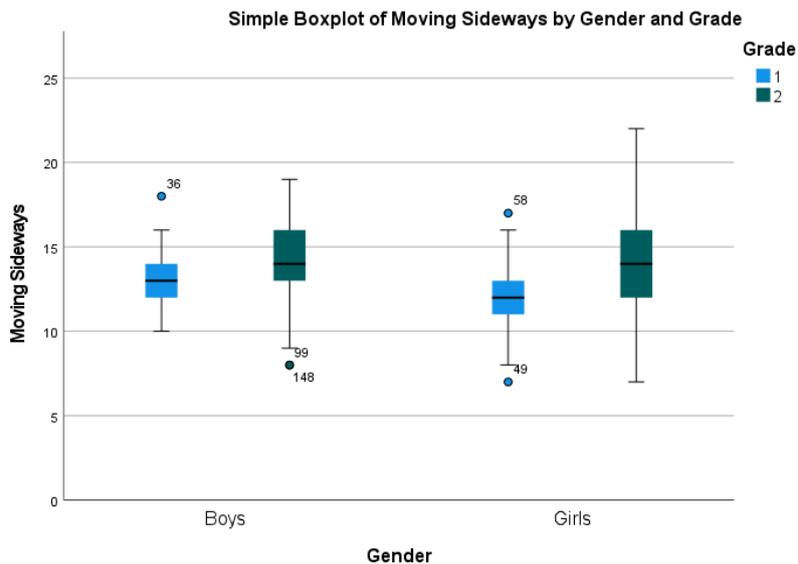
**Figure 2:** Boxplot of walking backwards by gender and grade

In the Fig.2 we can observe that the mean of walking backward for first grade boys is lower than that for second grade (25 vs 34), while in girls seems to be higher for second grade compared to first grade girls (37 vs. 29).



**Figure 3:** Boxplot of hopping height by gender and grade

In the Fig.3 Boxplot of hopping for height the mean test score for second grade boys is higher than that for first grade boys (13 vs 8). Similarly, the mean of second year girls in performing hopping for height test score for second grade was higher than that of the first grade girls (11 vs 9).



**Figure 4:** Boxplot of moving sideways by gender and grade

In the Fig.4 we have showed Boxplot with results on moving Sideways were the mean values of first grade boys is 13 moves for boys and 11 for girls, while in second grade boys performed 13 moves vs 14 moves girls of 2<sup>nd</sup> grade.

**Table 1:** T-test of differences in the tests scores by gender

Test		N	Mean	Standard deviation	t	p
Jumping_Sideways	Boys	103	47.21	14.907	2.855	.005
	Girls	111	41.77	12.949		
Walking_Backwards	Boys	103	31.61	12.972	-1.204	.230
	Girls	111	33.77	13.167		
Hooping_Height	Boys	103	11.57	3.743	2.113	.036
	Girls	111	10.56	3.277		
Moving_Sideways	Boys	103	13.70	2.400	2.209	.028
	Girls	111	12.94	2.629		

We have used T-test in order to see if we have statistically significant differences between the test results in terms of gender. From the table above we see that 3 variables have significant differences at the 5% level of significance according to gender. There is a significant difference between boys and girls in the Jumping Sideways test ( $t=2.855$ ,  $p<.05$ ). The average of the results of this test for boys is higher than the average for girls. While for the Walking Backward test, no significant difference is observed between boys and girls ( $t=-1.204$ ,  $p>0.05$ ). There is a significant difference between boys and girls in the Hooping Height test ( $t=2.113$ ,  $p<.05$ ). The average of the results of this test for boys is higher than the average for girls. Also, there is a significant difference between boys and girls in the Moving Sideways test ( $t=2.209$ ,  $p<.05$ ). The average of the results of this test for boys is higher than the average for girls.

**Discussion and Conclusions**

The KTK, or "Körperkoordinations Test für Kinder," is a qualitative tool developed by Kiphard and Schilling (2007) that is used to assess children's overall motor coordination skills in both normal and deficient motor coordination situations. This information aids physical education teachers in identifying students who may have issues with their motor coordination. Physical education teachers employed this tool in a practical and straightforward manner to assess children's total motor coordination. Jumping sideways is a component of the KTK coordination exam, which is appropriate for kids ages 5 to 14. It was intended to assess children's momentary coordination. In Germany, schoolchildren are tested using the well-documented KTK test as well as the hopping sideways method (Graf et al., 2004). Vandorpe et al. (2011) found that performance in all four tests improved considerably with age, and their follow-up analysis revealed that all age groups outperformed the one-year younger age group. These findings are consistent with our own research. When it came to walking backwards and hopping on one leg, girls performed better than guys. When it comes to gender-specific differences, the findings from both the aforementioned study and our own on the development patterns represented by hopping on one leg and walking backwards match with each other. Upon comparing the present study's data with those of Belgian (Vandorpe et al., 2011) and German (Kiphard and Schilling, 2007) children, it was observed that Portuguese boys and girls performed worse on the T-test in terms of sideways jumping and hopping on one leg than their Belgian counterparts. However, the results of the balance test showed the opposite pattern. The Portuguese boys outperformed their Belgian counterparts in the plate movement test at ages 6, 8, 9, and 10, but the females did worse. When one sample t-tests were performed using the German mean as the reference value, a similar pattern was noted. In the balancing test, Portuguese youngsters performed considerably worse than the German group in the areas of sideways leaping, hopping on one leg, and plate movement. Furthermore, children who exercise more have a greater degree of motor coordination (Graf et al., 2004). Playing sports is a great approach to help kids develop their fundamental motor skills and boost their physical activity levels. Sport involvement also has a strong

correlation with good gross motor coordination (Vandorpe et al., 2012), and it has a significant impact on children's gross motor coordination in the future (D'Hondt et al., 2013). The gradual improvement in performance on the test of general motor coordination is not surprising, as it is a common phenomenon that is known to improve with age up to adolescence in terms of the achieved level of performance of several fundamental motor skills, strength, and performance (D'Hondt et al., 2011; Vandorpe et al., 2011). It is important to note that there are inconsistencies with relation to gender disparities. Boys and girls in the kid observation group by Kiphard and Schilling did not differ in their ability to walk sideways or backwards. These results support the research findings on walking backwards, but not the sideways test results. The end findings of the primary school children's one-year motor skill monitoring program paint a vivid picture of the development of these abilities over the course of a school year. The outcomes show increased explosive power and coordination abilities that engage the large muscles, sometimes referred to as gross skills. There is no discernible improvement in the upper limbs' fine coordination abilities. Based on the data collected for this monitoring project, we can conclude that physical education instructors, not general teachers, should put in more professional effort and intervene in the classroom. The assessments, or tests, do not demonstrate an improvement in those motor abilities that call for more thorough planning and preparation of the physical education lessons. The study's subjects, the youngsters, had developed those skills that call for the use of the main/gross muscles and can only be enhanced by active participation in group plays or games.

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STRUCTURAL SOLUTIONS WITH FLEXIBLE CEMENTITIOUS COMPOSITES

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**ABSTRACT**

This study aims to investigate the utilization of flexible prefabricated textile and fiber-reinforced cement-based composites as innovative materials in the construction sector and many other application areas. This material are anticipated to offer a notable advancement in construction applications by amalgamating the strength of traditional concrete with the flexibility and adaptability of textile reinforcement.

Within the model, the seamless integration of liquid additives with cementitious material during in-situ hydration underwent meticulous examination, showcasing its effectiveness in enhancing structural integrity. At the core of this innovation lies the concept of in-situ hydration, a process enabling the smooth integration of liquid additives with cementitious material while the composite is in place, without disrupting its prefabricated nature. This approach eliminates the necessity for traditional mixing procedures, thereby streamlining construction processes and significantly reducing time and labor costs.

As a result of the study, it became evident that incorporating a mesh layer with a nonwoven configuration of fibers significantly enhanced the inter-laminar strength of the composites, mitigating the risks of damage and delamination. However, the flexible prefabricated composites addressed in this study mitigate these shortcomings by incorporating a mesh layer with a nonwoven configuration of fibers.

Results indicate that the adaptability of these composites extends beyond conventional building practices, offering unparalleled performance and durability across a wide range of applications in various industries. Furthermore, the versatility of these composites transcends conventional building practices, opening doors to a wide range of applications across various industries, from lightweight façades to earthquake-resistant structures.

**Keywords:** flexible cement, prefabricated composites, textile reinforcement.

HIGH POWER HETEROMODULAR NANOCOMPOSITE IN THE TiC-TiB<sub>2</sub>-BN-SiC-B<sub>4</sub>C-SiAlON-Al<sub>2</sub>O<sub>3</sub>-C CARBON FIBER SYSTEM

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**Resume**

**Goal** - to obtain on first stage  $\beta$  - SiALON containing nanocomposites by reactive sintering method at 1400<sup>0</sup>C, with nitrogen process from origin composition in TiC-BN-SiC-B<sub>4</sub>C-Si-Al-Al<sub>2</sub>O<sub>3</sub> system. By using this method of synthesis, it became possible to receive nanocomposites with different percentages of  $\beta$  - SiALON. Our task was to study the phase composition of received consolidated materials in the TiC-TiB<sub>2</sub>-BN-SiC-B<sub>4</sub>C- $\beta$ -SiAlON-Al<sub>2</sub>O<sub>3</sub> (nanopowder-400nm.) system.

**Method.** The obtained mass was grounded in an attritor and the consolidated composite was obtained by hot pressing at 1620<sup>0</sup>C during 40 minutes, with glass perlite (Armenia) dope 2 mass%, delaying at final temperature for 8 min, under 30 MPa pressure and vacuum – 10<sup>-3</sup> Pa. Perlite from Aragatc contained 96 mas. % glass.

To study the phase composition of the composites, we conducted an X-ray structural analysis on the DRON-3 device. And to study the microstructure, we conducted research on an optical microscope - AC100 and a raster electron microscope “Nanolab 7” of the company "OPTON”. The values of the electrical parameters of the studied composites were calculated on the basis of the obtained "Igp- t" dependence. We have studied mechanical properties.

**Result.** In TiC-TiB<sub>2</sub>-BN-SiC-B<sub>4</sub>C- $\beta$ -SiAlON-Al<sub>2</sub>O<sub>3</sub> –Carbon fiber system we obtained nanocomposites with high mechanical properties. The advantage of this method is that compounds, which are newly formed thanks to interaction going on at thermal treatment: Si<sub>3</sub>N<sub>4</sub>, Si, AlN are active, which contributes to  $\beta$ -SiALON formation at relatively low temperature, at 1300-1350<sup>0</sup>C. It is evident that incultation of ALN in crystal skeleton of  $\beta$ -Si<sub>3</sub>N<sub>4</sub> is easier since at this temperature interval crystal skeleton of Si<sub>3</sub>N<sub>4</sub> is still in the process of formation.  $\beta$ -SiAlON was formed at 1450<sup>0</sup>C. Part of boron carbide was transformed into boron nitride in nitrogen environment and in titanium diboride, which in the case of both composites is in small quantities.

**Conclusion.** The phase composition of the obtained composite provides high physical-technical and performance properties of these nanocomposites. Compression strength-2198 MPa, Bending strength-271 MPa, Thermal expansion coefficient  $\alpha_{20-700}$ -3.8 10<sup>-6</sup><sup>0</sup>C.

**Key words:** nanocomposite; hot press; electron microscope; phase composition; B<sub>4</sub>C-BN-TiC-TiB<sub>2</sub>-SiC- $\beta$ -SiALON-Al<sub>2</sub>O<sub>3</sub>-C Carbon Fiber, nano-powder system.

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**THE ROLE OF GENETIC DETERMINANTS IN PHYSICAL FITNESS AND SPORT PERFORMANCE**

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**ABSTRACT**

Bio-indicators are biochemical, physiological and genetic markers that serve to evaluate human health in general as well as during physical exercise or the performance of various sports activities. As such, their use is important for the evaluation, follow-up and long-term monitoring of the effects of exercise and sport on the human health, physical fitness and sports performance. Heritability is an important determining component of the effect of physical activity for human health, in influencing a number of health-related features such as physical fitness, obesity, biological response to exercise and sport performance.

In Albania, the use of the genetic markers in fitness and sports is little or unknown at all, and their use in the physical activity and health context it is not a common practice. The purpose of this study is to analyze and review the current literature mainly of the last 10 years regarding identification and use of genetic markers in physical activity and sports, recommend valuable determinants for the assessment, prediction and monitoring of health, performance parameters and rehabilitation in athletes.

The Human Gene Map for Performance and Health related Fitness Phenotypes (HGMPHFP) identifies more than one hundred of candidate “sport” genes associated with exercise performance and response to exercise/training. These genes interact with physical activity and/or exercise to influence multiple physical and physiological responses, including body size/mass, adiposity, biochemical parameters, and hemodynamics. The biological functions of these genes are consistent with the fitness phenotypes of physical activity and provide insight into the types of physiologic processes that might drive the capacity for physical activity and/or associated with performance phenotypes and their potential use as markers for talent identification and trainability in sport. While the most precise technique used for the gene identification and location is the Genome Wide Association Studies (GWAS). Due to the effectiveness of these techniques and methods, hundreds of genes/sequences are discovered to be related with physical activity in general, and others who seem to be particularly important and indicative for biological response to exercise/training and tracking sports performance in athletes.

However, physical activity, biological response and its health benefits and sport performance is a complex multifactorial phenomenon governed by several intrinsic factors such as bio-genetic polymorphism, psychomotor skills, physical fitness that are greatly influenced by a variety of extrinsic factors such as diet, exercise/training, behavioral, social and educational/cultural factors as well.

**Key words:** genetic markers, fitness, sport, GWAS, HGMPHFP.

“RELATIONS BETWEEN MALNUTRITION AND REPRODUCTIVE DISORDERS IN FEMALE ATHLETES”

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**ABSTRACT**

Females who regularly participate in sports rarely meet their energy intake needs which may develop several medical conditions, such as eating disorders, menstrual dysfunction, and decreased bone mineral density, accompanied or not with osteoporosis. Consequences to skeletal health can range from short-term changes in bone metabolism and increased risk of bone stress injuries to long-term consequences such as osteoporosis and premature fractures. The metabolic demand, exercise and sports have a significant impact on cyclical menstrual hormones. During the course of the menstrual cycle, women may have different caloric and macronutrient needs due to fluctuations in sex hormones, substrate reliance, and increased energy demand during exercise. Nowadays, when a high prevalence of females participate in physical activity and sports, these issues become crucial and critical for their overall health. Recent studies recognize that low energy availability and malnutrition are the main initiating factors for low bone mass density (BMD) and menstrual dysfunction in females in general, in those who are physically active and especially in athletes. Low energy availability (LEA) underpins the female athlete triad and relative energy deficiency in sport (RED-S). The condition arises when insufficient calories are consumed to support exercise energy expenditure, resulting in compromised physiological processes, such as menstrual irregularities in active females. The health concerns associated with longstanding low EA include menstrual/libido, gastrointestinal and cardiovascular dysfunction and compromised bone health, all of which can contribute to impaired sporting performance. This review provides an update on the prevalence and risk of low EA, within-day energy deficiency, and the potential impact of low EA on menstrual health and reproductive disorders. The methods to assess EA remain a challenge and contribute to the methodological difficulties in identifying “true” low EA. The Low Energy availability (LEA) is a major problem in women who exercise physically and/or sports, which seriously endangers not only their health but also negatively affects their physical and/or sports performance.

**Key words:** Bone Mass Density, female athletes, reproductive disorders, energy availability

**INTRODUCTION**

Engaging in physical activity and sports has positive effects and many benefits, such as physical health, improved self-esteem, how they look at their bodies and encourage sports people to stay active throughout their lives. However, an excess of physical activity, and coupled with an additional lack of adequate amount of food through the diet, will be associated with a lack of energy which, in the long run, will lead to a decrease in physical performance of the health of the body. (Mountjoy et al., 2014;

Maya & Misra, 2022 ). Athletes may develop eating disorders (characterized by abnormal eating habits), which in women are associated with menstrual disorders and eventually lead to decreased bone density (BMD), or osteoporosis. ). This result came in response to many studies that concluded that female athletes suffered from symptoms directly related to nutritional disorders, amenorrhea and decreased bone density . According to Loveless (2017), any disorder in itself can lead to medical concerns that endanger the health of female athletes or those involved in various level sports activities. But when all three components are present in an individual, the effects have a major potential and more negative impact on health and physical performance, as the components are intertwined and cumulative with each other. (Nattiv et. al., 2007; Brook et. al.,2019). Recognizing that low energy availability can affect athletes of either sex and have consequences beyond the female reproductive system and skeleton, in 2014 the International Olympic Committee introduced a broader term called relative energy deficiency in sport.[1,2 ,12,14]. Like the triad, this condition occurs when energy intake falls below energy output to the point that it negatively affects an athlete's physical and mental health.

## ENERGY AVAILABILITY

Energy availability (EA) is the amount of dietary energy available for normal physiological function after accounting for energy expended in exercise, expressed in proportion to lean body mass (LBM) [6,7,11].The concept of energy availability defines the energy that is used for basic metabolic function and daily living based on the amount of energy taken in through diet and the energy expended through exercises. Low availability can be reduced by restricting dietary intake and or increasing physical activity and exercise. Energy through diet or nutrition is used to meet the needs for basic physiological processes such as cell maintenance, thermogenesis, immunity, growth, reproduction, and the process of moving low EA can be a result of intentional dietary restriction and/or increased energy expenditure in exercise to reduce body mass, as occurs with disordered eating/eating disorders and dieting, or an inadvertent failure to match energy intake to energetic demands [8.9.13]. Soccer players score lower than non-athlete controls on scores of disordered eating, and the proportion of self-reported eating disorders (5.9%) is lower than other sports and controls [10]. Low EA has been associated with negative health and performance consequences such as menstrual dysfunction, osteoporosis and increased injury risk [7.8.12]. Intentionally low energy intake may come in the form of a diagnosable eating disorder or disordered eating behaviors that do not meet criteria for an eating disorder but still compromise energy intake. Unintentional dietary restriction may include inadequate access to nutritious food, extensive food allergies or intolerances ,medical condition affecting appetite or nutrient absorption. Clinical experience and evidence or examples drawn from scientific research have concluded that disordered eating and eating disorders such as anorexia nervosa, bulimia nervosa, binge eating (eating three meals in a short time), usually it is initiated by behaviors resembling dieting. top league players had low EA ( $< 30 \text{ kcal} \cdot \text{kg LBM} \cdot \text{day}^{-1}$ ) during the in-season period [11,13,14,15] and 26.3% had low EA during pre-season [12]. Within a typical training week, match day and heavy training (two exercise sessions) days result in a greater proportion of players with lower EA compared to rest or light (single session) training days [11,16]. This suggests that opportunities for energy intake should be maximised on match and heavy training days to prevent a recurring pattern of sub-optimal EA. This was a consequence of dietary energy intake not matching energetic demands [11,17]. Collectively, it appears that the majority of incidence of low EA occurred when energy intake was not adjusted to the energetic demands of training or match-play. In addition, practitioners should create environments that offer ample opportunities for food intake to support increased energy needs, coupled with player education on the negative consequences of low EA. Furthermore, prospective monitoring of menstrual cycle length should be undertaken as extended menstrual cycles can be a sign of low EA. It should be noted, however, that hormonal contraceptives may mask any effects of low EA on the regulation of menstruation. exercise regimens.[18,19,20]. Female athletes are at risk of developing eating disorders due to pressure to maintain a low body weight along with poor guidance about nutrition and weight loss from the athletic community.[20,21] Many have placed blame on the coach, who often fails to teach athletes about healthy dieting or cultivates an environment in which weight loss is encouraged regardless of the methods employed to attain it.[22,23] Disordered eating

and amenorrhea are most common among sports that emphasize leanness, aesthetics, a weight class, or endurance,[23,25] including gymnastics, ballet, figure skating, lightweight rowing, and running. Measuring EA is challenging. Many studies use screening tools as a surrogate for low EA. There is no universal standard for defining low EA ( though many studies use  $< 30 \text{ kcal/kg /FFM/day}$ . Controlled laboratory studies have defined optimal EA for a woman as at least  $45 \text{ kcal/kg /FFM/day}$ .  $EA(\text{ kcal/kg FFM/day})=EI(\text{kcal})-EEE(\text{kcal})/\text{FFM}/\text{kg}$ . Some studies have attempted to establish a cutoff for energy availability that can identify women at increased risk for menstrual irregularities. Loucks et al. showed that LH pulsatility is not affected when energy availability is maintained at  $45 \text{ kcal/kg LBM/day}$  or higher, but is altered below a threshold of  $30 \text{ kcal/kg LBM/day}$ . These findings are supported by another study showing that a decrease in energy availability from 38 to  $28 \text{ kcal/kg FFM/day}$  over a period of 3 months led to a decrease in LH pulse frequency and HPG axis suppression

### EATING DISORDERS

Eating disorders are clinical mental disorders and may be accompanied by other psychiatric problems: Low self-esteem, Depression, Anxiety Disorders, Anorexia Nervosa, Bulimia Nervosa

Disordered eating may include restrictive eating: Fasting, skipped meals, diet pills, laxatives, diuretics, enemas, overeating, binge-eating, purging.

There is a wide spectrum of disordered eating among athletes that ranges from simple dieting to clinically defined eating disorders such as AN(anorexia nervosa), BN(bulimia Nervosa), and an eating disorder not otherwise specified (Table 1). Anorexia athletica is a term used by some researchers to describe a disordered eating pattern seen in the female athlete who has an intense fear of gaining weight, even though she is underweight.[10,12,13] Women with anorexia athletica reduce their energy intake and exercise excessively. They may display features of AN and BN without meeting strict criteria for these diagnoses.[10] Among female athletes, there also exist several different forms of dieting that fall on a continuum. Healthy dieting is considered a modest lowering of daily calories, while harmful dieting or disordered eating includes restrictive behaviors, such as fasting, skipping meals, use of diet pills or laxatives, and bingeing and purging. [11,12]. Some athletes practice what has been called dietary restraint, an intent to limit food intake, regardless of how successful it is in execution.[11] Disordered eating associated with low energy availability also has serious psychological ramifications, including depression, low self-esteem, and various anxiety disorders.[15] It can be a slippery slope, leading to body image issues and severe eating disorders.[13,14]. A 2011 meta-analysis examined outcomes in patients with AN and BN during years.[6] There was an increased mortality rate among women with disordered eating, especially associated with AN. The standardized mortality ratios were 5.86 for AN, 1.93 for BN; 20% of those with AN who died had committed suicide.[6] Regardless of the severity of symptoms stemming from the components of the triad, it is important for health care professionals as well as coaches and nutritionists involved in these female athletes' care to be cognizant of the risks and potential consequences of the syndrome.

Criteria for Eating Disorders (tab.1)

Disorder	Criteria
Anorexia nervosa	Body weight < 85% expected for age and height Intense fear of gaining weight or becoming fat Disturbed body image Amenorrhea (absence of $\geq 3$ consecutive periods) <i>Types:</i> Restrictive and binge eating/purging
Bulimia nervosa	Recurrent episodes of binge eating Recurrent inappropriate attempts to compensate for overeating to prevent weight gain (eg, vomiting, laxatives, diuretics, other medications, fasting, excessive exercise) Binge eating and compensatory behaviors occurring $\geq$ twice a week for 3 months Perception of self-worth excessively influenced by body weight and shape <i>Types:</i> Purging and nonpurging
Eating disorder not otherwise specified	Disordered eating that does not meet the criteria for any specific eating disorder. <i>Examples:</i> All the criteria for anorexia but with regular menses All the criteria for anorexia but current weight in a normal range despite significant weight loss All the criteria for bulimia but with binge eating and inappropriate compensatory mechanisms occurring < twice weekly for 3 months Repeatedly chewing and spitting out food Recurrent binge eating without regular compensatory behavior

**Adipokines and appetite regulating hormones**

Hormones regulate energy balance via two sets of hypothalamic neurons: the neuropeptide Y, which when stimulated have orexigenic or food seeking effects, and the pro-opiomelanocortin/cocaine and amphetamine related transcript neurons, which when stimulated have an anorexigenic effect. By means of a complex interaction between these neuronal pathways and hormones involved in energy balance, the body seeks to achieve energy homeostasis.[14,26] Ghrelin is an orexigenic hormone secreted by the fundus of the stomach and duodenum, and its concentrations are inversely related to fat mass. Conversely, leptin is an anorexigenic adipokine that directly correlates with fat mass, and acts as a sensor of energy availability. Studies have reported lower leptin levels across all elite athletes independent of menstrual status compared with recreational athletes, associated with lower body fat. Recent evidence from studies of exercising women with FHA highlights the potential role of appetite-related hormones in the etiology of chronic energy deficiency and menstrual disturbances. Consistent patients with AN , exercising women with FHA consistently exhibit elevated levels of the orexigenic hormone, ghrelin, and the anorexigenic hormone, peptide YY (PYY) , yielding an overall anorexigenic effect. Thus concurrently elevated PYY and ghrelin concentrations, and the subsequent suppressive effect on appetite, may prevent compensatory increases in energy intake in exercising women with FHA. Oxytocin, a bone anabolic hormone, modulates metabolic rate as well as appetite. Studies have shown lower nighttime oxytocin in states of higher energy expenditure, as in athletes vs. non-athletes (Nazem & Ackerman, 2012). In amenorrheic athletes, lower oxytocin concentrations may contribute to abnormal bone microarchitecture in hypoestrogenic states. Lower oxytocin concentrations are also associated with lower resting energy expenditure in athletes but not non-athletes, and with lower energy availability in amenorrheic and not eumenorrheic athletes, suggesting a role for oxytocin in energy homeostasis in low energy states . Insulin increases peripheral glucose uptake and is anorexigenic, Adiponectin increases insulin sensitivity and increases with weight loss.[15,26] Higher adiponectin levels contribute to lower BMD by impacting both bone formation and resorption; while insulin is osteoanabolic. Elite amenorrheic athletes have lower serum insulin concentrations , with a positive correlation between insulin and leptin secretion suggesting that insulin may play a role in regulating leptin by sensing changes in the body’s energy balance

**Menstrual Dysfunction**

Menstrual dysfunction in the female athlete includes a wide spectrum of disorders. The most commonly discussed menstrual abnormality is amenorrhea, which is generally defined as the absence of menses 3 months or more, but can be subcategorized into primary and secondary types. Primary amenorrhea refers to a delay in the age of menarche (no menses by age 15 years in the presence of normal secondary sexual development or within 5 years after breast development if that occurs before the age of 10 years).[5,14,15 ]Secondary amenorrhea is a loss of menses after menarche. Other types of menstrual irregularity include anovulation, luteal phase deficiency, and oligomenorrhea (Table 2).Amenorrhea can be caused by a variety of diseases and genetic abnormalities, as well as energy deficiency and even stress.[26] The type of amenorrhea resulting from changes in energy availability is functional hypothalamic amenorrhea (FHA). FHA is characterized by the absence of menses due to suppression of the hypothalamic-pituitary-ovarian axis, without an identifiable anatomic or organic cause. This type of amenorrhea, commonly associated with exercising and stress, is most relevant to the female athlete. FHA is caused by an alteration in gonadotropin-releasing hormone pulsatility, which in turn causes a disruption of luteinizing hormone pulses from the pituitary and gonadal steroid release from the ovaries. It reflects a state of estrogen deficiency, which may be one of the causes of decreased BMD. FHA may also be associated with several physiological changes, including overactivity of the hypothalamic-pituitary-adrenal axis (causing an increase in cortisol release) and disturbances of the hypothalamic-pituitary-thyroid axis (resulting in a “sick euthyroid” pattern).[21,26] Leptin, a cytokine expressed by adipose tissue and strongly associated with fat mass, is lower in the amenorrheic athlete, most likely due to changes in body composition, particularly a decrease in fat mass.[26] Since leptin has a positive effect on gonadotropin-releasing hormone secretion and regulates the release of gonadotropins, its deficiency contributes to the loss of menses. In amenorrheic athletes, luteinizing hormone pulsatility is disrupted while pituitary responsiveness to gonadotropin-releasing hormone is increased, causing amenorrhea of a hypothalamic origin.[8,26]

Definitions of menstrual function Tab.2

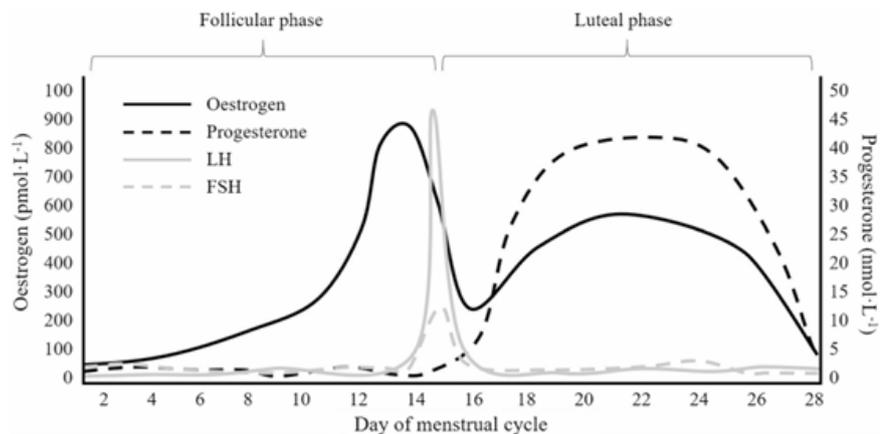
Menstrual Status	Definition
Eumenorrhea	Menstrual cycles at intervals near the median for young adult women (28 ± 7 days)
Amenorrhea	<i>Primary:</i> No menses by age 15 years in the presence of normal secondary sexual development or within 5 years after breast development if that occurs before the age of 10 <i>Secondary:</i> Loss of menses for ≥ 90 days after menarche
Anovulation	Absence of ovulation usually due to impaired follicular development
Luteal-phase defect	An asymptomatic condition caused by a shortened luteal phase (< 11 days) and/or a low concentration of progesterone
Oligomenorrhea	Menstrual cycles at intervals > 35 days

**Role of appetite-related hormones in the etiology of chronic energy deficiency**

Recent evidence from studies of exercising women with FHA highlights the potential role of appetite-related hormones in the etiology of chronic energy deficiency and menstrual disturbances. For example, consistent with patients with AN [10], exercising women with FHA consistently exhibit elevated levels of the orexigenic hormone, ghrelin, and the anorexigenic hormone, peptide YY (PYY) [ 14, 26], yielding an overall anorexigenic effect. In addition, fasting PYY concentration have been negatively correlated with REE [adjusted for fat-free mass (FFM)] and positively correlated with DT

score in women categorized by exercise (exercising vs sedentary) and menstrual status (FHA vs ovulatory). Thus concurrently elevated PYY and ghrelin concentrations, and the subsequent suppressive effect on appetite, may prevent compensatory increases in energy intake in exercising women with FHA. Interestingly, it appears that the method of the development of low EA (ie, through restricting intake or via increased exercise energy expenditure) may also affect hormone levels, satiety, and hunger. An acute bout of vigorous exercise has been shown to suppress appetite and decrease relative energy intake in both women and men [1,2,6] for several weeks. However, in contrast, experimental findings by Hubert et al demonstrated that a diet-induced energy deficit increased hunger in healthy women. These results suggest that a lack in initiative to match energy intake to exercise energy expenditure may be physiologically driven, via temporary suppression of ghrelin and increases in PYY post exercise [22,26]. Thus, these appetite-related hormones may serve as key metabolic signals underlying “inadvertent undereating,” [26] which may increase the risk of developing low EA and subsequent Triad conditions. However, these results are not conclusive [6,8,9] and notably, the mechanisms surrounding “exercise induced anorexia” are complex with currently unknown, potential long-term implications. The menstrual cycle results in large variations in the concentration of reproductive hormones (Fig. 1). These variations could hypothetically influence soccer performance via direct effects of hormones (e.g. oestrogen or progesterone) on physiological function, or due to side effects of the menstrual cycle such as pre-menstrual syndrome or dysmenorrhea (e.g. cramps, headaches and nausea). A recent meta analysis showed that exercise performance may be trivially reduced during the early follicular phase, although there was large variation in results between studies and much of the research was rated as low quality [26]. In particular, inter- and intra-participant variability in menstrual cycle characteristics (e.g. phase length and hormonal profile) can significantly affect study interpretation in the absence of rigid methodological control. However, as with most research in this area, participants were studied at a group level to assess if there were differences in mean responses between phases, whereas the effects of the menstrual cycle are highly individualised. This is supported by 77% of elite athletes reporting negative side effects of the menstrual cycle with [12.24] distinct symptoms varying in intensity, duration and timing between individuals [11.12] and more than half of athletes perceiving their performance to be affected at certain points during their cycle [11,12]. Given the individuality of symptoms and lack of coherence in the existing research, it is currently too early to provide any general guidelines in relation to the potential impact of the menstrual cycle on soccer performance. However, it is recommended that players/practitioners track menstrual cycles and symptoms to improve awareness of any phase-related effects on individual performance with a view to consideration of management strategies

**Fig. 1** Graphical representation of oestrogen, progesterone, luteinising hormone (LH) and follicle-stimulating hormone (FSH) concentrations during a “typical” menstrual cycle



### Methodology:

To address this issue, we conducted an extensive search in the current scientific literature regarding the matter, in some of the most prestigious online scientific platforms (Web of Science, PubMed and others). From more than 150 collected publications, 26 were included and taken for references, after selection and filtering according to the specific field, level of citation and publication time. The selection included publications and articles from the most prestigious journals indexed in Scopus and JCR with impact factor > 2.

## Results and Discussion:

Energy through diet or nutrition is required to meet the needs of basic physiological processes such as cell maintenance, thermogenesis, immunity, growth, reproduction, and movement process. Nutritional disorders, which affect two-thirds of women athletes, coincides with or relates to food restriction behavior. Eating disorders is caused because athletes often limit calories or fat intake, meanwhile maintaining a high training regime, which in most cases causes a chronic energy deficit. Factors such as age, weight, psychological stress, food insufficiency, genetic predisposition, percentage of body fat, amount/intensity of exercise and who influence the athletes' menstrual cycle. The previously accepted concept that "it is normal for a physically active female to have irregular menses" is false and not scientifically confirmed. Varying degrees of dysfunction exist, ranging from subclinical menstrual disturbances (an-ovulatory cycles) to oligo-menorrhea to primary/secondary amenorrhea. A series of metabolic changes occur in response to above conditions, in order to maintain the energy balance, thus affecting reproductive and bone-forming health. The general and specific nutritional needs should be primarily met with whole foods; however, key dietary supplements may be beneficial to females to support improvements in performance, recovery, and overall health. Prevalence of menstrual dysfunction among athletes depends on the nature of sport, intensity of training and nutritional status of the athlete. Traditionally, endurance runners are known to be at higher risk for functional hypothalamic amenorrhea (from hypogonadotropic hypogonadism) than other athletes, associated with overall lower body weight . A more recent study showed that runners were more aware of the menstrual dysfunction than dancers and figure skaters, and although two-thirds of participants were at risk for developing EA and amenorrhea. Young female collegiate athletes engaged in long-distance sports compared to swimmers are at a higher risk of bone stress injuries and bursitis (risk categorization based on presence or absence of amenorrhea, low BMI and BMD) . Among high school female runners, up to 25.8% report irregular menses , while in adult runners this number is as high as 62%. Another study found that 20% of athletes met criteria for disordered eating and 20.1% reported irregular menses. Oligo-amenorrheic athletes more frequently reported disordered eating and athletes with disordered eating were twice as likely to report irregular periods. Moreover, irregular menses were more common among athletes classified as having a lean build . Further, baseline disordered eating and shape concern has been associated with fewer menstrual cycles per year . Studies examining the long-term effects of energy deprivation in female athletes have demonstrated detrimental effects on menstrual health, cognitive behavior, and eating behaviors. Some studies have attempted to establish a cutoff for energy availability that can identify women at increased risk for menstrual irregularities. Loucks et al. showed that LH pulsatility is not affected when energy availability is maintained at 45 kcals/kg LBM/day or higher, but is altered below a threshold of 30 kcals/kg LBM/day. Other study showing that a decrease in energy availability from 38 to 28 kcal/kg FFM/day over a period of 3 months led to a decrease in LH pulse frequency and HPG axis suppression. The diagnosis and identification of the LEA depends on the complete examination of athletes by their doctors during physical training before participation.

This screening should include a menstrual history, history of physical activity and current level of activity, history of diet and current dietary behaviors related to weight and sports expectations, assessment of EA, biochemical examination, including assessments of endocrine status and iron, Magnez, Vit D and family history, especially that of the mother. age of menarche.

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**KBRN VE GIDA GÜVENLİĞİ**  
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**ÖZET**

Gıda güvenliği modern toplumların temel ihtiyaçlarından biri olarak kabul edilmektedir. Tüketicilere sağlıklarını riske atmadan, güvenle tüketebilecekleri gıdaların sunulması, bireylerin ve toplumun genel sağlığını doğrudan etkilemektedir. Bu makale gıda güvenliği kavramını farklı açılardan incelemekte ve bu alandaki temel ilkeleri vurgulamaktadır.

Gıda Güvenliği, gıda üretiminden tüketim sürecine kadar her aşamada sağlık risklerini en aza indirmeyi amaçlamaktadır. Hijyen standartlarına uyum çok önemlidir. Üretim, işleme, taşıma ve depolama aşamalarında hijyen standartlarına uyum, gıda güvenliğinin temel şartıdır. Ayrıca kalite kontrol önlemlerinin alınması ve gıda güvenliği kurallarının etkin bir şekilde uygulanması büyük önem taşımaktadır.

Gıda güvenliğini tehdit eden faktörler arasında kimyasal, biyolojik, radyolojik ve nükleer (KBRN) tehlikeler yer almaktadır. Özellikle biyolojik tehlikeler gıda kontaminasyonuna yol açarak sağlık risklerini artırabilir. Bu nedenle bu tür tehditlere karşı hazırlıklı olmak ve gıda güvenliğini sağlamak için uygun tedbirlerin alınması gerekmektedir.

Gıda güvenliği sadece insanların sağlığını değil aynı zamanda toplumun sosyal ve ekonomik refahını da etkileyen önemli bir konudur. Sağlıklı gıdaya erişimdeki eşitsizlikler, nüfusun genel sağlığı ve refahı üzerinde olumsuz etki yaratabilir. Ayrıca gıda zehirlenmesi ekonomik kayıplara neden olabilir ve gıda sektörüne olan güveni zayıflatabilir.

Gıda zehirlenmesi, tüketilen gıdalardaki zararlı mikroorganizmaların veya toksinlerin neden olduğu ciddi bir sağlık sorunudur. Bu durum genellikle gıda üretimi, depolanması veya işlenmesi sırasındaki sağlıksız koşullardan ya da kontamine gıdaların tüketilmesinden kaynaklanmaktadır.

Sonuç olarak bu makalede tartışılan konular gıda güvenliğinin önemini ve bu alandaki çeşitli faktörlerin etkisini vurgulamaktadır. Gıda güvenliği, sağlıklı bir toplum ve sürdürülebilir bir gıda

sistemi için ön koşuldur ve bu nedenle bu alandaki çalışmalara ve politikalara sürekli önem verilmesi gerekmektedir.

**Anahtar Kelimeler:** KBRN Tehlikeler, Toplumsal ve Ekonomik Etkiler, Sağlık, Gıda Zehirlenmesi

## ABSTRACT

Food safety is considered one of the fundamental needs of modern societies. Providing consumers with foods they can safely consume without risking their health directly affects both individuals and the overall health of society. This article examines the concept of food safety from various perspectives and emphasizes the fundamental principles in this subject.

Food safety aims to minimize health risks at every stage from food production to consumption. Compliance with hygiene standards is crucial. Adhering to hygiene standards during production, processing, transportation, and storage stages is essential for food safety. Additionally, taking quality control measures and effectively implementing food safety rules are of great importance.

Among the factors threatening food safety are chemical, biological, radiological, and nuclear (CBRN) hazards. Especially biological hazards can increase health risks by causing food contamination. Therefore, being prepared for such threats and taking appropriate measures to ensure food safety is necessary.

Food safety is not only about the health of individuals but also significantly affects the social and economic welfare of society. Inequalities in access to healthy food can have a negative impact on the overall health and well-being of the population. Additionally, food poisoning can be the reason of economic losses and weaken trust in the food industry.

Food poisoning is a serious health problem caused by harmful microorganisms or toxins in consumed foods. This situation often arises from unhealthy conditions during food production, storage, or processing, or consumption of contaminated foods.

In conclusion, the topics discussed in this article highlight the importance of food safety and the impact of various factors in this subject. Food safety is a prerequisite for a healthy society and a sustainable food system, and therefore, continuous emphasis should be placed on efforts and policies in this area.

**Key Words:** CBRN Hazards, Social and Economic Impacts, Health, Food Poisoning

## GİRİŞ

Gıda insan yaşamında hayati bir öneme sahiptir. Gıda hayati fonksiyonların devamlılığı için gerekli besinleri sağlar. Gıda güvenliği ise insanların alması gereken bu besinlerin insan sağlığına zarar vermemesi hususunda üretimden tüketime kadar alınması gereken birtakım önlemlerdir. Günümüzde gıda toplum sağlığı açısından endişe verici bir hale bürünmüştür. Bu noktada gıda güvenliği tüketicilerin sağlıklarında oluşabilecek problemleri her noktada kapsayıcı bir biçimde inceleyerek insan sağlığını koruması gereken bir unsur haline gelmiştir.

Gıda güvenliği üretimden tüketime geçinceye kadar insan sağlığını korumak amacıyla uygulanan birçok önleme sahiptir. Ancak bu önlemler hijyenik üretim ve hijyenik tüketimle sınırlı kalamayacak kadar çok detaylıdır. Bu önlemlere ek olarak mikrobiyal ve kimyasal kontaminasyonun engellenmesi, çapraz bulaşmanın önlenmesi ve KBRN tehlikelerinin göz ardı edilmemesi gibi önlemler de alınmalıdır.

Gıda güvenliği bireylerin sağlık ve refahları için hayati bir öneme sahip olduğu kadar toplumların sürdürülebilirliği ve ekonomik kararlılığı için de hayati bir öneme sahiptir. Bu makalede gıda güvenliği hususunda birçok farklı noktaya değinerek bu alanda insanların ve toplumların üstüne düşecek görevler nelerdir bunları gözlemleyeceğiz.

## Gıda Güvenliği Nedir

Tüketicilerin sağlıklarını korumaya yönelik gıdanın üretimi, işlenmesi, depolanması, taşınması ve tüketimi süreçlerindeki alınan önlemlerin bütününe gıda güvenliği denir. Gıda güvenliğinin nihai amacı tüketicinin güvenle tüketebileceği ürünün sağlanmasıdır ve bu süreçte gıdalla bulaşabilecek hastalıklarının önlenmesini sağlar. Gıda güvenliği, hijyenik üretim ve işleme süreçlerini içerir, saklama sürecinde besinin korunumunu gerektirir, ambalajlama ve etiketleme standartlarına dikkat eder ve buna ek olarak eğitimler ve denetimler gibi birden çok önlemi kapsar. Sonuç olarak, gıda güvenliği, insanların sağlıklı ve güvenilir gıdalara erişebilmesi için bilimsel, teknik ve yönetsel yaklaşımların tümüyle birleştirildiği kapsamlı ve detaylı bir süreçtir.

## Mikroorganizmaların Gıdalara Bulaşma Yolları ve Etkileri

Gıdaların mikroorganizmalarla bulaşması, çeşitli yollarla gerçekleşir. Bunlar:

1. Üretim ve İşleme Aşamasında: Gıda üretim ve işleme sürecinde, çevresel kirlilikler, toprak, su ve hayvan dışkıları gibi unsurlar gıdaları mikroorganizmalarla kontamine edebilir.
2. Hijyenik Olmayan Koşullar: İşlenmiş gıdaların hazırlanması, paketlenmesi ve saklanması hijyenik olmayan koşullar mikroorganizmaların bulaşmasına neden olabilir. Özellikle, gıda işletmelerinde uygun hijyen standartlarının sağlanmaması ciddi bir risk oluşturabilir.
3. Çevresel Faktörler: Gıdaların depolanması, taşınması ve satılması sırasında çevresel faktörler, özellikle kirliliği su, hayvan teması ve hijyenik olmayan ortamlar, mikroorganizmaların bulaşmasına katkıda bulunabilir.
4. Taşıyıcılar Aracılığıyla: İnsanlar, hayvanlar ve haşere gibi taşıyıcılar, mikroorganizmaların gıdalara bulaşmasında etkili olabilirler. Örneğin, taşıyıcılar aracılığıyla gıda işletmelerine veya depolama alanlarına giren mikroorganizmalar, gıdalara bulaşabilirler.
5. Çapraz Bulaşma: Çapraz bulaşma, mikroorganizmaların bir gıda ürününden diğerine veya yüzeylerden gıdalara geçişi durumudur. Bu durum, kontamine bir gıda ürünü veya yüzeyiyle temas eden başka bir gıda ürününün veya yüzeyinin de kontamine olmasıyla gerçekleşir. Bu, gıda güvenliğini ciddi şekilde tehdit eden bir durumdur ve çapraz bulaşma, gıda kaynaklı hastalıklara yol açabilir.

Mikroorganizmaların insan sağlığına etkileri birçok farklı semptomla kendini tanıtabilir. Bunlardan bazılarıysa mide bulantısı, kusma, ishal, karın ağrısı, ateş ve baş ağrısıdır. Özellikle Salmonella, Escherichia coli (E. coli), Listeria ve Campylobacter gibi bakteriler gıda yoluyla bulaşan hastalıkların yaygın nedenleridir ve bunlar ciddi enfeksiyonlara ve komplikasyonlara yol açabilirler. Bu hastalıklar, bağışıklık sistemi açısından zayıf olan bireylerde, yaşlılarda ve çocuklarda daha ciddi sonuçlar doğurabilir.

## Mikroorganizmaların gıdalara bulaşmasını önlemek için alınabilecek önlemler şunlardır:

1. Hijyenik Üretim ve İşleme: Gıda üretim tesislerinde ve işletmelerinde hijyenik koşulların sağlanması büyük önem taşır. Çalışanların ellerinin sık sık yıkanması, ekipman ve yüzeylerin düzenli olarak temizlenmesi ve dezenfekte edilmesi gerekir.
2. Gıda Güvenliği Eğitimi: Gıda işletmelerinde çalışanların ve tüketicilerin gıda güvenliği konusunda eğitilmesi önemlidir. Bu eğitimler, mikroorganizmaların bulaşmasını önlemek için alınması gereken önlemler konusunda farkındalık yaratır.
3. Ayrı Ekipman ve Yüzeyler: Çiğ ve pişmiş gıdaları işlemek için ayrı ekipmanlar ve yüzeyler kullanılmalıdır. Özellikle çiğ etlerle temas eden ekipmanların ve yüzeylerin ayrı tutulması önemlidir.
4. Doğru Depolama ve Pişirme: Gıdaların uygun sıcaklıkta saklanması ve pişirilmesi, mikroorganizmaların üremesini önler. Taze gıdaların buzdolabında saklanması ve etlerin yeterince pişirilmesi önemlidir.
5. Hijyenik Su Kullanımı: Gıda işleme ve hazırlama süreçlerinde temiz ve güvenli su kullanılması önemlidir. Kirli su kaynakları mikroorganizmaların gıdalara bulaşmasına neden olabilir.

Netice itibariyle, mikroorganizmaların gıdalarla kontaminasyonu, ciddi sağlık sorunlarına sebep olan bir durumdur fakat uygun hijyenik önlemler alınarak ve gıda güvenliği standartlarına uyularak bu riskler minimuma düşürülebilir. İnsanların da gıda güvenliği hakkında daha bilinçli olmaları ve hijyenik davranışları alışkanlık haline getirmeleri bu hususta önemlidir (WHO, 2022).

## **Gıda Güvenliği ve KBRN Tehditleri Arasındaki İlişki:**

KBRN tehditleri, kimyasal, biyolojik, radyolojik ve nükleer kaynaklı zararlı hale gelen herhangi bir şeyin gıdalara bulaşması veya gıda üretim aşamasında kullanılması ile ortaya çıkar. Bu tehlikeler, gıda güvenliği açısından ciddi tehditler doğurabilir ve tüketicilerin sağlığını tehlikeye atabilir. (Meulenbelt, 2018)

## **Gıdalarda Kimyasal Tehditler ve Önlemler**

Gıda güvenliğindeki kimyasal tehlikeler, gıdanın üretimden tüketime kadar olan yolculuğunda gıdalara karışan zararlı kimyasal maddelerden kaynaklanır. Gıdalarda en sık görülen kimyasal tehlikelerden bazıları şunlardır: Ağır metaller (kurşun, cıva, kadmiyum), Tarım ilaçları (organoklorinler, organofosfatlar), Mikotoksinler (mantar toksinleri), Dioksinler ve furanlar, Bisfenol A (BPA). Bu kimyasal maddeler, gıdaların bileşenleri, işleme sürecinde kullanılan kimyasallar veya çevresel kirlilikten kaynaklanabilir. Kimyasal tehlikeler genellikle gıda kontaminasyonu, kirletici maddelerin kullanımı veya gıda işleme sırasında oluşan hata sonucu ortaya çıkar.

## **Kimyasal Tehditlerin Kaynakları:**

1. Tarım İlaçları: Tarım ilaçları, zararlı haşere ve hastalıklarla mücadele etmek için kullanılır. Ancak, yanlış veya aşırı kullanımı sonucunda tarım ilaçları gıdalara karışarak insan sağlığını tehdit edebilir.
2. Kimyasal Katkı Maddeleri: Gıda işleme süreçlerinde kullanılan kimyasal katkı maddeleri, renklendiriciler, tatlandırıcılar, koruyucular gibi maddelerdir. Bu maddelerin yanlış kullanımı veya belirlenen limitlerin üzerinde kullanımı, gıdalarda tehlikeli düzeylere ulaşmasına neden olabilir.
3. Endüstriyel Kirlilik: Endüstriyel atıklar, gıda üretim tesislerinin çevresel kirliliğe neden olabilir ve gıdaların kontaminasyonuna yol açabilir. Bu tür kirlilikler, gıda güvenliğini ciddi şekilde tehlikeye atabilir.
4. Ambalaj Malzemeleri: Gıdaların paketlenmesi ve saklanmasında kullanılan ambalaj malzemeleri, gıdalara kimyasal maddelerin bulaşmasına neden olabilir. Özellikle plastik ambalaj malzemeleri, gıdalara plastikleşme ve kimyasal geçiş riski taşır.

## **Kimyasal Tehditlerin Önlenmesi İçin Alınabilecek Önlemler:**

1. Tarım İlaçlarının Kontrolü: Tarım ilaçlarının doğru ve güvenli bir şekilde kullanılması önemlidir. Yetkilendirilmiş pestisitlerin kullanılması, doğru dozlarda uygulanması ve beklenen hasat zamanlarına uygun olarak kullanılması gıda güvenliğini sağlar.
2. Kimyasal Katkı Maddelerinin Kontrolü: Gıda işleme süreçlerinde kullanılan kimyasal katkı maddeleri, belirlenen limitlerin aşılması ve gıda güvenliği standartlarına uygun olarak kullanılmalıdır. Ambalaj malzemeleri de gıda ile temas eden kimyasal maddelerin güvenliğini sağlamak için dikkatlice seçilmelidir.
3. Endüstriyel Kirliliğin Kontrolü: Gıda üretim tesisleri, endüstriyel atıkların doğru şekilde yönetilmesi ve bertaraf edilmesi konusunda dikkatli olmalıdır. Çevresel kirliliği önlemek için temiz üretim teknikleri ve geri dönüşüm uygulamaları teşvik edilmelidir.
4. Ambalaj Malzemelerinin Güvenliği: Gıda ile temas eden ambalaj malzemelerinin güvenliği, gıda güvenliği için kritik öneme sahiptir. Gıda ile temas eden ambalaj malzemeleri, gıdalara zararlı kimyasalların bulaşmasını önlemek için gıda güvenliği standartlarına uygun olmalıdır.

Sonuç olarak; Gıda güvenliğindeki kimyasal tehlikeler, tüketicilerin sağlığını çok ciddi şekilde tehdit edebilir. Gıdalarda kimyasal tehlikelere maruz kalmanın akut ve kronik olmak üzere iki tür etkisi vardır. Akut etkiler genellikle kısa süreli ve şiddetlidir, kusma, ishal gibi belirtilere neden olabilir. Kronik etkiler ise uzun süreli maruz kalma sonucu ortaya çıkar ve kanser, sinir sistemi bozuklukları

gibi ciddi sađlık problemlerine yol aabilir. Buna rađmen, alınabilecek uygun nlemlerle riski minimuma dřurmek mmkndr. Tarım ilalarının kontroll kullanımı, kimyasal katkı maddelerinin kontrol, endstriyel kirliliđin nlenmesi ve ambalaj malzemelerinin gvenliđi, gıda gvenliđini sađlamak iin alınabilecek nlemler arasındadır.

## **Gıdalarda Biyolojik Tehditler ve nlemler**

Gıdalar insan hayatı iin bu kadar nemliyen retim, iřleme yahut tketim ařamalarında eřitli biyolojik tehditlere maruz kalabilirler. Bu tehlikeler, bakteriler, virsler, mantarlar ve parazitler gibi mikroorganizmalar ve bunların rettiđi toksinlerden kaynaklanır. Gıda kaynaklı hastalıklar, her yıl milyonlarca insanı etkilemekte ve bu insanların kimisinde lme kadar gidebilecek ciddi sonular ortaya ıkarmaktadır.

## **Biyolojik Tehditlerin Kaynakları**

### **Bakteriler:**

- Salmonella: Salmonella bakterisi, iđ veya az piřmiř et, kmes hayvanları ve yumurtalarda bulunur. Salmonella enfeksiyonu, ishal, ateř ve karın ađrısı gibi semptomlara neden olur.
- E. coli: E. coli bakterisi, iđ et, st ve suda bulunur. E. coli enfeksiyonu, ishal, kusma ve karın ađrısı gibi semptomlara neden olabilir.
- Listeria: Listeria bakterisi, iđ et, st rnleri ve yumuřak peynirlerde bulunur. Listeria enfeksiyonu, hamile kadınlarda dřk ve yenidođanlarda enfeksiyona neden olabilir.

### **Virsler:**

- Norovirus: Norovirus, "mide gribi" olarak da bilinir. Kontamine gıda ve su yoluyla yayılır. Norovirus enfeksiyonu, ishal, kusma ve karın ađrısı gibi semptomlara neden olur.
- Hepatit A: Hepatit A virs, kontamine gıda ve su yoluyla yayılır. Hepatit A enfeksiyonu, karaciđer iltihabına neden olur.

### **Mantarlar:**

- Aspergillus: Aspergillus mantarı, fıstık ve mısır gibi gıdalarda bulunur. Aspergillus enfeksiyonu, akciđer enfeksiyonlarına neden olabilir.
- Fusarium: Fusarium mantarı, tahıl rnlerinde bulunur. Fusarium enfeksiyonu, mısır zehirlenmesine neden olabilir.

### **Parazitler:**

- Giardia lamblia: Giardia lamblia paraziti, kontamine su ve gıdalar yoluyla yayılır. Giardia enfeksiyonu, ishal, karın ađrısı ve kilo kaybına neden olabilir.
- Cryptosporidium parvum: Cryptosporidium parvum paraziti, kontamine su ve gıdalar yoluyla yayılır. Cryptosporidium enfeksiyonu, ishal, kusma ve karın ađrısı gibi semptomlara neden olur.

## **Biyolojik Tehditlerin nlenmesi**

**Hijyenik Uygulamalar:** Gıda retim ve iřleme tesislerinde hijyenik kořulların sađlanması, biyolojik tehlikelerin nlenmesinde en nemli adımdır. alıřanların el hijyeni, ekipman ve yzeylerin temizliđi ve dezenfeksiyonu, mikrobiyolojik kontaminasyonu nler.

**Dođru Piřirme ve Depolama:** Gıdaların dođru řekilde piřirilmesi, patojenik mikroorganizmaların ldrlmesine yardımcı olur. Ayrıca, gıdaların uygun sıcaklıkta saklanması, mikroorganizmaların bymesini engeller.

**Gıda Gvenliđi Eđitimi:** Gıda reticileri, iřletmeleri ve tketiciler, biyolojik tehlikeler konusunda eđitilmeli ve bilinlendirilmelidir. Bu, risklerin tanınması ve uygun nlemlerin alınması aısından nemlidir.

Gıda Kontrolleri ve Denetimler: Gıda güvenliği kontrolleri ve denetimlerinin düzenli olarak yapılması, gıda işletmelerinin uygun hijyenik koşulları sağlamasına ve biyolojik kontaminasyonun tespit edilmesine yardımcı olur.

## **Biyolojik Tehditlere Karşı Alınabilecek Önlemler**

- Gıdaları güvenilir kaynaklardan satın alın.
- Gıdaları iyice yıkayın ve pişirin.
- Çiğ ve pişmiş gıdaları ayrı kesme tahtalarında ve bıçaklarla hazırlayın.
- Buzdolabınızı ve dondurucunuzu doğru sıcaklıkta tutun.
- Son kullanma tarihi geçmiş gıdaları tüketmeyin.
- Ellerinizi sık sık yıkayın.
- Mutfak tezgahlarını ve ekipmanlarını düzenli olarak temizleyin ve dezenfekte edin.

Sonuç olarak gıdalarda biyolojik tehlikeler, insan sağlığı için önemli bir risk oluşturmaktadır fakat elbette bu riskleri minimize etmek için, tüm gıda üretim ve tüketim zincirinde bilinçli bir şekilde davranmak büyük önem taşımaktadır. Yetkili merciler tarafından gıda güvenliği standartlarının sıkı bir şekilde denetlenmesi ve insanlara gıda güvenliği konusunda çeşitli eğitimlerle bilinçlendirme çalışmaları yapılması da oldukça önemlidir. (Ülker Aslı GÜLER, 2017) (Erkmen, 2010) (Davies, 2017)

## **Gıdalarda Radyolojik Tehditler ve Önlemler**

Gıdalarda radyolojik tehditler, radyoaktif maddelerin gıdalara bulaşması ve insan sağlığını tehdit etmesi anlamına gelir. Nükleer kazalar, radyoaktif atıkların hatalı yönetimi veya doğal kaynaklardan radyasyon sızıntıları bu tehlide yol açabilir. Radyoaktif madde içeren gıdaların tüketilmesi ciddi sonuçlara sebebiyet verebilir. Bunlar arasında kanser, genetik hasar gibi ciddi sağlık sorunları yer alır.

### **Radyolojik Tehditlerin Kaynakları**

- Nükleer Kazalar: Nükleer santrallerde yaşanan kazalar, radyoaktif maddelerin atmosfere ve gıdalara yayılmasına yol açabilir. Bu durum, tarım alanlarını ve su kaynaklarını kirleterek gıdaların radyoaktif maddelerle kontamine olmasına neden olabilir.
- Nükleer Atık Yönetimi: Nükleer enerji üretimi ve tıbbi uygulamalardan doğan nükleer atıklar, uygun şekilde depolanmaz ve bertaraf edilmezse çevreye yayılabilir. Bu atıkların gıdalarla teması radyoaktif kontaminasyona yol açabilir.
- Radyoaktif Madde Taşımacılığı: Radyoaktif maddelerin taşınması sırasında yaşanan kazalar veya sızıntılar da radyoaktif kirliliğe ve gıdaların kontamine olmasına neden olabilir.

### **Radyolojik Tehditlere Karşı Önlemler**

- Nükleer Güvenlik: Nükleer santrallerin işletmecileri, nükleer kazaları önlemek için gerekli önlemleri almalı ve uluslararası güvenlik standartlarına uymalıdır.
- Nükleer Atık Yönetimi: Nükleer atıkların güvenli ve izole bir şekilde depolanması ve bertaraf edilmesi çevre kirliliğini ve gıdaların kontaminasyonunu önlemede kritik önem taşır.
- Gıda Güvenliği Kontrolleri: Gıda üretim tesisleri ve işletmeleri, radyoaktif maddelerin gıdalara bulaşmasını tespit etmek ve önlemek için düzenli gıda güvenliği kontrolleri yapmalıdır.
- Tüketici Bilgilendirme: Tüketicilere radyoaktif kontaminasyonun sağlık riskleri hakkında bilgi verilmeli ve radyoaktif madde içeren gıdalardan uzak durmaları için bilinçlendirilmelidir.

### **Radyolojik Tehditlere Karşı Alınabilecek Ek Önlemler**

- Gıdaların Güvenilir Kaynaklardan Temini: Gıdaların güvenilir ve radyasyona maruz kalmamış kaynaklardan temin edilmesi önemlidir.

- Yerel Ürünlerin Tercihi: Yerel olarak üretilen ve radyasyon testi yapılmış gıdaların tercih edilmesi kontaminasyon riskini azaltabilir.
- Gıdaların Doğru Saklanması: Gıdaların uygun sıcaklık ve koşullarda saklanması radyoaktif maddelerin çoğalmasını önleyebilir.

Sonuç olarak insan sağlığı açısından ciddi sıkıntılar oluşturan gıdaların radyolojik açıdan tehlikelerini minimize etmek gerekir. Bu riskleri minimize etmek için, nükleer güvenlik ve atık yönetimi konusundaki iyileştirmeler, gıda güvenliği kontrollerinin sıkılaştırılması ve tüketici bilincinin artırılması gibi adımlar atılması gerekmektedir. Yetkili merciler ve bu işin içinde olan herkes, gıdaların radyasyondan korunması ve halk sağlığının korunması için birlikte çalışmalıdır.

### **Nükleer Tehditlerin Gıda Güvenliğine Etkisi**

Nükleer kazalar veya radyoaktif kirlilik, gıda güvenliğini tehdit ederek halk sağlığını riske atabilir. Radyoaktif maddeler tarım ürünlerine, süt ve süt ürünlerine ve su ürünlerine bulaşarak birçok sağlık problemine zemin hazırlayabilir.

### **Etkilenen Gıdalar:**

- Tarım Ürünleri: Sebzeler, meyveler, tahıllar ve diğer tarım ürünleri radyoaktif maddelere maruz kalabilir.
- Süt ve Süt Ürünleri: Hayvanlar radyoaktif madde içeren yem ve su tüketirse, bu maddeler sütlerine geçebilir.
- Su Ürünleri: Balıklar ve diğer su ürünleri, radyoaktif maddelerin biriktiği su kaynaklarından etkilenebilir.

### **Riskleri Minimize Etmek İçin Alınabilecek Önlemler:**

- Radyoaktif Kontaminasyonun İzlenmesi: Gıda örnekleri düzenli olarak radyoaktif madde içerip içermediği açısından kontrol edilir.
- Gıda Güvenliği Uyarıları: Yetkililer, kontaminasyon tespit edilirse tüketicileri uyarır ve etkilenen gıdaları piyasadan çeker.
- Gıda İşleme ve Saklama: Gıdaların uygun şekilde işlenmesi ve saklanması radyoaktif maddelerin etkilerini azaltabilir.
- Yerel Yetkililerle İşbirliği: Sağlık ve gıda güvenliği otoriteleri, durumu izlemek ve gerekli önlemleri almak için birlikte çalışır.

Sonuç olarak; Nükleer kazalar ve radyoaktif kirlilik gıda güvenliğini tehdit eder. Radyoaktif kontaminasyonun izlenmesi, gıda güvenliği uyarıları, gıda işleme ve saklama yöntemleri ve yerel yetkililerle iş birliği gibi önlemlerle oluşabilecek riskleri kontrol altında tutmak mümkündür. (WHO, Nuclear accidents and radioactive contamination of foods , 2011) (Wang, 2017)

### **Gıda Zehirlenmesi Nedir**

Gıda zehirlenmesi, bahsettiğimiz zararlı mikroorganizmalar veya toksinler içeren gıdaların tüketilmesi neticesinde ortaya çıkan bir hastalıktır. Mide bulantısı, kusma, ishal, karın ağrısı, ateş ve baş ağrısı gibi belirtilere neden olabilir. Hafif vakalarda evde tedavi edilebilirken, şiddetli vakalarda acil tıbbi müdahale gerekebilir.

### **Gıda Zehirlenmesi: Belirtileri, Tedavisi ve Önlenmesi**

Gıda zehirlenmesi durumunda hızlı ve doğru müdahale hayati önem taşıdığından, gıda zehirlenmesi belirtilerini ve tedavi yöntemlerini bilmek önemlidir.

### **Belirtiler:**

Gıda zehirlenmesi belirtileri, tüketilen gıdadaki zararlı maddeye ve kişinin genel sağlık durumuna bağlı olarak değişebilir. En yaygın belirtiler şunlardır:

- Mide bulantısı

- Kusma
- İshal
- Karın ağrısı
- Ateş
- Baş ağrısı
- Halsizlik

Bu belirtiler, gıda tüketiminden birkaç saat veya birkaç gün sonra ortaya çıkabilir.

#### **Tedavi:**

Gıda zehirlenmesi tedavisi, semptomların şiddetine göre değişir. Hafif vakalarda, evde tedavi genellikle yeterlidir.

#### **Hafif ve Orta Şiddette Semptomlar İçin:**

- Bol su ve sıvı tüketimi: İshal ve kusma nedeniyle kaybedilen sıvıların geri kazanılması önemlidir. Sulu gıdalar ve elektrolit içecekleri de faydalı olabilir.
- Dinlenme: Vücudunuzun iyileşmesi için yeterli dinlenmeye ihtiyacınız var.
- Hafif ve sindirime dost gıdalar: Mide rahatsızlığını ve ishali hafifletmek için pirinç, muz, elma püresi ve yoğurt gibi gıdalar tüketebilirsiniz.

#### **Şiddetli Semptomlar İçin:**

- Tıbbi yardım alın: Şiddetli kusma, yüksek ateş, şiddetli karın ağrısı veya kanlı ishal gibi belirtileriniz varsa acilen bir sağlık kuruluşuna başvurmalsınız.
- Vücut sıvılarını yenilemek: Doktorunuz, kaybedilen sıvıların geri kazanılması için intravenöz sıvı tedavisi önerebilir.

#### **Gıda Kaynağının Belirlenmesi ve Bildirilmesi:**

Gıda zehirlenmesine neden olan gıdayı tespit edebiliyorsanız, bu bilgiyi sağlık kuruluşuna veya ilgili yetkililere bildirmeniz önemlidir. Bu, diğer kişilerin aynı gıdadan etkilenmesini önleyebilir.

#### **Gıda Zehirlenmesinin Önlenmesi:**

- Gıda zehirlenmesini önlemek için aşağıdaki önlemleri alabilirsiniz:
- Gıda güvenliği kurallarına uyun.
- Çiğ ve pişmiş gıdaları ayrı tutun.
- Gıdaları yeterince pişirin.
- Taze ve güvenilir kaynaklardan gıda satın alın.
- Gıdaları uygun şekilde saklayın.
- Ellerinizi sık sık yıkayın.

Gıda zehirlenmesi, ciddi sağlık sorunlarına yol açabilen bir hastalıktır. Belirtileri ve tedavi yöntemlerini bilmek, hızlı ve doğru müdahale etmenizi sağlar. Belirtileri ve tedavi yöntemlerini bilmekle beraber bu hastalıklara yakalanmamak için gıda güvenliği kurallarına uymak ve hijyenik koşullara dikkat ederek tüketim yapmak gereklidir. (Dr. Nagham Mahmood Aljamali, 2021) (Aman Kumar Gupta\*, 2022)

#### **Gıdaların Halk Sağlığı ve Ekonomik Açından Önemi**

Gıdalar, insan sağlığı açısından çok önemlidir dolayısıyla halk sağlığı ile doğrudan ilgilidir. Aynı zamanda, gıdaların üretimi, işlenmesi ve dağıtımı ekonomik açıdan da büyük bir öneme sahiptir bunun nedeni bu endüstride milyonlarca insanı istihdam etmesidir ve ekonomik büyümeye katkı sağlamaktadır.

## Gıdaların Halk Sağlığı Açısından Önemi

Sağlıklı bir yaşam sürdürebilmek için insanların sağlıklı besin maddelerini alabilmeleri hayati önem taşır. Dengeli ve besleyici bir diyet, vücudun ihtiyaç duyduğu vitaminler, mineraller, proteinler ve diğer besin öğelerini sağlayarak sağlıklı bir büyümeyi, gelişmeyi ve vücut fonksiyonlarının düzgün çalışmasını destekler. Sağlıklı beslenme, obezite, diyabet, kalp hastalıkları, kanser ve diğer kronik hastalıkların riskini azaltır bununla beraber gıda güvenliğine dikkat ederek tüketim yapmak bulaşıcı hastalıkların önlenmesi hususunda epey önemlidir. Netice olarak da toplum daha sağlıklı olur.

Özellikle çocuklar ve genç yetişkinler için sağlıklı ve hijyenik beslenme büyük önem taşır, çünkü bu yaş grupları vücutlarını ve beyinlerini geliştirmek için yeterli ve tehdit oluşturmayacak besin maddelerine ihtiyaç duyarlar. Sağlıklı ve hijyenik beslenme alışkanlıklarının erken yaşlarda kazanılması, ileriki yaşlarda oluşabilecek obezite ve kronik hastalıkların önlenmesine yardımcı olur.

## Gıdaların Ekonomik Açısından Önemi

Gıda endüstrisi, tarımsal üretim, gıda işleme, dağıtım ve perakende sektörlerini içerir ve milyonlarca insanı istihdam eder. Bu sektörler dünya genelinde ekonomik büyümeye katkı sağlar. Bununla beraber tarım, tarım ekipmanları, tohumlar, gübreler ve diğer tarım girdileri sağlayan endüstrilerle birlikte birçok yan sektörü destekler.

Gıda işleme endüstrisi, tarımsal ürünlere değer katarak ekonomik değer yaratır. Bu endüstri, gıdaların daha uzun süre saklanabilir hale getirilmesini sağlayarak raf ömrünü uzatır böylece mevsimsel ürünlere yıl boyu erişim sağlanır. Ayrıca, gıda işleme işletmeleri, çeşitli gıda ürünlerinin üretiminde uzmanlaşarak tüketicilere geniş bir yelpazede seçenek sunarlar.

Gıda perakende sektörü de ekonomik büyümeye önemli katkılar sağlar. Marketler, süpermarketler, restoranlar ve diğer gıda hizmeti sağlayan işletmeler, gıda ürünlerinin tüketiciye ulaştırılmasında kritik bir rol oynarlar ve bu sektörlerde birçok kişi istihdam edilir. (Bodirsky, 2020) (Federica Ciccullo, 2020)

## KBRN Saldırıları ve Ekonomik Hasar

KBRN saldırıları, gıda zincirine zarar vererek ekonomik kayıplara neden olabilir. Hayvan ve bitki hedefli saldırılar üç düzeyde ekonomik hasara yol açabilir:

1. Kontrol Altına Alma Önlemleri: Şüpheli sürülerin karantinaya alınması ve hayvanların itlaf edilmesi gibi kontrol önlemleri doğrudan maliyetlere sebep olabilir.
2. Endüstrilerin Zararları: Tarım, hayvancılık ve gıda işleme endüstrileri, saldırıların etkisiyle zarar görebilir, bu da dolaylı ekonomik kayıplara yol açabilir.
3. Koruyucu Ticaret Ambargoları: KBRN saldırıları sonrasında diğer ülkeler tarafından uygulanan koruyucu ticaret ambargoları, ihracatı engelleyerek ekonomik hasara neden olabilir.

Gıdalara kasıtlı KBRN kontaminasyonu ise ciddi ekonomik ve ticari sonuçlara yol açabilir. Saldırıların boyutu ve aşaması ekonomik etkiyi belirler. Küçük saldırılar bile yerel düzeyde önemli kayıplara neden olabilirken, kitlesel ölümler nadirdir ve ekonomik zarar daha yaygındır. İthalat kısıtlamaları, gıda imhası ve gıda kirliliği şüphesi bile yıkıcı ekonomik etkilere neden olabilir.

Gıdaların halk sağlığı ve ekonomik açıdan önemi büyüktür. Sağlıklı ve besleyici gıdaların tüketimi, bireylerin sağlıklı bir yaşam sürdürmelerini sağlarken, gıda endüstrisi de milyonlarca insanı istihdam ederek ekonomik büyümeye katkı sağlar. Bu nedenle, sağlıklı beslenme alışkanlıklarının teşvik edilmesi ve gıda endüstrisinin desteklenmesi önemlidir, çünkü bu hem bireylerin hem de toplumun sağlığı ve refahı için hayati öneme sahiptir. (Dalziel, 2009)

## SONUÇ

Gıda güvenliği, insan yaşamının temelini oluşturan ve insan sağlığını doğrudan etkileyen önemli bir konudur. Bu makalede gıda güvenliğinin tanımı, mikroorganizmaların gıdalara bulaşma yolları ve etkileri, çapraz bulaşma, KBRN ve gıda güvenliği ilişkisi, gıda

zehirlenmesi, gıda güvenliğinin sosyolojik ve ekonomik etkileri gibi alt başlıklarda detaylı bilgiler sunulmuştur.

## **Gıda Güvenliğinin Önemi:**

Gıda güvenliği, sadece bireysel sağlık için değil, aynı zamanda toplumların sosyoekonomik kalkınması için de kritik öneme sahiptir. Güvenli gıdaya erişim, sağlıklı bir yaşamın temel şartlarından biridir. Gıda kaynaklı hastalıklar, hem insan sağlığını doğrudan tehdit eder hem de önemli ekonomik kayıplara yol açar. Dünya Sağlık Örgütü (WHO) verilerine göre, her yıl gıda kaynaklı hastalıklardan 600 milyondan fazla insan hastalanmakta ve 420 bin kişi hayatını kaybetmektedir.

## **Gıda Güvenliğine Tehditler:**

Gıda güvenliğini tehdit eden birçok faktör bulunmaktadır. Mikroorganizmalar, kimyasallar, fiziksel tehlikeler ve KBRN ajanları bu tehditlerin başında gelmektedir. Mikroorganizmalar, gıdalarda üreyerek insanlarda hastalıklara neden olabilir. Kimyasallar, tarım ilaçları, gıda katkı maddeleri ve diğer kaynaklardan gıdalara bulaşabilir ve insan sağlığını tehdit edebilir. Fiziksel tehlikeler ise gıdalarda bulunan cam, metal veya plastik gibi parçalar olabilir ve yaralanmalara neden olabilir. KBRN ajanları ise kasıtlı veya kazayla gıdalara bulaşarak insanlarda ciddi sağlık sorunlarına yol açabilir.

## **Gıda Güvenliğini Sağlamak için Alınması Gereken Önlemler:**

Gıda güvenliğini sağlamak için tüm aşamalarda gerekli önlemlerin alınması önemlidir. Üreticiler, gıdaların hijyenik koşullarda üretilmesini ve korunmasını sağlamalıdır. İşletmeler, gıdaların güvenli bir şekilde işlenmesi ve depolanması için gerekli altyapıya sahip olmalıdır. Tüketiciler ise gıdaları satın alırken ve tüketirken hijyen kurallarına dikkat etmelidir. Gıda güvenliğinin sağlanması için tüm paydaşların (kamu, özel sektör, sivil toplum kuruluşları ve tüketiciler) iş birliği yapması önemlidir.

## **Gıda Güvenliğinin Geleceği:**

Gıda güvenliği, artan nüfus, iklim değişikliği ve küreselleşme gibi birçok faktörden etkilenen bir konudur. Gelecekte gıda güvenliğini sağlamak için yeni teknolojilerin geliştirilmesi, uluslararası iş birliğinin artırılması ve gıda güvenliği konusunda bilinçlendirme çalışmaları yapılması önemlidir. Sonuç olarak, gıda güvenliği tüm insanlığın ortak sorumluluğudur. Gıdaların güvenli ve sağlıklı olması için tüm paydaşların gerekli adımları atması ve iş birliği yapması hayati önem taşımaktadır.

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PITYRIASIS ROSEA, CASE REPORT

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**ABSTRACT**

Pityriasis rosea is a common, acute exanthem of uncertain etiology. Viral and bacterial causes have been sought, but convincing answers have not yet been found. Pityriasis rosea typically affects children and young adults. It is characterized by an initial herald patch, followed by the development of a diffuse papulosquamous rash. The etiopathogenesis of PR has always been a dilemma, and extensive research is going on to elicit the exact cause. Review focuses mainly on the difficult aspects of this benign common disorder such as etiopathogenesis, atypical manifestations, recurrent cases, differential diagnosis and therapy treatment. The herald patch often is misdiagnosed as eczema. Pityriasis rosea is difficult to identify until the appearance of characteristic smaller secondary lesions that follow Langer's lines. Several medications can cause a rash similar to pityriasis rosea, and several diseases, including secondary syphilis, are included in the differential diagnosis. One small controlled trial reported faster clearing of the exanthem with the use of erythromycin, but the mechanism of effect is unknown. Resolution of the rash may be hastened by ultraviolet light therapy but not without the risk of hyperpigmentation. Topical or systemic steroids and antihistamines often are used to relieve itching.

**Keywords:** Acyclovir, human herpesvirus, pityriasis rosea, antihistamines.

**Introduction**

Pityriasis rosea is a papulosquamous skin disorder that occurs most commonly between the ages of 10 until 35. Classically, it usually begins with a single “herald patch” lesion, followed by the onset of secondary scaly, pinkish skin eruptions within 1–2 weeks.<sup>1</sup> Recurrent pityriasis rosea is rare. Pathogenesis is still not completely understood. The etiopathogenesis of PR has always been a dilemma, and extensive research is going on to elicit the exact cause.<sup>2</sup> It typically starts with the development of a large erythematous scaly plaque also called the herald patch, is followed by an eruption of multiple secondary small erythematous scaly lesions located predominantly on the trunk and following the lines of cleavage on the back.<sup>3</sup> The disease is self-limiting and in most cases, the eruption improves in 2–8 weeks/time.<sup>4</sup>

**Patient presentation**

A 22-year-old albanian male complained of mildly pruritic rashes for 20 days. He casually found a herald skin lesion on his left upper limb. With his skin disorder progressing, he felt a mild pruritus. Secondary eruptions appeared on the neck, trunk, and extremities, and they increased in number. Most of the lesions were distributed on the neck, chest, back, and proximal upper limbs. At the beginning it appeared with red spots on the belly and arms, with slight itching. Fig 1 and 2. These signs appear before treatment.



Fig. 1 and 2 : The sings before treatment

Two days after the treatment, the clinical signs increased, but the patient did not feel their itching. Fig 3 and 4. After establishing the diagnosis, the treatment began with Acyclovir, antihistamines. Xemose emollient cream, applied twice a day to the skin, Bidien cream was applied twice a day to the skin in the most red places and Masurota 25 ml, with 20 capsules, was consumed at a dose of 1 capsule a day.



Fig. 3 and 4 : The sings two days after treatment

After two weeks of treatment, there were no clinical signs, but the treatment continued for 20 days. The patient was treated with oral medication to ease allergic symptoms such as pruritus and topical steroid creams. His symptomatic itching gradually disappeared and the lesions resolved within 12 days, because the treatment started on time.

### Discussion

Pityriasis rosea is a clinical entity that was named by Gibert in 1860. It is a sudden-onset, self-limiting, and papulosquamous disease. The exact etiology of pityriasis rosea is still not clear, but many factors, such as viruses, bacteria, fungi, and non-infective etiologies, may induce pityriasis rosea.<sup>5</sup> Only a few

reports about pityriasis rosea are available. One report showed that pityriasis rosea is associated with coryzal illness and fever,<sup>6</sup> and another showed recurrent pityriasis rosea associated with oral ulcers,<sup>7</sup>

In summary, we have described a case of pityriasis rosea. The patient was successfully treated with a combination of medications, topical or systemic steroids and antihistamines. The symptoms of this disorder should be recognized by dermatologists.

### Conclusion

Although lot is known about PR, there are still a lot of gray areas which need to be addressed in future studies. We conclude that viral etiology is probably the most likely cause of PR, and thus, antivirals should be given in early stages of PR itself. Quick treatment with antihistamines and corticosteroids heals faster and does not leave marks on the skin.

Disclosure of potential conflicts of interest and Acknowledgments

The authors declare that there is no conflict of interest.

We are grateful for the support from our patient.

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USING TEXTURAL FEATURES OF CELL NUCLEI TO DEVELOP AN ARTIFICIAL NEURAL NETWORK FOR IDENTIFYING CELLS UNDERGOING CHEMICAL DAMAGE

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**ABSTRACT**

Recent advancements in artificial intelligence (AI) offer new concepts in the analysis of two-dimensional signals in cell physiology and pathology. Using contemporary software platforms, one can use textural data of cell nuclei to train and test a complex artificial neural network for recognition and analysis of cells undergoing damage and apoptosis. The textural data can be obtained using modern computational algorithms such as those based on gray-level co-occurrence matrix (GLCM) or run-length matrix (RLM). Resulting features such as angular second moment (textural uniformity) and inverse difference moment (local textural homogeneity) can be used for model training, while the output represents the class of the cell or its functional status. Hereby, we propose a hypothetical GLCM and RLM-based multilayer perceptron model that can be used for the classification of *Saccharomyces cerevisiae* cells in various settings. The model is written using the scikit-learn Python library and can be used for future experiments on yeast cells. The model serves as a basis for future work in the application of artificial intelligence methods in fundamental biomedical sciences.

**Keywords:** AI Analysis; Textural Analysis; Apoptosis Detection; Neural Network; Cell Classification

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**FLOW AND HEAT TRANSFER ANALYSIS IN A CHANNEL CONTAINING INCLINED  
BAFFLES AND GRADUALLY EXPANDING BOTTOM WALL**

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**ABSTRACT**

In this study, turbulent heat transfer in a channel containing inclined baffles on the upper wall and gradually expanding lower wall are numerically analyzed. In the numerical study, the solutions are realized with the finite volume approach (FVM). SIMPLE algorithm is utilized for velocity and pressure relationship. The top wall of the duct is flat and adiabatic, and this surface contains inclined baffles. The bottom wall of the duct expands gradually and maintains a constant temperature. The working fluid is air. The impact of varying Reynolds numbers on turbulent heat transfer is examined by keeping other geometric properties of the channel constant. The study results are compared with the channel without baffles and the straight channel. As a result of the analysis, the pressure drop in the duct, heat transfer and performance factor are calculated. The results obtained are presented in graphs. In addition, velocity and temperature contour images are obtained in the channels with and without baffles for different Reynolds numbers. It is observed from the contour images that the channel geometry and inclined baffles remarkably change the flow and temperature fields. Nusselt number and pressure drop raised with increasing the inlet velocity of the fluid. Inclined baffles added into the channel improved heat transfer, but the pressure loss also increased slightly. The best heat transfer is found at high Reynolds number and in the channel with inclined baffles.

**Keywords:** Baffles, gradually expanding channel, heat transfer enhancement, pressure drop

**INTRODUCTION**

Researchers have been working on different heat transfer enhancement techniques for a long time. This research aims to achieve high thermal performance by using lower energy. For this reason, research has focused on passive improvement methods. Since these methods do not require additional energy, they are both inexpensive and safe (Alam et al. 2014; Ajarostaghi et al. 2022). It is known that wavy/corrugated surfaces and extended surfaces added into the channel significantly increase heat transfer (Alfellag et al. 2022; Nfawa et al. 2021; Akcay and Akdag, 2023). Numerical and experimental studies conducted on heat transfer and flow in wavy ducts with different geometric shapes (Zontul et al. 2021; Akcay, 2022; Li et al. 2022). Studies on this subject have increased due to the large number of parameters examined.

Ahmet et al. (2014) examined thermal and hydraulic behavior in trapezoidal, sinusoidal, and triangular wavy ducts. The maximum thermal enhancement and the highest-pressure loss were found the trapezoidal duct. Zhang and Che (2011) investigated the thermohydraulic performance in different wavy channels (trapezoidal, triangular, sinusoidal, elliptical, and rectangular) and trapezoidal profile provide higher heat transfer and friction factor than other channels. Salami et al. (2019)'s study results indicated the maximum thermal performance was found in the sinusoidal shaped duct. Selimefendigil and Öztop (2016) numerically investigated heat transfer over a backward facing step with a wavy bottom wall for different barrier forms. Thermal performance enhanced of 6.66% for the diamond type barrier compared to the corrugated duct without obstacles. Alnak (2020) conducted a numerical work

investigating the effects of the baffle angles on the turbulent heat transfer in a duct with V-type wavy bottom surface and a straight top surface. It was reported that the baffle angles affected the heat transfer considerably and that the  $90^\circ$  baffle angle provided the best heat transfer among other baffle angles.

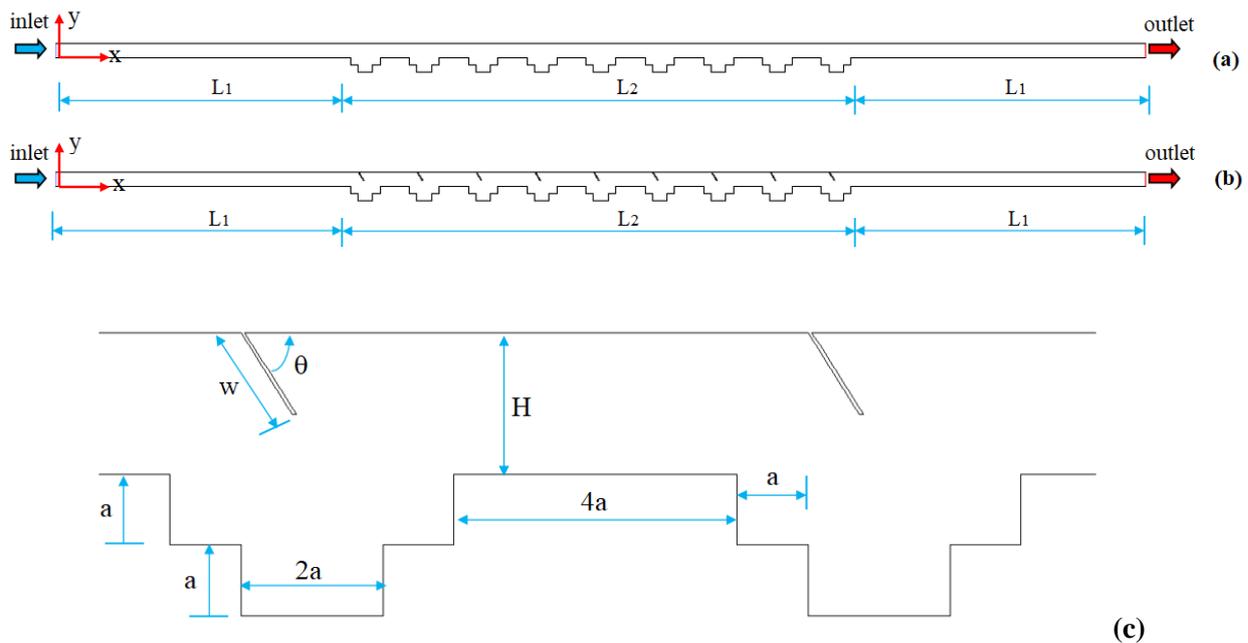
In a numerical study, Feng et al. (2022) investigated the flow and thermal efficiency in a triangular channel containing trapezoidal baffles. They reported that in the presence of trapezoidal baffles, heat transfer and pressure loss increased by 350% and 170%, respectively. They also reported that the baffles improved thermohydraulic performance by 30%.

The aim of the above studies is to determine the duct geometry that provides the best thermal performance while keeping pressure drop to a minimum. Due to the large number of investigated parameters, new studies are needed. Therefore, this numerical study focuses thermal improvement and pressure drop in the gradually expanding ducts with/without baffles at different Reynolds number ( $2000 \leq Re \leq 4800$ ). Additionally, the findings are compared with the flat duct.

## 2. NUMERICAL PROCEDURE

### 2.1. Numerical Geometry

Figure 1 indicates 2d geometries of the gradually expanding channel with/without baffles. The height of the duct is  $H = 18$  mm. There is an adiabatic flat part of  $L_1 = 360$  mm at the inlet and outlet of the ducts. The length of the gradually expanding wavy part of the duct is  $L_2 = 612$  mm. The baffle length is  $w = 12$  mm, baffles angle is  $\theta = 60^\circ$ ,  $a$  is 9 mm. Details of other geometric features of the channel are shown in Figure 1c. The baffle thickness is considered 0.5 mm. The duct includes of 9 wavy parts.



**Fig.1.** Geometry of the gradually expanding channel, a) without baffles, b) with baffle, c) detail of the channel with baffles

### 2.2. Governing Equations

In the numerical work, the fluid is air. The fluid is incompressible and Newtonian type. The fluid flow at turbulent and steady regime. The effects of body force and radiation are neglected. The governing equations are given by:

$$\frac{\partial}{\partial x_i} (\rho \bar{u}_i) = 0 \quad (1)$$

$$\frac{\partial}{\partial t} (\rho \bar{u}_i) + \frac{\partial}{\partial x_j} (\rho \bar{u}_i \bar{u}_j) = -\frac{\partial \bar{p}}{\partial x_i} + \frac{\partial}{\partial x_j} \left[ (\mu + \mu_t) \left( \frac{\partial \bar{u}_i}{\partial x_j} + \frac{\partial \bar{u}_j}{\partial x_i} \right) \right] - \rho \overline{u'_i u'_j} \quad (2)$$

$$\frac{\partial}{\partial t} (\rho c \bar{T}) + \frac{\partial}{\partial x_j} (\rho \bar{u}_i \bar{T}) = \frac{\partial}{\partial x_j} \left[ (\Gamma + \Gamma_t) \left( \frac{\partial \bar{T}}{\partial x_j} \right) \right] \quad (3)$$

$$-\rho \overline{u'_i u'_j} = (\mu_t) \left( \frac{\partial u_i}{\partial x_j} + \frac{\partial u_j}{\partial x_i} \right) \quad (4)$$

$$\frac{\partial}{\partial t} (\rho k) + \frac{\partial}{\partial x_i} (\rho k \bar{u}_i) = \frac{\partial}{\partial x_j} \left[ \left( \mu + \frac{\mu_t}{\sigma_k} \right) \frac{\partial k}{\partial x_j} \right] + G_k - \rho \varepsilon \quad (5)$$

$$\frac{\partial}{\partial t} (\rho \varepsilon) + \frac{\partial}{\partial x_i} (\rho \varepsilon \bar{u}_i) = \frac{\partial}{\partial x_j} \left[ \left( \mu + \frac{\mu_t}{\sigma_\varepsilon} \right) \frac{\partial \varepsilon}{\partial x_j} \right] + C_{1\varepsilon} \frac{\varepsilon}{k} G_k - C_{2\varepsilon} \rho \frac{\varepsilon^2}{k} \quad (6)$$

In the work, flow and heat transfer behavior in a gradually expanding channel with inclined baffles are examined for different Reynolds numbers ( $2000 \leq Re \leq 7000$ ).

Reynolds number, Re is written by:

$$Re = \frac{\rho U D_h}{\mu} \quad (7)$$

where,  $\rho$  is the fluid density,  $D_h$  is hydraulic diameter,  $U$  is the mean inlet velocity, and  $\mu$  is the dynamic viscosity.

The Nusselt number ( $Nu_{ave}$ ) is calculated by:

$$Nu_{ave} = \frac{h D_h}{k} \quad (8)$$

here,  $h$  and  $k$  show the convective heat transfer coefficient and the thermal conductivity, respectively.

The heat transfer coefficient,  $h$  is found by:

$$h = \frac{q''}{\Delta T_{log}} \quad (9)$$

where  $q''$  is the heat flux and  $\Delta T_{log}$  shows the logarithmic difference of the temperature.

The heat transfer enhancement (HTE) is obtained as the ratio of the Nusselt number ( $Nu_b$ ) in the gradually expanding duct with inclined baffles to the Nusselt number ( $Nu_o$ ) in the straight duct

(Eq.10).

$$TE = \frac{Nu_b}{Nu_o} \quad (10)$$

The friction factor (f) calculated based on the pressure difference ( $\Delta P$ ) between inlet and outlet of the duct is defined by:

$$f = \frac{\Delta P}{\frac{1}{2}\rho U^2} \frac{D_h}{L} \quad (11)$$

The relative friction factor ( $f_{rel}$ ) is found by:

$$f_{rel} = \frac{f_b}{f_o} \quad (12)$$

where,  $f_b$  and  $f_o$  are the friction factors for the gradually expanding duct with inclined baffles and straight channel, respectively.

The performance factor (PF) can be defined by:

$$PF = \frac{HTE}{f_{rel}^{1/3}} \quad (13)$$

### 2.3. Numerical Procedure

The numerical work was solved using ANSYS Fluent (2015) solver. The equations were discretized using a second-order upwind scheme. The SIMPLE model was utilized for the pressure- velocity coupling. The convergence of the energy equations was  $10^{-8}$ , for other residuals was  $10^{-5}$ . In the study, the mesh independence testing was performed, and it was determined that the 179208 (for the gradually expanding channel with inclined baffles), 180781 (for the gradually expanding channel without baffles) and 158075 (for the straight channel) element numbers are sufficient for the calculations.

### 2.4. Boundary Conditions and Validation

The “velocity inlet” boundary condition is applied at the duct inlet. The air enters the duct at a temperature of  $T_{in} = 300$  K with a mean velocity, U. At the duct exit, the “pressure outlet” is defined. The all-straight walls are adiabatic. The gradually expanding bottom walls of the duct ( $L_2$ ) are protected at  $T_s = 340$  K. All baffles have adiabatic. The no-slip wall conditions are performed for all surfaces of the duct. The numerical study was compared to Brodniansk’a and Kot’smid (2023)'s experimental results. Figure 2 shows the results of both studies.

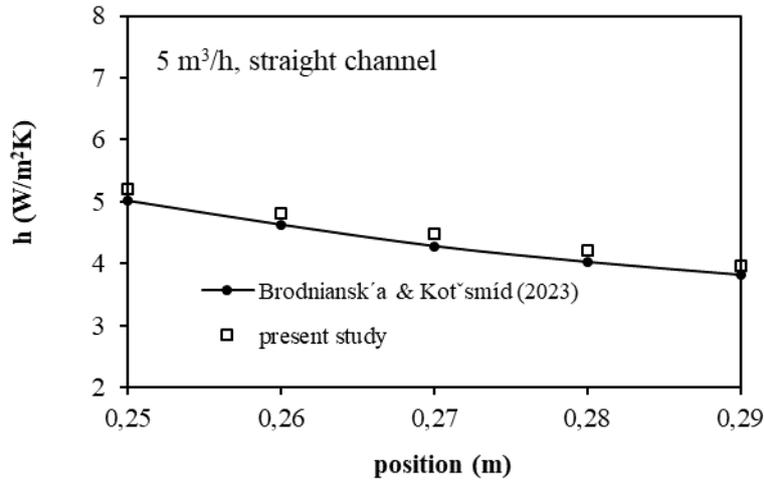


Fig.2. Verification of the numerical results.

### 3. RESULTS AND DISCUSSION

In the numerical study, different contour images were acquired in the gradually expanding ducts with/without baffles at different Reynolds number ( $2000 \leq Re \leq 4800$ ). Additionally, the results obtained were compared with the smooth duct.

Fig. 3 shows velocity contours for all duct cases at  $Re = 2000$  (Fig. 3a) and  $Re = 4800$  (Fig. 3b). It has been observed that the channel geometry changes the flow structure considerably. Especially in the presence of baffles, the main flow is directed to wavy cavities and an oscillatory movement occurred in the flow. Increasing the channel entrance velocity increases the mass flow rate and inertia force. In this way, a greater amount of cold fluid is allowed into the channel.

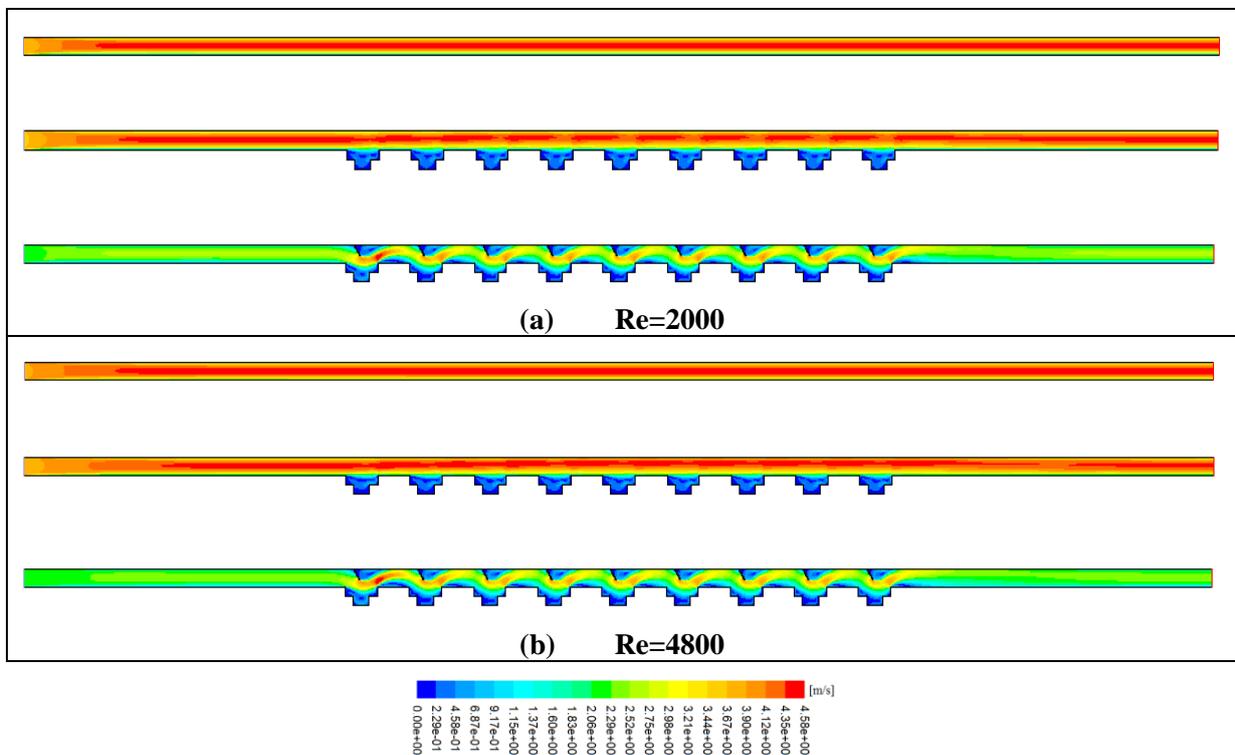
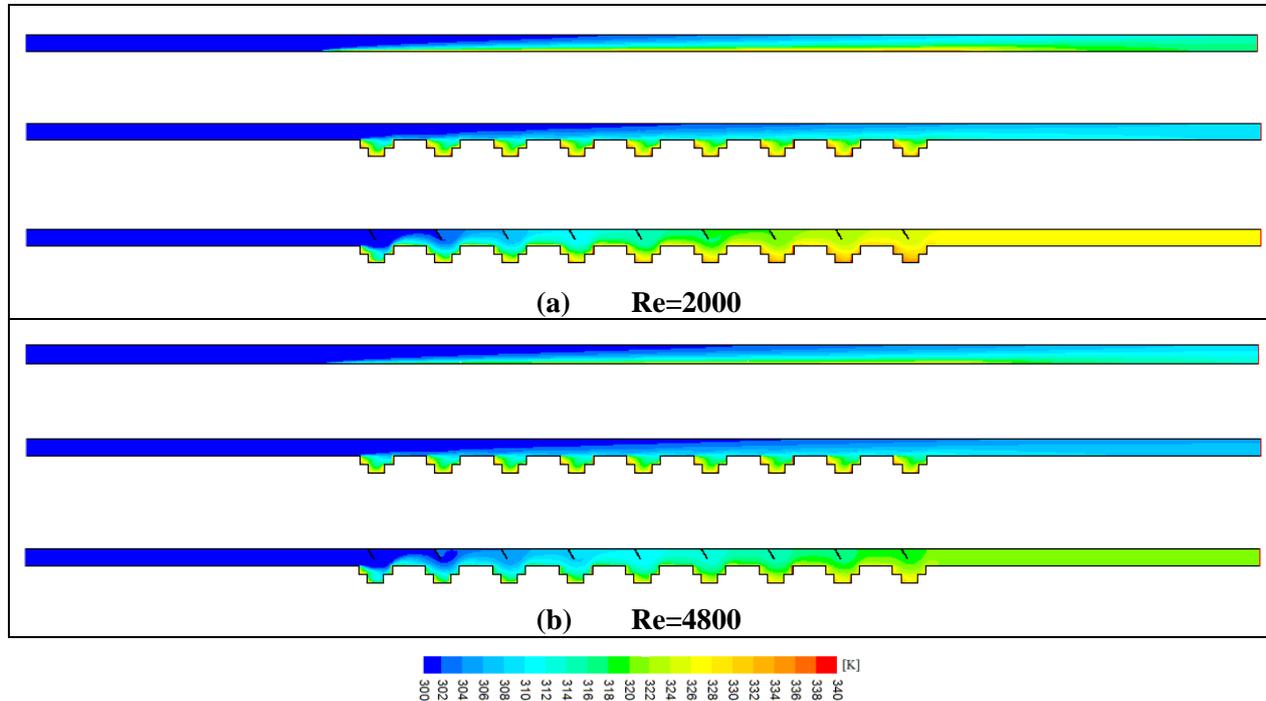


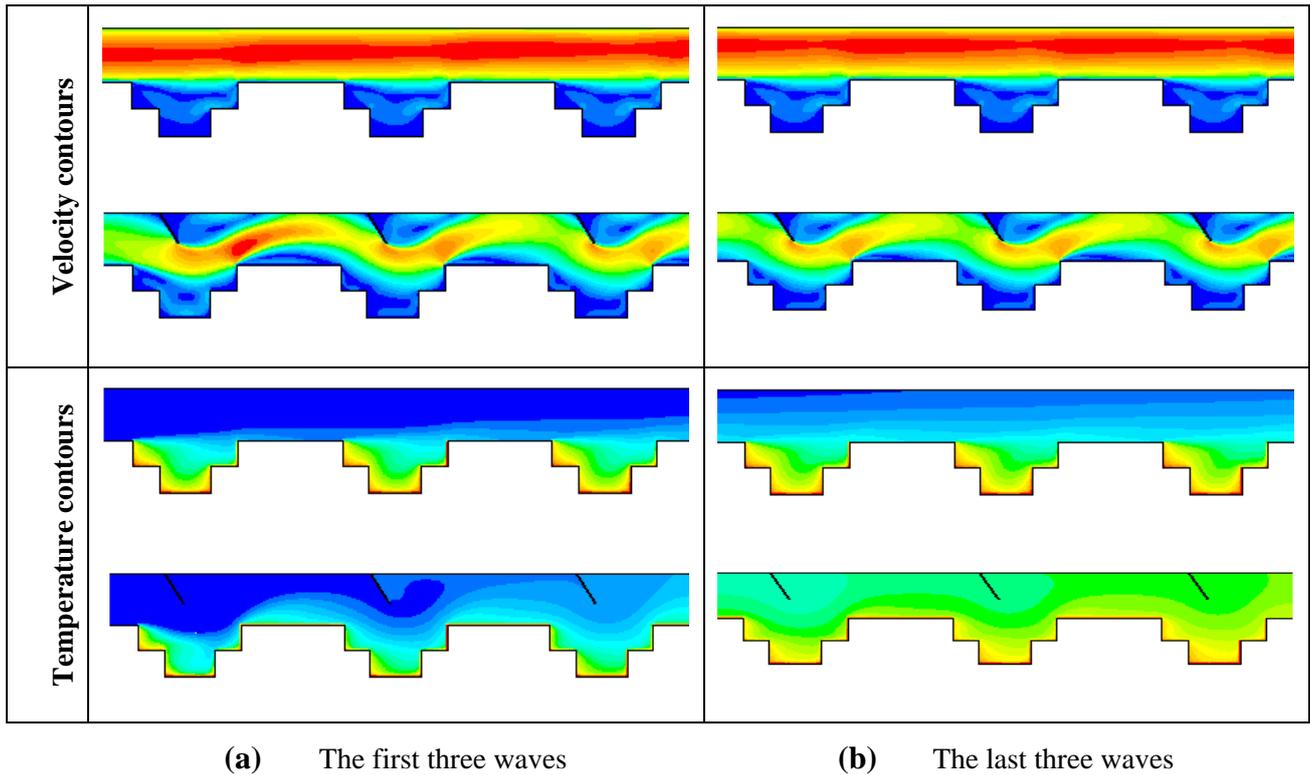
Fig. 3. Velocity contours for all channels, a- $Re=2000$ , b-  $Re=4800$ .

Fig. 4 indicated the temperature contour images for all duct cases at  $Re = 2000$  (Fig. 4a) and  $Re = 4800$  (Fig. 4b). The temperature fields were affected by the duct geometry, inclined baffles, and the Reynolds numbers. In all duct cases, the temperature gradient is found high at  $Re = 2000$ . It was seen that the temperature gradient remarkably diminished at  $Re = 4800$ . Rising  $Re$  allowed more cold fluid to contact the heated duct walls. The baffles directing the fluid to the expanding cavities provided to the reduction of surface temperature of the duct.



**Fig. 4.** Temperature contours for all channels, a- $Re=2000$ , b- $Re=4800$ .

Figure 5 presents the velocity and temperature contour images of the first three waves (Fig.5a) and the last three waves (Fig.5b) in ducts with and without baffles for  $Re=4800$ . In the duct without baffles, the fluid flows parallel to the upper surface. A flow loop is created by the fluid directed towards the expanding cavities on the bottom surface of the duct. In the duct with baffles, the inclined baffles direct the flow towards the expanding sections and a significant oscillation in the flow occurs. Secondary flow structures form after the baffles and within the expanding cavity. From the temperature contours, the temperature inside the duct increased noticeably in the last three waves compared to the first three waves. Because while the fluid flows through the channel with constant temperature, its temperature increases towards the direction of flow. It was seen that the surface temperature in the duct with baffles is markedly bottom than in the duct without baffles.



**Fig. 5.** Details of the velocity and temperature contours for  $Re=4800$

Figure 6 indicates the image of the velocity vectors of the expanding section in the middle of the duct (5<sup>th</sup> groove part) in the duct with and without baffles for  $Re = 4800$ . It is seen that in the channel without baffles, the vectors in the main flow are parallel to the surface and a flow cycle is formed in the expanding section. In the channel with baffles, the vectors of the main flow have changed direction due to the baffles. A large flow cycle formed immediately after the baffle. It was also observed that flow cycles occur on gradually expanding surfaces. These cycles are important phenomena because they cause heat transfer to increase by moving cold fluid to hot surfaces.

Figure 7 indicates the contour images of the pressure drop for  $Re=2000$  (Fig. 7a) and  $Re=4800$  (Fig. 7b) for all channel flows. At both Reynolds numbers, it is observed that while the pressure loss in the straight and the duct without baffles are quite close to each other, the pressure loss in the duct with baffles increases significantly. Since baffles present an obstacle to flow, a pressure drop in the channel is inevitable.

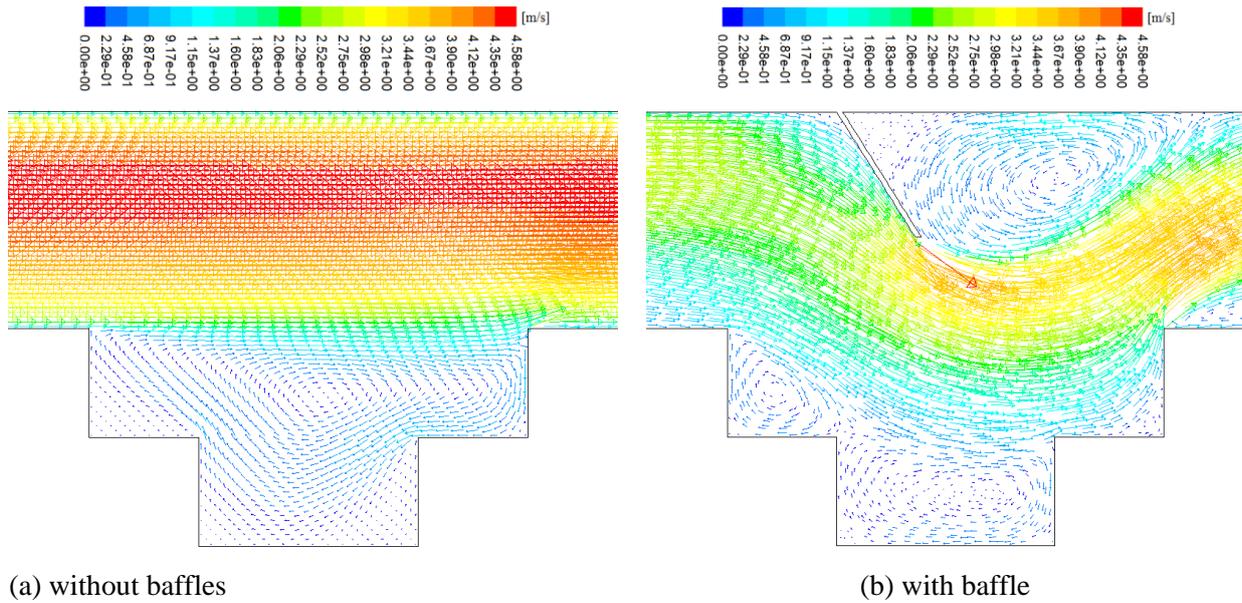


Fig. 6. Velocity vectors for 5<sup>th</sup> wave at Re=4800 in the duct with and without baffles

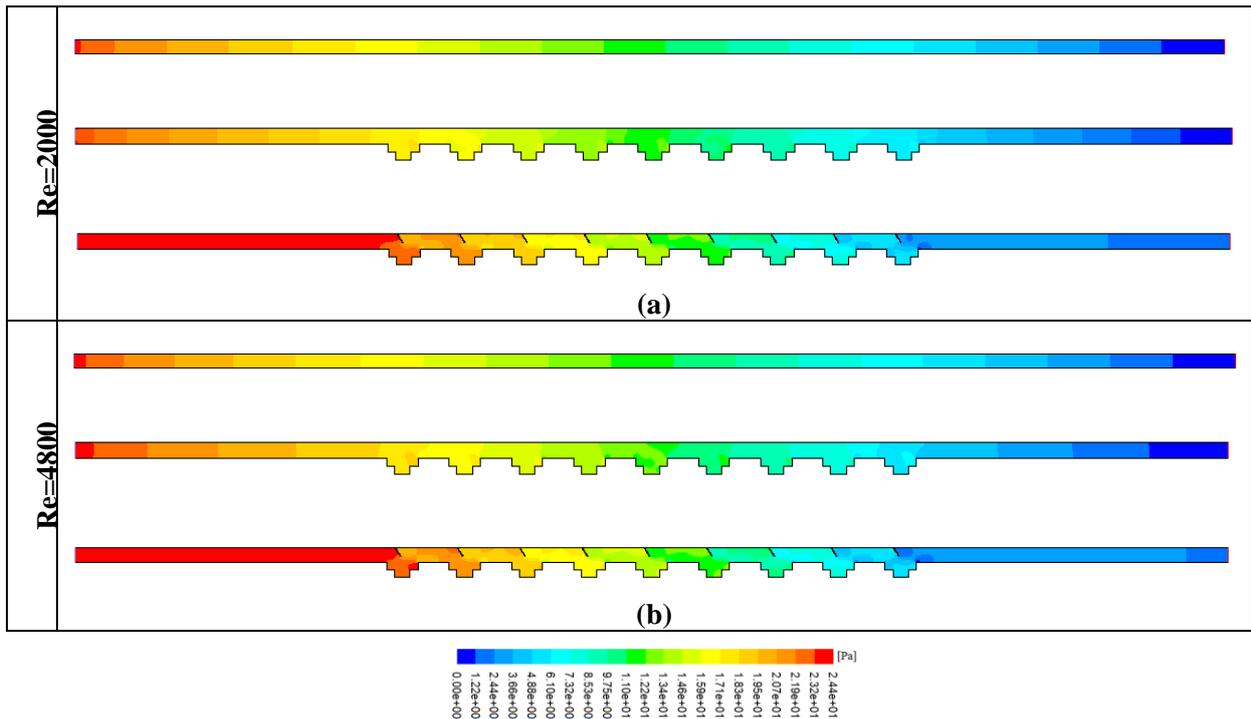
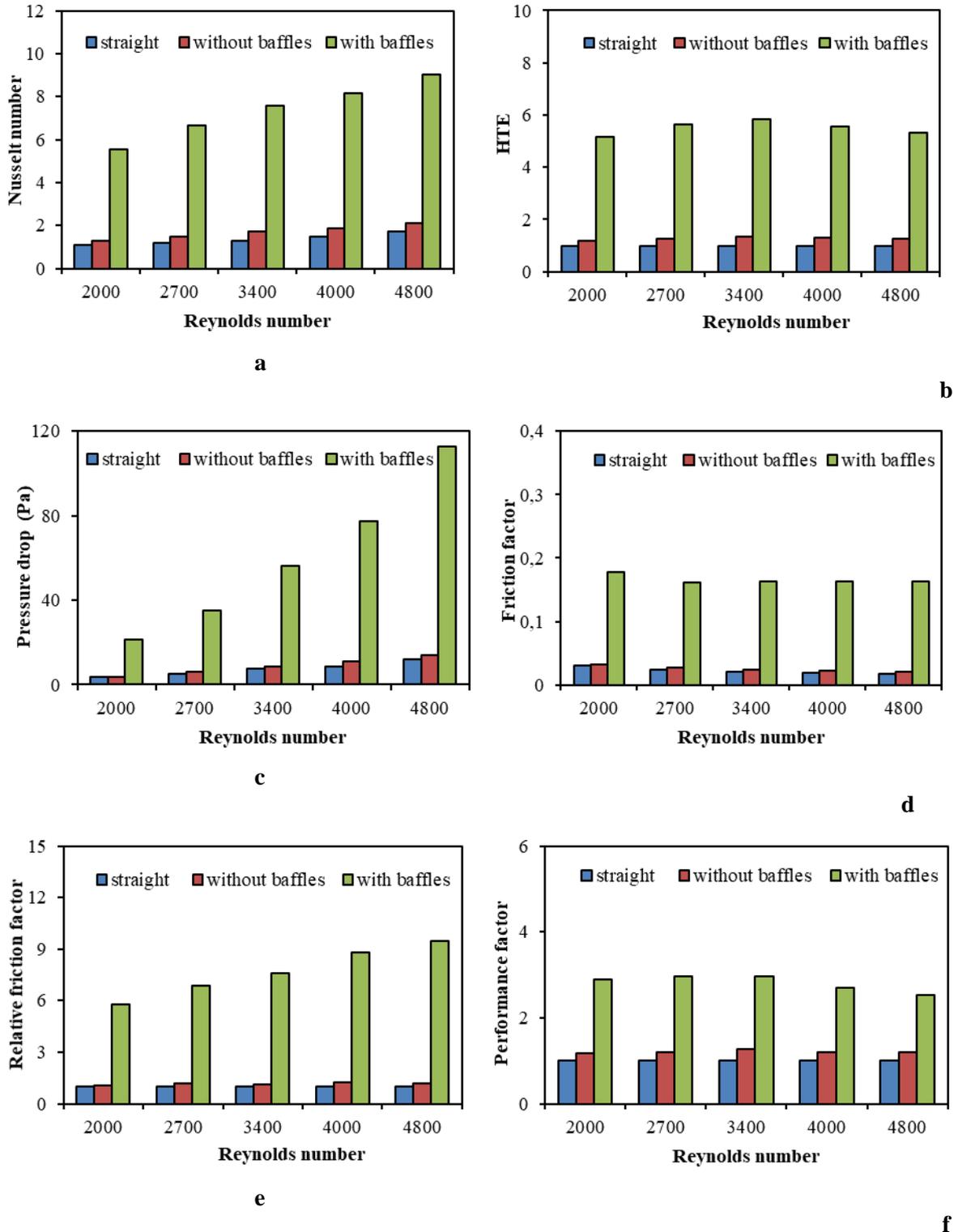


Fig. 7. Pressure drop contours for all channel cases, a) Re=2000, b) Re=4800

Figure 8a indicates the Nusselt number versus the Reynolds number for all duct cases. It is seen that the Nusselt number increases with increasing Re. Nu was obtained higher in the duct without baffles than in the smooth duct. In the duct with baffles, Nu was found to be significantly higher than in other channel cases. The highest Nu was found to be Nu = 9.04 in the channel with baffles at Re = 4800. Fig. 8b presents the variation of heat transfer enhancement (THE) with the Re. The heat transfer is significantly improved in the smooth duct compared to the duct with and without baffles. It was determined that at Re = 3400, heat transfer in the duct with baffles increased 5.85 times compared to the flat duct. Fig. 8c shows the pressure drop versus Re for all duct cases. The pressure loss increases

with the Re. The high-pressure loss occurred in the duct with baffles, followed by the channel without baffles and flat channel, respectively. The maximum pressure loss was obtained 112.63 Pa in the duct with baffles at Re = 4800.



**Fig. 8.** a- Nu, b- HTE, c- Pressure drop, d- Friction factor, e- Relative friction factor, f- PF versus Re.

The friction factor with the Re for all duct flows is shown in Figure 8d. It was observed that the friction factor tended to decrease as the Re increased. The friction factor in the duct with baffles is much higher than in the duct without baffles and in the straight channel. Fig. 8e presents the relative friction factor with the Re in all duct cases. The flat duct was considered as reference. The relative friction

factor in the duct with baffles is much higher than in the duct without baffles and in the flat channel. Fig. 8f indicates the PF versus the Re. The flat channel was considered as reference. The PF in the duct with baffles is much higher than in the duct without baffles and in the straight channel. The best PF was found as 2.97 in the duct with baffles at  $Re = 3400$ .

## 4. CONCLUSION

The numerical work analyzed heat transfer and flow behavior in the gradually expanding ducts with/without baffles at varying Reynolds number ( $2000 \leq Re \leq 4800$ ). Additionally, the results were compared with the flat duct. The contour images were presented in all duct flows. The important findings obtained in the study were listed below:

- The contour images indicated that the duct geometry, the baffles, and Re markedly affected the temperature and flow fields.
- For all channel flows, Nusselt number raised with increasing Reynolds number.
- The highest Nu was obtained to be  $Nu = 9.04$  in the duct with baffles at  $Re = 4800$
- At  $Re = 3400$ , heat transfer in the duct with baffles increased 5.85 times compared to the flat duct.
- The maximum pressure loss was obtained 112.63 Pa in the duct with baffles at  $Re = 4800$ .
- For all duct flows, as the Re increased, the friction factor decreased.
- The best performance factor was found as 2.97 in the duct with baffles at  $Re = 3400$ .
- The numerical work indicated that inclined baffles added in a gradually expanding duct can improve thermohydraulic performance.

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GAGAUZ ŞİİR EKSENİNDE İŞTİKAK SANATININ SEMANTİK BAĞLAMDA ANALİZİ  
SEMANTIC ANALYSIS OF THE ART OF İSTİKAK ON THE AXIS OF GAGAUZ POETRY

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**ÖZET**

Çalışmada, belli yönlü estetik sinyallerin semantik boyuttaki özgün dizilimini modelleyen iştikak sanatına gönderme yapılmıştır. İştikak ögesinin anlam yelpazesinden yansıyan “türetme” odaklı sözcelerle sembolize edilen sanatsal lokasyon, coşku ve âhenk birimlerini koordine ederek gramatikal yapıya estetiksel bir yön çizmiştir. Edebi yörüngede ezgisel bir uyum ve armonik bir haz yaratmak adına, aynı orijinden türeyen birden çok sözcenin bir dize ya da beyitteki betimsel örüntüsüne dikkat çekilmiştir.

Aynı kökten türeyen estetik unsurların coşkun iletimini tasvirleyen ve yazınsal dizgeyi zenginleştiren iştikak ögesinin anlam evreni, sanatçının gizil edebi hünerini de gün yüzüne çıkarmıştır. Söylem çarkını retorik bir tarzla çeviren söz konusu estetiksel yaratı, vokabüler yelpazenin anlam açısını genişleterek edebi galaktığın imgelem ufkuna sıra dışı çağrışımlar transfer etmiştir. Dolayısıyla, anlam paradigmasına ekstrem bir betim yükleyen bu senkronik tasarım, Gagauz sözcüğünü varsıl bir doğrultuya taşımıştır.

Araştırma, metin bağlamında dizayn edilen hissel yaratıların derin yapısına işlenen estetik bulguları işaretleyerek yorumsal tetkik yöntemini görünür kılmıştır. Gagauz edebiyatına dair inşa edilen şiirsel düzlem, iştikak şemasının anlam skalasında çözümlenmiş, doküman analizi metodu esas alınmıştır. Çalışma desenine yönelik teorik faktörlerin veri tabanı, semantik bir yaklaşımla analiz edilmiştir. Ortak kökten türeyen sözcelerin estetik reaksiyonunu sembolize eden dilsel yapının, Gagauz yazınına harmonik bir tarz yüklediği tespit edilmiştir. Böylelikle, duygusal periyodu estetik bir kurguyla örüntüleyen otantik çağrışım, Gagauz betim sınırındaki metaforik desenleri güçlendirerek anlam tablosunu lirik bir üslupla yeniden dramatize etmiştir.

**Anahtar Kelimeler:** Gagauz şiiri, İştikak sanatı, Semantik, Belagat, Estetik.

**ABSTRACT**

In the study, reference is made to the art of istikak, which models the unique sequence of eloquent aesthetic signals in the semantic dimension. The artistic location, symbolized by "derivation" oriented utterances reflected from the semantic spectrum of the element of interest, has drawn an aesthetic direction to the grammatical structure by coordinating the units of enthusiasm and harmony. In order to create melodic harmony and harmonic pleasure in the literary orbit, attention is drawn to the descriptive pattern of multiple utterances derived from the same origin in a line or couplet.

The universe of meaning of the element of interest, which depicts the enthusiastic transmission of aesthetic elements derived from the same root and enriches the literary system, has also brought to light the artist's latent literary talent. The aesthetic creation in question, which turns the wheel of discourse in a rhetorical style, has transferred extraordinary connotations to the imagination horizon of the literary galactic by expanding the semantic angle of the lexical spectrum. Therefore, this synchronic design, which imposes an extreme description on the meaning paradigm, has carried the Gagauz vocabulary to a richer direction.

The research has made the interpretive analysis method visible by marking the aesthetic findings embedded in the deep structure of emotional creations designed in the context of the text. The poetic plane built about Gagauz literature was analyzed in the semantic scale of the involvement scheme, and the document analysis method was taken as basis. The database of theoretical factors for the study design was analyzed with a semantic approach. It has been determined that the linguistic structure, which symbolizes the aesthetic reaction of utterances derived from a common root, imposes a harmonic style on Gagauz literature. Thus, the authentic connotation that patterns the emotional period with an aesthetic fiction has re-dramatized the table of meaning in a lyrical style by strengthening the metaphorical patterns on the border of Gagauz description.

**Keywords:** Gagauz poetry, Istikak art, Semantics, Rhetoric, Aesthetic.

## GİRİŞ

Aynı orijinden türeyen birden çok sözcenin bir dize veya beyitteki estetiksel uyumu, iştikak sanatının görünüm açısını yansıtır. Edebi düzlemde gramatikal ve sanatsal bir iz düşünle tasarlanan iştikak tablosu, coşku ve âhenk birimlerini estetiksel bir üslupla resmeder. Dolayısıyla, vokabüler ekseninde konuşlanan belîğ yönlü sözceler, iştikak dizgesinin armonik bileşimiyle yeniden semantize edilir.

Söylem atmosferini etkili ve güçlü kılmak adına, aynı kökten yansıyan en az iki sözcenin kök seslerindeki anlamsal uygunluk, iştikak sanatının odak noktasını belirler. İştikak imgesi, yüzey yapıda her ne kadar cinas faktörüyle benzetimsel bir çağrışım yaratsa da, derin yapıda kök seslerin gizil estetik ahenginin esas alındığı görülür.

İştikak sanatı, aynı kökten türemiş sözcükleri bir arada kullanma sanatıdır. Söyleyişe uyum ve güzellik kazandırmak amacıyla yapılır. Aliterasyon ve asonans gibi söz sanatlarıyla benzerliği vardır. Onlardan farkı, uyum sağlayan sözcüklerin bir kökten türemiş olmalarıdır (Köklügiller, 2009: 160). Aynı kökten olmamakla birlikte, telaffuzları birbirine benzeyen kelimelerin bir ibarede toplanması ise “şibh-i iştikak” olarak nitelendirilir (Tanç, 2006: 39). Dolayısıyla, bu sanatta aynı köke bağlı harflerin benzerliğinden ötürü aynı kökten türemedikleri hâlde, aynı kökten türemiş gibi görünen sözlerin bir arada kullanılması söz konusudur. İştikak sanatından tamamen ayrı olmayan bu sanata da kısaca “iştikak” adı verilebilir (Elgün, 2000: 123). Cinasta ilgili görülen iştikak, iki kelimenin mânâ ve kök harflerindeki uygunluk durumudur. Cinasta, söyleniş veya yazılışça aynı, anlamca ayrı kelimeler arasındaki benzerlik ise, iştikak cinasını bu tanıma göre anlamak doğru değildir. İştikak cinasının da esprisi “benzerlik” olup, bu ise kök harflerin birliğindeki benzerliktir. Burada söylenişçe aynılık, mânâca gayrılık değil; kök harflerin birlik ve uygunluğunun esas alınmasıdır (Eliaçık, 2018: 292). Diğer söz sanatlarında olduğu gibi, iştikakın bir sanat niteliği taşıması için sözde doğal olarak bulunması, özellikle kullanılmış olduğu izlenimi vermemesi (Saraç, 2019: 67); daha doğrusu, iştikakı oluşturan kelimelerin doğallığa dayanması gerekir (Selçuk vd., 2022: 161).

## BULGULAR

Gagauz şiir enleminde iştikak sanatının semantik bağlamdaki görüntü ekseni şu şekilde belirlemiştir:

1.

Bulunêr o uçakta,

Hem hızlı uçurdakta.

Uultu bizä yapêr.

Bukva “U” nala benzeer.

(Zanet, 2012: 6)

Söze renk ve âhenk katmak adına tasarlanan iştikak dizgesi, aynı kökün türevleri olan sözcelerin bir arada kullanılması esasına dayanmaktadır. Şiirde; “uçakta” ve “uçurdakta” (uçurtma) sözceleri arasında estetiksel bir çağrışım söz konusudur. Her iki sözcüğün kökü “uç-” olup bu sanatsal perspektif, iştikak düzleminin armonik dokusunu yansıtmaktadır.

2.

Bir direk gibiyim bân,

**Şapkam** uçmuş tepemdân.

**Şapkalı** bân bukva – “İ”,

**Şapkasız** oldum bân “I”.

(Zanet, 2012: 26)

Şiirde; “şapkam”, “şapkalı” ve “şapkasız” kelimelerinin senkronik bileşimi aracılığıyla iştikak yapılmıştır. Aynı kökenden akseden söz konusu kelimelerin ezgisel reaksiyonu, anlam yörüngesini sanatsal bir tarzla yeniden inşa etmiştir.

3.

Açan baardı “Of!” insan,

**Çalgıcılar** durgunsa.

**Çalêrlar** hep, sırdıp, –

Öbür ayaa da... kayıp.

**Çal, çalgıcı, sän, çal,**

Ötsün gitara keskin

Titireräk hem sesin,

Biz oynaycez, sän **çal.**

(Filioglu, 2005: 113)

Şiirin birinci dördlüğünde geçen “çalgıcılar” ve “çalêrlar” sözceleri ile ikinci dördlükte “çal” ve “çalgıcı” sözceleri, “çal-” kökünden türemiş olup iştikak sanatını görünür kılmıştır. Böylece şiirsel söylemin anlam ufkundan yansıyan ve aynı orijinden gelen kelimelerin senkronik yankısı, okuyucunun imgelem dünyasında sanatsal bir izlenim yaratmıştır.

4.

**Daulcu** aşaa kalmaz –

Daalacêk **daul**, susmaz!

Ama da gelin-güvä,

Nända vardır taa bölä?!

(Kösä, 2011: 31)

Şiirde; “daul” (davul) ve “daulcu” (davulcu) sözceleriyle dramatize edilen otantik dizilim, iştikak sanatının âhenk tablosunu resmetmiştir. Sanatçı, söylem paletini zenginleştirmek adına, aynı kökenden gelen belîğ katmanlı sözcelerin anlam yelpazesinden ilham almıştır.

5.

Bir uursuz yolları adımnêêrım,

Kasaba da olmuş kıstaf.

**Buluşmaa** hep seninnän aarêêrım,

**Buluştuanan – bulamêırım** laf.

(Zanet, 1998: 42)

Şiirde; “bul-” kökünden türetilen “buluşmaa”, “buluştuanan” ve “bulamêırım” kelimeleri aynı kökün türevleri olup iştikak ekseninde konuşlanmıştır. Böylelikle, belâgat enleminden yansıyan lirik temlerin estetiksel görüntüsü, iştikak sanatının tasviri dokusunda belirgin kılınmıştır.

**6.**

Yalancılar gelerlär kuvedä,  
insannarın fikirlerni dolaştırıp.

Da sora, arkayı dönüp,  
bakêrlar yukardan bizä,

**gülümseyip** hem da **gülmää** alıp...

(Zanet, 2021: 130)

Şiirde; “gülümseyip” ve “gülmää” kelimeleri aynı kökenden türedikleri ve bir dizede toplandıkları için iştikak yapılmıştır. “gül-” fiilinin türevleri olan bu sözceler arasında çağrışımsal bir etkileşim söz konusu olmuştur.

**7.**

Ya al ba, kardaş, makar ki **elää**

Da kendi yaptını başla **elemää**.

Büük günahlar kalacêk **elektä**:

Verip kolayı onnarı prost etmää.

(Zanet, 1998: 23)

Dörtlükte geçen “elää, elemää, elektä” kelimeleri, aynı orijinden gelen estetik sinyallerin coşkunu iletimini tasvirlemiştir. Sanatçı, anlam yelpazesine kinestetik bir imgelem yaratmak amacıyla retorik bağlamdan esinlenmiştir.

**8.**

Kış, nicä bir **büücü**,

**Büüleer** bizi, dünneyi bütün,

Natura, sansın bir ölü

Durêr yavaş, raat hem uslu,

O hiç düşünmeer uyanmaa

Da genä aktan yaşamaa...

(Akt.Bulgar, 1996: 18)

Şiirde; “büü” (büyü) kökünden türetilen “büücü” (büyücü) ve “büüleer” (büülüyor) kelimeleri aynı odaktan geçerek iştikak örgesini görünür kılmıştır. Sanatsal bir hazla yaratılan estetiksel dizge, okuyucunun duygu ve düşünce katmanını zenginleştirmiştir.

**9.**

Bän yakacak taşıyêım

Sän **çekersin** koorları

**Çeksän çekmesan - sanêrim**

Suuldamaycan onnarı.

(Baboglu, 2003: 104)

Şiirsel yörüngede “çek-” kökünün türevleri olan “çekersin, çeksän, çekmesan” sözcükleri aynı doğrultuda dizilerek iştikak sanatının betim kuşağını meydana getirmiştir. Uyum ve âhenk birimleriyle resmedilen özgün tasarı, sanatçının saklı düş atmosferini de gün yüzüne çıkarmıştır.

**10.**

Eriyerlär üç kısa solukta

Feneşli yazım renkli **günneri**...

Bin altın **güneş güler güllüktä** –

Bu orak ayı sannêr **gülleri**!

(Bujilova, 2019: 40)

Şiirde “gün” ve “güneş” sözcükleri ile “güler, güllüktä, gülleri” sözcükleri arasında köken benzerliğinden kaynaklı bir iştikak seremonisi söz konusudur. Sanatçı, bilinçli bir şekilde aynı boylamda kullandığı sözcüklele düşsel bir uyum yaratmayı amaç edinmektedir.

**11.**

**Bän yaşadım, yaşêêrim, yaşaycam**

sadä Halkımnan birliktä:

erdä, göktä, sonsuzlukta,

yıldan yıla, gündän günä...

(Zanet, 2021: 25)

Sanatçı; “yaşa-” fiilini çekimli bir hâlde işleyerek iştikak sanatı yapmaktadır. Bu otantik tasarımdan hareketle, “yaşadım, yaşêêrim, yaşaycam” sözcüklelele harmanlanan ortak kök örgesi, iştikak tepkimesinde işlem görerek söylem piramidini güçlendirmektedir.

**12.**

Diil läözım **korkmaa** zoor davalardan,

**Kork** sade ucuz kazanmaklardan.

**Korkma** doorudan hem düülmüş olmaa,

**Kork** salt yalancı hem da tok olmaa!

Üüren **korkunun** üzünä gülmää, -

Hem **korkaklundan** kendinin **korkmaa**!

(Bujilova, 2019: 206)

Sanatçı; “kork-” kökünden hareketle “kork, korkma, korkmaa, korkunun, korkaklundan” sözcüklelelele iştikak sanatı yapmıştır. Şiirin neredeyse tüm dizelerini kuşatan armonik kreasyon, dilsel katmanı güçlendirerek retorik kutuplu estetik bileşenleri aktivize etmiştir.

**13.**

**Yol-yolcaaz, dünnää yolu**

Sän **yolcuylan** hep dolu,

Bän da **yollarda** bir can

**Yolcuyum** taa zamandan

Taşı, topraam, tenimi

Kefimi, kahrımı...

(Baboglu, 2003: 124)

Sanatçı, “yol” sözcüğünün türevlerini iştikak reksiyonunda işleyerek söylem grafiğini retorik bir yöne çekmektedir. Aynı kökten türeyen “yol-yolcaaz, yolu, yolcuylan, yollarda, yolcuyum” sözcüklerinin aynı rotada belirmesi bu olguyu kanıtlar niteliktedir.

**14.**

Ne fayda, ani aalêersın,

Ani kannı yaş dökersin

Bu **dalgalı** dünnäada?...

Durmadaan geçer **dalga!**

(Karagançu, 2015: 151)

Şiirde geçen “dalga” kelimesi ve bu kelimedenden türeyen “dalgalı” ibaresinin bir arada kullanılması iştikak sanatını görünür kılmaktadır. İştikakı niteleyen sözcüklerin, şiirsel yelpazenin anlam sığasına lirik bir haz kattığı ve söylem motifini sıra dışı bir tasarımla yeniden dizayn ettiği görülmektedir.

**15.**

Aulda çalêr **türkü**,

Hiç gözümeer **türkücü**.

Bütün aulun üstü:

Zü-zü, zü-zü – yok ucu!

(Bujilova, 2020: 252)

Şiirde; “türkü” ve “türkücü” sözcükleri arasında iştikak odaklı bir uyum söz konusudur. Aynı kökten türeyen sözcüklerin müzikal vurgusuyla desenlenen edebi lokasyon, şairin düşlem yörüngesini varsıl bir doğrultuya çekmektedir.

**16.**

Ne sarp düşünmüş **yapan** kılıcı!

**Yapmış**, ki beensin onu öldür’cü.

Sarp **yapılı** – el acıtmasın,

keskinnii – bolay diri brakmasın.

(Kara Çoban, 2004: 65)

Şiirde; “yap-” kökünden türetilen “yapan, yapmış, yapılı” kelimeleri bir arada kullanılarak iştikak sanatı yapılmıştır. Çağrışımsal bir ilgiyle modellenen ve aynı orijinden akseden kelimelerin ezgisel uyumu, iştikak sanatının gizil anlam şemasını açığa çıkarmaktadır.

**17.**

Sän oldun käämil gelin –

**Sevindin, sevindirdin,**

ko adın metedilsin,

hepsi sana **sevinsin**.

(Köse, 2001: 40)

Şiirde geçen “sevindin, sevindirdin, sevinsin” sözcükleri “sev-” fiilinin türevleri olup aynı doğrultuda dizilim göstermiştir. Görüldüğü üzere, iştikak çatısı altında birleşen sözcüklerin senfonik yankısı, gramatikal bir devinimle aktivize edilmiştir.

**18.**

Taa çoktan, küçüklümdän,  
merada **kazdım** açan  
büük **kazmaylan** sıcakta  
ayırıklı toprakta...

**Tekerlek** gibi yolda

**tekerlendim** ömürdä:

näända vardı çok azmak,  
näända vardı taş-çakmak.

(Kösä, 2001: 243)

Şiirin birinci dörtlüğünde “kazdım” ve “kazmaylan” sözceleri; ikinci dörtlüğünde ise “tekerlek” ve “tekerlendim” sözceleri aynı orijinden yansımaktadır. Dolayısıyla, ortak kökten gelen kelimelerin aynı düzlemde tasvir edilmesi iştikak sanatını çağrıştırmaktadır.

**19.**

**Vardım** bän dä dünnedä,  
**Vardı** alifim sana,  
Sade bilmedim, sendä  
**Var mıydı** sevda bana.  
Ama yoktun sän.

(Kuroglu, 2011: 66)

Şiirin görünüm ufkundan akseden “vardım, vardı, var mıydı” sözcükleri arasında bir iştikak sanatı oluşturulmuştur. Her üç sözcük de aynı kökten türemiş olup anlam spektrumuna estetiksel bir haz yüklemiştir. Sanatçı, söze renk katmak amacıyla iştikak sınırından geçirdiği sözcelerle estetiksel bir sunum gerçekleştirmiştir.

**20.**

Duraklanmış yorgun dermen,  
**Uyuyêr** suyu kopkada,  
**Uyuklêêr** çoban dirseendä,  
Uzadılmış yaamurluunda.

(Karagançu, 2015: 173)

Şiirsel yaratıda “uyu-” kökünden türetilen “uyuyêr” ve “uyuklêêr” kelimeleri bir araya gelerek iştikak düzlemini inşâ etmiştir. Aynı kökenden yansıyan kelimelerin sessel uyumu, sözün anlam orbitalini güçlendirerek söylem ufkuna otantik bir betim yüklemiştir.

**SONUÇ**

Belâgat sınırından geçen saklı estetik bulguların özgün iletimini simgeleyen iştikak sanatı, çalışmanın odak noktasını görünür kılmıştır. Edebi düzlemde yansıyan “türeme” ya da “türetme” odaklı

birimlerle inşâ edilen sanatsal yapının, uyum ve coşku motifleri vasıtasıyla yazınsal dokuyu güçlendirdiği dikkate sunulmuştur.

Çalışmada, düşünsel enlemde otantik bir çağrışım yaratmak adına, aynı kökten türeyen birden fazla sözcenin bir dize veya beyitteki gizil ezgisine vurgu yapılmıştır. Bu sanatın tasviri dokusunda cinas sanatının anlam dağarcığını niteleyen yazılış ve okunuş ritmi aynı, anlam eksenini farklı kelimeler değil; aynı kökten türeyen seslerin estetiksel uyumu ve coşkun âhengi esas alınmıştır.

İştikak sanatının derin yapısında konuşlanan “şibh-i iştikak” örgesi ise aynı kökten türemedikleri hâlde, aynı kökten türemiş izlenimi veren ve telaffuz açısından benzer sözcelerin aynı odakta toplanma eylemini yansıtmıştır. Ancak çalışmada, şibh-i iştikak motifinden ziyade; iştikak sanatının anlam evreninden ilham alınmıştır. Dolayısıyla, Gagauz şiir düzleminden akseden ve aynı orijinden gelen estetiksel veriler gün yüzüne çıkarılmıştır.

Araştırma, Gagauz yazınına dair modellenen şiirsel dizgenin, iştikak sanatının lirik katmanında işlenerek özgün bir tasarımla yeniden dizayn edildiğini bildirmiştir. Böylelikle ortak kökten gelen sözcükleri aynı yöne çeken ve sanatsal bir imgelemin belgi görüngüsü olan iştikak önermesinin, Gagauz söz varlığını güçlendirip metaforik yürügedeki saklı motifleri açığa çıkardığı tespit edilmiştir.

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OBTAINING GRAIN ORIENTATION INFORMATION FROM THE EBSD IMAGE

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**ABSTRACT**

Electron backscatter diffraction (EBSD) is a scanning electron microscopy (SEM) based technique utilized for microstructural analysis of materials, providing crucial insights into crystallographic structures at a microscopic level. This paper presents a methodology for determining grain orientations in Ti-6Al-4V alloy using EBSD images and MATLAB analysis.

In this study, EBSD images taken from literature were utilized, depicting phase distribution, grain orientations, and grain boundaries of cold-rolled Ti6Al4V material. A MATLAB code was prepared to associate grain colors with information of orientation, enabling vectorial determination of grain orientations. In order to save on the number of transactions a part of the microstructure was processed, with coordinates of each grain determined and inputted into the MATLAB code. Validation was conducted using a simple color scale, confirming the accuracy of the obtained orientation information. The results were visualized in a three-dimensional graph, demonstrating the grain information of orientation obtained from the EBSD image. Miller indices were converted to vectors, and validation data from the MATLAB software affirmed the correctness of the results.

In conclusion, the study showcases a method for accurately determining grain orientations in Ti-6Al-4V alloy using EBSD images and MATLAB analysis. This approach provides researchers with a valuable tool for microstructural analysis, facilitating provides a generalization in determining the grain orientation of materials from EBSD images.

**1. INTRODUCTION**

Electron backscatter diffraction (EBSD) is a scanning electron microscopy (SEM)-based technique used to analyze the crystallographic structure of materials at a microscopic scale (Prior et al., 1999). The working principle of the system; It is based on directing a focused electron beam to a sample surface by means of a special detector adapted to the SEM device and obtaining diffraction patterns of electrons scattered from the sample (Inkson, 2016). Thanks to this technique, important information

such as crystal structure, crystal orientation, phase identification, grain size, morphology and grain boundary on the surface of the analyzed sample can be obtained (Schwartz, Kumar, Adams, & Field, 2009).

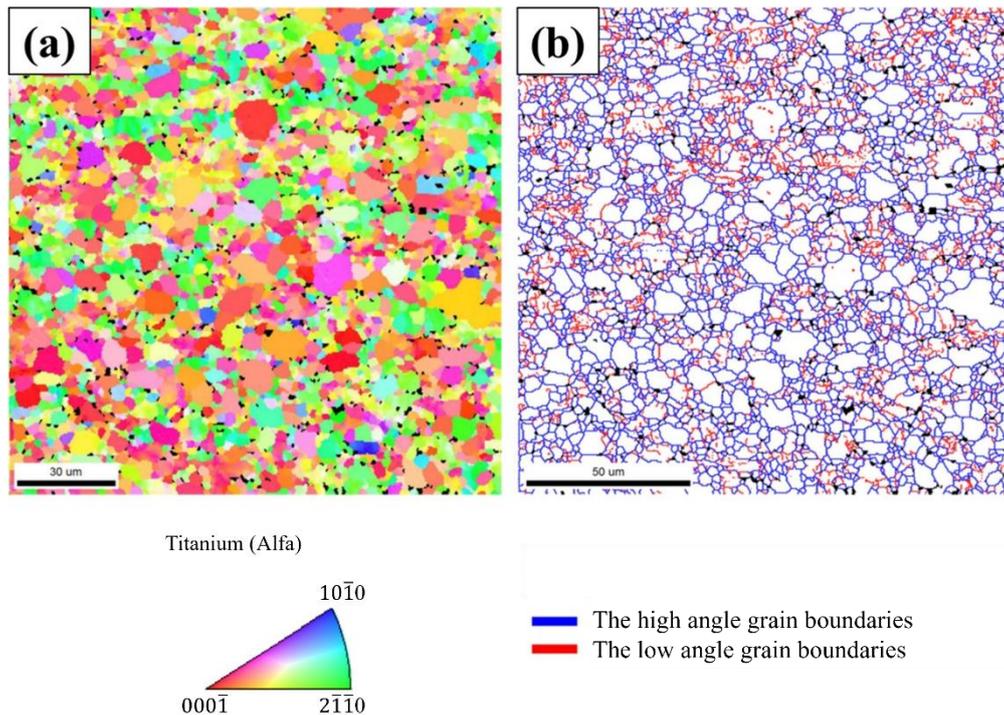
In order to obtain successful results in this highly functional analysis, a special sample preparation process is required. It is necessary for the interaction of the electron beam that the surfaces of the samples to be analyzed are flat and polished. In addition, special preparation techniques such as chemical etching or ion milling may be required to reveal the crystallographic properties of interest in the material to be analyzed (Vander Voort, Van Geertruyden, Dillon, & Manilova, 2006).

When establishing microstructure analysis by finite element method, it is essential to define the orientation information of the grains to the analysis. When the orientation information of the grains is not defined in the analysis, since all the grains will behave in the same direction, the grain behaves like an isotropic material and undergoes deformation at the same rate. When grain orientations are defined separately for grains, they undergo deformation at different rates during forming and different stress values are calculated. As a result, this approach yields results that are closer to reality. There are many studies in the literature in which grain orientations are defined while performing two and three dimensional microstructure analyses (Kalidindi, Bhattacharyya, & Doherty, 2004; Pai, Prakash, Samajdar, & Patra, 2022; Renversade & Quey, 2024).

In addition to the high initial investment cost of high-tech devices, long waiting times (the waiting order for samples to be analyzed) and long analysis times to obtain the correct image pose challenges. Apart from this, many difficulties are encountered during the EBSD image acquisition and mapping process (Wilkinson, Britton, Jiang, & Karamched, 2014). In particular, materials such as titanium alloys, which are also used in this study, where the SEM image cannot be easily obtained, force the researchers. A sample data set to represent the material is sufficient for researchers working on the method development process rather than the material development process. However, since EBSD contains a lot of data, this data is usually shared with graphs, which is a much easier method, instead of being presented in detail in the table. In this study, the orientation information of the grains in an EBSD image of the Ti-6Al-4V material taken from the literature was obtained by means of a MATLAB code. The accuracy of the information obtained on a simple color scale is confirmed.

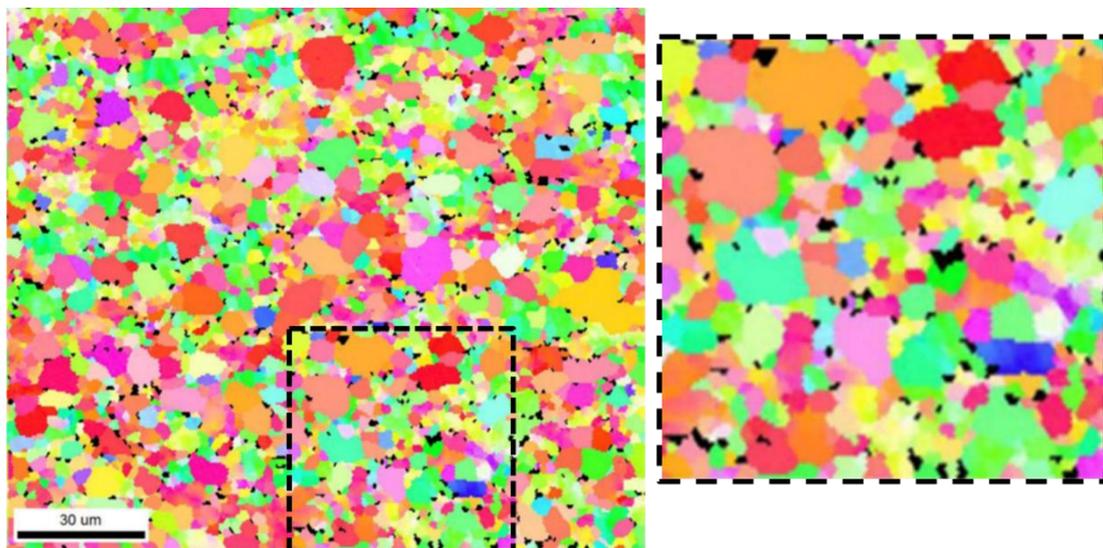
## 2. METHODOLOGY

In this study, EBSD images from Deb et al. (2022) were used. In Figure 1.a, the EBSD image showing the phase distribution and grain orientations of the cold-rolled Ti6Al4V material is given, and in Figure 1.b, the microstructure image showing the grain boundaries is given. The orientation information of the colors represented by the grains is given in the color scale shared with the EBSD image. In the alpha phase with a hexagonal structure, the colors in the color scale (RGB) represented by  $000\bar{1}$  orientation of Red,  $2\bar{1}\bar{1}0$  orientation by Green,  $10\bar{1}0$  orientation by Blue, and all color combinations in between represent different orientations, which means millions of combinations. Within the scope of this study, code has been prepared in MATLAB software to determine which color belongs to which orientation among thousands of combination colors. This code determines the color of each grain whose coordinate is entered and associates it with the color scale, allowing the grain to obtain the information of orientation vectorially.



**Fig. 1.** Microstructure images in the study Deb et al. (2022) (a) EBSD image showing grain orientations and phase distributions (b) Grain boundaries

Since performing microstructure analyzes for all grains would increase both the processing time during the establishment of the analysis and the analysis time, a part of the microstructure was processed. A 51 μm x 51 μm part of the image containing 250 alpha-phase grains was cropped and processed. Figure 2 shows the images obtained by cropping over the original image.



**Fig. 2.** Cropped version of microstructure images obtained from the literature

In order to obtain the coordinate information of the grains in the cropped image easily, all the grains were numbered and mapped as shown in Figure 3.a. The mapping process is a work done to make things easier. After the mapping process, the coordinates of each grain were determined. The

determined coordinates were defined as input to the MATLAB code and the color information of each grain was obtained. Figure 3.b shows the marking of coordinate information defined as input on the image by MATLAB. The marked regions are used for localization and do not have any effect on the analysis.

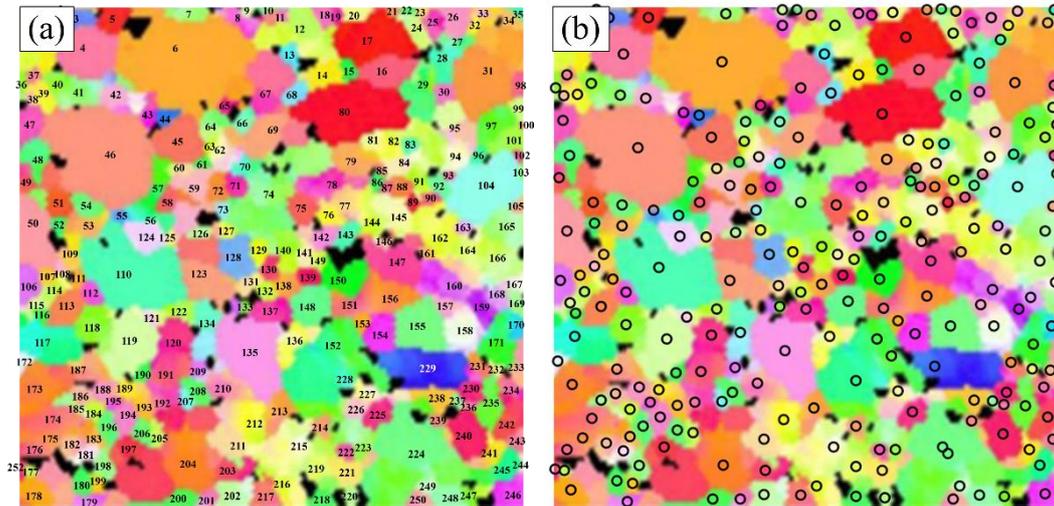


Fig. 3. (a) Mapping in the microstructure image (b) Coordinates marked by MATLAB

### 3. VALIDATION STUDY

Since there is no EBSD data for the Ti-6Al-4V material to compare the accuracy of the data obtained thanks to the MATLAB code, this process was carried out using the colors on a simple color scale. As can be seen in Figure 4, a simple color scale was created with Red, Green, Blue and the colors in between. Here, the Red (255 0 0) color represents the  $000\bar{1}$  direction, the Green (0 255 0) color represents the  $2\bar{1}\bar{1}0$  direction, and the Blue (0 0 255) color represents the  $10\bar{1}0$  direction.

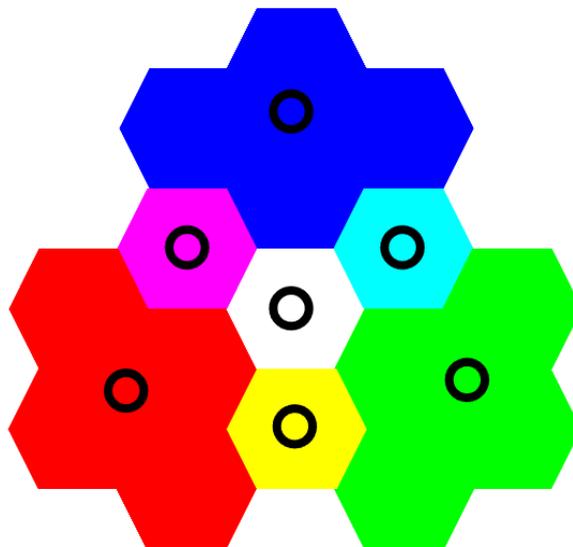


Fig. 4. Color scale prepared to determine the accuracy of the data

4. RESULTS and DISCUSSION

The vector grain orientation information obtained by analyzing the EBSD image is presented in a 3D graph in figure 5. Thanks to the code prepared here, the color of each point whose coordinate information is defined is determined and associated with the color scale and the direction information is obtained vectorically.

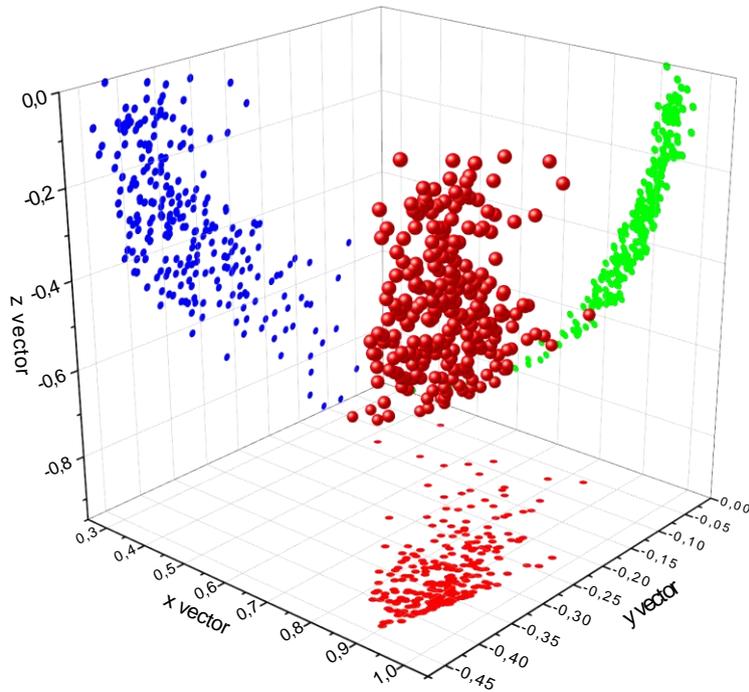


Fig. 5. Three-dimensional graph of grain orientation information obtained from EBSD image of Ti-6Al-4V alloy

The results of the determination of directions on a simple color scale prepared for verification purposes are given in Table 1. When the Miller indices of the hexagonal structure were converted to vectors, the results obtained were found to be correct.

Table 1. Validation data from MATLAB software

Color	Color code (RGB)	Miller Indices	(x), (y), (z) vectors
Red	255 0 0	$000\bar{1}$	(0), (0), (-1)
Green	0 255 0	$2\bar{1}\bar{1}0$	(0,894), (-0,447), (0)
Blue	0 0 255	$10\bar{1}0$	(1), (0), (0)

5. CONCLUSIONS

Using a code prepared in MATLAB software, the orientation information of the grains was determined by associating the color scale with the colors of the grains with an EBSD image of the Ti-6AL-4V material. The verification study revealed the accuracy of the information obtained. In this study, the coordinate information of the grains of any material with an EBSD image can be defined to the developed code and the orientation information of the grains can be easily obtained.

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**KÜRESELLEŞEN DÜNYADA HEMŞİRELİK GÖÇÜ**  
**NURSING MIGRATION IN A GLOBALIZING WORLD**

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**ÖZET**

Küreselleşmenin sosyal, ekonomik, politik, kültürel boyutları sağlık sistemlerini olumlu ve olumsuz etkilemiştir. Modern hemşirelik 19. yüzyıl ortalarında küreselleşmenin mekanizmaları olan savaşlar, kolonileşme ve misyonerlik faaliyetleri ile dünyaya yayılmıştır. Küreselleşmenin sosyal, ekonomik, politik, kültürel boyutları sağlık sistemlerini olumlu ve olumsuz etkilemiştir. Dünyada değişen demografik yapı ve kültürel farklılıklar, sağlıkta teletıp, teleşahlık gibi yeni teknolojiler, hemşirelerin başka ülkelere göç etmesine, toplumda bakım görevleri almalarına neden olmuştur.

Bu derleme ile küresel düzeyde gerçekleşen sağlık çalışanlarının göçüne ilişkin genel çerçeve ortaya koyulmaya, göçün nedenleri, sonuçları, göçe ilişkin politika ve yasal düzenlemeler hemşirelik özelinde incelenmeye çalışılmıştır.

Ülkelerin sağlık insan gücü eksikliği ve dengesiz dağılımı ciddi problemlere neden olan hemşirelik göçü, hemşirelerin uluslararası serbest dolaşımı ile birlikte daha kritik bir hal almakta ve önem kazanmaktadır. Hemşirelik göçünün hem göç alan ve veren ülkeler hem de göçe konu olan hemşirelik açısından olumlu ve olumsuz sonuçlarının incelenmesi, dolayısıyla bu hareketliliğin taraflar açısından maksimum fayda yaratacak şekilde yönetilmesi hemşirelik mesleğinin geleceği açısından önem arz etmektedir.

**Anahtar kelimeler:** Küreselleşme, Hemşirelik, Göç

## ABSTRACT

The social, economic, political, and cultural dimensions of globalization have had both positive and negative effects on health systems. Modern nursing spread around the world in the mid-19th century through wars, colonization, and missionary activities, which are the mechanisms of globalization. The social, economic, political, and cultural dimensions of globalization have had both positive and negative effects on health systems. Changing demographic structure and cultural differences in the world and new technologies such as telemedicine and telehealth have caused nurses to migrate to other countries and take on care roles in society.

In this review, we have attempted to identify the general framework of migration of health professionals at the global level and to examine the reasons, and consequences of migration, policies, and legal regulations regarding migration specifically for nursing.

Nursing migration, which causes serious problems due to the shortage of health workers and the unbalanced distribution of countries, becomes more critical with the free international movement of nurses. The future of the nursing profession needs to examine the positive and negative consequences of nursing migration, both for the receiving and sending countries and for the migrant nurse, and therefore to manage this mobility in a way that creates maximum benefit for all parties.

**Keywords:** Globalization, Nursing, Migration

## 1. GİRİŞ

Mesleki göç, iş veya meslek nedenleriyle bir ülkeden başka bir ülkeye taşınma veya yer değiştirme sürecidir. İş olanakları, ekonomik fırsatlar, kariyer ilerlemesi, daha iyi yaşam koşulları gibi etmenler mesleki göçü etkilemektedir. Yüksek nitelikli profesyonellerden düşük vasıflı işçilere kadar çeşitli meslek gruplarından insanlar farklı ülkeler arasında hareket etmektedir. Bu durum küresel işgücü piyasalarını etkilemekte ve ekonomik dinamikleri şekillendirmektedir (World Bank, 2020).

Yirminci yüzyılın sonlarına doğru, dünya genelinde yaşanan hızlı, politik, teknolojik, ekonomik ve sosyal değişimler sağlık sektörünü de etkilemiştir. Küreselleşme sürecinde, sağlıkla ilgili sorunlar küresel boyutta yayılmış ve bu durum sağlık bakımı sunan gruplar arasında yer alan hemşireleri de etkilemiştir (Ersin ve Bahar, 2014).

Hemşirelik, geçmişten günümüze kadar kültürel, sosyal ve teknolojik değişimler ile kendini sürekli yenilemeyi başaran; birey, aile ve toplumun sağlık ve esenliği ile ilgilenen uygulamalı bir sağlık disiplindir. Hemşireliğin temel işlevleri; birey, aile ve toplumun sağlığını ve esenliğini korumak, sürdürmek ve geliştirmektir. Hemşirelik, hastaların doğrudan bakımını üstlenmesi nedeniyle sağlık sektöründe kritik rol oynayan, sağlık hizmetlerinin koordinasyonunu ve hasta güvenliğini sağlayan, eğitim ve danışmanlık hizmetleri sunan ve önleyici sağlık bakımını destekleyen, sağlık hizmetlerinin temel yapı taşlarından biridir (Ünsal, 2017).

Mesleki göçün en sık görüldüğü alanlardan biri sağlık hizmetleridir. Hemşirelik göçü ise, bir ülkeden diğerine veya bir bölgeden diğerine hemşirelerin iş bulma veya daha iyi çalışma koşulları, eğitim ve yaşam standartları gibi nedenlerle göç etmesini ifade etmektedir. İhtiyaç açısından değerlendirildiğinde, hemşirelik mesleğine olan talep göçü arttırmaktadır. Nüfus artışı ve yaşlanma, sağlık hizmetlerinin çeşitlenmesi, hastane ve sağlık kuruluşlarının genişlemesi, kriz durumları ve salgınlar, hemşirelikteki uzmanlaşma ve ihtisaslaşma ve hemşirelik mesleğinin toplum için kritik bir öneme sahip olması gibi faktörler hemşirelik göçünün artmasında etkilidir. Bu faktörlerin birleşimi, hemşirelik mesleğine olan ihtiyacın sürekli olarak artmasına ve bu mesleğe olan talebin devam etmesine neden olurken; Ekonomik İşbirliği ve Kalkınma Teşkilatı (OECD), Dünya Ticaret Örgütü (DTÖ), Dünya Sağlık Örgütü (DSÖ) ve Uluslararası Hemşireler Konseyi (ICN) gibi önemli kuruluşlarda da bu faktörler sıklıkla kabul görmektedir. Bu durum hemşirelik göçünün prevelansını artırmakta, göç veren ülkelerde hemşirelerin göç etmesiyle sağlık sistemi zorlanabilmekte ve hizmet kalitesi düşebilmektedir. Göç alan ülkelerde ise hemşirelik göçü, sağlık hizmetlerinin karşılanmasında ve kalitesinin artırılmasında bir fırsat olabilmektedir (Yıldırım, 2009).

## 2. AMAÇ

Bu derleme ile küresel düzeyde gerçekleşen sağlık çalışanlarının göçüne ilişkin genel çerçeve ortaya koyulmaya, göçün nedenleri, sonuçları, göçe ilişkin politika ve yasal düzenlemeler hemşirelik özelinde incelenmeye çalışılmıştır.

## 3. HEMŞİRELİK VE GÖÇ

Son 20 yılda, küreselleşme adı verilen kavram sıklıkla tartışılan bir konu haline gelmiştir. Küreselleşme, dünya genelinde mal, hizmet, finansal piyasalar, yatırımlar, teknoloji, üretim faktörleri, bilgi, eğitim, demografi, kültür, hukuk, siyaset ve çevre gibi ortak değerlerin bölgesel veya ulusal sınırlarını aşarak sürekli ve hızlı bir şekilde uluslararasılaşması sürecidir (Çeken ve ark., 2008). Göç, küreselleşmenin getirdiği sonuçlardan biridir ve farklı nedenlerle gerçekleştirilmektedir. Göç, ülkelerin çalışan insan niceliği ve niteliğini etkileyen önemli faktörlerden biridir (Türk Hemşireler Derneği, 2023).

Küreselleşme sürecinde meydana gelen politik, ekonomik, sosyal ve teknolojik alandaki gelişmeler uluslararası işgücü hareketlerini kolaylaştırmış ve teşvik etmiştir (Ersin ve Bahar, 2014; Hüsmenoğlu ve Tuna, 2020). Tüm dünyayı etkisi altına alan bu gelişme sağlık alanına da yansımıştır (Hüsmenoğlu ve Tuna, 2020). Bu durum, nitelikli hemşirelerin farklı ülkeler arasında göç etmelerine neden olmuştur (Ersin ve Bahar, 2014). Florence Nightingale ile başlayan hemşireliğin, dünya çapında evrim geçirdiği göz önüne alındığında, modern hemşireliğin kökenlerinin 19. yüzyılın ortalarında Avrupa ve Kuzey Amerika'da ortaya çıktığı görülmüştür. Küreselleşmenin etkisiyle, bu meslek, savaşlar, sömürgeleştirme ve dini misyonerlik çabaları gibi süreçlerle dünyanın dört bir yanına yayılmıştır (Basuray, 1997). 1990 yılı itibarıyla sağlık alanında ortaya çıkan insan gücü açığı sonucunda, Dünya Sağlık Örgütü (WHO) ve Uluslararası Hemşireler Birliği (ICN) ilk kez 1999'da hemşire açığı hakkında uyarılarda bulunmuştur (Türk Hemşireler Derneği, 2023). Gelişmiş kapitalist ülkelerde ağırlıklı olmak üzere hemşire sayısındaki azalma veya yetersiz olma durumu nedeni ile birçok ülkede göçmen hemşirelere ihtiyaç duyulmaktadır (Aiken, 2004; Clark ve ark., 2006). Hemşirelik ve göç, küresel sağlık politikaları ve uygulamaları açısından büyük öneme sahiptir. Bu alanlarda yapılan çalışmalar, sağlık hizmetlerinin iyileştirilmesi ve küresel sağlık eşitsizliklerinin azaltılması için önemlidir.

## 4. DÜNYADA VE TÜRKİYE'DE HEMŞİRELİK GÖÇÜ

Küreselleşmenin etkileriyle, özellikle hemşireler, kariyer olanakları, işsizlik riski ve daha iyi yaşam koşulları gibi etkenlerle düşük gelirli ülkelere, zengin ülkelerdeki iş imkânlarına yönelmektedir. Hemşirelik göçünün 1970'li yılların ortasından günümüze kadar giderek arttığı görülmektedir (ILO, 2014; Aluttis ve ark., 2014; WHO, 2006). Sağlık çalışanlarının büyük kısmını oluşturan hemşirelerin 1970'lerde sadece %5'i doğduğu yerden uzakta çalışırken, en fazla göçmen artışının olduğu Ekonomik İşbirliği ve Kalkınma Örgütü'ne üye ülkelerde son yıllarda göçmen doktor ve hemşire sayısında %60 artış olduğu ifade edilmektedir (ILO, 2014). Göçün artışında, değişen ekonomi-politik yapıyla birlikte küreselleşme, ülkeler arasındaki sınırların ortadan kalkması, ulaşım- haberleşme olanaklarının artması, teknolojinin gelişimi, gelişmiş ülkelerin göçü teşvik eden politikaları etkili olmuştur (Öncü, 2018). OECD verilerine göre, 30 ülkede çalışan hemşirelerin %11'inin göçmen statüsünde olduğu görülmektedir (Blyte ve ark., 2009). Dünya Sağlık Örgütü'nün (DSÖ) yapmış olduğu bir çalışmada, 191 ülkeden elde edilen verilere göre, küresel hemşire stokunun yaklaşık 28 milyon olduğu tespit edilmiştir. 2018'de bu stokun ağırlıklı olarak (%69) profesyonel hemşirelerden oluştuğu belirtilmiş, 2013 ile 2018 yılları arasında dünya çapında hemşirelik stokunda 4.7 milyonluk fiili bir artış yaşandığı gözlenmiştir (WHO, 2020). Amerika'da çalışan hemşirelerin %11'inin yabancı uyruklu olduğu ve %80'inin gelişmekte olan ülkelere göç ettiği belirlenmiştir (Thapa ve Shrestha, 2017). Ganalı hemşirelerin ise %24'ünün yurtdışında çalıştığı görülmektedir (Abuosi ve Abor, 2015).

Türkiye'de ise çalışan sağlık çalışanları ekonomik nedenler başta olmak üzere çalışma koşulları, özlük hakları, sağlıkta şiddet gibi pek çok nedenle yurt dışına göç etmekte ve çok sayıda hemşire de yurt dışında çalışmayı amaçlayarak buna yönelik bir çaba sarf etmektedir. Türk Hemşireler Derneği'nin yapmış olduğu çalışmaya katılan hemşirelerin göç kararı nedenlerine bakıldığında; hemşirelerin %55.7'sinde ekonomik sebeplerin, %25.8'inde psikolojik ve fiziksel şiddetin, %48.9'unda mesleğe yönelik sorunların etkili olduğu belirlenmiştir. Çalışmaya katılan hemşirelerin %61,5'i hemşirelik

maaşları ile ilgili olumsuz geri bildirimde bulunarak emekleri karşısında hak ettikleri maaşları almadıklarını ifade etmişlerdir. Türk Hemşireler Derneği'nin yaptığı başka bir çalışmada ise; hemşirelerin yurt dışına göç etmelerine yönelik düşünce ve girişim durumları değerlendirilmiştir. "Hemşire Göç Eğilim Çalışması" adı altında gerçekleştirilen araştırma ile 8274 hemşirenin "göç eğilimleri" ölçülmüş, araştırmaya katılan hemşirelerin %76.3'ünün yurtdışında çalışmak istediği belirlenmiştir. Bu oranın içerisinde %21'i yurt dışında çalışmak için dil engelini geçme yönünde çabaladığını, %18'i ise yurt dışında çalışmak için gerekli şartları oluşturmaya çalıştığını ifade etmiştir. Çalışmaya katılan hemşirelerin %43'ü Avrupa ülkelerini tercih ettiklerini belirtirken, %21.6'sı Amerika ve Kuzey Amerika'yı, %15.8'i ise İngiltere'de hemşirelik yapmak istediğini ifade etmiştir. Avrupa'da en çok çalışılmak istenen ülkeler arasında ilk sırayı Almanya almaktadır. Almanya'nın ardından İtalya ve Hollanda tercih edilmektedir (Türk Hemşireler Derneği, 2023).

## 5. HEMŞİRELİK GÖÇÜNÜN NEDENLERİ

Hemşirelik göçünün nedenleri, genellikle iki ana kategori altında incelenmektedir. Bunlar; küresel dinamikleri kapsayan üst düzey faktörler ve bireylerin ülkelerdeki çekici ve itici unsurlarını içeren alt düzey faktörlerdir (Yıldırım, 2009).

### 5.1. Üst Düzey Faktörler

Hemşirelerin serbest dolaşımını belirleyen üst düzey faktörler arasında ekonomik ve politik faktörler, küreselleşme, teknolojik ilerlemeler, toplumun değişen beklentileri, yaşlanan nüfus, hastalık örüntülerindeki değişimler, Avrupa Birliği (AB) dinamikleri ve uluslararası kuruluşlar bulunmaktadır. Bu unsurlar, genellikle bireylerin ve ailelerin kontrolü dışında olan daha geniş etkileyici faktörlerdir (Yıldırım, 2009).

**Ekonomik ve Politik Faktörler:** Ülkelerin ekonomik durumu, hemşirelerin göç etme nedenlerinden biri olarak öne çıkmaktadır. Bu durum genellikle fakir ülkelere zengin ülkelere doğru bir göç şeklinde gerçekleşmektedir. Gray ve Phillips tarafından gerçekleştirilen bir çalışmada, hemşire göçünü etkileyebilecek faktörler arasında kişi başına düşen milli gelir, hemşire maaşları, bağımlılık oranı ve tahmini hemşire sayıları öne çıkmaktadır (Yıldırım, 2009).

**Küreselleşme:** Küreselleşme, tanımı ve doğası gereği, kişilerin hareketliliğini içeren bir süreç ve dinamiktir. Dolayısıyla küreselleşme, hemşirelerin uluslararası dolaşımı ile yakından ilişkilidir. Piyasaların küreselleşmesi uluslararası göçü kolaylaştırmış ve hem bireylerin hem de ticaretin serbest dolaşımı önündeki engelleri azaltmıştır (WHO, 2006).

**Teknolojik Gelişmeler:** Teknolojik gelişmeler, hemşirelerin serbest dolaşımına veya göçüne iki şekilde neden olur. Bunlardan ilki, daha fazla uzmanlaşma ve yeni iş alanlarının ortaya çıkmasıdır. Bu durum sağlık insan gücü talebini artırabilir. İkinci neden ise, bazı ülkelerin gelişmiş teknolojiye sahip olmaması ve hemşirelerin daha iyi teknolojik ortamlarda eğitim almak ve çalışmak için daha gelişmiş ülkelere göç etmesidir (Yıldırım, 2009).

**Toplumun Artan Beklentileri:** Artan beklentiler, hemşireleri daha iyi eğitim almak, daha iyi ortamda (teknolojik ve yönetsel anlamda) çalışmak, hasta ilişkileri konusunda daha donanımlı olmak konusunda zorlamaktadır. Bu zorlama da hemşirelerin göçünü gündeme getirebilmektedir (Yıldırım, 2009).

**Nüfusun Yaşlanması:** Nüfusun yaşlanması, hemşirelik göçü üzerinde çeşitli etkilere sahiptir. Yaşlı nüfusun artması, sağlık hizmetlerine olan talebi artırırken, bu da daha fazla hemşireye ihtiyaç duyulmasına yol açabilir. Buna ek olarak, yaşlanan nüfus genellikle kronik hastalıkların ve yaşla ilişkili sağlık sorunlarının daha yaygın hale gelmesine neden olabilir. Bu durum hemşirelerin uzmanlık alanlarında değişiklik yapmasını veya belirli alanlara yönelmesini gerektirebilir (Yıldırım, 2009).

**Avrupa Birliği Dinamikleri:** Serbest dolaşım, Avrupa Birliği'nin (AB) temelini oluşturan kritik unsurlardan biridir. AB'nin Tek Avrupa Pazarı'nın bir parçası olan kişilerin serbest dolaşımının teşvik edilmesi, işgücü hareketliliğini sağlamak için önemli bir politika alanı oluşturmaktadır. AB dinamiklerinde hemşirelerin serbest dolaşımını desteklemek için çeşitli düzenlemeler ve uygulamalar bulunmaktadır. AB düzenlemelerinin varlığı, hem kurumsal hem de mevzuat açısından hemşirelerin

serbest dolaşımını belirleyen önemli unsurlardan biridir (Commission of the European Communities, 2008).

**Uluslararası Kuruluşlar ve Meslek Örgütleri:** Dünya Sağlık Örgütü (DSÖ), Dünya Bankası (DB), Ekonomik Kalkınma ve İş Birliği Örgütü (OECD), Uluslararası Para Fonu (IMF), Uluslararası Çalışma Örgütü (ILO), Uluslararası Göç Örgütü (IOM) ve Dünya Ticaret Örgütü (DTÖ) gibi uluslararası kuruluşlar ile Dünya Tıp Birliği, Uluslararası Hastane Federasyonu ve Uluslararası Hemşireler Konseyi (ICN) gibi uluslararası sağlık meslek kuruluşları, hemşirelerin uluslararası göçü üzerinde etkili olan önemli aktörlerdir. Bu kuruluşlar, uluslararası göç sürecinin yönetilmesinden, göçmenlerin haklarının korunmasına kadar çeşitli alanlarda faaliyet göstermektedirler. Göçmen hemşireler için politika geliştirme, eğitim ve uzmanlaşma fırsatları gibi konularda çalışmalar yürüterek uluslararası göçü etkileyen faktörleri ele alan bu kuruluşlar, uluslararası işbirliği ve koordinasyon yoluyla hemşirelerin uluslararası göçüne ilişkin politika ve uygulamaların geliştirilmesine katkıda bulunmaktadır (Yıldırım, 2009).

## 5.2. Alt Düzey Faktörler

Hemşirelik göçünde etkili olan alt düzey faktörler; "çeken" ve "iten" faktörler olarak iki ana kategori altında incelenebileceği belirtilmektedir. Çekici faktörler, göç alan ülkelerin sağlık hizmetlerinin cazibesini yansıtırken, itici faktörler ise göç veren ülkelerin sağlık sistemi veya çalışma koşullarındaki zorlukları temsil etmektedir (Arango, 2000).

Hemşirelik göçünde iten ve çeken faktörler şu şekilde sıralanabilir:

**İten Faktörler:** Düşük ücret, olumsuz çalışma koşulları, sağlık sistemindeki kaynak yetersizliği, sınırlı kariyer ve eğitim olanakları, uzmanlık eğitiminin olmayışı, sınırlı esnek kariyer planlama fırsatı, sürekli eğitim eksikliği, iş memnuniyetsizliği, HIV/AIDS'nin etkisi, ekonomik istikrarsızlık, politik zorluklar, olumsuz yaşam koşulları, personel yetersizliği nedeniyle aşırı iş yükü, düşük mesleki statü, işsizlik, açlık ve yoksulluk, doğal afetler, çevresel bozulmalar, şiddet ve eziyet, evlilik birleşmeleri, ailevi nedenlerden dolayı bir araya gelme, savaşlar, güvenlik endişesi, kendi ülkesinde gelecek görememe gibi nedenler hemşirelik göçünde itici güçler arasında sayılmaktadır (Ersin ve Bahar, 2014).

**Çeken Faktörler:** Daha yüksek gelir, işçi dövizini gönderme fırsatı, daha iyi muamele ve çalışma koşulları, daha iyi donatılmış sağlık sistemleri, kariyer fırsatları, ileri eğitim fırsatları, yüksek eğitim standartları, seyahat olanakları, iş yardımı, aile için daha iyi bir gelecek, daha kaliteli bir yaşam, politik istikrar gibi nedenler hemşirelik göçünde çekici güçler arasında sayılmaktadır (Ersin ve Bahar, 2014).

Hemşirelerin göç etmelerinde, özellikle çalışma hayatından kaynaklanan beklentiler ilk sırayı almaktadır. İnsanlar sonuç olarak hem iş hayatlarında, hem sosyal hayatlarında daha yüksek bir standart elde etmek, daha güvenilir ve refah seviyesi yüksek bir hayat sürdürmek istemektedirler. Başta ücret dengesizliği, olumsuz koşullar, güven problemi, siyasi baskı ya da otorite boşlukları, insanlarda memnuniyetsizliğe yol açmakta ve bu olumsuzluklardan kurtulacaklarını düşündükleri ortamlara gitmek ve çalışmak istemektedirler (Cavlak, 2014).

## 6. HEMŞİRELİK GÖÇÜNÜN SONUÇLARI

Hemşirelik göçü, göç alan ve göç veren ülkelerde farklı sonuçlara yol açmaktadır.

### 6.1 Hemşirelik Göçünün Göç Veren Ülkelerdeki Sonuçları

Hemşirelik göçü, göç veren ülkelerde çeşitli olumsuz etkilere neden olabilir. Öncelikle, hemşirelerin göç etmesi sağlık sektöründe personel eksikliğine yol açabilir, bu da sağlık hizmetlerinin aksamasına ve hasta bakımında gecikmelere neden olabilir. Yetersiz personel nedeniyle hizmet kalitesinde de düşüş yaşanabilir ve hastaların sağlık hizmetlerine erişimi zorlaşabilir. Hemşirelerin göç etmesi aynı zamanda göç veren ülkelerde eğitim kaybına da yol açabilir; bu ülkelerde eğitim almak için yapılan yatırımların kaybıyla birlikte, sağlık sistemlerindeki personel eksikliği daha da artırabilir. Nitelikli hemşirelerin göç veren ülkelerdeki ekonomik üretkenliğin azalması, ekonomik kayıplara da neden olabilir. Sosyal ve kültürel açıdan ise, hemşirelik göçü toplumların sağlık hizmetlerine olan güvenini azaltabilir veya zedeleyebilir (Özkan, 2008).

## 6.2 Hemşirelik Göçünün Göç Alan Ülkelerdeki Sonuçları

Hemşirelik göçü, göç alan ülkelerde çeşitli etkilere sahip olabilir. Öncelikle, göç eden hemşireler sağlık hizmetlerinin sunumunda önemli bir rol oynayarak, göç alan ülkelerin sağlık sistemlerini güçlendirebilirler. Daha fazla hemşire, sağlık hizmetlerinin erişilebilirliğini artırabilir ve sağlık bakımı kalitesini yükseltebilir. Ayrıca, farklı kültürlerden gelen hemşirelerin varlığı, göç alan ülkelerde sağlık personeli havuzunu çeşitlendirerek kültürel zenginliği artırabilir. Bu durum, sağlık hizmetlerinin daha geniş bir demografik yelpazeye hitap etmesine ve hastaların kültürel ihtiyaçlarının daha iyi karşılanmasına yardımcı olabilir. Hemşirelik göçü aynı zamanda iş gücü piyasasındaki dengeleri de etkileyebilir; talebin yüksek olduğu durumlarda, göç eden hemşireler iş gücü piyasasındaki boşlukları doldurabilir ve sağlık hizmetlerinin sürdürülebilirliğine katkıda bulunabilir. Göç alan ülkeler ayrıca, göç eden hemşireler aracılığıyla uluslararası işbirliği ve bilgi paylaşımı fırsatlarından yararlanabilir. Farklı ülkelerden gelen hemşireler, deneyimlerini ve en iyi uygulamaları paylaşarak sağlık hizmetlerinin iyileştirilmesine katkıda bulunabilir. Göç eden hemşirelerin entegrasyonu ve uyumu için destekleyici politika ve programların geliştirilmesi, hemşirelerin toplumlara daha iyi adapte olmasını sağlayarak sağlık hizmetlerinin daha etkin bir şekilde sunulmasına katkıda bulunabilir. Bu etkiler, hemşirelik göçünün göç alan ülkelerdeki sağlık sistemleri ve toplumlar üzerindeki önemli etkilerini göstermektedir (Özkan, 2008).

## 7. HEMŞİRELİK GÖÇÜ İLE İLGİLİ POLİTİKALAR VE DÜZENLEMELER

Hemşirelik göçü ile ilgili yapılan politikalar ve düzenlemeler, çeşitli alanlarda şekillenmektedir. Bazı ülkeler göçü kontrol altına almak veya yönetmek için politikalar geliştirirken, bazıları ise göçü teşvik etmek amacıyla belirli kriterlere dayalı politikalar uygulayabilmektedir (Okumuş ve ark., 2016).

General Agreement on Trade in Services (GATS) gibi uluslararası antlaşmalar ve AB üye ülkeler arasındaki çok taraflı direktifler, özellikle hemşirelerin, başka bir ülkede çalışmasını veya göçünü teşvik ederek serbest dolaşımı kolaylaştırmaktadır. Bu tür düzenlemeler, sağlık hizmetlerinde nitelikli iş gücünün hareketliliğini artırarak uluslararası işbirliğini ve sağlık sistemlerinin etkinliğini desteklemeyi amaçlamaktadır (Buchan ve ark., 2005; Özkan ve Hamzaoğlu, 2008).

### 7.1. Göç Alan Ülkelerin Politika ve Düzenlemeleri

ABD, Kanada, İngiltere, Yeni Zelanda, Avusturya, Almanya, Norveç, İsveç, İsviçre gibi ülkeler, 1980'li yılların ortalarından itibaren özellikle hemşirelerin uluslararası göçünü teşvik edici politikalar uygulamış ve bunun için lobicilik faaliyetleri yürütmüştür (Özkan ve Hamzaoğlu, 2008). AB üyesi ülkeler arasında sağlık çalışanlarının sınırlılık olmaksızın göç etmesine izin verilirken, İngiltere, AB üyesi sağlık çalışanlarına kolay izin vererek ve ABD'ye göre daha az sınava tabi tutarak göçü desteklemektedir. Göçmen sağlık çalışanları AB bölgesi dışından geldiklerinde İngiltere'de vize süresi iki yıl iken, ABD'de deniz aşırı ülkeler dışındaki sağlık çalışanlarına üç yıllık bir vize süresi verilmektedir (Aiken ve ark., 2004; Herdman, 2004; Özkan ve Hamzaoğlu, 2008). Ayrıca ABD, göçmen hemşire alabilmek için düşük ev kirası politikaları uygulamaktadır. (Bruch,2008). Britanya Krallığı, sağlık çalışanlarını kendi ülkesine çekebilmek için yapılacak programlara bütçe ayırmış, Avustralya, hemşire açığının çözümlenebilmesi için bir senato kurmuş, İskoçya ise bu konuya yönelik bir zirve düzenlemiştir. İngiltere, Kanada ve İrlanda son zamanlarda ulusal yayınlara hemşire açığı ile baş etme stratejileri üzerine öncelik tanımaya başlamıştır ( Buchan, 2001; Özkan, 2008). ABD, Hindistan gibi ülkelerden gelen göçmen hemşireler için yeni sınav merkezleri açarak göçü desteklemektedir. Göç veren ülkelerdeki lisans eğitimlerinin merkez kapitalist ülkelere göre yeniden yapılandırılması ve göç alan ülkelerin eğitim programlarının "mükemmel" veya "iyi" olarak sunulması gibi politikalar da göçü artırıcı etkilere sahiptir. Uluslararası öğrenci ve öğretim elemanı değişim programları da göçü teşvik etmektedir. Birleşik Krallık da dâhil olmak üzere birçok gelişmiş kapitalist ülke, göçü teşvik etmek amacıyla geçici izin sürelerini (3-5 yıl gibi) artırırken; bu politika, özellikle ABD ve Birleşik Krallık gibi birçok ülkenin, hemşire istihdamında göçmen hemşirelere bağımlılığının artmasıyla sonuçlanmıştır (Hawthorne, 2001; Aiken, 2004).

## 7.2 Göç Veren Ülkelerin Politika ve Düzenlemeleri

Hemşirelerin göç etmemesi için ülkelerin izlediği politika ve düzenlemeler başlıca şu şekildedir:

**Çalışma Koşullarının İyileştirilmesi:** Hemşirelere daha iyi çalışma koşulları sağlanması, hemşirelerin ülkelerinde kalmalarını teşvik edebilir. Daha iyi maaşlar, çalışma saatlerinin düzenlenmesi, iş güvenliği ve kariyer gelişimi olanakları gibi faktörler, göç etmeyi azaltan faktörler arasındadır (Okumuş ve ark., 2016).

**Mesleki Gelişim Olanakları:** Ülkeler, hemşirelerin mesleki gelişimlerini desteklemek için eğitim ve sürekli mesleki eğitim olanakları sunabilir. Bu, hemşirelerin kariyerlerini ülkelerinde geliştirmelerine ve yeni fırsatlar aramak için yurtdışına gitme ihtiyaçlarının azalmasına olanak sağlayabilir (Okumuş ve ark., 2016).

**Yerel İstihdam Fırsatlarının Artırılması:** Ülkeler, yerel sağlık hizmetlerinde çalışmak için teşvik edici politikalar geliştirebilir. Bu, hemşirelerin kendi ülkelerinde istihdam edilmelerini ve yerel sağlık sistemlerine katkıda bulunmalarını teşvik edebilir (Soydaş ve Seren, 2023).

**Sağlık Sektöründe Yatırım:** Ülkeler, sağlık sektörüne daha fazla yatırım yaparak sağlık hizmetlerinin kalitesini artırabilir ve personel açığını kapatmak için yerel sağlık personeline odaklanabilir (Okumuş ve ark., 2016).

**Göç Politikalarının Düzenlenmesi:** Ülkeler, hemşirelerin göç etmelerini sınırlamak için göç politikalarını ve vize düzenlemelerini gözden geçirebilir veya kısıtlayıcı önlemler alabilir (Okumuş ve ark., 2016).

Bu politika ve düzenlemeler, hemşirelik göçünü yönetmek, hemşirelerin haklarını korumak ve sağlık sistemlerinin sürdürülebilirliğini sağlamak amacıyla çeşitli alanlarda uygulanabilir.

## 8. HEMŞİRELİK GÖÇÜNÜN MESLEKİ GELİŞİME VE EĞİTİME ETKİSİ

Hemşirelik göçünün mesleki gelişime ve eğitime etkileri şu şekilde sıralanabilir;

**Bilgi ve Deneyim Paylaşımı:** Göç eden hemşireler, yeni çalıştıkları yerdeki meslektaşlarıyla bilgi ve deneyimlerini paylaşabilirler. Farklı kültürlerden gelen hemşirelerin bir araya gelmesi, mesleki bakış açılarının genişlemesine ve uygulama alanlarının zenginleşmesine katkıda bulunabilir (Yıldırım ve Dündar, 2017).

**Çeşitlilik ve Kültürel Farkındalık:** Hemşirelikte göç, sağlık hizmetlerinde çalışanların çeşitliliğini artırır ve kültürel farkındalığı geliştirir. Bu da hasta bakımında daha duyarlı ve etkili bir yaklaşımın benimsenmesine yardımcı olabilir (Yıldırım ve Dündar, 2017).

**Mesleki Gelişim Fırsatları:** Göç eden hemşireler, yeni ülkelerinde farklı uygulama alanlarına ve tekniklere maruz kalabilirler. Bu da kendi mesleklerinde daha geniş bir perspektif kazanmalarına ve yeni beceriler öğrenmelerine olanak tanır (Yıldırım ve Dündar, 2017).

**Eğitim ve Akademik Değişim:** Hemşirelik göçü, eğitim kurumları arasında akademik değişim fırsatları yaratabilir. Hemşirelik öğrencileri veya akademisyenler, farklı ülkelerde eğitim veya araştırma yapma imkânına sahip olabilirler. Bu da hemşirelik alanında uluslararası işbirliğini teşvik edebilir (Temel, 2011).

**Mesleki Standartlar ve Uyum:** Farklı ülkelerdeki sağlık sistemlerinin ve mesleki standartların farklılıkları, göç eden hemşirelerin uyum süreçlerini etkileyebilir. Yeni bir ülkede mesleki lisans veya sertifikasyon gereksinimlerini karşılamak zaman alabilir ve bazen ek eğitim veya sınavlara ihtiyaç duyulabilir (Yıldırım ve Dündar, 2017).

Bu etkilerin genellikle mesleki pratikleri zenginleştirdiği ve küresel sağlık sistemlerinin güçlenmesine katkıda bulunduğu söylenebilir.

## 9. HEMŞİRELİK GÖÇÜNDEKİ SOSYAL VE KÜLTÜREL DEĞİŞİKLİĞE ADAPTASYON SÜRECİ

Hemşirelik göçü, hemşirelerin farklı kültürler, toplumlar ve iş ortamları arasında hareket etmesini gerektiren bir süreçtir. Bu süreç, sosyal ve kültürel değişikliklere uyum sağlama gerekliliğini de beraberinde getirir. Göç eden hemşirelerin, yeni bir ülkede çalışırken hastaların kültürel bakış açısını anlaması ve buna uyum sağlaması önemlidir. Karşılıklı bu etkileşim hasta-hemşire ilişkisini güçlendirir ve etkili bir sağlık hizmeti sunumunu destekler. Ancak, bazı durumlarda göç eden hemşireler, hastaların kültürel bakış açılarına uyum sağlamakta zorlanabilir ve iletişim engelleriyle karşılaşabilirler. Bu durum, sağlık hizmetlerinin kalitesini etkileyebilir ve hasta memnuniyetini azaltır. Göç eden hemşirelerin, hastaların kültürel arka planlarına ve inançlarına saygı göstermeleri ve bu bilgiyi tedavi sürecine entegre etmeleri önemlidir. Kültürel farklılıklara duyarlı bir yaklaşım benimsemek ve gerekirse kültürlerarası iletişim becerilerini geliştirmek, hasta-hemşire ilişkilerini olumlu yönde etkiler ve sağlık sonuçlarını iyileştirir. Bu nedenle, göç eden hemşirelerin kültürel açıdan duyarlı ve esnek olmaları, etkili sağlık hizmeti sunumunu açısından son derece değerlidir (Bektaş, 2013).

Farklı bir kültürde bakım hizmeti sunma sadece hastayı değil hemşireyi de etkilemektedir. Hemşireler göç ettiği yerlerde kültürel şok yaşayabilmektedir. Göç eden hemşirelerin yaşadığı kültürel şok, genellikle sağlık hizmetleri sektöründeki özellikler nedeniyle diğer meslek gruplarından farklı olabilmektedir. Göç eden hemşirelerin bu süreçte karşılaşabileceği bazı kültürel şoklar (Bektaş, 2013);

**Sağlık Sistemlerinin Farklılığı:** Hemşireler, farklı ülkelerde sağlık hizmetlerinin organizasyonu, uygulama standartları ve hastalarla etkileşim tarzları konusunda farklılıklarla karşılaşabilirler. Örneğin, bir ülkede sağlık hizmetlerinin daha merkezi bir yapıda olması, diğer ülkelerde ise daha fazla bireysel sorumluluk gerektiren bir sistemle çalışma, göç eden hemşirelerin uyum sağlamasını zorlaştırabilir (Bektaş, 2013).

**Kültürel Farklılıklar:** Göç eden hemşireler, hasta-bakım beklentileri, aile ile etkileşim tarzları ve sağlık konularında tabuların farklı olabileceği yeni bir kültüre adapte olmak zorunda kalabilirler. Bu, özellikle hasta ve hasta aileleriyle etkileşimde zorluk yaşayabilecekleri anlamına gelebilir (Bektaş, 2013).

**Profesyonel Standartlar ve Eğitim Gereksinimleri:** Göç eden hemşireler, aldıkları eğitim ve deneyimlerin, yeni ülkelerin sağlık hizmetleri standartlarına ne kadar uygun olduğunu değerlendirmek zorundadırlar. Gerekirse, yeni standartlara uyum sağlamak için ek eğitim veya sertifikasyona almalıdırlar (Temel, 2011).

**Dil Engelleri:** Sağlık hizmetleri mesleği, doğrudan hastalarla etkileşim gerektirdiği için dil becerileri çok önemlidir. Göç eden hemşireler, yeni bir dil öğrenmek veya mevcut dil becerilerini geliştirmek zorunda kalabilirler (Yıldırım ve Dündar, 2017).

**Mesleki Kimlik:** Göç eden hemşireler, yeni bir kültürde pratik yaparken, mesleki kimliklerinde bazı değişiklikler yaşayabilirler. Bu; mesleki rollerin, sorumlulukların ve hasta-bakım yaklaşımlarının farklı olabileceği yeni bir ortamda adaptasyonu içerebilir (Bektaş, 2013).

Bu kültürel şoku atlatmak için göç eden hemşireler; yerel dilin öğrenilmesi, yerel adet ve geleneklere uyum sağlama, meslek etikleri ve uygulamalarındaki farklılıkları anlama ve kabul etme gibi bazı adımlar atmalıdır. Aynı zamanda, yeni iş ortamında mesleki rollerini anlamak ve yerel sağlık sisteminin gerekliliklerine uyum sağlamak da önemli diğer adımlardır (Yıldırım ve Dündar, 2017).

Hemşirelik göçünde adaptasyon süreci genellikle bireyin kişisel deneyimlerine, psikolojik esnekliğine ve destek sistemlerine bağlı olarak değişir. Bazı hemşireler bu süreçte hızlı bir şekilde uyum sağlarken, bazıları için bu süreç daha uzun sürebilir. Yeni teknolojileri ve prosedürleri öğrenmek, kurumun politika ve prosedürlerine uyum sağlamak gibi pratik konuların yanı sıra, sosyal etkileşimler ve mesleki ilişkiler de adaptasyon sürecinin bir parçası olarak ortaya çıkmaktadır (Yıldırım ve Dündar, 2017). Yeni bir hastaneye adapte olan hemşirelerin hastanelere adaptasyonlarında genellikle mentorluk veya oryantasyon programlarından faydalanılmaktadır. Bu programlar, yeni çalışanlara kurumun işleyişi hakkında bilgi vermekte, kaynak kişilerle tanışmalarını sağlamakta ve işlerini daha verimli bir şekilde yapabilmeleri için destek olmaktadır. Ancak göç eden hemşirelerin yeni bir hastaneye

adaptasyon süreci, zaman alabilir ve bir dizi farklı faktörden etkilenebilir. Uygun destek ve kaynaklar yardımıyla, hemşirelerin yeni çalışma ortamlarına başarıyla adapte olmaları ve verimli bir şekilde çalışmaları sağlanabilir (Yıldırım ve Dündar, 2017).

## 10. HEMŞİRELİK GÖÇÜNE İLİŞKİN ÇÖZÜM ÖNERİLERİ

Hemşirelik göçüne ilişkin çeşitli çözüm önerileri şunlar olabilir:

**Yerel Kapasitenin Güçlendirilmesi:** Göç veren ülkeler, yerel hemşirelik eğitim programlarına ve sağlık sistemlerine yatırım yaparak yerel kapasiteleri güçlendirilebilir. Bu, ülkelerin kendi sağlık personeli ihtiyaçlarını karşılaması sağlanabilir ve göç azaltılabilir (Yıldırım, 2009).

**Küresel İşbirliği ve Destek:** Uluslararası toplum, göç veren ülkelerin sağlık sistemlerini güçlendirmek için destek ve işbirliği sağlayabilir. Eğitim, altyapı geliştirme, teknoloji transferi ve kaynak sağlama gibi alanlarda uluslararası yardımların artırılması, hemşirelik göçünün azaltılmasına katkıda bulunabilir (Yıldırım, 2009).

**Göç Politikalarının Düzenlenmesi:** Göç alan ülkeler, sağlık sektöründe göçü dengelemek için uygun politika ve düzenlemeleri uygulayabilir. Örneğin, sağlık personeli göçünü kontrol etmek için vize düzenlemeleri ve mesleki göç programları oluşturabilirler (Yıldırım, 2009).

**İstihdam ve Kariyer Olanaklarının İyileştirilmesi:** Göç alan ve göç veren ülkeler, hemşirelerin istihdam ve kariyer olanaklarını iyileştirmek için işbirliği yapabilirler. Öncelikle, her iki tarafta da hemşirelik eğitime ve mesleki gelişime yönelik yatırımlar artırılabilir. Göç alan ülkeler, yerel hemşirelik eğitim programlarını güçlendirerek ve daha fazla eğitim fırsatı sunarak kendi hemşire işgücünü genişletebilir. Bu, yerel ihtiyaçları karşılamaya ve göçe bağımlılığı azaltmaya yardımcı olabilir. Göç veren ülkeler ise, hemşirelerin eğitimlerini tamamladıktan sonra kariyer fırsatları sunarak onları yerelde tutabilirler. Bu, liderlik pozisyonları, uzmanlaşma programları ve sürekli eğitim imkânlarını içerebilir. Ayrıca, her iki tarafta da çalışma koşullarının iyileştirilmesi ve rekabetçi bir ücret politikası uygulanması önemlidir. İyi bir çalışma ortamı ve adil bir ücret, hemşirelerin işlerine bağlılığını artırabilir ve göç etme eğilimini azaltabilir. Göç alan ve göç veren ülkelerin birlikte çalışarak hemşirelerin istihdam ve kariyer olanaklarını iyileştirmeleri, küresel sağlık hizmetlerinin güçlenmesine ve sürdürülebilir bir hemşirelik işgücünün oluşturulmasına katkı sağlayabilir (Soydaş ve Seren, 2023).

**Kültürel Duyarlılık ve Eğitim:** Hemşireler, farklı kültürel bağlamlarda etkili iletişim kurma ve hasta bakımını kişiselleştirme becerilerine sahip olmalıdır. Kültürel farkındalık ve kültürel çeşitliliğe duyarlılık eğitimleri, hemşirelerin küresel bir ortamda başarılı olmalarını sağlayabilir. Göç eden hemşirelere, yeni ülkelerinde kültürel ve dil eğitimi sağlanmalıdır. Bu, iletişim becerilerini geliştirerek hasta bakımında etkili olmalarına yardımcı olunabilir (Temel, 2011).

Bu çözüm önerilerinin uygulanması, hemşirelik göçünün küresel düzeydeki sağlık hizmetlerinin kalitesini iyileştirebilmektedir.

## 11. SONUÇ VE ÖNERİLER

Ülkelerin çoğu sağlık insan gücünün eksikliği ve dengesiz dağılımı problemleriyle karşı karşıya olup bu problemler; hemşirelerin uluslararası serbest dolaşımı ile birlikte daha da önem kazanmaktadır. Nitekim uluslararası kuruluşların da sağlık insan gücü göçünü gündemlerine almaları ile birlikte, durum dünya sağlık politikası gündeminde tartışılır hale gelmiştir (Okumuş ve ark., 2016). Bu derlemede hemşirelerin uluslararası düzeydeki göçünün nedenleri, sonuçları, çözüm önerileri ve ülkelerin neler yapması gerektiği konuları ortaya konulmaya çalışılmıştır. Göçün nedenlerini anlamak göçü yönetebilmenin ön koşulu niteliğinde iken; hemşirelerin göçünü etkileyen pek çok faktör bulunmaktadır. Bu faktörler arasında; ekonomik ve politik faktörler, küreselleşme, teknolojik gelişmeler, toplumun artan beklentileri, nüfusun yaşlanması ve hastalık yapılarının değişmesi, AB dinamikleri ve uluslararası kuruluşlar gibi üst plandaki faktörler ile daha yüksek gelir kazanma isteği, daha iyi çalışma koşulları, daha iyi donatılmış sağlık sistemlerinde çalışma isteği, kariyer ve ileri eğitim fırsatları, kaliteli bir yaşam ve aile için daha iyi bir gelecek gibi alt plandaki faktörler gelmektedir (Yıldırım, 2009).

Sağlık hizmetlerinin eşitlikçi dağılımını sağlamak ve hemşirelik mesleğinin küresel standartlarını yükseltmek için göç alınan ve verilen ülkeler arasında küresel işbirliği ve koordinasyonun sağlanması hemşirelik göçünün etkilerinin yönetilmesi açısından önemlidir. Küreselleşme ve hemşirelik göçü arasındaki ilişki, küresel sağlık sistemleri ve sağlık personeli piyasaları üzerinde derinlemesine bir etkiye sahiptir ve dengeli politika ve düzenlemelerin yapılması son derece gerekli bir yaklaşımdır. Aynı zamanda, göç eden hemşirelerin haklarını korumak ve insan haklarını güvence altına almak için özel yasalar veya düzenlemeler geliştirilmesi, uluslararası düzeyde işbirliği, en iyi uygulamaların paylaşılmasını ve ortak çözümlerin bulunmasını sağlayarak hemşirelik göçüyle ilgili politikaların etkinliğini artırılması dikkat edilmesi gereken diğer yaklaşımlardır (Okumuş ve ark., 2016).

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**OBSTETRİK ŞİDDET VE HEMŞİRELİK SORUMLULUKLARI**  
**OBSTETRIC VIOLENCE AND THE RESPONSIBILITIES OF THE NURSE**

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**ÖZET**

Obstetrik şiddet; sağlık profesyonellerinin, gebelik, doğum ve doğum sonrasında kadına uyguladığı bir şiddet türüdür. Sağlık profesyonelleri ve tüm dünya için önemli bir insan hakkı ihlali olan obstetrik şiddete hemşirenin farkındalığı anne ve bebek sağlığı açısından son derece önemlidir.

Bu derlemenin amacı obstetrik şiddetin önemini vurgulamak ve obstetrik şiddet probleminin önlenmesinde hemşirelere düşen sorumlulukları ortaya koymaktır.

Obstetrik şiddet türleri fiziksel istismar, onaylanmamış bakım, mahremiyetin ihlali, onur kırıcı bakım, ayrımcı bakım, bakım ihmali ve sağlık kurumunda zorla tutulma şeklinde sıralanabilir. Sosyo-ekonomik düzeyin düşük olması, etnik köken, ırk, cinsel kimlik, doğum sayısının fazla olması gibi durumlar obstetrik şiddeti etkileyen risk faktörleridir. Obstetrik şiddet, annenin fiziksel, psikolojik ve sosyal yönden kötü etkilenmesine, annenin cinsel organlarının zarar görmesine, kendini kötü hissetmesine ve özgüveninin düşmesine neden olurken; bebeğin de doğum esnasında hayatını kaybetmesine neden olabilmektedir. Anneyi biyopsikososyal yönden olumsuz etkileyen ve bebeğin yaşamını tehdit eden obstetrik şiddeti önlemede hemşirelerin farkındalıklarının artırılması, doğum sırasında anneyi her türlü şiddetten koruması ve gerekli durumlarda hastanın savunuculuğunu yapması son derece önemli yaklaşımlardır.

**Anahtar kelimeler:** Doğum, Gebelik, Hemşirelik, Obstetrik şiddet, Sağlık profesyonelleri

**ABSTRACT**

Obstetric violence is defined as violence inflicted on women by health professionals during pregnancy, childbirth, and the postpartum period. Nurses' awareness of obstetric violence, which is an important human rights violation for health professionals and the world at large, is extremely important for the health of mothers and babies.

This review aims to emphasize the importance of obstetric violence and to highlight the responsibilities of nurses in preventing the problem of obstetric violence.

Types of obstetric violence can be listed as physical abuse, unauthorized care, violation of privacy, degrading care, discriminatory care, neglect of care, and forced confinement in a health facility. Situations such as low socioeconomic level, ethnicity, race, sexual identity, and a large number of births are risk factors for obstetric violence. Obstetric violence has a negative physical, psychological, and social impact on the mother, damaging her reproductive organs, making her feel bad, and reducing her self-confidence; it can also lead to the death of the baby during birth. Sensitization of the nurses, protection of the mother from all kinds of violence during childbirth, and advocacy for the patient when necessary are extremely important approaches to prevent obstetric violence that negatively affects the mother biopsychosocial and threatens the life of the baby.

**Keywords:** Birth, Health professionals, Nursing, Obstetric violence, Pregnancy

## 1. GİRİŞ

Şiddet; bireyin fiziksel, cinsel, psikolojik veya ekonomik yönden zarar görmesiyle veya acı çekmesiyle sonuçlanması olası hareketleri, buna yönelik tehdit ve baskıyı veya özgürlüğün keyfi engellenmesini de içeren tutumlar ve davranışlardır (Adalet Bakanlığı, 2024).

Kadına yönelik şiddet, toplumsal cinsiyet eşitsizliğinden ortaya çıkan ve kadınların toplumdaki ikincil konumlarına dayanarak kadınlara uygulanan her türlü şiddet eylemi veya tehdidir (Kadın Dayanışma Vakfı, 2024).

Obstetrik şiddet kadınların, gebelik, doğum ya da doğum sonrası dönemde, bedenleri ve reproduktif süreçleri ile ilgili otonomilerinin insanlık dışı olarak tabir edilen muamelelerle ellerinden alınması, tıbbileştirmenin kötüye kullanımı ve doğal süreçlerin patolojik hâle gelmesidir (Kaban ve Ay, 2023).

Doğum ve doğum sonu süreç bakımını on yılı aşkın süredir kadın vücudunun yoğun şekilde tıbbileştirilmesi ile anne ve bebeğe yönelik gereksiz müdahaleleri içeren önemli değişikliklere maruz kalmıştır. Bakım, aşamalı olarak, gebeliğin artık yaşamın fizyolojik bir olayı olarak anlaşılmadığı, aşırı kontrol ve iyileşme gerektirdiği perspektifiyle arızalı bir cismi tedavi etmeyi amaçladığı bir olgu olmuştur (Jardim ve Modena, 2018). Doğum sürecinde gebelerin olumsuz davranışlara maruz kaldığını fark eden DSÖ, “her kadının, onurlu, saygılı sağlık bakımını içeren en yüksek sağlık standardına sahip bakımı alma hakkına sahip olduğunu” ve tüm dünyada “birçok kadının sağlık merkezlerinde gerçekleşen doğum sırasında saygısız ve saldırgan muameleye maruz kaldığını, bu durumun sadece kadınların saygılı bakım haklarını ihlal etmek değil aynı zamanda yaşam, sağlık ve fiziksel bütünlük haklarını da tehdit ettiğini” belirtmektedir (WHO, 2014).

Obstetrik şiddet sağlık profesyonelleri ve tüm dünya için önemli bir insan hakkı ihlalidir. Aynı zamanda anne ve bebek sağlığı açısından son derece önemlidir. Şiddet, bilinçli ya da bilinçsiz her ne şekilde uygulanırsa uygulansın anne ve bebek sağlığını olumsuz etkileyerek sağlıklı bir toplum oluşturmada önemli bir engel meydana getirmektedir (Kilci ve ark., 2020). Obstetrik şiddet, kültürel uygulamaları ve onaylanmamış bilimsel prosedürleri uygulama, mesleki gizliliğin ihlali, uygun olmayan tıbbileştirme, gebelik ve doğum sonu sürecin önemsenmemesi, kadınların bedeni ve cinselliklerine serbestçe karar verememesi, özellikle cinsel ve üreme sağlığı açısından kadınların yaşam kalitesini olumsuz yönde etkilemesi durumudur (Meijer ve ark., 2020). Bebek sağlığını da olumsuz yönde etkileyen obstetrik şiddet, bebeğin ciddi sorunlar yaşamasına hatta ölümüne bile sebep olabilmektedir. Özelde ana çocuk sağlığını temelde toplum sağlığını etkileyen obstetrik şiddet konusunda hemşirelerin farkındalıklarının artırılması ve hastanın savunuculuğunu yapması mesleki açıdan son derece önemlidir. Bu nedenle hemşirelerin bu konuda yeterli bilgiye sahip olmaları sağlanmalı ve farkındalıkları artırılmalıdır.

## 2. AMAÇ

Bu derlemenin amacı obstetrik şiddetin önemini vurgulamak ve obstetrik şiddet probleminin önlenmesinde hemşirelere düşen sorumlulukları ortaya koymaktır.

### 3. OBSTETRİK ŞİDDET

Obstetrik, doğum ve doğum sonrası dönemde tüm kadınların üreme yolları ve yenidoğanın bakımı ile ilgilenen tıbbi uzmanlık alanıdır (Wikipedia, 2021).

Dünya Sağlık Örgütü (2002) şiddeti; “bireyin kendisine, başkasına, belirli bir topluluk veya gruba yönelik yaralama, ölüm, fiziksel zarar, bazı gelişim bozuklukları veya yoksunluk ile sonuçlanabilen, tehdit ya da fiziksel zor kullanma” olarak tanımlamıştır (WHO, 2002).

Obstetrik şiddet, bir insan hakkı ihlali ve ciddi bir halk sağlığı sorunu olarak tasvir edilmekte ve sağlık çalışanları tarafından gerçekleştirilen ihmalkar, pervasız, ihmalcı, ayrımcı ve saygısız davranışlar şeklinde ortaya çıkmaktadır (Jardim ve Modena, 2018). Amerika Birleşik Devletleri’nde obstetrik şiddetin tanımını yapmak için yapılan bir derleme çalışmasında obstetrik şiddet, kadının her türlü gebelik ve doğum sürecinde bilgilendirilmiş onamı alınmaksızın yapılan girişimler şeklinde tanımlanmıştır (Garcia, 2020).

Gebeye yapılan bir uygulamanın obstetrik şiddet olarak tanımlanması için;

- Gebelik, doğum ve doğum sonrası döneme ait olması
- Sözel, fiziksel, medikal bir hata, eksiklik ve girişimden kaynaklı olması
- Sağlık profesyonelleri tarafından uygulanıyor olması gerekmektedir (Martins ve ark., 2022).

Obstetrik şiddet sayılan uygulamalar ise şunlardır:

- Doğum eylemi ve takibi sonucunda aile üyelerinin gebeye eşlik etmesine izin vermemek
- Ağrılı ve sık vajinal muayene yapmak
- Doğum eylemi sırasında rutin fundal bası uygulamak
- Lokal analjezik madde kullanmadan epizyotomi işlemi yapmak
- Eylem süresince gebeye karşı sert sözler sarf etmek ve gebeyi suçlamak, gebeye sert cevaplar vermek, tehdit etmek.
- İzinsiz gebenin bedenine yönelik girişimde bulunmak (Abbasi ve ark., 2022; Pehlivanoglu, 2023).

### 4. OBSTETRİK ŞİDDETİN TARİHSEL SÜRECİ

Günümüzde hala yüksek sesle konuşulmayan bir sorun olarak karşımıza çıkan obstetrik şiddetin geçmişi, doğum ve sosyal eşitsizlikler bağlamında çok eskilere dayanmaktadır. On altıncı yüzyılda Roma Katolik yetkililerinin rızaları olmadan Yahudi kadınların bebeklerine el koyarak vaftiz etmeleri ve kadınları dini seçim yapmaya zorlamalarıyla başlayan bu süreçte ırka ve dine bağlı ayrımcılıkların yapılması obstetrik şiddetin nedenleri olarak görülmüştür. Yirminci yüzyılın başlarına kadar kendini din ve ırk üzerinden gösteren obstetrik şiddet bu yüzyıldan sonra cinsiyet üzerinden kendine yeni bir yol bulmuştur. Ayrıca bu yüzyıldan sonra kadınlar doğum süreçlerinde daha fazla müdahale ile karşılaşmaya başlamıştır (Yılmaz ve ark., 2023).

Obstetrik şiddet kavramı, ilk olarak Latin Amerika’da 1980-1990 yıllarında kadın hakları savunucularının doğumun aşırı tıbbileştirilmesine karşı durmalarıyla gündeme gelmiştir (Shabot, 2016). Daha sonra 1990’lı yıllarda yapılan çalışmalarda doğum şiddeti ele alınmış ve kadınların kadın doğum servislerinde ihmal edildiği, sözlü ve fiziksel şiddete maruz kaldıkları, bakım sağlayıcılarıyla kadınların genel uygulamalarda çatıştıkları ve kadınların aldıkları bakımdan memnun olmadıkları belirlenmiştir (Jewkes ve ark., 1998). Dünyada obstetrik şiddetin tanımı ilk kez 2007 yılında Venezuela ortaya çıkmış ve aynı zamanda obstetrik şiddeti suç kabul eden ilk yasa kabul edilmiştir (Shetty ve ark., 2021; Khosla ve ark., 2016).

## 5. OBSTETRİK ŞİDDET TÜRLERİ

### 5.1. Fiziksel Şiddet

Fiziksel şiddet, sağlık personelinin gebe kadını dövmesi, tehdit etmesi, taciz etmesi gibi olayları içermektedir. Aynı zamanda çok fazla vajinal muayene, kadınların bacaklarının kabaca açılması, yatağa sabitlenmesi, gereksiz epizyotomi açılması ve işlem sırasında karına aşırı baskı uygulanması gibi işlemler fiziksel şiddet kapsamında değerlendirilmektedir (Acar ve Şahin, 2021).

### 5.2. Rızasız Bakım

Rızasız bakım, gebeyi yapılacak işlemler hakkında bilgilendirmeden işlemlerin uygulanmasıdır. Aynı zamanda müdahaleler hakkında tam bilgilendirme yapılmadan alınan onamlar da rızasız bakıma girmektedir (Acar ve Şahin, 2021).

### 5.3. Mahremiyetin Gözetilmediği Bakım

Mahremiyetin gözetilmediği bakım, gebeye ait bilgilerin herkese açık olması, hassas konularla alakalı (gebenin cinsel hayatı, geçirdiği hastalıklar ve bulaşıcı hastalık varlığı gibi durumlar) gizliliğin olmaması, vajinal muayenede mahremiyetin gözlenmemesi ve vajinal muayenenin birçok kişi tarafından yapılması durumlarıdır (Acar ve Şahin, 2021).

### 5.4. Onursuz Bakım

Onursuz bakım, gebeye bağırarak, suçlayıcı ve kaba davranmak, gebeyi azarlamak, gebenin moral ve motivasyonunu düşürecek her türlü davranış, bilgilendirme ve bakımla ilgili olumsuz davranışları içermektedir (Acar ve Şahin, 2021).

### 5.5. Ayrımcı Bakım

Ayrımcı bakım, gebenin dini, dili, ırkı, etnik kökeni, yaşı, bulaşıcı hastalık varlığı, ekonomik durumu, mesleği, eğitim seviyesi konularında maruz kaldığı durumları kapsamaktadır. Tüm bu davranışlar gebenin aynı zamanda onurunu zedeleyen ve kendini kötü hissetmesine sebep olan konulardır (Mihret, 2019).

### 5.6. İhmal Edilmiş Bakım

İhmal edilmiş bakım, gebenin doğum sırasında yalnız bırakılması, doğum eyleminde yardımcı olunmaması, yaşamını tehdit eden durumlarda gerekli müdahalelerin vaktinde yapılmaması, gebenin her türlü ihmali bu kapsamda değerlendirilir (Kukura, 2018; Bowser ve Hill, 2010; Savage ve Castro, 2017).

### 5.7. Sağlık Merkezinde Alıkoyma

Sağlık merkezinde alıkoyma, özellikle özel kuruluşlarda gebenin ve bebeğin ödeme koşullarının yerine getirilmemesi sebebiyle kadının istemediği halde kuruluştaki alıkonulması ya da kurumunu kendi rızası ile değiştirememesi önemli bir obstetrik şiddet türüdür (Kukura, 2018; Bowser ve Hill, 2010; Savage ve Castro, 2017).

## 6. DÜNYADA VE TÜRKİYE'DE OBSTETRİK ŞİDDETİN PREVELANSI

Dünyada obstetrik şiddet ile ilgili birçok ülkede yapılan çalışmalara göre obstetrik şiddet prevalansı %15 ile %97 arasında değişmektedir (Shetty ve ark., 2021). Bu kapsamda obstetrik şiddetin ülkeler düzeyinde prevalansına bakıldığında; Brezilya'da kadınların %25'inin doğum eyleminde şiddete maruz kaldığı; kadınların uygulanan amniyotomi, epizyotomi, lavman işlemlerinin ve refakatçilerin doğumda kendilerine eşlik etmesine izin verilmemesinin şiddet olarak algılandığı saptanmıştır (Kilci ve ark., 2020). 2015-2020 yılları arasında yapılan 22 yayının incelendiği bir sistematik derlemede Meksika'da %23.6, ABD'de %17.3, Mozambik'te %28, Malavi'de %58, Tanzanya'da %70, Kenya'da %20, Etiyopya'da % 78,6, Gana'da %34, Gine'de %30, Nijerya'da %44 oranında kadının doğum sırasında obstetrik şiddete maruz kaldığı belirlenmiş, Mozambik (%40.8 ), Malavi (%73,1), Gine (%49,5) ve Gana'da (%46,9) en çok mahremiyet ihlali olduğu belirtilmiş, ikinci önemli obstetrik şiddet konusunun ise izinsiz ve bilgi verilmeden yapılan vajinal muayene ve epizyotomi olduğu

saptanmıştır (Shetty ve ark. 2021). Kolombiya'da yapılan bir çalışmada gebelerin gebelikleri ve doğumlarıyla alakalı özgür karar verme ve kendini ifade etme hususunda zorluk yaşadıkları görülmüştür (Pehlivanoglu, 2023). Hindistan'da ise bu konuyla alakalı Hint Edebiyatı'nın incelenmesi ile özel sektör ve kamuya ait doğum salonlarında obstetrik şiddetin gözlemlendiği, düşük sosyal statüye sahip gebelere daha fazla kötü muamele edildiği sonucuna varılmıştır (Chattopadhyoy ve ark., 2017). Arjantin'de; ilk hamileliğini yaşayan kadınların doğum sırasında sfinkter kontrol kaybına neden olan epizyotomiye maruz kaldığı, sağlıklı bir hamilelik yaşayan kadınlara izlem yapılmadan altı saat boyunca oksitosin verildiği, tecavüz sonrası küretajın engellenmesi gibi uygulamaların yapıldığı bildirilmiştir (Biscegli ve ark., 2015). İtalya'da yapılan bir araştırmada ise, 0-14 yaş arası çocuğu olan annelerin %21'i, doğum sırasında obstetrik şiddet yaşadıklarını belirtmiştir. Her 10 kişiden 4'ü (%41) doğumda sağlanan yardımın, kadının saygınlığını ve psiko-fiziksel bütünlüğünü ihlal ettiğini ortaya koymuştur. Doğum sırasındaki bildirilen en olumsuz deneyim ise epizyotomi (%54) olduğu vurgulanmış, epizyotomi uygulanan kadınların %61'i müdahaleye ilişkin bilgilendirilmediklerini bildirmişlerdir. Genel olarak Dünya'daki epizyotomi oranları incelendiğinde, Asya ülkelerinde oranın çok yüksek (Taiwan'da %100, Çin'de %82) olduğu saptanmıştır. Bu oran Amerika Birleşik Devletleri'nde %32,7, Kanada'da %23,8 olarak saptanmıştır (Vacaflor, 2016). Ayrıca, kadınların %65'i doğum odasında on iki saatten fazla kalmak zorunda kaldıklarını bildirmiş, %59.9'u doğum sırasında hareket etmesine izin verilmediğini belirtmiştir (Ghanbari-Homayy ve ark. 2019).

Türkiye'de ise obstetrik şiddet; farkedilmeyen, konuşulmayan ve dikkate alınmayan bir konudur. Türkiye'de obstetrik şiddetle ilgili yapılan çalışmalar sınırlı sayıda olup epizyotominin primiparların yaklaşık %90'ında açıldığı ve genel epizyotomi oranının %65 olduğu bildirilmiştir (Graham ve ark., 2005; Şahin ve ark., 2007; Sayiner ve Demirci, 2007; Vacaflor, 2016). Kaban'ın çalışmasında (2022) kadınların doğumları esnasında en fazla maruz kaldığı ilk üç şiddet türü tanımlanmıştır. Bu şiddet türleri; oral alımın kısıtlanması (%73.3), izinsiz vajinal muayene (%46.2) ve ten tene temasın geciktirilmesi (%45.5) olarak belirlenmiştir. Bu çalışmada fiziksel şiddet oranının düşük olduğu (%7.8) saptanmıştır (Kaban, 2022).

### 7. OBSTETRİK ŞİDDETE MARUZİYETTE RİSK FAKTÖRLERİ

Gebelik döneminde kadına ve ailesine uygun danışmanlık ve eğitimin verilmemesi kadının ruhsal ve fiziksel sağlığını bozan ve tehdit eden davranışlar, fiziksel istismar ve saygısız bakım obstetrik şiddet nedenleri arasında sayılmaktadır. Ayrıca;

- Obstetrik şiddetin bilinmemesi
- Gebeye yönelik obstetrik şiddet konusunda herhangi bir yasanın olmaması
- Obstetrik şiddet farkındalık ve bilinçlendirme çalışmalarının olmaması
- Konu ile ilgili farklı multidisipliner çalışmalarının olmaması
- Gebenin düşük eğitim düzeyi
- Yaşananlara kimsenin müdahale etmemesi
- Bazı kadınlar şiddeti hak ederler anlayışı
- Gebenin daha önce şiddete maruz kalması
- Gebenin sosyoekonomik düzeyinin düşük olması
- Toplumda kadının statüsünün düşük olması
- Gebenin sağlık kurumlarından nasıl hizmet alınacağını bilmemesi
- Müdahalenin fazla olması gibi durumlar obstetrik şiddet için risk faktörleridir (Karataş ve Gölbaşı, 2021; American Academy of Family Physicians, 2022; Jardim ve Modena, 2018).

## 8. OBSTETRİK ŞİDDETİN MATERNAL VE FETAL SONUÇLARI

Obstetrik şiddet, kısa ve uzun vadede istenmeyen sonuçlara neden olmakta, ana çocuk sağlığını olumsuz etkileyerek sağlıklı bir toplum oluşturmada önemli bir engel oluşturmaktadır (Abdollahi ve ark., 2015; Sezgin ve Özcan, 2020). Obstetrik şiddet hem annenin hem de bebeğin fiziksel ve mental sağlığını olumsuz etkileyen bir olgudur (Chadwick ve ark., 2014; Diaz-Tello, 2016; Salter ve ark., 2021). Obstetrik şiddete maruz kalan kadınların, fiziksel yaralanma; sağlık sistemine veya sağlık profesyoneline başvurmadan kaçınma; duygudurum bozuklukları, kişilik özelliklerinde değişim ve travma sonrası stres bozukluğunu içeren psikolojik travma; yeni doğanla bağ kurmada sorunlar, aile dinamiklerinde olumsuz değişimler, cinsel fonksiyonda bozulma gibi bir dizi olumsuz durumla karşı karşıya kalmaktadır (Garcia, 2020; Ishola ve ark., 2017).

### 8.1. Obstetrik Şiddetin Maternal Sonuçları

Gebelik, doğum ve doğum sonrası dönemde sağlık personelinin gebeye uyguladığı şiddet ya da kötü muamele gebeyi fiziksel, psikolojik ve sosyal yönden olumsuz etkilemektedir.

Gebelik döneminde obstetrik şiddetin ortaya çıkma nedenleri; kadının ihtiyaçlarının göz ardı edilmesi, gebeye yeterli ve doğru bilgi verilmemesi, fiziksel şiddet uygulanması, rızasız bakım yapılması, tedavi reddinin onaylanmaması, sözlü aşağılama, ilaçların gereksiz kullanımı, kaba muamele, etnik köken, ırk veya ekonomik geçmiş, kadının yaşı, bulaşıcı hastalıkların varlığı gibi durumlara dayalı olarak ayrımcılık veya aşağılamaya uğramasıdır (Perera ve ark., 2018; Jardim ve Modena, 2018).

Doğumda maruz kalınan fiziksel şiddetin maternal sağlık sonuçlarına etkileri; erken membran rüptürü, antepartum kanama, uterus ve plasenta abrupsiyonu, üreme sağlığı problemleri, artmış sağlık alma gereksinimi gibi sonuçlar doğurur (Bailey, 2010; Black, 2011).

Doğumda yaşanan duygusal şiddet doğum sonu dönemde maternal depresyon, anksiyete, strese bağlı iştahsızlık annenin sağlığını etkileyen sorunlara sebep olmaktadır (Bozkurt ve Daşikan, 2016).

### 8.2. Obstetrik Şiddetin Fetal Sonuçları

Gebelik sırasında maruz kalınan şiddet, çocuğun gelişim dönemini de etkilemektedir ve olumsuz gebelik sonuçları ile ilgili intrauterin gelişme geriliği, düşük doğum ağırlıklı ve prematüre doğum, fetal distres, fetal asfiksi, fetal yaralanmalar, yumuşak doku hasarları, kemik kırıkları, akciğer ya da dalak rüptürü ve fetal/neonatal mortalite ve morbidite gibi fetal/yenidoğan açısından tehlikeli ve ciddi sağlık sonuçları içermektedir (Howell ve ark., 2017; Bacchus ve ark., 2004).

## 9. OBSTETRİK ŞİDDETİN ÖNLENMESİNDE HEMŞİRENİN ROL VE SORUMLULUKLARI

Kadınların gebelik, doğum ve doğum sonu dönemde güvenli ve saygılı bir bakım alması temel insan haklarından biridir. Ancak bu dönemlerde sağlık profesyonelleri tarafından kadınlara obstetrik şiddet uygulanmaktadır. Bakım eşitsizliğinin önlenmesi için gebelik, doğum ve doğum sonrası dönemde kadınların yanında bulunan hemşirelerin bu konuda örgütlenmesi ve eşitlik için ortaya çıkan kadın hareketlerini sürdürmesi gerekmektedir. Hastayla birebir etkileşim halinde olan hemşireler obstetrik şiddete maruz kalan gebelerle/kadınlara etkili bir şekilde iletişim kurabilmeli ve obstetrik şiddet konusunda farkındalık yaratmalıdır. Hemşirenin gebelerle/doğum yapan kadınlarla kurduğu etkili iletişim, kadınların özgüvenini artırarak kendilerini daha iyi ifade edebilmelerini ve daha güvende hissetmelerini sağlamaktadır (Yılmaz ve ark., 2023).

Gebenin/doğum yapan kadının olduğu her alanda çalışan hemşireler kadın ve aile sağlığını korumak, sürdürmek için danışman, rehber ve eğitimci rolünü üstlenmektedir (Özçalkap, 2022). Hemşire gebeye danışmanlık verirken anlaşılır, kısa ve yeterli bilgiyi tam olarak vermelidir. Ayrıca hemşire gebeye, obstetrik şiddetin ne olduğu, hangi durumların obstetrik şiddet kapsamında değerlendirildiği ve obstetrik şiddete maruz kaldığında ne yapması gerektiği konusunda eğitim vermelidir. Hemşire, obstetrik şiddet karşısında gebenin kendini ifade edemediği ve bilincinin yerinde olmadığı her durumda da hastasının savunuculuğunu yapabilmelidir (Karaçam ve Eroğlu, 2019).

Doğum takibi ve doğum eyleminin gerçekleştirilmesini hemşirelere bırakmak ve hemşirelerin kanıta dayalı, bilimsel temeli olan girişimleri uygularken insan haklarına aykırı davranışlardan kaçınması, obstetrik şiddetin önüne geçilmesini sağlamaktadır (Diaz, 2022). Hemşirelerin doğum eyleminde gebeye yönelik destekleyici bakım biçimleri; fiziksel destek, duygusal destek, bilgilendirme desteği/egitim vermek ve savunma desteği sağlamak şeklinde sıralanabilir (Karaçam & Akyüz, 2011). Bu bağlamda obstetrik şiddetin önlenmesi için hemşireler, iletişim becerilerini geliştirmeli, mesleki profesyonelliğin gerekliliğini yerine getirmeli, mesleki bilgi ve beceriye sahip olmalı, empati kurmalı, saygılı olmalı, önyargılı olmamalı ve girişimlerinde kanıt temelli uygulamalar kullanmalı, gerekli durumlarda hastasını savunabilmeli, hastasına eksik olduğu konularda eğitim verebilmeli, hastasına tedavisi hakkında danışmanlık yapabilmeli, hastasının hastanedeki tüm sürecini belli bir program dahilinde yönetebilmelidir (Karaçam ve Eroğlu, 2019; Özçalkap, 2022).

## 10. SONUÇ VE ÖNERİLER

Kadınların gebelik, doğum ve doğum sonu dönemde güvenli ve saygılı bir bakım alması temel insan haklarından biridir. Ancak bu dönemlerde sağlık profesyonelleri tarafından kadınlara uygulanan obstetrik şiddet, son zamanlarda dünyada önemli bir sağlık sorunu olarak görülmekte; anne, bebek hatta aile sağlığını fiziksel, psikolojik ve sosyal yönden etkilemektedir. Obstetrik şiddetin tanımı ve uygulamaları tam olarak bilinmeyen, fark edilmeyen, konuşulmayan ve dikkate alınmayan bir konu olmasına rağmen sağlık alanında obstetrik şiddetin sık karşılaşılan bir durum olduğu bilinmektedir (Yılmaz ve ark., 2023). Bu durum problemin tanımlanmasını ve çözümlerin belirlenmesini zorlaştırmaktadır. Obstetrik şiddetin görünürlüğünün artırılması için bu konuda yapılan araştırmaların artırılması ile birlikte toplum ve sağlık profesyonellerinin farkındalıklarının artırılması gerekmektedir. Bunun içinde toplum ve sağlık profesyonellerine kapsamlı eğitim verilmesi son derece önemli bir yaklaşımdır. Anne ve bebek ölümlerini arttıran obstetrik şiddete karşı devletlerin yasal düzenlemeler yapması diğer önemli bir konudur. Obstetrik şiddet ile ilgili yapılan çalışmaların, toplumun ve sağlık profesyonellerinin farkındalığının artırılması, bunun içinde topluma ve sağlık profesyonellerine kapsamlı eğitim verilmesi gerekmektedir. Sağlık profesyonellerinin önemli bir bölümünü oluşturan ve hastalarla birebir etkileşimde bulunan hemşirelerin de eğitimci, danışman, rehber, hasta savunucu rolü, süreç yönetici ve bakım verici rollerini yerine getirmesi gerekmektedir (Kilci ve ark., 2020).

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INVESTIGATION OF pH EFFECT ON CU(II) ION REMOVAL FROM WASTEWATER  
USING ADSORPTION METHOD

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**ABSTRACT**

In this study, heavy metals, which are one of the main causes of water pollution and have become a major problem worldwide, are discussed. Especially copper (II) ions play an important role in increasing water pollution. Copper, which enters water through industrial activities and wastewater, is also found in nature. Although it is an essential nutrient for some biosystems at low concentrations, it can cause serious toxic effects at high concentrations. Therefore, combating copper pollution is vital for the protection and sustainability of aquatic ecosystems. For this purpose, adsorption method, which is frequently used for the removal of heavy metals from wastewater in industrial processes, was used in this study for the treatment of Cu(II) ions. Cross-linked porous polymer microparticles synthesised by suspension polymerisation method, called GAGs, were used to study the pH effect on the adsorption of Cu(II) ions. To determine the optimum pH value, solutions containing 10, 20, 30 and 40 mg/L Cu(II) ions were prepared at 25°C and calibration graphs were obtained. After calibration, they were exposed to a dark environment for 24 hours in the presence of 10 mL Cu(II) solution and 0.01 g adsorbent polymer. All variables such as temperature, time and polymer weight were fixed during the experimental studies. According to the data obtained, at the end of the adsorption process, the highest adsorption value was found to be 4000 mg/g at pH 4.5. As a result of the experiment, 99.67% of Cu(II) ions were easily removed by adsorption process using GAG polymer microparticles at pH 4.5.

**Keywords:** Copper (II), pH effect, adsorption, wastewater

**INTRODUCTION**

Copper is an element that has an important place in human history and has a wide range of uses in various industries. Copper has a wide range of industrial uses. The wide use of copper reveals that environmental impacts should not be ignored. The use of copper in various industrial processes or packaging can be an important source of environmental pollution. In particular, even low concentrations of copper can cause toxic effects for aquatic organisms and human health. Although copper is an important mineral for the human body, its unbalanced increase in the body can cause various health problems. If the amount of copper in the body increases excessively, serious health problems can occur. Excessive copper intake can lead to damage to the liver and kidneys. It can also cause disturbances in the digestive system and gastrointestinal problems. As a result of excessive copper intake, anaemia (anaemia) may develop. [1] Although copper is an indispensable part of industrial and technological progress, it bears an important responsibility for the control of its environmental impacts and its sustainable use. Therefore, it is necessary to develop strategies that

focus on the environmental impacts of copper production, utilisation and waste management processes. These strategies will make it possible both to ensure environmental sustainability and to utilise the valuable properties of copper. Alternative methods have been developed to destroy chemical components such as heavy metals and organic pollutants from wastewater, since such components cannot be chemically destroyed[2].

Commonly used methods for metal removal from water, such as precipitation, evaporation, ion exchange and membrane removal, are expensive and time consuming, leading to the search for alternative solutions in this field [3].

The adsorption process consists of two components, the adsorbed and the adsorbent. The adsorbed can be single or multiple, and the substance adsorbed is called the adsorbate. An important characteristic of a successful adsorbent is a large surface area per unit mass. The progress of the adsorption process depends on the interactions between the adsorbate and adsorbent and the properties of the system formed. Substances with different chemical structures exhibit different adsorption properties.[4]

In recent years, cross-linked polymers containing various functional groups have been used as adsorbents for the retention of anions and cations in solutions. Such polymers have the ability to control the physical and chemical adsorption capacity depending on the amount and type of functional groups they contain. In addition, their ability to be used in a wide pH range and their selectivity depending on the functional groups they contain provide advantages compared to inorganic adsorbents [5].

### RELATED WORKS

A study investigated the adsorption of copper, zinc, lead and nickel. Low-cost materials such as montmorillonite, brick clay and bauxite were used to achieve the highest adsorption efficiency. Optimum adsorption times and adsorbent amounts were determined and the effect of pH was investigated. When adsorption equilibration was achieved, most of the initial concentrations were adsorbed. This study highlights the need for optimizing adsorption processes and effective management of waste disposal [6].

In another study, TiO<sub>2</sub> nanoparticles and TiO<sub>2</sub>/active sludge composite were synthesized by sol-gel method and their Cu(II) removal potential from aqueous media was investigated. The synthetic materials were characterized by XRD, UV-VIS, SEM, EDS and FTIR analysis. In adsorption tests, parameters such as adsorbent selection, pH, contact time and initial metal ion concentration were investigated. As a result of the experiments, it was determined that TiO<sub>2</sub>/A.Ç. (25°C) adsorbent provided 85% removal. The optimum pH value was determined as 5 and the equilibrium time was reached in 360 minutes. According to Langmuir isotherm, the maximum adsorption capacity was calculated as 47.61 mg/g. Kinetic and thermodynamic studies showed that the system obeyed pseudo-second order kinetics and adsorption was spontaneous. In conclusion, the TiO<sub>2</sub>/A.O. composite synthesized by sol-gel method was found to be an effective Cu(II) adsorbent [7].

In another study, a solution of acrylonitrile containing polyethylene glycol was irradiated with gamma rays at 14 and 60 kGy to form an Interpenetrated Polymer Network (IPN). Then, IPN was amidoximated with hydroxylamine to obtain amidoxime-polymer network (amidoxime-IPN) and this new material was tested as an adsorbent to remove copper(II) ions from water. The effect of pH value on adsorption was investigated at 25°C in batch system and the optimum pH value was determined as 8. The adsorption experiments were carried out in accordance with the pH values of seawater and wastewater by examining the compliance with Langmuir and Freundlich isotherms. The concentration of copper(II) ions was determined by UV-VIS spectrophotometer and structural analysis of IPN was performed by FTIR spectrophotometer. Adsorption values above 800 mgCu/g IPN were obtained for both doses of irradiated IPN at 25°C and pH=8 in stirred-batch system. These results indicate that amidoxime-IPNs can be used as an effective adsorbent for the removal and recovery of copper(II) ions from aqueous media [8].

Mocioi et al. Chemical modifications of maleic anhydride/dicyclopentadiene copolymer with triethylenetetraamine, p-aminobenzoic acid and p-aminophenylacetic acid produced new polymeric structures for Cu(II) ion removal from aqueous solutions. The results emphasized the importance of

chelator structure and macromolecular chain geometry for the retention efficiency. The residual Cu(II) ions were evaluated by atomic adsorption to determine the retention efficiency ( $Z_r$ ), the retention capacity ( $Q_e$ ) and the distribution coefficient ( $K_d$ ) of the metal ion into the polymer matrix. Factors such as pH, thermal stability of the polymer, polymer-metal complex, contact procedure and batch time were discussed. Based on the characterization, a potential retention mechanism is proposed. The polymer supports and their metal complexes were characterized using ATD and FTIR measurements [9].

## MATERIAL AND METHODS

### Experimental Studies

This study investigates the adsorption ability of cross-linked and porous GAG polymer synthesised by suspension polymerisation method in aqueous Cu(II) solution at different pH values. The chemicals required for this study were obtained from Sigma Aldrich.

### Preparation of pH Waters

In this study, pH stabilisation using Mettler-Toledo pH meter was carried out by adding 1M HCl and 0.1M NaOH dropwise into pure water. The pH values for the pH waters required for the experiment were prepared as 2.5, 3.5, 4.5 and 5.5, respectively. Parameters such as polymer amount, time and temperature were constant in the study.



**Figure 1.** Example of aqueous solution at pH 3.5



**Figure 2.** Images of pH waters used in the experiment

### Preparation of Copper (II) Solutions at Different pH Values and Different Concentrations

Using the solutions prepared with pH values of 2.5, 3.5, 4.5 and 5.5, 500 mL 1000 mg/L stock solution containing Cu(II) ion was prepared.  $\text{Cu}(\text{NO}_3)_2 \cdot 3\text{H}_2\text{O}$  solid was used for this. The blue coloured solid was weighed in the required amounts and 500 mL of each pH water was adjusted to 1000 ppm.



**Figure 2.** Solid  $\text{Cu}(\text{NO}_3)_2 \cdot 3\text{H}_2\text{O}$



**Figure 3.** Step 1: weighing process



**Figure 4.** Step 2: Example of solution preparation at pH 3.5



**Figure 5.** Step 3: prepared stock solutions

Stock solutions prepared at different pH values were diluted in 25 mL balloon jugs with concentrations of 1000, 2000, 3000 and 4000 ppm. The solution was sampled and scanned at the required wavelength. For this purpose, UV-VIS spectrometer (HACH LANGE DR 5000 brand) was used in the wavelength range of 200-500 nm. The  $\lambda_{\text{max}}$  value (the wavelength at which maximum absorption occurs) was determined as 302 nm. Calibration graph was then drawn for each pH value.



**Figure 6.** 25 mL 1000, 2000, 3000 and 4000 ppm Cu(II) solution (repeated for each pH value)

### Cu (II) Adsorption from Aqueous Solution

Weighed 0.01 g of GAG polymer in a clean, dry, capped and large glass vial. 10 mL of the prepared solution was added. It was observed that the optimum concentration for the experiment was 4000 ppm. The prepared solutions were kept in a dark environment and at room temperature (25 °C) for 24 hours. At the end of 24 hours, absorbance values were determined by UV-VIS spectroscopy. Necessary calculations were made according to the absorbance values and the most suitable pH value was found according to the adsorption capacities.



**Figure 7.** solutions at pH 2.5 containing polymer (1000, 2000, 3000 and 4000 ppm)

Adsorption capacity is determined according to the formula in Equation 1 below.

Equation 1:

$$Q_e = \frac{(C_0 - C_e) * V}{m}$$

$Q_e$ : Adsorption capacity (mg/g)

$C_0$ : Initial dye concentration (mg/L)

$C_e$ : The concentration of dyestuff remaining in the solution (mg/L)

V: Volume of solution (mL)

m: Amount of polymer (g)

## RESULTS AND DISCUSSIONS

### Effect of pH change on adsorption

At the end of 24 hours, UV measurements were made for each concentration at each pH value and adsorption capacities were calculated. Calibration graphs prepared to determine the amount of copper (II) remaining unadsorbed in the solution are given in the figures for pH 2.5, 3.5, 4.5 and 5.5 respectively.

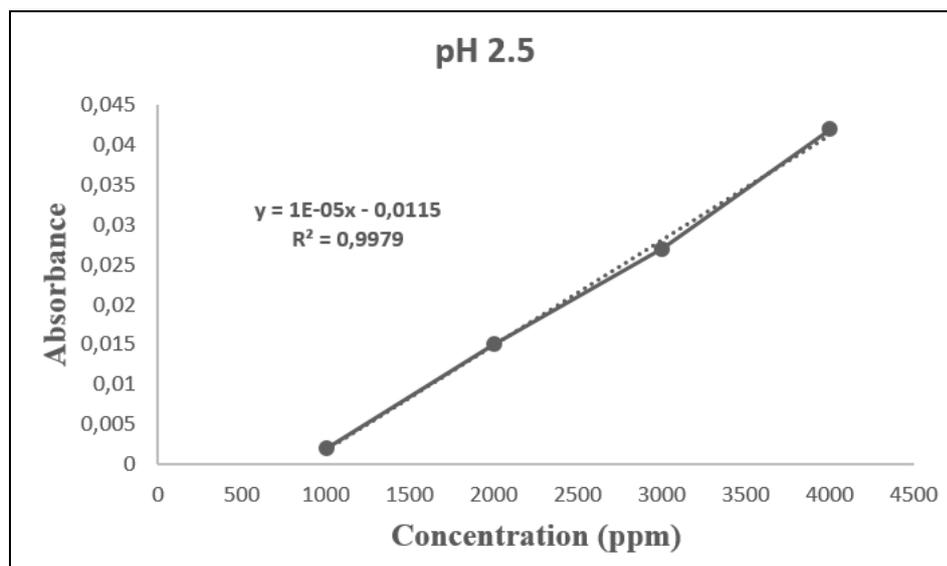


Figure 8. Calibration graph for pH 2.5

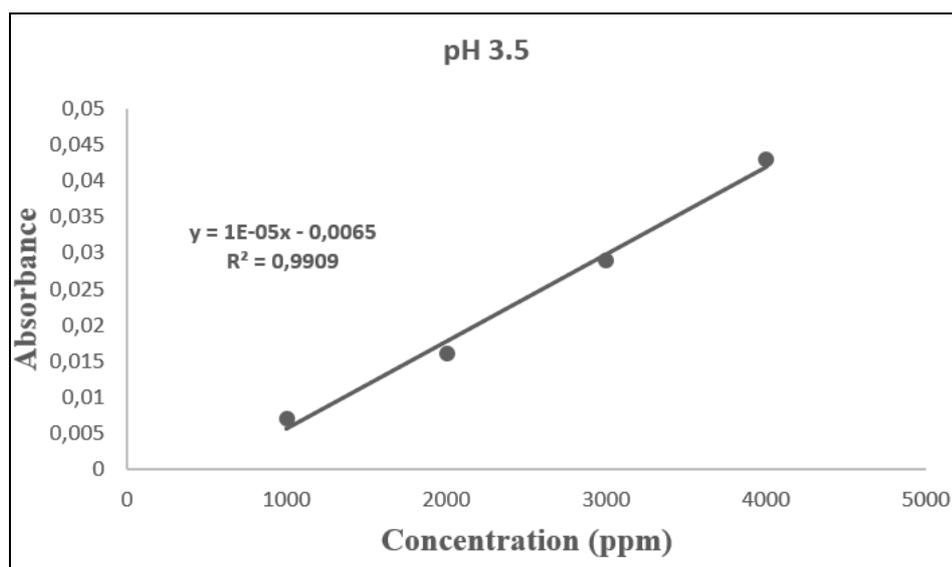


Figure 9. Calibration graph for pH 3.5

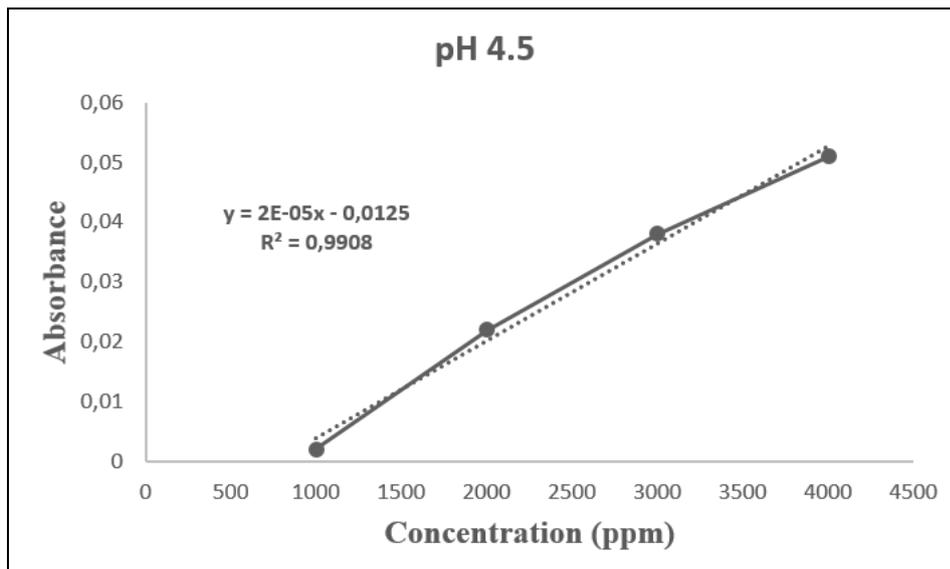


Figure 10. Calibration graph for pH 4.5

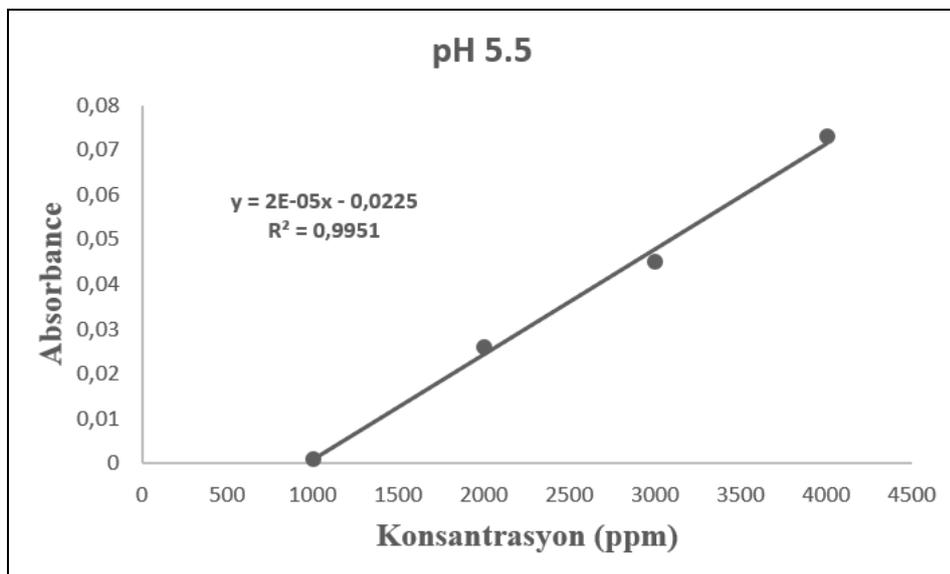
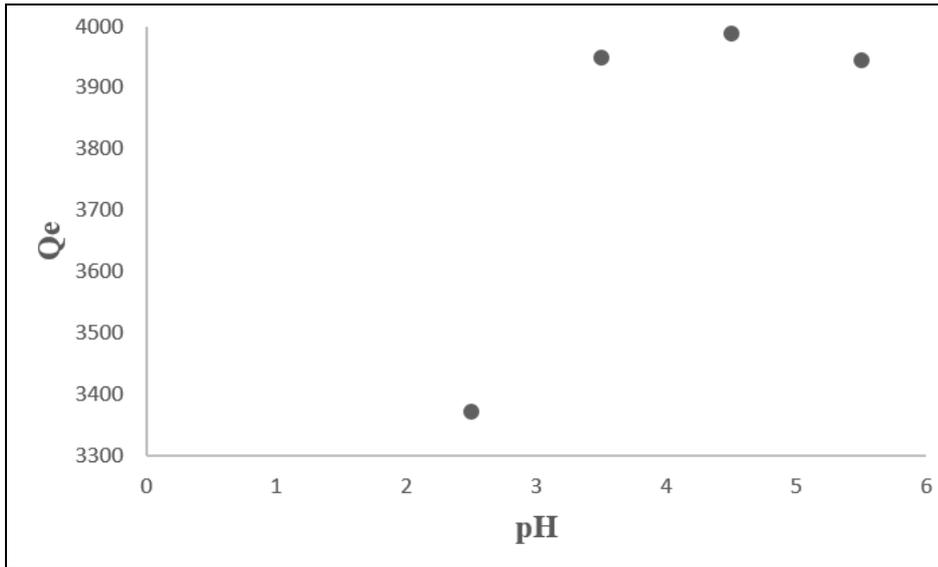


Figure 12. Calibration graph for pH 5.5

Ph Value	C <sub>0</sub>	Abs. Value	C <sub>e</sub>	m (g)	Q <sub>e</sub>
2.5	4000	0,042	628,333	0.01	3371,7
3.5	4000	0,043	50	0.01	3950
4.5	4000	0,051	12,5	0.01	3987,5
5.5	4000	0,073	55,5556	0.01	3944,4

Table 1. 24 Hour Time Results for 40 ppm



**Figure 13.** pH effect of adsorption capacity

pH value	Q <sub>e</sub>	Removal %
2.5	3371,7	82.71
3.5	3950	98.75
4.5	3987,5	99.67
5.5	3944,4	98.60

**Table 2.** % Cu(II) removal according to different pH values

## CONCLUSION

In conclusion, it highlights the effectiveness of cross-linked porous polymers, especially GAG polymers, in the adsorption and removal of copper (II) ions from aqueous solutions, a critical process for water treatment and environmental sustainability. The research focused on the performance of these polymers at varying pH levels and proved that the adsorption capacity is pH dependent, with maximum adsorption capacity achieved at pH 4.5. The percentage of Cu(II) ion removal at pH 4.5 reached 99.67%. This result shows us that this synthesised polymer can be a very good adsorbent at the mentioned pH value.

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INVESTIGATION OF pH EFFECT ON CR(VI) ION REMOVAL FROM WASTEWATER  
USING ADSORPTION METHOD

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**ABSTRACT**

While the climate crisis has recently emerged as a rising threat, contaminated water makes the sustainability of the basic source of life even more difficult. Chromium (VI) is widely used in industrial processes such as metal plating, leather processing, textile and dye production. The chemical wastes and wastewater generated during these processes may contain chromium and these wastes may enter the environmental waters. Environmental waters are heavily polluted as a result of industrial wastes and mining activities. The toxic and carcinogenic effects of chromium (VI) threaten water resources. For these reasons, removal of chromium (VI) ion from wastewater by adsorption has become a necessity. In this study, the adsorption of Cr(VI) ion from water was investigated using cross-linked porous polymer microparticles, GAG's. The pH value of the solution is a critical factor in the adsorption process and the optimum pH value was determined by working in different ranges. The optimum pH value was determined by keeping all factors (temperature, time and polymer weight) constant. As a result of the experiments with solutions containing different Cr(VI) ion concentrations, adsorption was carried out at 25°C for 24 hours at a solution concentration of 40 mg/L. The optimum pH value was determined as 5 and the maximum adsorption capacity was obtained as 18.648 mg/g (46.62% removal). The results show that GAG polymer microparticles can effectively, rapidly and practically remove Cr(VI) ion in water by adsorption. This study highlights a practical approach towards the use of innovative materials to reduce chromium (VI) pollution.

**Keywords:** Chromium (VI), adsorption, heavy metal, pH effect

**INTRODUCTION**

Chromium often occurs as a residual output from a range of industrial processes such as alloy formation, leather processing, electroplating, chromium-enriched stainless steel production, textile and dye making, pigment development and ceramics [1]. Chromium is typically found in two basic oxidation states: trivalent (Cr(III)) and hexavalent (Cr(VI)). The toxicity level of chromium is determined by its oxidation state. In particular, Cr(VI) anions such as  $\text{CrO}_4^{2-}$  and  $\text{Cr}_2\text{O}_7^{2-}$  are considered carcinogenic. These Cr(VI) anions are highly soluble in water, making them a common pollutant frequently discharged from industries such as leather, textiles, cement, paint, glass and steel production. These pollutants can easily leach into surface and groundwater. On the other hand, Cr(III) is much less soluble and only becomes toxic at high concentrations. It has been suggested that trace levels of Cr(III) are vital for human health and the metabolic processes of numerous plants [2]. Hexavalent chromium has caused considerable alarm due to its high toxicity, mutagenic properties and carcinogenic effects on living organisms. In contrast, the trivalent form is generally less harmful and is

thought to play an important role in glucose metabolism in mammals [3]. Numerous technologies have been developed for the removal of chromium from water and wastewater. These methods include chemical precipitation, ion exchange, membrane separation, ultrafiltration, flotation, electrocoagulation, solvent extraction, sedimentation, electrochemical precipitation, soil washing/washing, electrokinetic extraction, phytoremediation, reduction, reverse osmosis, dialysis/electrodialysis, adsorption/filtration, evaporation. [4]. The separation techniques mentioned above are often laborious and tend to lead to additional pollution [5]. Available in various forms such as micro and nanospheres, membranes and more, polymeric adsorbents are gaining popularity due to their cost advantages, superior efficiency, user-friendliness, versatility and reusability. When it comes to Cr(VI) removal, certain polymeric adsorbents containing functional groups such as imidazole, ethyleneimine, amidoxime, acrylamide, dithiocarbamate, aniline, aniline/chitosan, thiazolidine, triazole, reactive amino acids, 2-chloroaniline, o-toluidine, ortho-phenylenediamine, ethylenediamine and 4-vinylpyridine are used [6].

## RELATED WORKS

In a study by Reis et al.[7] , functional density theory calculations were used to study how Cu<sup>2+</sup>, Cr<sup>3+</sup> and Cd<sup>2+</sup> metal ions interact with cellulose and cellulose acetate. Once the structures were optimized, several analyses were performed, including molecular electrostatic potential, reactivity indices, boundary molecular orbitals, structural parameters, interaction energy and QTAIM analysis. The results showed that all ions interacted with the cellulose and cellulose acetate matrix, with Cr<sup>3+</sup> having the most effective interaction. QTAIM analysis revealed that the interactions of cellulose acetate with Cr<sup>3+</sup> and cellulose with Cu<sup>2+</sup> are electrostatic, while the others are partially covalent. In a different study, he focused on the development of wastewater treatment adsorbents. He developed quaternary ammonium polymers (QAPs) for rapid and selective Cr(VI) removal from water. QAPs had more adsorption sites and higher nitrogen exposure rate compared to Cr(VI) ions imprinted polymers (Cr(VI)-IIP). They also showed a larger adsorption capacity and initial adsorption rate for Cr(VI). In the tests, the QAPs were able to remove all 5 mg/L Cr(VI) within five seconds and showed excellent selectivity for Cr(VI) adsorption. The study shows that maximizing the exposure of the adsorption site can help to design effective selective adsorbents for Cr(VI) removal and recovery from wastewater [8]. A research focused on improving adsorbents by increasing the density and amount of functional groups. Three graphene oxide adsorbents modified with terminal amino hyperbranched polymers were introduced. These adsorbents were used to convert toxic hexavalent chromium (Cr(VI)) to less harmful Cr(III). Several techniques were used to characterize the adsorbents and calculate the receptor site densities. The adsorbents showed high capacity for Cr(VI) adsorption, while GO-HBP-NH<sub>2</sub>-TEPA showed the best performance[9].

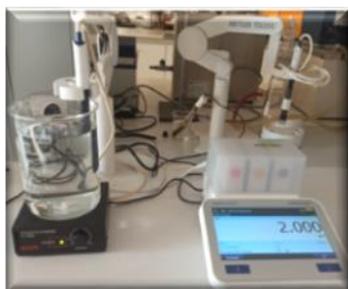
## MATERIAL AND METHODS

### Experimental Studies

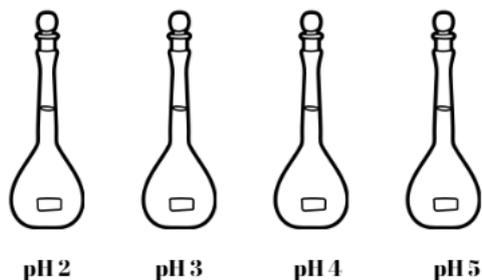
In this study, cross-linked and porous GAG polymer synthesized by suspension polymerization was used as adsorbent. The ultimate aim of this study was to demonstrate the adsorption ability of the polymer in aqueous Cr(VI) solution at optimum pH and optimum concentration. All chemicals used in the experiment were obtained from Sigma Aldrich.

### Preparation of pH Waters

The pH stabilization with Mettler-Toledo pH meter was performed by adding 1M HCl and 0.1M NaOH dropwise into pure water. The pH values for the pH waters required for the experiment were prepared as 2,3,4 and 5 respectively. Parameters such as polymer amount, time and temperature are stable in the study. pH stabilization with Mettler-Toledo pH meter device was performed by adding 1M HCl and 0.1M NaOH dropwise into pure water. The pH values for the pH waters required for the experiment were prepared as 2,3,4 and 5 respectively. In the study, parameters such as polymer amount, time and temperature are stable.



**Figure 1.** Example of aqueous solution at pH 2



**Figure 2.** Symbolic representation of transferring the prepared pH waters into volumetric flasks

### Preparation of Cr(VI) Solutions at Different pH Values

In order to prepare 500 mL 1000 ppm stock solutions containing Cr(VI) at different pHs, firstly, the required amount of orange coloured potassium dichromate ( $K_2Cr_2O_7$ ) solid was taken and weighed using a precision balance. Then, the weighed solid was dissolved in a beaker with the previously prepared pH water and transferred to a 500 mL balloon jug and completed with 500 mL of the same pH water. This procedure was performed for all pH waters (pH 2, 3, 4, and 5).



**Figure 3.** Solid  $K_2Cr_2O_7$

Stock Solution Preparation Steps

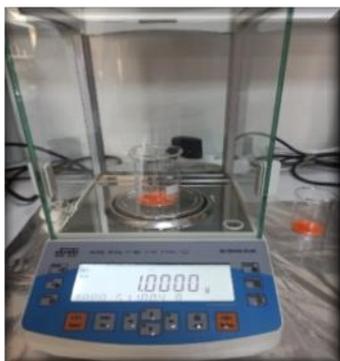


Figure 4. Step

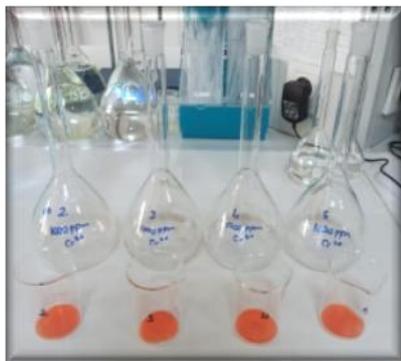


Figure 5. Step



Figure 6. Step 3

HACH LANGE DR 5000 UV-VIS spectrometer device in our laboratory was used for wavelength scanning. A scan was performed in the wavelength range of 200-500 nm for any of the stock solutions, and the wavelength at which the maximum absorption occurred was determined as 346 nm. The determined  $\lambda_{max}$  was used for all necessary measurements. Each of the 1000 ppm stock solutions with pH values of 2-3-4 and 5 were diluted to final concentrations of 10, 20, 30 and 40 ppm in 25 mL balloon jugs. The prepared solutions will be used as calibration solutions for the other steps. The most appropriate concentration value was determined as 40 mg/L in the calibration graphs.

**Absorption Capacity and pH Effect**

The pH value of the solution is one of the important factors affecting the adsorption capacity. The change in pH value affects the degree of ionisation of adsorbent molecules and the surface properties of the adsorbent. Therefore, considering the pH of the solution is important for understanding and optimising adsorption processes [10]. Adsorption capacity values were calculated according to the formulae in Equation 1.

(1)

$$Q_e = \frac{(C_0 - C_e) * V}{m}$$

$Q_e$ : Adsorption capacity (mg/g)

$C_0$ : Initial dye concentration (mg/L)

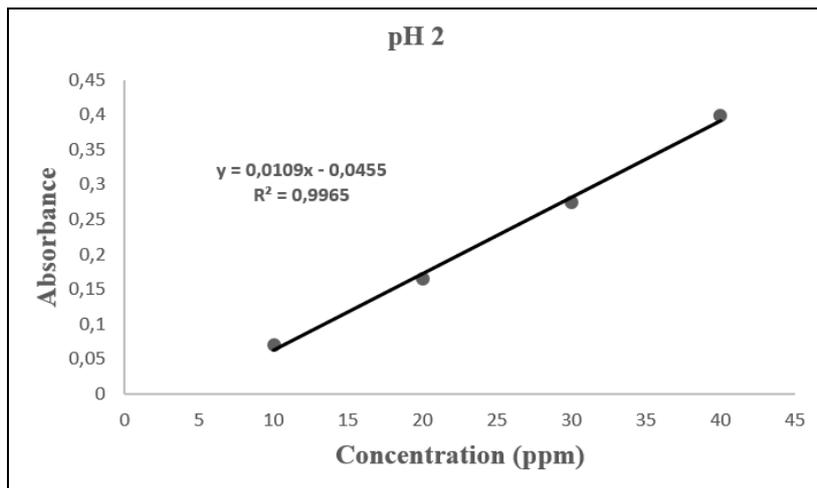
$C_e$ : The concentration of dyestuff remaining in the solution (mg/L)

$V$ : Volume of solution (mL)

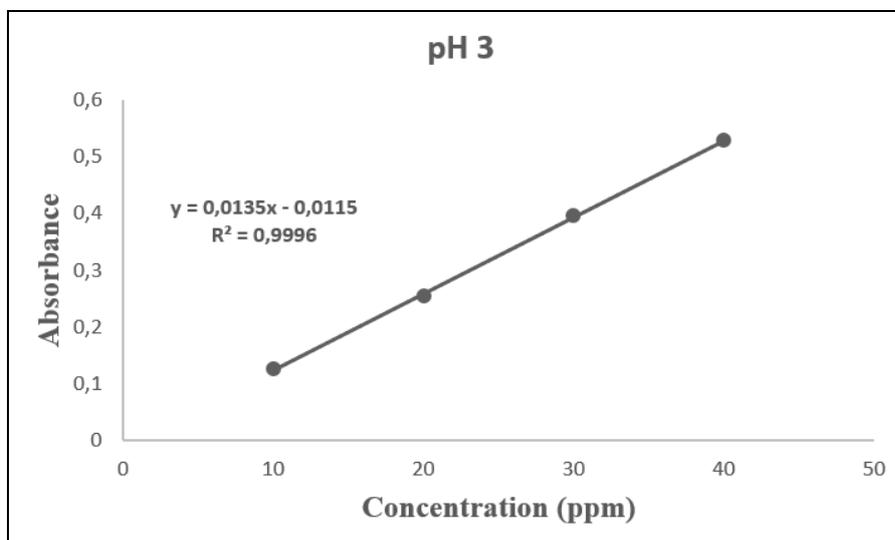
$m$ : Amount of polymer (g)

**RESULTS AND DISCUSSIONS**

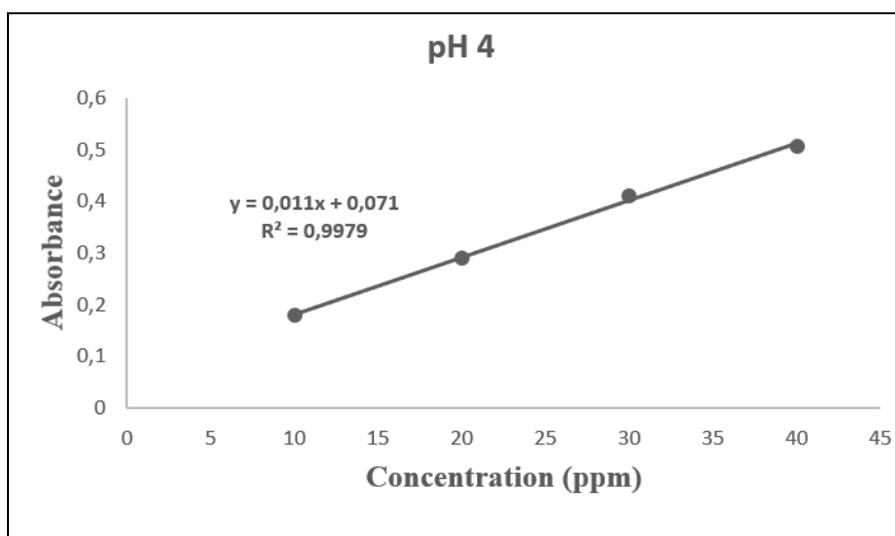
In the experiment, the effects of pH on the adsorption of GAG polymer in chromium (VI) ion aqueous solution were investigated. The adsorption of 10 mL of chromium (VI) solution added to a glass container with a lid containing one gram of GAG polymer, which is not affected by oxygen and humidity, was carried out at 25 °C and in a dark environment for 24 hours. At the end of 24 hours, UV measurements were made for each concentration of each pH value and adsorption capacities were calculated. Calibration graphs prepared to determine the amount of chromium (VI) remaining unadsorbed in the solution are given in figures for pH 2,3,4 and 5 respectively.



**Figure 1.** Calibration graph for pH 2



**Figure 2.** Calibration graph for pH 3



**Figure 3.** Calibration graph for pH 4

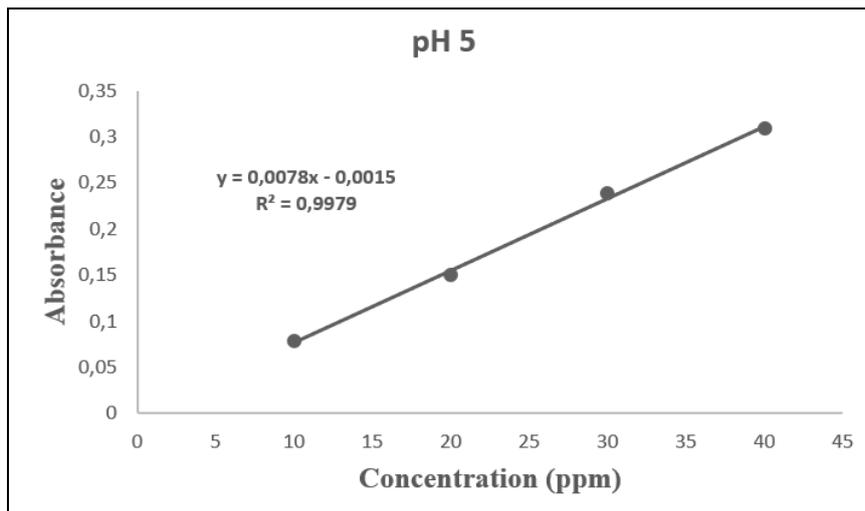


Figure 4. Calibration graph for pH 5

pH Value	C <sub>0</sub> (ppm)	Abs. Value	C <sub>e</sub>	m (g)	Q <sub>e</sub>
2	40	0.398	27.5153	0.01	12.483
3	40	0.529	21.5405	0.01	18.459
4	40	0.506	22.2280	0.01	17.772
5	40	0.309	21.3522	0.01	18.648

Table 1. 24 Hour Time Results for 40 ppm

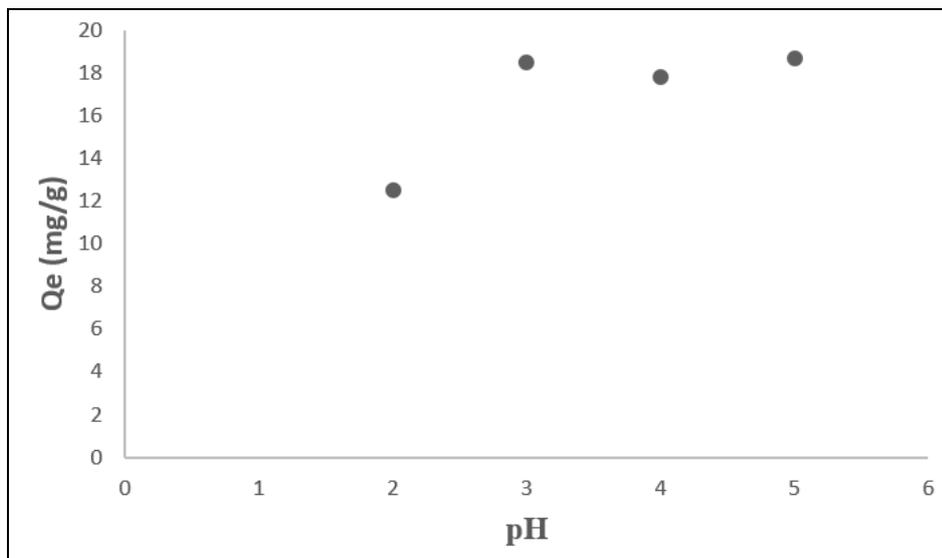


Figure 5. pH effect of adsorption capacity

pH value	Q <sub>e</sub>	Removal %
2	12.483	31.23
3	18.459	46.15
4	17.772	44.43
5	18.648	46.62

Table 2. % Cr (VI) removal according to different pH values

## CONCLUSION

Cross-linked porous polymers play a critical role in the removal of chromium (VI) ions in wastewater and water reuse. Such polymers are an important tool for environmental sustainability and protection of water resources. As a result, in this study, the adsorption of GAG polymer with the above-mentioned properties was investigated at different pH ranges of Cr (VI) ion aqueous solution. In the experimental results, it is observed that the values at pH 3 and pH 5 are close to each other, but the value at pH 5 is slightly higher. The optimum pH value of Cr(VI) ion removal at pH 5 was determined as 46.62%. These results show that GAG polymer can remove Cr(VI) ion from wastewater, but it is a work in progress for better results.

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**KATAR KRİZİ VE KATAR'IN POLİTİKALARI: KAYNAK LANETİ/ LÜTFU  
ÇERÇEVESİNDE BİR ANALİZ**

**QATAR CRISIS AND QATAR'S POLICIES: AN ANALYSIS WITHIN THE FRAMEWORK  
OF RESOURCE CURSE/BLESSING**

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**ÖZET**

Yüzey alanı oldukça küçük bir ülke olmasına karşın Katar doğalgaz üretiminde Rusya ve İran'ın ardından en çok doğalgaz üreten ülkedir. Dünyanın doğal gaz rezervinin %12,5'i ve petrol rezervinin %1,5'i Katar'da bulunmaktadır. Doğal kaynaklar yönünden zengin ve jeopolitik olarak dezavantajlı olan, ekonomisinin büyük çoğunluğu doğalgaza dayanan bu ülke için güvenlik hayati bir önem taşımaktadır. Birçok devletle ikili anlaşmalar yaparak, hükümet dışı ve hatta bazı ülkeler tarafından terör örgütü olarak adlandırılan organizasyonlar ile işbirliği yaparak ve onlara finansman sağlayarak kendi güvenlik politikalarını yönlendiren Katar, 2017'de bir krizle karşı karşıya kalmıştır. Katar Krizi olarak adlandırılan bu kriz, Suudi Arabistan, Bahreyn, Birleşik Arap Emirliği ve Mısır'ın Katar ile yaşamış oldukları politik, diplomatik ve ekonomik gerilimleri kapsamaktadır. Bu krizin temel nedeni Katar'ın terörü desteklemesi ve bölgedeki siyasi istikrarı etkileyecek işbirlikleri yapmasıdır. Bunun sonucunda, bölge ülkeleri bu durumu Katar'a belli kısıtlamalar getirerek yönetmeye çalışmışlardır. Bu çalışma, Katar'ın Kriz sırasında güvenlik kaygılarını ve ikili siyasi ilişkilerini ne ölçüde yönetbildiğini Kaynak laneti/lütfü teorisi çerçevesinde tartışmayı amaçlamaktadır. Bu teori, Doğal enerji kaynaklarına sahip ülkelerin kaynaklarının o ülkenin gelişmişliğini daha olumlu mu yoksa daha olumsuz mu etkilediğini tartışmakta ve doğal kaynakların bir lütuf mu yoksa bir lanet mi olduğu sorgulamaktadır. Yapılan İngilizce ve Türkçe yazın taraması sonucunda 2017 yılı sonrasında Katar'ın güvenlik politikalarının, siyasi işbirliklerinin ve Katar krizinin bütün olarak doğal kaynak laneti veya lütfü teorisi çerçevesinde incelenmediği görülmüştür. Bu doğrultuda, çalışma Katar Krizini farklı bir noktadan ele alarak literatüre katkı sunmayı amaçlamaktadır.

**Anahtar Kelimeler:** Katar Krizi, Doğal Kaynaklar, Kaynak Laneti, Kaynak Lütfü, Güvenlik.

**ABSTRACT**

Although its surface area is quite small, Qatar is the country that produces the most natural gas after Russia and Iran. Qatar holds 12.5 per cent of the world's natural gas reserves and 1.5 per cent of the world's oil reserves. Security is of vital importance for this country, which is rich in natural resources and geopolitically disadvantaged and whose economy is mostly based on natural gas. Qatar, which directs its own security policies by making bilateral agreements with many states, cooperating with and financing non-governmental organisations, which are even called terrorist organisations by some countries, faced a crisis in 2017. This crisis, known as the Qatar Crisis, encompasses the political, diplomatic and economic tensions that Saudi Arabia, Bahrain, the United Arab Emirates and Egypt have experienced with Qatar. The main motive of this crisis was Qatar's support for terrorism and its co-operation that would affect the political stability in the region. As a result, the countries in the region have attempted to handle this situation by imposing certain restrictions on Qatar. This study

aims to discuss the extent to which Qatar was able to manage its security concerns and bilateral political relations during the crisis within the framework of the Resource Curse/Blessing theory. This theory discusses whether the resources of countries with natural energy resources affect the development of that country either more positively or negatively, and questions whether natural resources are a blessing or a curse. As a result of the English and Turkish literature review, it has been determined that Qatar's security policies, political co-operation and the Qatar Crisis after 2017 have not been analysed within the framework of the natural resource curse or blessing theory as a holistic framework. Accordingly, this study aims to contribute to the literature by analysing the Qatar Crisis from a different perspective.

**Keywords:** The Qatar Crisis, Natural Resources, Resource Curse, Resource Blessing, Security.

**TURKEY'S APPROACH TO SOMALIA AND SOMALILAND: ANALYSES OF STRATEGIC OBJECTIVES AND POLITICAL DYNAMICS**

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**ABSTRACT**

The Somali-Somaliland issue refers to the longstanding dispute between the Somali Federal Government and the Somaliland region in the northwest of Somalia over its claim for independence. Throughout the process, the issue has deepened and become increasingly complex due to the interaction of political, ethnic, and socio-economic factors. At this point, the Somali-Somaliland issue threatens the political unity and territorial integrity of the country. Various approaches have been proposed for resolving this issue, but progress towards resolving the Somali-Somaliland problem has been quite limited. In this context, deep mistrust and disagreement persist between the parties in the current conjecture. At this point, Turkey's approach towards Somalia and Somaliland reflects Turkey's strategic objectives in the region and the political dynamics shaping these objectives. In this respect, regional power balances, the role of the international community and Somali domestic politics are seen as important political dynamics shaping Turkey's approach to Somalia and Somaliland. Turkey believes that instability in Somalia and the conflict between Somaliland and the Federal Government of Somalia threaten regional stability. In this context, this study will analyze Turkey's approach towards Somalia and Somaliland, which seceded from Somalia but is not officially recognized, and will also examine Turkey's actions towards peace-building, stabilization and development efforts in Somalia, considering Turkey's strategic objectives in the context of the political dynamics of the region.

**Keywords:** Somalia, Somaliland, Turkey, Strategic Role

**ÖZET**

Somali-Somaliland sorunu, Somali Federal Hükümeti ile Somali'nin kuzeybatısındaki Somaliland bölgesi arasındaki uzun süreli anlaşmazlığı ifade eder. Somaliland'ın bağımsızlık iddiası nedeniyle, bu süreç boyunca siyasi, etnik ve sosyo-ekonomik faktörlerin etkileşimi sonucunda sorun derinleşmiş ve giderek karmaşıklaşmıştır. Bu noktada, Somali-Somaliland sorunu ülkenin siyasi birliğini ve toprak bütünlüğünü tehdit etmektedir. Bu sorunun çözümü için çeşitli yaklaşımlar önerilmiş olsa da, Somali-Somaliland sorununun çözülmesine yönelik ilerleme oldukça sınırlıdır. Bu bağlamda, derin güvensizlik ve anlaşmazlık taraflar arasında mevcut konjonktürde hâlâ devam etmektedir. Bu noktada, Türkiye'nin Somali ve Somaliland'a yaklaşımı, Türkiye'nin bölgedeki stratejik hedeflerini ve bu hedefleri şekillendiren siyasi dinamikleri yansıtmaktadır. Bu bağlamda, bölgesel güç dengeleri, uluslararası toplumun rolü ve Somali iç siyaseti, Türkiye'nin Somali ve Somaliland'a yaklaşımını şekillendiren önemli siyasi dinamikler olarak görülmektedir. Türkiye, Somali'deki istikrarsızlık ve Somaliland ile Somali Federal Hükümeti arasındaki çatışmanın bölgesel istikrarı tehdit ettiğine inanmaktadır. Bu bağlamda, bu çalışma Türkiye'nin, Somali'den ayrılmış ancak resmen tanınmamış olan Somaliland'a yaklaşımını analiz edecek ve Türkiye'nin bölgedeki stratejik hedeflerini, bu hedefleri şekillendiren siyasi dinamikler bağlamında, Somali'de barışın sağlanması, istikrarın tesis edilmesi ve kalkınma çabalarına yönelik adımlarını inceleyecektir.

**Anahtar Kelimeler:** Somali, Somaliland, Türkiye, Stratejik Rol

YENİDEN YAZIM ÖRNEĞİ OLARAK ADNAN BİNYAZAR'IN DEDEM KORKUT'TAN  
ÖYKÜLER ADLI ESERİNDE BOĞAÇ HAN

AS AN EXAMPLE OF REWRITING, BOĞAÇ HAN IN ADNAN BİNYAZAR'S WORK  
TITLED STORIES FROM DEDEM KORKUT

*Didem BÜLBÜL*

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**ÖZET**

Yenidenyazım süreci, alt metin ve ana metin ilişkisi içerisinde metinlerarasılık bağlamında halk anlatılarının farklı formlarda ortaya çıkışıdır. Bu süreç metin içerisinde yer alan karakterlere, olay örgüsüne, anlatış biçimine metinlerarası ilişkiler açısından bakmamızı sağlar. Bir anlatının yeniden yazım sürecine girmesi için birçok özelliği barındırması gerekmektedir. Yeniden yazım sürecine girecek olan metnin toplum tarafından dikkat çeken ve benimsenen tarafları bulunmaktadır. Bu benimseyiş aslında toplumun kendi izlerini görmesi ile ilişkilendirilebilir. Dede Korkut kitabında yer alan boylar her daim araştırmalar için güncel bir kaynaktır. Türk kültürünün izlerini en güzel şekilde sergileyen bir eserdir. Bu yüzden araştırmacılar ve yazarların ilgisini çekmiş ve çeşitli alanlarda kullanılmıştır.

Hikâyelerde toplumun inanışlarını, gelenek ve göreneklerini, kültürünü, toplumda iz bırakmış olayları somut olarak görürüz. Bu kurmaca metinlerde düş gücünün niteliği yadsınamaz bir gerçektir. Türk tarihinde insanlar tarafından kabul görmüş ve onlar arasında yer edinmiş kişilere ait anlatılarda da bu düş gücünün farklılıklarını bulmak mümkündür. Dirse Han Oğlu Boğaç Han boyunda ana karakter olan Boğaç Han'ın boyda yaşadığı her bir olay onu Dedem Korkut kitabı içinde göze çarpan bir kahraman haline getirmiş ve üzerine birçok alanda çalışma yapılmasını sağlamıştır. Bunlardan biri de Adnan Binyazar'ın "Dedem Korkut'tan Öyküler" adlı eseridir. Eserde "Dirse Han Oğlu Boğaç Han" boyu "Boğaç Han" adı altında hikâye türünde yeniden yazılmıştır. Çalışmada, Boğaç Han'ın, alt metninden yola çıkarak hikâye türünde nasıl ifade edildiği, benzerlik ve farklılıkları, hangi açılardan ele alındığı, hikâye türünün özelliğini ne kadar taşıdığı tespit edilerek yeniden yazım sürecindeki katkısı aktarılmıştır.

**Anahtar Kelimeler:** Metinlerarasılık, Yenidenyazım, Adnan Binyazar, Dede Korkut, Boğaç Han

**ABSTRACT**

The rewriting process is the emergence of folk narratives in different forms in the context of intertextuality within the relationship of subtext and main text. This process allows us to look at the characters, plot, and narrative style in the text in terms of intertextuality. In order for a narrative to enter the rewriting process, it must contain many features. There are aspects of this text that attract attention and are adopted by the society. This adoption can actually be associated with the society seeing its own traces. The stories in Dede Korkut are always an up-to-date source for research. It is the work that most successfully displays the reflections of Turkish culture. Therefore, it has attracted the attention of researchers and writers and has been used in various fields.

In the stories, we concretely see the beliefs, traditions and customs, culture, and events that have left a mark on the society. The quality of imagination is important in these fictional texts. We can see this effect in people who were accepted by people and had a place among them in Turkish history. Every

event experienced by Boğaç Han, the main hero of the story, made him an important hero in the book of Dedem Korkut and led to studies in many areas. One of these is Adnan Binyazar's work called "Stories from Dedem Korkut". In the work, "Dirse Han Oğlu Boğaç Han" was rewritten as a story using the name "Boğaç Han. In the study, Boğaç Han's contribution to the process was conveyed in the rewriting by determining how it was expressed through the subtext, its similarities and differences, from what angles it was discussed, and how much it carried the character of the story.

**Key Words:** Intertextuality, Rewriting, Adnan Binyazar, Dede Korkut, Boğaç Han

## GİRİŞ

Türklerin geçmişteki yaşayışlarını, inanışlarını, kültürlerini, gelenek ve göreneklerini günümüze ulaştıran birçok eser bulunmaktadır. Dedem Korkut Kitabı da bu değerleri bize gösteren en önemli eserlerden biridir. Öyle ki Mehmet Fuad Köprülü bu konuyu şu şekilde dile getirmiştir: “*Bütün Türk edebiyatını terazinin bir gözüne, Dede Korkut’u öbür gözüne koysanız yine Dede Korkut ağır basar*” (Ergin, 2013: 9)

Dedem Korkut Kitabı’nın Dresden ve Vatikan olmak üzere iki nüshası bulunmaktadır. Dresden nüshasında yer alan tam adı “Kitab-ı Dedem Korkud ‘Alâ Lisân-ı Tâife-i Oğuzân”dır. Dresden nüshası bir mukaddime on iki hikâyeden oluşmaktadır. Vatikan nüshasında ise bir mukaddime ve altı hikâye yer almaktadır. Eksiksiz olarak ele alınan ve çalışmaların üzerine yapıldığı nüsha, Dresden yazmasıdır. Dresden nüshası Flischer tarafından bulunmuş ve 1831’ yılında kayda geçirilmiştir. Türkiye’deki ilk neşri ise Kilisli Muallim Rıfat tarafından 1916 yılında yapılmıştır. Latin harfli ilk yayını Orhan Şaik Gökyay tarafından 1938 yılında yapılmıştır. Dresden ve Vatikan nüshalarının beraber yer aldığı, eserin sonunda iki nüshanın da tıpkıbasımlara yer verildiği 1958 yılında yayımlanan “Dede Korkut Kitabı I / Giriş- Metin- Faksimile” adlı eserin sahibi ise Muharrem Ergin’dir. (Bekki, 2016: 26)

Dedem korkut kitabının Türklerin hayatı hakkında bize sunduğu geniş yelpaze her zaman araştırmalar ve araştırmacılar için heyecan verici olmuştur. Boylarda işlenen konular o dönemde yaşayan toplumun yansıması olmuş ve geçmiş yaşantılarımıza ışık tutmuştur. Türk toplumunun değerleri, olaylar çevresinde ele alınmış ve edebi tarz ile yoğrularak estetik bir biçimde sunulmuştur. Bu yüzden Dedem Korkut Kitabı’nda yer alan boylar hem parça hem bütün olarak oldukça önemlidir.

### 1. Metinlerarasılık ve Yenidenyazım

Metinlerarasılık, en az iki metin arasındaki bağlantının ortaya çıkmasını sağlayan ve birbirinden bağımsız olmayan bu metinleri açığa çıkararak belirli bir kuram çerçevesinde disiplinler arası ele alınmasıdır. Metinler bir sürecin ürünüdür. Metni oluşturan kişi bu süreçte yaşamı boyunca etkileşime girdiği her şeyden yararlanabilir (Güvenç, 2019: 14).

Nesilden nesile aktarılan ya da yaratılan ürünler belirli bir zaman diliminde ele alınır. Bu zaman diliminde ise etkileşim oldukça önemlidir. Çünkü değişikliği sağlayan bu sürecin etkisidir. Metinlerarasılıkta yer alan alt metin kavramı, ana metinlerin oluşumunu sağlayan temel yapıdır. Yeniden yazmada, ana metin; bir dönüşüm veya yeniden yazım işleminin sonucunda önceki bir metinden yani alt metinden yeniden türetilir (Aktulum, 2011:418).

Yeniden yazım süreci, alt metin ve ana metin ilişkisi içerisinde halk anlatılarının farklı formlarda ortaya çıkışıdır. Bu süreç metne bağlı kalarak metin içerisinde yer alan karakterlere, olay örgüsüne, anlatış biçimine farklı açılardan bakmamızı sağlar ve bize farklı sunumlar ortaya çıkarır. Bir anlatının yeniden yazım sürecine girmesi için birçok özelliği barındırması gerekmektedir. Yeniden yazım sürecine girecek olan metnin toplum tarafından dikkat çeken ve benimsenen taraflarının bulunması gerekir. Bu benimseyiş aslında toplumun kendi izlerini görmesi ile ilişkilendirilebilir. Öyle ki günümüzde çeşitli reklam filmlerinde, senaryolarda, tiyatrodan ve daha birçok alanda eski yaşayış ve kültürlere dayanarak alanında birçok yazar yeni formlar ortaya çıkarmaktadır. Burada amaçlardan biri eserin hitap ettiği kitlenin kültürel izlerine dokunmak ve onları etkileyip dikkatlerini çekmektir. Toplumun bu yöndeki eğilimleri ise yeniden yazım süreçlerini oldukça etkilemekte ve oluşumuna katkı sağlamaktadır.

Yeniden yazım sürecindeki bu çeşitlenmenin diğer bir yönü ise geçmişin sürekliliğini sağlamak ve dinamikliğini göstermektir. Bu yansımaların amacı topluma geçmiş kimlikleri tekrar hatırlatma ve bu kimliklerin unutulmasına engel olmaktır (Aktulum, 2013: 9). Bir nevi gelenek ve göreneklerin, kültürlerin birçok formda ana tema olarak işlenmesi bundandır. Eski dönemlerdeki yaşayışların günümüze evrilişteki süreci yeniden yazım şekilleri ile topluma aktarılmaktadır. Yeniden yazım sürecinde yazar açısından bakıldığında bilinç dışı yaratımlar da bulunabilir. Yazar aslında farkında olmadan alt metinden yararlanabilir ilgi alanlarını eserine yansıtabilir. Bilinçli bir oluşum yerine bilinç dışı birikimlerinden yararlanarak oluşturabilir. Bu farklı açılar, aslında metinlerarasılık kuramının ne kadar çeşitli şekillerde oluşabileceğini göstermektedir.

## 2. Alt metin: Dirse Han Oğlu Boğaç Han Boyu

Dresden nüshasında “mukaddime”den sonra gelen ilk boy olan “Dirse Han Oğlu Boğaç Han”dır. Alt metin olarak Muharrem Ergin’in Dede Korkut Kitabı adlı eserinden “Dirse Han oğlu Boğaç Han Boyunu Beyân İder” hikâyesi ele alınmıştır. Özet, Muharrem Ergin’in, Dede Korkut Kitabı, Ankara Üniversitesi Basımevi, Ankara, 1964, adlı kitabında bulunan metinden üretilmiştir. Dirse Han Oğlu Boğaç Han hikâyesinin özeti şu şekildedir:

Bayındır Han yılda bir kez ziyafet verir ve Oğuz beylerini misafir eder. O ziyafette ak, kızıl, kara olmak üzere üç otağ kurdurur. Kızı olanı kızıl otağ, oğlu olanı ak otağ hiç çocuğu olmayanın ise kara otağ oturtulmasını ister. Allah’ın çocukları olmayanlara gazap eylediğini bu yüzden ziyafette kendisinin de onlara hürmet göstermeyeceğini söyler. Çocuğu olmayan Dirse Han ziyafete geldiğinde kara otağ oturtulur, altına kara keçe serilir ve önüne kara yahni koyulur. Bunun üzerine Dirse Han çok üzülür ve bu karşılama şeklinin nedenini sorar ve çocuğu olmadığı için bu muameleyi gördüğü cevabını alır. Daha sonra eşinin yanına giderek çocukları olmamasının nedenini öğrenmek ister ve eşine sorar. Eşi de nazik şekilde dua etmeleri ve sevap işlemeleri gerektiğini söyler. Bunun üzerine Dirse Han ve eşi bu gerekenleri yaparak bir erkek çocuğu sahibi olur. Bu çocuk on beş yaşına gelir. Bayındır Han’ın bir boğası bir de erkek devesi vardır. Yılda iki kez Oğuz beyleri ile birlikte bunları güreştirir ve izlemeye gelir. Böyle bir eğlence günü bu erkek çocuğu arkadaşları ile oyun oynarken boğayı çocukların oyun oynayacağı yere bırakırlar. Dirse Han’ın oğlu diğer çocuklar gibi kaçmayarak boğa ile karşı karşıya gelir. Çocuk, hem akli hem de gücü ile boğayı bir yumruk ile yıkar. Bunun üzerine Dedem Korkut’u çağırılır ve çocuğa ad vermesini isterler. O da çocuğa Boğaç adını verir. Dirse Han da oğluna beylik verir ama Boğaç, babasının kırk yiğidini önemsemez. Bu kırk yiğitte bunun öcünü, babası ile Boğaç Han’ın arasına girerek alır. Boğaç Han’ın olur olmaz kötülükler yaptığını ve bu durumun Bayındır Han’ın kulağına giderse gazaba uğrayacaklarını söyler. Bu yüzden çare olarak Boğaç’ın ölmesi gerektiğini söyler. Dirse Han’da onlara kanar. Bunun içinde kırk yiğit, av düzenleyerek Boğaç Han’a tuzak kurabileceklerini söyler. Dirse Han’da onlara kanıp avda oğlunu ok ile vurur. Boğaç Han’ı öylece bırakıp dönerler. Daha sonra annesi oğlunu avda bulur. Yaralı olan Boğaç Han’a annesinden önce Hızır yardım eder, yarasına anne sütü ve dağ çiçeğinin merhem olacağını söyler. Annesi de oğlanı iyileştirir. Boğaç’ın yaşadığını öğrenen kırk namert ise kendi canlarını kurtarmak için Dirse Han’ı tutsak ederler. Bunun üzerine iyileşen Boğaç Han babasını kırk namertten kurtarmak için yola çıkar. Boğaç Han, Dirse Han’ı kırk namerdin elinden kurtarır. Bayındır Han Boğaç Han’a beylik verir. Dede Korkut gelir, dua eder.

## 3. Dedem Korkut’tan Öyküler / Boğaç Han: Adnan Binyazar

Yeniden yazım sürecinde ana metin olarak ise Adnan Binyazar’ın Dedem Korkut’tan Öyküler adlı eserindeki “Boğaç Han” hikâyesi ele alınmıştır. Eserde “Dirse Han Oğlu Boğaç Han” boyu “Boğaç Han” adı altında hikâye türünde yeniden yazılmıştır.

Adnan Binyazar’ın “Dedem Korkut’tan Öyküler” adlı eserinin ilk basımı 1972 yılında Türk Dil Kurumu tarafından yayımlanmıştır. Çalışmada bir “ön söz” ve “Boğaç Han”, “Bamsı Beyrek”, “Deli Dumrul”, “Tepegöz” başlıklı dört hikâyenin yeniden yazımı yer almaktadır.

Adnan Binyazar, kitabının ön sözünde yeniden yazımı kullandığını şu şekilde açıklamıştır: “Biz, Dedem Korkut’tan, özgün bulduğumuz dört öykü seçtik. Boğaç Han, Bamsı Beyrek, Deli Dumrul, Tepegöz adlı öyküleri, -bir ölçüde- yeniden anlatmağa çalıştık. Gerçekçi ve yalın anlatımı olan bu öykülere bazı katmanlarda bulunduk.” (Binyazar, 1972: 8).

Dede Korkut Kitabı'nda –alt metinde–“Dirse Han Oğlu Boğaç Han Boyını Beyân İder” olarak geçen hikâye burada da ilk sırada olmak koşuluyla “Boğaç Han” olarak yer almıştır. Burada ilk biçimsel dönüşüm hikâyenin başlığında gerçekleşmiştir. Diğer bir biçimsel dönüşüm ana metin ile alt metnin girişinde verilen cümlelerde yapılmıştır. Yazar, burada biçim dönüşümü olarak *genişletme* kullanmıştır:

Alt metin	Ana metin
“Bir gün Kam Gan oğlu Han Bayındır yirinden turmuş-idi. Şami günlüğü yir yüzine dikedürmüş-idi. Ala sayvanı gökyüzüne aşanmış-idi. Bin yirde ipek halıcası döşenmiş-idi” (Ergin, 1964: 6)	“Günün birinde Kam Gan Oğlu Bayındır Han, yerinden kalkmıştı. Büyük günlüğünü kara yerin üzerine diktirmişti. Günlüğün şaçakları gökyüzüne yükselmişti. Oturduğu yerin her yanına binlerce ipek halıcık döşenmişti. <i>Bir şölen havası içindeydi Oğuz elleri. Herkes bir şenliğe başlamanın coşkusu içindeydi. Gelenler gidenler, koşuşanlar sayılamayacak ölçüde çoktu. Nedendi Oğuz ellerindeki bu değişiklik?</i> ” (Binyazar, 1972: 9)

Ana metnin başlangıcında alt metine dair eklemeler yapılmıştır. Yazar burada konuşma dilini kullanarak öyküleştirmeye ile merak duygusunu açığa çıkarmaya çalışmıştır. Çeşitli betimlemeler ile mekân tasviri kullanmıştır. Ayrıca metinde yer alan “*Oğuz elleri*” ifadesi önemlidir. Sözlü ya da yazılı halk bilgisi ürünleri bir döneme ait bakış açısı taşır. “*Bir metni metinlerası düzlemde inceleyebilmek için o metnin içinde bulunduğu tarihi ve sosyal yapıya da bakmak gerekir*” (Edis Aydoğan, 2022: 12). Ana metindeki hikâyeye eklenen ulusal kimliğin vurgulandığı bu ifadeyle *düşünyapıbirimsel* dönüşümün meydana geldiği söylenebilir. Ayrıca alt metinde Oğuzların bu şölende çok mutlu olduklarına dair ibareler yer almazken ana metinde Oğuzların mutlu, kalabalık, coşku içerisinde betimlenmesi düşünyapıbirimin özelliklerini göstermektedir.

Alt metinde yer alan Bayındır Han'ın, “Oğlu kızı olmayanı Allah Te'âlâ kargayubdur, biz dahı kargaruz bellü bilsün.” (Ergin, 1964: 4) şeklindeki ifadesi, “Oğlu kızı olmayanı Tanrı kul saymaz, biz de kul saymayız.” (Binyazar, 1964: 10) şeklinde ana metne alınmıştır. Alt metindeki ifadeler sadeleşip günlük konuşma diline daha yakın bir şekilde verilmiştir. Yazarın ana metinde, alt metinde yer almayan tasnifinde ise Dirse Han şu şekilde betimlemiştir. “Dirse Han'ın gözleri kızardı, *kara bıyıkları titredi.*” Alt metinde Dirse Han'ın fiziksel özelliklerine dair bilgi yer almamaktadır. Yazar burada olayın akışı ile birlikte kahramanın kızgınlığına uygun betimlemelere yer vermek istemiştir. Yine alt metinde yer almayan “*yiğitler yiğidi*” sıfatlarını kullanarak “Dirse Han” için kahramanlık katmanı eklemiştir: “...Bunları sordu *yiğitler yiğidi* Dirse Han” (Binyazar, 1972: 11). Dirse Han'ın kızgınlığı anlatılırken birden kahramanlığını vurgulayıcı “*yiğitler yiğidi*” sıfatına yer verilmiştir. Metinde savaşa dair bir bilgi yer almazken bu tanımlama anlamsal dönüşümde *değersel* dönüşümü meydana getirir.

Alt metinde yer almayan ve nazım kısımlarına bağlanması için yazılan bir diğer geçiş metni şu şekildedir: “*Sonra da kendini tutamadı, aldı kopuzunu eline, acılı sözler söyledi elif gibi ince kadınına. Bir öfke sardı ki yüreğini, yer gök gürlledi sanırsın*” (Binyazar, 1972: 11). Dede Korkut'ta; Oğuz alpları aynı zamanda ozandır. Hemen her zaman yanlarında “kopuz” taşırlar ve savaş meydanları da dâhil soylamalarını kopuz eşliğinde söylerler.(Bekki, 2016: 90) Alt metinde yer almayan Dirse Han'ın kopuzunu alıp söylemesi ve devamındaki ifadeleri biçimsel dönüşümde *genişletmeye* örnektir. Ayrıca yazar betimlemeler ve benzetmeler yaparak anlatımını sadeleştirmeye ve güçlendirmeye çalışmıştır.

Ana metinde Boğaç Han'ın kahramanlık yapıp ad alması için çağrılması alt metinden daha geniş bir şekilde aktarılmıştır. Burada biçimsel dönüşüm özelliklerinden *genişletme* yapılmıştır. Yazar anlatımını konuşma diline yakın yalın bir halde okuyucuya aktarmıştır. Hikâye türünden yeniden yazılan boyda pekiştirmeler, sıfatlar ile Dede Korkut'a verilen değer miktarını aktarmış aliterasyonlarla akıcılığı sağlamıştır: “*Çağırdılar ozanlar ozanı, bilgeler bilgisi Dedem Korkut'u. Çıkıp geldi nerelerden geldiyse. Oğlanı aldı Dirse Han'ın yanına. Aldı bin dilli kopuzunu eline, yürekten deyişler söyledi, bir Oğuz yiğidinin erdemlerini anlattı.*” (Binyazar, 1972: 14)

Ana metinde, alt metine dair soylamalara da yer verilmiştir. Halk hikâyeleri nazım-nesir karışık bir yapıya sahiptir. Hikâyenin olay örgüsü ve akışı nesir, duygular nazım olarak ifade edilir. Nesir kısımlarda anlatıcı istediği şekilde değişimler yapabilirken nazım kısımlarında serbest şekilde müdahale edemezler. (Boratav, 2002: 79). Bu soylamalarda yazar alt metinde yer alan ifadelere büyük ölçüde bağlı kalarak aktarım yapmıştır. Eşler arasında gerçekleşen nazım kısımları iki metinde şu şekilde yer almıştır:

Alt metin	Ana metin
Berü gel başum bahtı ivüm tahtı	Beri gel alınımın yazısı, evimin kadını
İvden çıkup yoriyanda selvi boylum	Evden çıkıp yürüyende servi boylum
Topuğında sarmaşanda kara saçlum	Topuğunda sarmaştığında kara saçlum
Kurulu yaya benzer çatma kaslum	Kurulu yaya benzer çatma kaşlum
Koşa badem sığmayan tar ağızlum	Çift badem sığmaz dar ağızlum güz elması gibi al yanaklum
Güz almasına benzer al yanaklum	
Kavunum viregüm düvlegüm	Kadınım, evimin direği, elifim... (Binyazar, 1972: 11)
<i>Görür misin neler oldu</i> (Ergin, 1964: 4)	

“Görür misin neler oldu” dizesi ana metinde çıkarılmış olduğundan biçimsel dönüşüm yollarından *kesip çıkarma* işleminin uygulandığı görülmektedir. Bu kısım ana metinde yazar tarafından konuşma çizgisi dâhilinde verilerek şu şekilde *düzyazılaştırma* yapılmıştır: “*Bilir misin neler oldu kadınım, neler geldi başıma?*” Yazar, burada konuşma diline daha yakınlaşarak sohbet havası içerisinde olayın akışını tamamlamak istemiştir. Ayrıca nazım kısımlarındaki üslubu bozmayacak şekilde *düzyazılaştırma* yapılmıştır.

Alt metinde hikâyenin sonunda Dede Korkut’un gelip dua etmesi ana metinde de yer almıştır. Ana metinde sadeleşme yapılarak verilen dileklerde “*Yöm vireyin hanum*” kısmı yer almamaktadır. “*Boylarda sık tekrarlanan “Görelüm hanum ne soylamış, yöm vereyim hanum, meğer hanum, hanum hey ve hanum gibi ibareler, Dedem Korkut boylarının sözel ortam yaratıcılığının bir ürünü olabileceğine ve aynı zamanda bu boyların bir han/bey huzurunda bir ozan tarafından anlatıldığına işaret eder”* (Bekki, 2016:128). Burada yazar tarafından *kesip çıkarma* yapılmış ve onun yerine de iyi dilekler sunarak eklemelere yer verilmiştir:

Ana Metin	Alt Metin
Kara ölüm geldüğünde kiçit versün. Sağlıç- ile sağınçın devletün Hak artursun. Ol öğdügüm yüce Tanrı dost olubanı meded irsün. <i>Yöm vireyin hanum: ...</i> (Ergin, 1964: 14)	Kara ölüm geldiğinde geçit versin. Sağlıkla mutlulukla geçsin yaşamın, artırsın Tanrı esenliğini, mutluluğunu... o övdüğün yüce Tanrı, dost olarak yardım etsin sana!.. (Binyazar, 1972: 25)

## SONUÇ

Çalışmada, yazar kitabının ön sözünde de belirttiği gibi Dede Korkut hikâyelerinden dört tanesini seçmiş ve bu hikâyeler çerçevesinde yeniden yazımlar oluşturmuştur. Seçtiği hikâyelerdeki kahramanlar, güncel olarak da barındırdığı özellikler bakımından en çok çalışmalara konu olanlardır. Ana metin, alt metinin olay örgüsüne ve yer alan kahramanlara sadık bir şekilde yapılandırılmıştır. Yazar anlamsal dönüşümden ziyade biçimsel dönüşüm öğeleri olan ekleme, kesip çıkarma, genişletme, diyalog haline dönüştürme gibi yöntemleri kullanmıştır. Diğer taraftan da bazı yerlerde geleneksel anlatıcı üslubunu kullanması hikâye formu için olumlu bir yazım olmuştur. Yazar kendi görüşlerini bildirmesi, olayların akışına uygun betimlemeler kullanması ve sohbet havasında anlatım tarzı ile hikâyeci anlatıcılara özgü özellikleri göstermiştir. Yazar günlük konuşma diline yakın olmak için deyimleri, pekiştirme sözcükleri, seslenme ifadelerini, sıfat ve aliterasyonları hikâye akışına göre yerleştirmiştir. Anlatımlarda yer yer okuyucu ile diyalog içinde bulunan bir üslup kullanmıştır.

Yazarın ayrıntılara girmesi ile birlikte ana metinde hacim artışı olmuştur. Ayrıca alt metinde bulunan nazım kısımları ana metinle paralellik göstermiş nesir kısımları da lirik bir tarz ile aktarılmıştır.

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STUDY OF THE FERMI SURFACE OF SINGLE-CRYSTAL RHENIUM AT LOW TEMPERATURES

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**ABSTRACT**

In recent years, a branch of science and technology has been developing - spintronics, where it studies and uses the spin of an electron along with its charge to transmit and process information. In this regard, interest has increased in the study of such phenomena as the magnetotransport effect, the Hall effect, where the spins of electrons on the Fermi surface of metals and semiconductors are considered.

The work studied the magnetotransport properties of rhenium, which has a hexagonal structure. Experimental results of a study of the electrical and galvanomagnetic properties of the transition metal rhenium in strong magnetic fields in a wide temperature range from helium to room temperature are presented. The temperature and field dependences of the Hall coefficient of single-crystal samples were measured depending on the direction of the applied magnetic field relative to the symmetry axes. The anisotropy of the magnetoresistance of single-crystal rhenium in magnetic fields up to 80 kOe at a temperature of 4.2 K has been studied. In fields of the order of 20 kOe, a kink is observed in the curves  $\Delta\rho/\rho=f(H)$ , which can be explained as a consequence of magnetic breakdown. The anisotropy of the Hall constants  $R_0$  and  $R_0^1$  of rhenium, determined, respectively, in weak and strong magnetic fields in the temperature range 4.2 – 250 K is studied. It is shown that the Hall constant  $R_0^1$  is strongly anisotropic and increases with increasing angle  $\varphi$ . Based on the measured values of Hall constants  $R_0$  in strong magnetic fields at an angle between the direction of the magnetic field and the hexagonal axis  $\varphi=90^\circ$  for rhenium, the number of current carriers per atom was estimated. The estimate leads to the value  $n_d=0.292$ . The results obtained are discussed on the basis of existing theories.

**Keywords.** Transition metal, single crystal, galvanomagnetic effects, Hall effect, low temperatures.

SOME CONCEPTS ON GENERALIZED INTUITIONISTIC FUZZY NORMED SPACES

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**ABSTRACT**

In this article, we study generalized intuitionistic fuzzy normed spaces. Also we study some topological properties of these spaces.

MIGRATION MANAGEMENT IN ALBANIA: PROGRESS TOWARDS EUROPEAN UNION  
ACCESSION

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**ABSTRACT**

This article examines Albania's progress in migration management in the context of its journey towards European Union accession. Evaluating developments within Chapter 24, encompassing justice, freedom, and security, the study assesses Albania's efforts to align its legislation and enforcement capacities with EU standards. Specifically, it analyzes Albania's implementation of national migration strategies, ratification of international conventions, negotiations on re-admission agreements with origin countries, and the Pact with Italy. Furthermore, the article explores Albania's evolving asylum policies and its engagement in cross-border cooperation agreements within the Schengen area. Through this examination, the article offers insight into Albania's progression towards European integration while highlighting encountered challenges and opportunities. Additionally, the decision by the Council of Ministers to approve expanded national migration profiles for 2019-2022 is a significant step towards enhancing migration management in Albania. It involves the identification of migration profiles and measures to enhance data collection, including a robust monitoring and reporting system. Moreover, the decision emphasizes coordination and cooperation among relevant institutions, underscoring the importance of collaboration between government authorities and non-governmental organizations. Overall, the article reflects Albania's commitment to addressing migration challenges and finding sustainable solutions in alignment with principles of justice and respect for fundamental human rights.

**Keywords:** Albania, migration management, European Union accession, Chapter 24, national migration profiles.

## 1 Introduction

Albania finds itself at a pivotal juncture in its journey towards European Union accession, marked by a dynamic interplay of migration governance, regional cooperation, and legal intricacies.<sup>3</sup> As the country endeavors to align its legislation and enforcement practices with EU standards, the recent Pact with Italy emerges as a focal point in Albania's migration management discourse.<sup>4</sup> Against the backdrop of Chapter 24, which encompasses justice, freedom, and security, Albania's efforts to navigate the complexities of migration governance assume paramount importance.<sup>5</sup>

The Italy-Albania Pact, signed on November 6, 2023, is a significant milestone in Albania's migration landscape, ushering in a new era of bilateral cooperation and shared responsibility. Rooted in the principles of collaboration and mutual benefit, the Pact aims to address migration challenges through innovative mechanisms, including the relocation of asylum seekers rescued at sea to designated centers on Albanian territory. However, the implications of this landmark agreement extend beyond mere operational logistics, engendering legal, constitutional, and ethical considerations that merit careful examination.<sup>6</sup>

This article embarks on a comprehensive exploration of Albania's migration management strategies within the context of its European Union accession aspirations. With a particular focus on the implications of the Italy-Albania Pact, the study delves into Albania's endeavors to align its policies and practices with the stringent requirements set forth by the European Union. Through an in-depth analysis of Albania's implementation of national migration strategies, its ratification of international conventions, and its negotiations on re-admission agreements with countries of origin, this study seeks to shed light on the intricacies of Albania's migration landscape.

Furthermore, the article illuminates Albania's evolving asylum policies and its engagement in cross-border cooperation initiatives within the Schengen area, underscoring the country's dynamic response to the complex challenges posed by migration. By elucidating these dynamics, the article aims to provide valuable insights into Albania's progression towards European integration while offering a nuanced understanding of the nuances and complexities inherent in its migration governance framework.<sup>7</sup>

Moreover, the article underscores the pivotal significance of the Council of Ministers' decision to approve expanded national migration profiles for the years 2019-2022.<sup>8</sup> This decision represents a pivotal milestone in Albania's migration management efforts, heralding a new era of enhanced data collection mechanisms and closer collaboration among relevant institutions. As Albania embarks on

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<sup>3</sup> Press corner. (n.d.). European Commission - European Commission. [https://ec.europa.eu/commission/presscorner/detail/en/QANDA\\_23\\_5612](https://ec.europa.eu/commission/presscorner/detail/en/QANDA_23_5612)

<sup>4</sup> Albania ratifies migrant deal with Italy – DW – 02/22/2024. (n.d.). Dw.com. <https://www.dw.com/en/albania-ratifies-migrant-deal-with-italy/a-68336646>

<sup>5</sup> Chapter 24 – Cluster 1 Albania. (n.d.). Retrieved May 3, 2024, from [https://cluster1albania.com/?page\\_id=1382](https://cluster1albania.com/?page_id=1382)

<sup>6</sup> The Italy-Albania Agreement on Migration: Pushing Boundaries, Threatening Rights. (n.d.). Amnesty International. <https://www.amnesty.org/en/documents/eur30/7587/2024/en/>

<sup>7</sup> Screening report Albania Cluster 1 -Fundamentals Functioning of Democratic Institutions Date of screening meetings: Chapter 5 -Public Procurement Date of screening meetings: Chapter 18 -Statistics Date of screening meetings: Explanatory meeting: 12 and 13. (2019). [https://neighbourhood-enlargement.ec.europa.eu/system/files/2023-07/AL%20Cluster\\_1%20Draft%20screening%20report\\_external%20version.pdf](https://neighbourhood-enlargement.ec.europa.eu/system/files/2023-07/AL%20Cluster_1%20Draft%20screening%20report_external%20version.pdf)

<sup>8</sup> (2024). Kryeministria.al. <https://www.kryeministria.al/newsroom/vendime-te-miratuara-ne-mbledhjen-e-keshillit-te-ministrave-date-31-janar-2024/>

this transformative journey, the article seeks to illuminate the opportunities and challenges that lie ahead, guiding policymakers and stakeholders towards sustainable solutions that uphold principles of justice and respect for fundamental human rights. This article serves as a comprehensive examination of Albania's migration management strategies in the context of its EU accession aspirations, offering valuable insights into the country's progression towards European integration and the pivotal role played by the Pact with Italy in shaping its migration governance landscape.<sup>9</sup>

## 2 Migration Management in Albania: Legal Framework and Alignment with EU Legislation

Albania, situated at the crossroads of migration routes in the Western Balkans, faces multifaceted challenges and opportunities in managing migration. As the country aspires to European Union accession, its migration governance framework undergoes scrutiny and transformation to align with EU standards. This article delves into Albania's legal framework governing migration and assesses its alignment with European Union legislation, highlighting key areas of convergence and divergence.

Albania's legal framework governing migration is rooted in its Constitution, which guarantees the rights and freedoms of foreigners within its territory. Fundamental principles such as freedom of movement, non-discrimination, and equal treatment form the cornerstone of Albania's approach to migration governance.<sup>10</sup> Additionally, Albania has ratified numerous international conventions addressing migration issues, reflecting its commitment to upholding human rights standards in the realm of migration. Some of the key international instruments ratified by Albania include the Universal Declaration of Human Rights, the International Covenant on Economic, Social and Cultural Rights, the International Covenant on Civil and Political Rights, and the International Convention on the Elimination of All Forms of Racial Discrimination. These instruments provide a robust legal framework for protecting the rights of migrants and ensuring their dignified treatment within Albania's borders.<sup>11</sup>

Furthermore, Albania's legal framework has witnessed significant alignment with EU legislation in recent years, as the country endeavors to harmonize its laws with European standards.<sup>12</sup> Normative acts pertaining to visa issuance, employment, residence permits, and family reunification have been revised to reflect EU directives and regulations. By aligning its legislation with EU norms, Albania aims to facilitate smoother integration into the European Union and enhance cooperation on migration matters with EU member states.

Albania's alignment with EU legislation on migration is guided by the requirements set forth in Chapter 24 of the EU accession process, which covers justice, freedom, and security. As part of its accession negotiations, Albania is expected to harmonize its migration policies and practices with EU standards, thereby ensuring compatibility with the broader European legal framework.

Key areas of alignment with EU legislation include asylum and refugee policies, border management, and the readmission of irregular migrants. Albania has made significant strides in adopting EU best practices in these areas, including the establishment of asylum procedures in line with the Common

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<sup>9</sup> THE NATIONAL STRATEGY ON MIGRATION AND ACTION PLAN 2019 – 2022, from <https://albania.iom.int/sites/g/files/tmzbdl1401/files/documents/THE%20NATIONAL%20STRATEGY.pdf>

<sup>10</sup> CONSTITUTION OF THE REPUBLIC OF ALBANIA. (n.d.). [https://www.gjk.gov.al/web/constitution\\_of\\_albania\\_1722.pdf](https://www.gjk.gov.al/web/constitution_of_albania_1722.pdf)

<sup>11</sup> Migration Governance Snapshot: Republic of Albania. (2018). <https://www.migrationdataportal.org/sites/g/files/tmzbdl251/files/2018-09/Migration%20Governance%20Snapshot-Republic%20of%20Albania.PDF>

<sup>12</sup> Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 2023 Communication on EU Enlargement policy. (n.d.). [https://neighbourhood-enlargement.ec.europa.eu/system/files/2023-11/SWD\\_2023\\_690%20Albania%20report.pdf](https://neighbourhood-enlargement.ec.europa.eu/system/files/2023-11/SWD_2023_690%20Albania%20report.pdf)

European Asylum System and the implementation of border control measures consistent with the Schengen acquis.<sup>13</sup>

Moreover, Albania's engagement in regional and bilateral cooperation initiatives with EU member states further underscores its commitment to aligning with EU migration policies. The Italy-Albania Pact, signed in 2023, exemplifies Albania's efforts to collaborate with EU partners on migration management, particularly in the context of irregular migration flows in the Mediterranean region.

While Albania has made considerable progress in aligning its migration framework with EU legislation, challenges persist in areas such as asylum processing, migrant integration, and border security.<sup>14</sup> Delays in asylum procedures, inadequate reception facilities, and limited resources pose obstacles to effective migration management in Albania.

However, these challenges also present opportunities for Albania to enhance its migration governance capacity through targeted reforms and strategic investments. By strengthening asylum procedures, expanding integration programs, and bolstering border infrastructure, Albania can improve its ability to manage migration flows effectively and mitigate associated risks. Albania's migration management efforts are intricately linked to its European Union accession aspirations, as the country seeks to align its legal framework and practices with EU standards. While significant progress has been made in harmonizing Albania's migration policies with EU legislation, challenges remain in areas requiring further attention and investment.<sup>15</sup>

By addressing these challenges and leveraging opportunities for reform, Albania can enhance its migration governance capacity and contribute to regional stability and cooperation in the Western Balkans.<sup>16</sup> Through continued collaboration with EU partners and adherence to international human rights standards, Albania can build a more inclusive and effective migration management system that upholds the rights and dignity of migrants while promoting mutual prosperity and security.

### **3 Decision No. 50: a milestone in Albania's migration management**

Decision No. 50, adopted on January 31, 2024, by the Council of Ministers of Albania, represents a critical step forward in the country's migration management strategy. This decision is emblematic of Albania's commitment to addressing the multifaceted challenges posed by migration while advancing its goals of transparency, efficiency, and effectiveness in managing migratory flows. Central to Decision No. 50 is the approval of expanded national migration profiles for the years 2019-2022. These profiles offer a comprehensive analysis of migration trends, encompassing various factors such as the scale of migration, demographic characteristics of migrants, their countries of origin, and the reasons driving their migration.<sup>17</sup> By developing a nuanced understanding of these migration patterns, policymakers can tailor their responses to meet the diverse needs and challenges faced by migrants. Moreover, Decision No. 50 prioritizes the enhancement of data collection mechanisms related to migration. A robust monitoring and reporting framework is established to systematically gather, analyze, and utilize migration data. This data-driven approach empowers authorities to make informed

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<sup>13</sup> Cimade, L. (n.d.). Analysis Albania: Migration issues in the Balkans. Retrieved May 3, 2024, from <https://www.lacimade.org/wp-content/uploads/2023/04/LaCim.CollNotes3-EN-Pages-Def.pdf>

<sup>14</sup> STUDY REPORT "On the Rights and Freedoms of Migrants, Asylum Seekers and Refugees in Albania. (2018). <https://ahc.org.al/wp-content/uploads/2018/09/Migrantet-English.pdf>

<sup>15</sup> *Ibidem*

<sup>16</sup> REGIONAL COOPERATION IN THE WESTERN BALKANS Policy Report "Mini-Schengen" Common Regional Market. (2021). [https://balkansgroup.org/wp-content/uploads/2021/02/Regional-Cooperation-in-the-Western-Balkans\\_Regional-Economic-Area-the-mini\\_schengen-and-the-Common-Regional-Market-WEB-1.pdf](https://balkansgroup.org/wp-content/uploads/2021/02/Regional-Cooperation-in-the-Western-Balkans_Regional-Economic-Area-the-mini_schengen-and-the-Common-Regional-Market-WEB-1.pdf)

<sup>17</sup> National Contribution to the Fundamental Rights Report 2023 Albania. (n.d.). Retrieved May 3, 2024, from [https://fra.europa.eu/sites/default/files/fra\\_uploads/fr\\_2023\\_albania\\_en.pdf](https://fra.europa.eu/sites/default/files/fra_uploads/fr_2023_albania_en.pdf)

decisions and formulate evidence-based policies to address migration challenges effectively.<sup>18</sup> Furthermore, Decision No. 50 underscores the importance of fostering collaboration and coordination among relevant stakeholders involved in migration governance. This includes not only government agencies but also non-governmental organizations, international partners, and civil society actors. By promoting dialogue and cooperation, Decision No. 50 seeks to harness the collective expertise and resources of all stakeholders to develop holistic and sustainable solutions to migration issues. Additionally, Decision No. 50 reflects Albania's commitment to aligning its migration policies with international standards and best practices. Through partnerships with neighboring countries and international organizations, Albania aims to leverage shared knowledge and experiences to enhance its migration management capabilities. This collaborative approach not only strengthens Albania's response to migration challenges but also fosters regional cooperation and solidarity. In summary, Decision No. 50 signifies Albania's proactive approach to migration management, emphasizing the importance of comprehensive policy frameworks, robust data infrastructure, and inclusive governance structures. By embracing these principles, Albania is poised to navigate the complexities of migration while upholding its commitments to fairness, dignity, and human rights for all migrants.<sup>19</sup>

## 4 Albania-Italy Migration Pact

Bilateral cooperation on migration between Italy and Albania has taken a significant step forward with the signing of the Italy-Albania Protocol on November 6, 2023. This protocol marks a landmark agreement between the two countries aimed at enhancing collaboration in addressing migration challenges and managing migratory flows more effectively.

The Italy-Albania Protocol arises from the mutual recognition of the need to strengthen bilateral cooperation on migration, particularly in light of Albania's aspirations for European Union accession. It underscores the shared commitment of both nations to address migration issues in a

The protocol provides for the relocation of asylum seekers rescued at sea by Italian ships to designated centers in Albanian territory. These centers are capable of accommodating up to 3000 people and are intended to facilitate the reception and processing of asylum claims. The protocol has a duration of five years, with provisions for automatic renewal unless one of the parties decides to withdraw. This ensures the continuity of cooperation between Italy and Albania in addressing migration challenges. Are excluded vulnerable groups such as minors, pregnant women, and other vulnerable individuals from being relocated to Albanian centers. Instead, these individuals are to be brought back to Italy for appropriate care and support.<sup>20</sup>

Italian jurisdiction remains applicable within the designated areas in Albanian territory where the centers are located. This ensures the application of Italian and European legislation in managing asylum claims and migration processes.

The expenses for the operation of the centers and the processing of asylum claims are borne by the Italian government. This includes ensuring the provision of necessary health facilities and medical services for migrants.

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<sup>18</sup> THE NATIONAL STRATEGY ON MIGRATION AND ACTION PLAN 2019 – 2022, from <https://albania.iom.int/sites/g/files/tmzbdl1401/files/documents/THE%20NATIONAL%20STRATEGY.pdf>

<sup>19</sup> QBD. (n.d.). Vendime të Këshillit të Ministrave. Qendra E Botimeve Për Diasporën. Retrieved May 3, 2024, from <https://qbd.gov.al/vendime-te-keshillit-te-ministrave/>

<sup>20</sup> Mediterranean: Italy-Albania Deal Takes Another Step Forward — Syrian Refugees Go Back and Forth Between Cyprus and Lebanon Despite Apparent Return Agreement — More Crossings and Deaths as Italian Legislation Partly Blamed for 3000 Drownings in 2023 | European Council on Refugees and Exiles (ECRE). (2023). Ecre.org. <https://ecre.org/mediterranean-italy-albania-deal-takes-another-step-forward-%E2%80%95-syrian-refugees-go-back-and-forth-between-cyprus-and-lebanon-despite-apparent-return-agreement-%E2%80%95-more-crossings-and-death/>

Both parties are responsible for maintaining security and order within the designated areas. Italian authorities oversee security operations within the centers, while Albanian authorities are responsible for security in the external space and during transfers.

The protocol presents legal and operational challenges, particularly concerning extraterritorial management of migrants and adherence to international legal principles. These challenges include issues related to detention, access to asylum procedures, and respect for human rights.

Overall, the Italy-Albania Protocol represents a significant milestone in bilateral cooperation on migration, reflecting a shared commitment to addressing migration challenges while upholding principles of fairness, dignity, and respect for human rights. By working together, Italy and Albania aim to navigate the complexities of migration more effectively and develop sustainable solutions to migration issues.

On December 13, 2023, Albania suspended the procedure awaiting the decision of the Constitutional Court.<sup>21</sup> The decision followed two appeals filed against the agreement by members of the center-right opposition to Edi Rama. The appeal was based on the premise of a violation of international laws and the Albanian constitution. In particular, the protocol, concerning the rights and freedoms of individuals and affecting the territory of the State, was required to be concluded with the authorization of the President of the Republic, ensuring transparency and democratic legitimacy. The doubts raised are related to the comparison with the British government's project in Rwanda where, in exchange for an economic agreement signed in Kigali, asylum seekers arriving in British territory through the English Channel would be transferred to Rwanda before even examining their case. On November 15, 2023, the Supreme Court unanimously declared that Rwanda cannot be considered a safe country. People from there could be sent back to their country of origin where they could face violence and persecution, violating the principle of non-refoulement. The Albanian Constitutional Court ruled on January 29, 2024, affirming that the agreement with Italy is in accordance with the Constitution and can therefore be ratified by Parliament.<sup>22</sup> According to the press release of the Albanian body, the agreement does not undermine the territorial integrity of Albania, nor does it violate the freedoms of individuals despite criticisms from some local non-governmental organizations and internal opposition regarding the opening of facilities. On February 15, the Senate of the Republic, with 93 votes in favor and 63 against, approved the bill for the ratification and execution of the Italy-Albania Protocol.<sup>23</sup> It will not be possible to make the centers operational in Albania by spring 2024 as previously planned, given the political and legislative events in both Italian and Albanian territories. The criticisms raised in both territories concerned issues of unconstitutionality. In Italy, the criticism stemmed from the failure to observe Article 80 of the Constitution, which states that "The Chambers authorize, by law, the ratification of international treaties which are of a political nature, or provide for arbitration or judicial regulations, or entail variations of territory or burdens on finances or modifications of laws." The protocol, given its content, requires the application of the aforementioned Article 80. In Albania, as mentioned earlier, the prior and necessary authorization of the President of the Republic had led to the hearing of the Constitutional Court. The outcome in Italy came with the presentation of the ratification law to the Chamber of Deputies by the Government which had approved the law on January 24.

The Italy-Albania Protocol, although aiming to regulate bilateral cooperation on migration, raises a series of legal, operational, and political issues. The analysis of the legal and practical implications of

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<sup>21</sup> Pascale, F. (2023, December 14). Albanian court suspends controversial Italian migrant deal. [Www.euractiv.com; EURACTIV. https://www.euractiv.com/section/politics/news/albanian-court-suspends-controversial-italian-migrant-deal/](https://www.euractiv.com/section/politics/news/albanian-court-suspends-controversial-italian-migrant-deal/)

<sup>22</sup> Njoftim për shtyp. (n.d.). [Www.gjk.gov.al. Retrieved May 3, 2024, from https://www.gjk.gov.al/web/Njoftim\\_per\\_shtyp\\_3025\\_1-1.php](https://www.gjk.gov.al/web/Njoftim_per_shtyp_3025_1-1.php)

<sup>23</sup> Italy: Lower house ratifies Italy-Albania migrant deal. (2024, January 25). [InfoMigrants. https://www.infomigrants.net/en/post/54766/italy-lower-house-ratifies-italyalbania-migrant-deal](https://www.infomigrants.net/en/post/54766/italy-lower-house-ratifies-italyalbania-migrant-deal)

such an agreement highlights the complexity of extraterritorial management of migrants and the need to respect fundamental principles of international law and human rights.<sup>24</sup>

## 5 Conclusions

In conclusion, the examination of Albania's migration management within the context of its journey towards European integration reveals several key insights across three focal points: the legal framework and alignment with EU law, Decision No. 50, and the Albania-Italy Pact.

Firstly, Albania has made significant strides in aligning its legal framework with EU legislation and international conventions related to migration. The country's ratification of various international instruments demonstrates its commitment to upholding the rights and freedoms of migrants while adhering to principles of non-discrimination and equal treatment. However, challenges remain regarding the effective implementation of these legal frameworks and their impact on migrants' rights.

Secondly, Decision No. 50 represents a crucial milestone in Albania's migration management efforts. By approving expanded national migration profiles for the years 2019-2022, the government has taken proactive steps to enhance data collection, coordination among relevant institutions, and collaboration with non-governmental organizations. This decision underscores Albania's commitment to addressing migration challenges comprehensively and fostering sustainable solutions.

Thirdly, the Albania-Italy Pact signifies a significant development in bilateral cooperation on migration between the two countries. While aimed at managing migratory flows more effectively, the pact raises legal, operational, and ethical considerations regarding extraterritorial management of migrants and adherence to international legal principles. The protocol underscores the complexities inherent in migration management and the need for collaborative, rights-based approaches.

Overall, these focal points underscore Albania's progression towards European integration in the context of migration management. While significant strides have been made, challenges persist, including ensuring effective implementation of legal frameworks, enhancing coordination among relevant stakeholders, and addressing legal and ethical concerns in bilateral cooperation agreements. As Albania continues its journey towards European integration, it must remain vigilant in upholding principles of fairness, dignity, and respect for human rights in its migration policies and practices. Through continued cooperation and dialogue with EU institutions and member states, Albania can further advance its migration management efforts and contribute to regional stability and prosperity.

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<sup>24</sup> The 2023 Italy-Albania protocol on extraterritorial migration management. (2023, December 7). CEPS. <https://www.ceps.eu/ceps-publications/the-2023-italy-albania-protocol-on-extraterritorial-migration-management/>

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**MIGRATION IN EUROPE: A HISTORICAL ANALYSIS AND CONTEXTUALIZATION OF THE CONCEPT OF INTEGRATION**

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**ABSTRACT**

This paper provides a comprehensive historical analysis of migration patterns in Europe from the mid-20th century to the present days. It examines the evolution of migration policies, the emergence of new migratory routes, and the changing dynamics of integration within European societies. This article confidently examines the rich history of migration in Europe and the concept of migrant integration. It assertively discusses the evolution of migration and its significant impact on the development of European societies from the origin of humanity to the present day. The article confidently examines the motives and causes of migration throughout historical periods, with a strong emphasis on the economic, political, and social factors that decisively drive this process. This paper confidently contextualizes the concept of integration within Europe by tracing the historical trajectory of migration. It explores how migration has shaped European societies, economies, and political landscapes over time, highlighting both the challenges and opportunities associated with the integration process nowadays. The paper sheds light on the complexities of migration and integration in Europe through a multidisciplinary approach drawing on historical, political and legal perspectives.

**Keywords:** migration, Europe, historical analysis, integration challenges, migration motives.

**1. Migration as part of the human history**

Human beings, throughout their long history spanning millions of years, have always shown a strong tendency to migrate, to move from their places of origin in search of new territories.<sup>25</sup> We can say that migration is a characteristic of humanity. People from ancient times have moved in groups, from one place to another in search of better opportunities. The spread of humanity itself constitutes a migratory phenomenon that, over time, has formed different populations adapting to various environmental conditions<sup>26</sup>.

Migration is a global phenomenon that affects the international community as a whole. It is difficult, almost impossible, to find a state that has not generated migration throughout its history. The universal nature of this phenomenon cannot be doubted, hence numerous studies and research have been conducted in an attempt to describe a complete picture. The awareness that migration has always characterized human life provides us with a solid basis to demonstrate how it has contributed to the

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<sup>25</sup> Ambrosini M., "Sociologia delle migrazioni", il Mulino Bologna, 2005, f. 24.

<sup>26</sup> <http://www.lenius.it/storia-delle-migrazioni/>

formation of cultural, social, and political identities over the years and continues to play a crucial role in our societies.<sup>27</sup>

Humans, since ancient times, have moved in groups, in search of food or to avoid dangers. Legends and archaeological research show traces of ancient movements. The primitive spread of humanity from Africa is a migratory phenomenon that, over generations, has formed different populations adapted to various environmental conditions. Migration phenomena have transformed lands and continents, biological composition, and ethnic and linguistic diversity of their inhabitants. Migratory movements are also the result of pressures motivated by economic differences among populations. Another important factor is the mass increase in population. The phenomenon of migration has existed at all times but not as a continuous process. The reasons lie in the changes, even in more recent times, in the physical characteristics of humanity. A clear way to create a general overview of the phenomenon and to focus on migration movements in the economic and political contexts in which they occur, as well as to understand how they interact with society, is precisely the division into historical periods.<sup>28</sup>

Humanity, as already noted by all scholars, has its origins in Africa, and then slowly but steadily moved to every continent. This leads to the conclusion that the phenomenon of migration is as old as humanity. There have been four types of human movements<sup>29</sup>:

1. Clan migrations and the conquest of new territories;
2. Forced movement of people, including prisoners, slave trade, and expulsion of minorities for political or religious reasons;
3. Movement of people for work reasons;
4. Free movement of people.

The term "migration" generally refers to the free movement of people, but other types of movements were equally important in the current distribution of humanity.

Europe has been a transit destination from its beginnings.<sup>30</sup> Ancient civilizations practiced nomadism especially in search of new territories to settle, and even when the first civilizations were established, as in Mesopotamia, migration continued, often due to war and famine. The population of Europe occurred from the southeast to the northwest and from Eastern Mediterranean to the British Isles. It was a slow progress during which migrants settled in new territories. This expansion depended on population growth on one hand and land availability on the other, a condition that changed over time. In fact, in the last two thousand years, with a constantly changing world, these conditions have become increasingly rare. Migrants had to deal with the local population by negotiating coexistence conditions, imposing themselves or suffering these conditions depending on the power of their relationships and circumstances.<sup>31</sup>

In the first millennium of the Christian era, migrations in Europe had the characteristics of invasions and occupations, as happened with the expansion of the Roman Empire, and later with its fall or with the Germanic peoples who invaded Europe. Many of the migratory movements that characterized Europe in the first millennium of our era had the characteristics of invasion-occupation: this happened for the Germanic peoples who spread in Europe with the fall of the Roman Empire. Arrivals of numerically modest groups, compared to local populations, but driven by military and conquering ambitions..<sup>32</sup> In the second millennium, migrations towards the east of Germanic peoples, towards

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<sup>27</sup> Gozzini G., *Le migrazioni di ieri e di oggi. Una storia comparata*, Mondadori, Milano, 2005, f. 45.

<sup>28</sup> Ambrosini M., *"Sociologia delle migrazioni"*, il Mulino Bologna, 2005, f. 25.

<sup>29</sup> Chiarelli B., *Migrazioni Antropologia e storia umana di una rivoluzione in atto*, 1992. Visituar 30 Mars, 2016, <http://www.cestim.org>

<sup>30</sup> "Le migrazioni nel mondo antico" in: geostoria.wwwbly.com: <http://geostoria.wwwbly.com/migrazioni -nel-mondo>

<sup>31</sup> Livi Bacci Massimo, *In cammino. Breve storia delle migrazioni*, Il Mulino, Bologna, 2008, p. 15.

<sup>32</sup> Livi Bacci Massimo, *In cammino. Breve storia delle migrazioni*, Il Mulino, Bologna, 2008, p. 15.

territories previously occupied by Slavs, are also notable. Migration flows occurred due to the high level of organization of the population and the fact that the local Slavic population was somewhat underdeveloped, but also because the climatic conditions were very favorable for farmers and the distances between departure and arrival areas were relatively short. German migrants had plows, tools that made it possible to clear and cultivate difficult lands; Slavs practiced hunting and fishing.<sup>33</sup>

Population movements are a phenomenon that has always accompanied moments of demographic growth, technological changes, political and ethnic conflicts. Furthermore, the European territory, since ancient times, has always been the scene of massive displacements of people in search of better living conditions. Factors favoring migration may be internal factors of the country of origin (push factors), or external factors present in destination countries (pull factors). In general, push factors affect the poor the most, forced to leave their country due to extreme poverty resulting from wars; often, migrants move from their country to another neighboring country with better economic conditions. Pull factors are more effective among the poor who cannot afford the expenses of a long journey.

In general, what motivates a person to leave their country is the search for a job to improve living conditions; education or further education; tourism; marriage or family reunion; leaving the country for political, ethnic, religious, or environmental reasons.

In the latter case, we refer to refugees, people who are seeking shelter to survive. Migration, in fact, is caused by the necessity to find, in another country, the conditions for life, security, freedom, and human dignity denied by the country of origin. Refugees are a special category of migrants who have left their country of origin due to a serious threat to their life or freedom. The "pull" of the host country is given by the presence of a large number of job opportunities, as well as by a high level of social, economic, and personal security. The "pull" is strengthened when the cultural and religious ties of the migrant group are already present in the host country. In recent decades, the scale of migration has increased significantly due to a number of factors, including globalization, technological advancements, demographic shifts, economic disparities, and political instability. This has led to a more complex and interconnected global migration landscape, with diverse flows of people moving across borders for various reasons. Migration has always been a defining aspect of human history, shaping societies, cultures, and economies across the globe. While the specific drivers and patterns of migration have evolved over time, the fundamental human impulse to seek better opportunities and improve one's life remains constant. Understanding the historical context of migration can provide valuable insights into contemporary migration issues and help inform more effective policy responses to address the challenges and opportunities associated with migration in the modern world.

Depending on the distance, we can distinguish internal migration (e.g., movements within a single country), international migration, and intercontinental migration. After this brief overview of the different aspects that can help distinguish one migration phenomenon from another, let's focus on the European continent, the subject of this research paper, which has changed its position regarding migratory movements in just a few decades..<sup>34</sup> Even without going far back in time, it is undeniable that migrations have been a constant in European history for centuries. We're not just referring to the north-south flows in 1492 that Westerners associate with the beginning of the modern era. There were tens of thousands of Spanish Jews who, expelled by Catholics at the end of the Reconquista, found refuge in the lands of the Ottoman Empire, where they were welcomed without problems, undoubtedly for economic and administrative reasons. The Sultan himself ordered to facilitate their entry and integration, knowing well the cultural, artisanal, industrial, and political contribution they would bring to his country with their arrival".

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<sup>33</sup> Ibid. p.20

<sup>34</sup> Chiarelli B., *Migrazioni Antropologia e storia umana di una rivoluzione in atto*, 1992. Visituar 30 Mars, 2016, <http://www.cestim.org>.

Starting from 1500, Europe, once a destination for migrants, became a place of migration (Discovery of America in 1492). Until 1800, about one million people left the old continent for America every century, a number that may seem small but was sufficient to make an impact on the new continent, in terms of language, religion, culture, etc.

Conditions favoring this migration were primarily related to new means of transportation that were faster and safer with a larger capacity. But internal movement within the old continent also improved, with four-wheeled wagons, road improvements, and the construction of bridges and canals playing a significant role<sup>35</sup>.

Furthermore, during the 1800s, international migration increased significantly, as trains and steamships facilitated travel and made crossing borders and oceans easier. Between 1814 and World War I, tens of millions of people left Europe: the so-called Great Migration. The first wave consisted of soldiers and officers who had been part of Napoleon's armies and were left unemployed. The second wave consisted of the escape of revolutionaries and Bonapartists from French territory after the failure of 1848, as well as disillusioned individuals who had seen the downfall of their homeland under foreign rule. During this period, there were movements of people towards America, but also within the old continent. In the early twentieth century, Paris became the capital of migrants.<sup>36</sup>

The third wave, finally, had mainly economic character and continued until 1929, the year of the Great Depression in America. During this period, a continuous outflow of departures from Europe, over a century, led to about 50 million people leaving, a figure underestimated by history. It should also be noted that about one-third of these migrants returned to their countries or migrated to new destinations.<sup>37</sup>

Overall, scholars tend to consider classical and medieval migration as collective migration, meaning the migration of peoples, while modern and contemporary migration is seen as individual migration<sup>38</sup>.

After the conquest of the New World, the colonies strongly attracted people seeking work and new opportunities. Among those who left were many people who, unable to afford the trip, offered their labor for free for several years in exchange for the ticket. A separate discussion, not geographically related to the old continent and for this reason not addressed here, is the slave trade: millions of people were forcibly deported from Africa to America to be enslaved.<sup>39</sup>

The lack of data on the issue of migration created the illusion for a long time that before the French Revolution there was a period of immobility and silence, in which peasants were strongly tied to the land. In fact, even those were years of great movement: from villages to cities, or from village to village, from city to city, and finally towards new worlds.

Moreover, political debates of the time revolved around the concern about the departure of their peasants, as it was believed that a country's strength depended on a large population. As a result, the 1800s were not only the century of great migration but also the century of the discovery of the latter as a political, economic, and social phenomenon.<sup>40</sup>

Between 1800 and the beginning of World War I, the European population increased from 188 million to 548 million inhabitants, and this population pressure, together with slowly growing agriculture, constituted a powerful push towards migration. It should not be forgotten that at the beginning of the nineteenth century, while England was laying the foundations for the Industrial Revolution, two-thirds of the European population was still engaged in agriculture. Productivity increased, thanks to new cultivations, improved techniques, etc. But this increasing productivity corresponded to the growth of the population, which had caused the division of property and the increase in landless families. This

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<sup>35</sup> Ambrosini, M., *Sociologia delle migrazioni*, Bologna, Il Mulino, 2011, f. 58.

<sup>36</sup> Ambrosini, M., *Sociologia delle migrazioni*, Bologna, Il Mulino, 2011, p. 58.

<sup>37</sup> Livi Bacci Massimo, *In cammino. Breve storia delle migrazioni*, Il Mulino, Bologna, 2008, p. 17-19.

<sup>38</sup> *Ibid*

<sup>39</sup> "La tratta degli schiavi" in: <http://geostoria.webly.com/la-tratta-degli-schiavi.html>

<sup>40</sup> Livi Bacci Massimo, *In cammino. Breve storia delle migrazioni*, Il Mulino, Bologna, 2008, p. 19.

fact increased migration, which only slowed down when the growth of labor force began to be used in the manufacturing industry. The road to America continued with intensity until the crisis of 1929.<sup>41</sup>

In the early 1800s, travel by sailing ships was no faster than in Columbus's time: it took five or six weeks from Liverpool to New York. In 1838, the steamship "Great Western" crossed the Atlantic in 15 days, and around 1880, the Atlantic crossing took one week. From Spain (Galicia) to Cuba, it took 38 days by sailing ship in 1850, and about ten days by steamship.<sup>42</sup>

The expansion of the railway network made it possible to reach departure ports more quickly.<sup>43</sup> Also, the policies of different departure and arrival states facilitated migration. For example, in England and the Scandinavian countries, all restrictions on foreign travel were lifted from the early 1830s. In Italy, in 1901, the law providing for various controls was abolished, while in Austria, Hungary, and Russia, the right to migrate was recognized at the end of the 1800s. In the United States, in 1862, President Abraham Lincoln issued the so-called Homestead Act, which gave 65 hectares of land to every head of household who made a request and pledged to cultivate it.<sup>44</sup>

The twentieth century was a century of great turmoil: two world wars, the 1929 crisis in America, the division of Europe into two opposing blocs, and then the subsequent fall of the Berlin Wall, the birth of the European Union, etc. The first oil crisis came to disrupt this framework, where trans-Mediterranean migration represented a complementary factor and virtuous interconnection between the economies of the two blocs of the continental shores. In the second half of the twentieth century, under the aforementioned light, a new phenomenon also arose in the internal history of Europe: in the years of reconstruction and economic recovery after World War II, the most industrialized European countries began to attract workers from other regions of Europe, as well as from countries that had recently emerged from colonization.

According to United Nations estimates, from 1950 to 1970, Western Europe (France, Germany, Benelux, and Switzerland) absorbed a net migration of 6.6 million, while Southern Europe (Italy, Spain, Portugal, Greece, Yugoslavia) generated a net migration (6.3 million), but with the opposite sign. Not all migration to the most powerful countries came from Southern Europe: Turks in Germany and citizens of former colonies (the Indian subcontinent, the Caribbean, Indonesia, the Maghreb) moving to European countries influenced these migration flows.<sup>45</sup>

The countries of Mediterranean Europe saw massive migration (Italy, Portugal, Greece, Spain, Turkey) as places of departure for migrants, and the arrival country became central and western Europe (France, Germany, England, Benelux, Switzerland). As for France, it also welcomed Maghrebians (especially Algerians), while the Netherlands welcomed Indonesians and West Indians; Indians and Pakistanis emigrated to Great Britain.

For inhabitants of former colonies, it was easier; they benefited from knowing the language, customs, and traditions of the host society. In the fifties and sixties, this phenomenon continued to be quite strong but decreased significantly around the second half of the seventies, after the rise in oil prices. For this reason, the economic crisis that followed led to the dismissal and then the return of many foreigners. Meanwhile, the victory of democracy in Spain, Portugal, and Greece, and the general increase in prosperity led to the cessation of departures and the increase in returnees.

From 1970, Europe, from a place of migration, becomes a place of attraction for migration. Internal flows from the poor south to the rich north decrease with the decline in births in southern countries, with income leveling off per capita, and with a decrease in the demand for labor.

Ultimately, it was the same reasons that led to the cessation of large-scale migration from the old continent to the new one. In the most developed economies, it began to happen that local residents did not accept low-skilled, poorly paid, and often risky jobs that often matched the labor supply of

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<sup>41</sup> Livi Bacci Massimo, *In cammino. Breve storia delle migrazioni*, Il Mulino, Bologna, 2008, p. 20.

<sup>42</sup> *Ibid* p. 20.

<sup>43</sup> *Ibid* p. 21.

<sup>44</sup> Colucci M., Sanfilippo M., *Le migrazioni. Un'introduzione storica*, Carocci, Roma, 2009, p.12.

<sup>45</sup> Khalid Koser, *Le migrazioni internazionali*, Il Mulino, Bologna, 2009, p. 17.

migrants..<sup>46</sup> Migration, which in Europe had been 7 million from 1920 to 1940, increased to 28 million people in the two decades from 1990 to 2010..<sup>47</sup> Of course, it should not be forgotten that it was internal migration within the borders of Europe that was always directed from economically weak countries, such as Italy, Spain, Portugal, Greece, to the stronger ones, such as England, France, Germany, Benelux.

This labor force of Europe was replaced by a considerable influx of non-European workers (Africans, Asians, Latin Americans). Since 1989, there has also been a large, but not massive, influx of workers from Eastern European countries to Western European countries, due to various reasons:

- The fall of political regimes that were against migration;
- A generally low standard of living;
- Redefinition of territorial borders and new borders of some states.

The old continent, which in 1900 was inhabited by 300 million people, now has more than 700 million inhabitants, a figure that corresponds to the flow of migrants and entry into the European Union of new states.

Migration has been a constant in European history for centuries, with various waves of movement driven by economic, political, and social factors. Over time, Europe transitioned from being a destination for migrants to becoming a source and transit region, with internal, international, and intercontinental migration shaping its demographic landscape. Advances in transportation, such as steamships and railways, played a crucial role in facilitating migration, making long-distance travel faster, safer, and more accessible. Economic conditions, such as industrialization, agricultural changes, and fluctuations in employment opportunities, significantly influenced migration patterns within and outside Europe. Political events, including wars, revolutions, and changes in regimes, often triggered mass migrations, while social factors like urbanization and population growth also contributed to migratory movements. The legacy of European colonialism influenced migration patterns, with former colonies attracting migrants to their former colonizers and contributing to demographic shifts within Europe. Demand for labor in industrialized countries led to the recruitment of workers from other European regions and non-European countries, shaping multicultural societies in Europe. Changes in migration policies, both within Europe and in destination countries like the United States, impacted the volume and direction of migratory flows, with periods of openness followed by restrictions. Migration significantly impacted Europe's demographic landscape, contributing to population growth, cultural diversity, and labor market dynamics. In recent decades, Europe has transitioned from a region of emigration to a destination for migrants, with demographic, economic, and political shifts influencing migration trends. Overall, the history of migration in Europe reflects the complex interplay of economic, political, and social factors, shaping the continent's identity and demographics over time.

## 2. Europe and migration flows

Between the years 1973 and 1974, the largest European immigration countries closed their borders to economic flows. This decision, though significant, was taken through administrative channels without parliamentary debate or consultation between receiving countries, let alone with countries of origin. The main effects of this historical turning point were not primarily domestic, as immigration continued in large waves in the form of family reunification, but rather international. The closure contributed to the activation of new migratory circuits: on one hand, from former states of immigration in Southern Europe towards Arab countries, particularly those in the Gulf, which were protagonists in the oil boom, and on the other hand.<sup>48</sup>

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<sup>46</sup> Ibid, p. 44.

<sup>47</sup> Livi Bacci Massimo, *In cammino. Breve storia delle migrazioni*, Il Mulino, Bologna, 2008, p. 25.

<sup>48</sup> Prodi R., Rritja e Bashkëpunimit Euro-Mesdhetar në "Euromed Report", nr. 14, 29 Gusht 2000, p. 2. Coleman, *New Light on Mediterranean Migration*, in «International Migration», 1999, p. 501.

Since then, immigration in general, and Arab immigration in particular, has been perceived in Western Europe as a dis-economy and a political problem, increasingly characterized as a matter of public policy, while illegal flows increased. Even in countries like Italy and Spain, where economic immigration continued to some extent, this aspect, though important, was either neglected or concealed.

During the eighties, as a consequence, migrations increasingly emerged as an object of conflict of interests and a structural tension factor in Euro-Mediterranean relations. In a North Africa undergoing full demographic explosion, economic stagnation, attacked by Islamic integralism, and sensitive to authoritarian regression, immigration is an important security valve and - through remittances - a "bonus" of prosperity and a crucial social stabilization factor. However, the Schengen Europe is deaf to these reasons. To worsen the situation, there was the sudden closure of migration in the Arab world. Starting from the late seventies, Saudi Arabia and the United Arab Emirates adopted a policy to encourage the recruitment of Asian labor at the expense of Arab labor. The percentage of the latter in the region dropped from 69% in 1975 to 30% in 1985. Furthermore, the invasion of Kuwait and subsequent international military intervention had a devastating impact. In early 1990, there were 2.8 million foreigners living in Iraq and Kuwait, more than 2 million of whom were from Arab countries. The war and tensions led to the displacement of at least 400,000 Egyptians, 250,000 Jordanians and Palestinians, as well as 700,000 Yemenis from the Arab world.<sup>49</sup> Only in the last two decades has international migration ceased to be, as in the fifties and sixties, an economic necessity and virtuous complementarity between Western Europe and the countries of the Southern Mediterranean.

Today, such flows - increasingly irregular and illegal - are mainly a source of misunderstanding and friction between states and often, unfortunately, between individuals. To reduce these tensions, initiatives for dialogue and cooperation between European immigration states and countries (North Africa and the Middle East) of emigration and transit have multiplied in recent years. A complex and dynamic line of relations that suggests the importance of strengthening not only bilateral relations (which are now increasingly managed by the EU on the European side) but also the multilateral and regional dimension of cooperation in the field of migration.<sup>50</sup> When it comes to immigration in Europe, the one that has always made noise has always been the migration coming from the southern shores of the Mediterranean. The land between Greece and Turkey is the new gateway to Europe. To understand how the starting points of migrants heading towards Europe have gradually changed, it is necessary to draw a map starting from the Canary Islands, passing through the Strait of Gibraltar, the Strait of Sicily, the Aegean Sea, and reaching the land border between Greece and Turkey.<sup>51</sup>

Analyzing the map of the Mediterranean, we can observe the play of communication vessels: a migration flow is blocked in Morocco, and another one opens in Tunisia, with a constant: migration flows are increasingly oriented towards the East. The European border is like a major obstacle, to which flows must constantly be contained. Frontex, the European Agency for the Management and Control of the External Borders of the European Union, is responsible for this unpleasant yet important task - forced, in emergency cases, to add new elements to such a fragile geopolitical scenario that very little is needed to trigger a new crisis. But behind these metaphors, behind the image of a "Fortress Europe," behind the figures and numbers, there are thousands of lives every year trying, often paying with death, to escape poverty, hunger, and war.

Thousands of victims, as shown by the Observatory for the Balkans and Caucasus, try every year to achieve their "European personal dream." A careful reading of these maps shows the lack of a global vision at the European level regarding the phenomenon of migration. Frontex interventions so far have been beneficial, at least from the perspective of the objective it set for itself: reducing migration flows. New routes to Europe, in fact, increasingly bypass the sea; the Mediterranean is no longer the main

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<sup>49</sup> Mbi këtë temë një studim i rëndësishëm i Y. Courbage: *Scenari demografici mediterranei. La fine dell'esplosione*, Botim i Fondazione Giovanni Agnelli, Torino, 1998. Rezultatet më të rëndësishme janë mbledhur në "Banka e të dhënave mbi të ardhmen e popujve mesdhetar", *on-line* ([www.fga.it/800-1/OE343.htm](http://www.fga.it/800-1/OE343.htm)).

<sup>50</sup> R. Prodi, *Rritja e Bashkëpunimit Euro-Mesdhetar në "Euromed Report"*, nr 14, 29 Gusht 2000, p. 2, 9D. Coleman, *New Light on Mediterranean Migration*, in «International Migration», 37(2), 1999, f. 501.

<sup>51</sup> Prodi R., *The growth of Euro-Mediterranean Cooperation*, in «Euromed Report», n° 14, 29 gusht 2000, p. 2,

highway to Europe. The sunken ship, fortunately, is no longer the main means to reach the destination.<sup>52</sup>

At the same time, Greece, Turkey, the Balkans, and Eastern Europe are becoming more and more destinations. The phenomenon will intensify in the coming years. In recent years, two main routes have been described, both starting from Turkey.<sup>53</sup>

1) The first is entirely overland from Turkey to Bulgaria and Romania.

2) The second always starts from Turkey and passes through Greece and Italy.

New migrants mainly travel by land, hidden in cargo trucks, or by sea, hiding on ships sailing towards Greece and Italy. Risky journeys, but certainly less "spectacular" than improvised boats.

Symbolically, these geographical areas are becoming the new gateways to Europe and are attracting the attention of many observers. The Southeast European region will face the phenomenon of migration that is evolving rapidly in the coming years. So far, most of these states are not prepared for such a task, and this has an impact on the guarantees and minimum standards guaranteed for migrants. In light of what we said above, there are still gray areas around the identification of the typical migrant, which could help in the root solution of the migration phenomenon. Indeed, it is impossible to find an accurate identikit of the migrant. On the boats crossing the Mediterranean, young people from the outskirts of Tunisia travel together with journalists fleeing the Eritrean regime, young fathers from rural areas of Morocco, and refugees from civil war in Somalia, economic migrants from Eastern countries, and many others.

What is certain is that migration flows are mixed. This means economic migrants and political refugees. Refugee flows vary depending on the geopolitical context. It is enough to look at the increase in the number of migrants in Greece - through Turkey - who are Afghan and Iraqi refugees following the outbreak of war in both countries.

But Europe is not only made up of border countries in the Mediterranean. Similar problems, but with different aspects, also exist in the countries that close the continent in the east. In the same scenario, Poland, the Czech Republic, and Slovakia come in. Here, there is mainly Asian and African emigration. Ukraine is the main transit country, from which migrants enter Poland or Slovakia without an entry visa. The dynamics are the same.

In conclusion of this overview of early and current migrations that have affected Europe, both in entry and exit, we must return to the fundamental concept that migration remains an instrument to improve living conditions more than economic conditions.<sup>54</sup>

Indeed, when there are no external factors, migrants assess the costs and benefits of their departure, making a balance that affects their families and the communities they come from. The gap between the living conditions of the country of departure and the host country is undoubtedly a strong push factor for migration.

According to economist and diplomat John Kenneth Galbraith, migration broke the old equilibrium of poverty that was characteristic of European countries. This happened through the force of adaptation, called "accommodation," to conditions of poverty considered unchanging. The rural measures of past centuries were "adjusted" to the balances of poverty, just as contemporary Western measures accustomed to living in a wealthy society with high levels of consumption were "adjusted" to the balance of prosperity. For most of those who attempted migration, it worked.<sup>55</sup> Even better for their children. Migration has rarely required active efforts on the part of governments. Often, it has gained the acceptance of governments and, finally, their oversight. When fully experienced, it not only

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<sup>52</sup> Michele Colucci, Matteo Sanfilippo, *Le migrazioni. Un'introduzione storica*, Carocci, Roma., 2009, p. 21.

<sup>53</sup> *Ibid*

<sup>54</sup> Michele Colucci, Matteo Sanfilippo, *Le migrazioni. Un'introduzione storica*, Carocci, Roma, 2009, p. 20

<sup>55</sup> Antonio Vecchia, *Cose di scienza*, 08.04.2014, n°: [http://www.cosediscienza.it/varie/03\\_migrazioni.html](http://www.cosediscienza.it/varie/03_migrazioni.html).

allowed escape from poverty for those involved first and foremost but also facilitated the "exit" from the equilibrium of poverty for those motivated to pursue other paths.<sup>56</sup>

### 3. The concept of Integration

The public debate on the integration of migrants into host societies is undoubtedly significant. Simply entering "immigrant integration" into Google yields around 70 million results. This debate involves not only scholars and academics but also politicians, activists, and numerous journalists. However, if we use the same keywords on Google Scholar, a search engine reserved for scholarly literature, the result is fewer than 500,000 articles, scholarly papers, essays, or books dedicated to the topic. In analytical terms, "immigrant integration" refers to a state within a specific social system where there is a high degree of structural interrelation between the foreign and native populations. There is a relatively stable structure of shared expectations that regulates their interactions in a way that makes them predictable for everyone involved. As a practical category, integration always, albeit somewhat clearly, has a normative purpose. In political and institutional debate, "Integration"<sup>57</sup> refers to a social state considered desirable and one that enables individuals to lead a "good" or "civilized" life. As a legal term, "integration" - like "democracy," "social cohesion," "justice," "equality," and so on - always refers to what a society should be, and for this reason, according to the definition, every existing society is always less integrated than it should be.

From the perspective of integration, as a category of practice, in order to speak of "integration," it is not sufficient to have a number of empirical elements in the effective social interaction of locals and migrants (and in their mutual interactions), but close cooperation in line with the core values of modern liberal societies is necessary. Not all possible analytical integrations are considered acceptable. An example may help clarify this often overlooked point, which leads to frequent misunderstandings. In the Persian Gulf, one of the main magnets of migration on the planet, foreigners represent a considerable portion, in some cases even the majority, compared to the local population. The percentage of migrants in the general population is relatively higher than that of any European country, and this is fundamental to almost all spheres of life. In some of them, a large part of the foreign residents has been present for several generations (in some cases for centuries). Despite these numbers, conflict is very low, stable expectations, and the dynamics of their presence in large numbers are predictable. According to an analytical profile, we are talking in this case about migration flows deeply integrated with the social structure of Gulf countries<sup>58</sup>. At the same time, these results have been achieved through a legal system that ensures "the existence of two fundamentally different legal subsystems, one for citizens and one for foreigners. Opportunities, even after decades of becoming citizens, are excluded or allowed for a few individuals. This situation, in other words, violates almost all elements that form the basis of integration definitions in the discussion of liberal democracies. It is precisely this legal need that often, and inevitably, makes the effort to define and measure the "process of migrant integration" debatable. It follows that even seemingly unanimous definitions of "integration," formulated in general, may face serious difficulties. Like many legal terms used in political language, all actors want "integration," and refusal has almost exclusively a provocative value. This does not mean that there is an agreement among the parties involved as to what the main dimensions of the phenomenon are, or what criteria distinguish different situations. The term "integration of migrants" has been used both at the community level and in the political debate of member states. The perspective in which it is used, and the conceptual framework of the debate that supports it, reflects the history of migration in Europe in recent decades and the activism of European

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<sup>56</sup> John Kenneth Galbraith, *The Nature of mass poverty*, Harmondsöorth, Penguin Books, Londra, p. 98-99; trad. italiana: *La natura della povertà di massa*, Mondadori, Milano, 1980

<sup>57</sup> Nevola G., *Politics, Identity, Territory. The "Strength" and "Value" of Nation-State, the Weakness of Regional Chal-lenge*, 2011, p. 67

<sup>58</sup> Rosa P., *La svolta sociologica nelle relazioni internazionali: tre approcci e tre filoni di ricerca*, 2010, f. 200 e nē vazhdim.

institutions on this issue.<sup>59</sup> From a historical perspective, what characterizes the "experience of leading emigration countries" in Western Europe is the lack of interest, until recently, in the long-term consequences of elections on migration. Until the mid-1980s, we can say that the integration of migrants was a policy issue. While countries importing labor developed policies to control foreign populations, this effort was not practically accompanied by policies to integrate them into host countries. This was based on two assumptions. In the case of intra-European flows, it was assumed that "assimilation was an inevitable result that did not require special interventions. In the case of extra-European flows, the opposite was assumed, that cultural and religious differences were such that these workers were fundamentally unassimilable, and respectively with temporary presence<sup>60</sup>. Only when governments began to realize the nature of the foreign population as sustainable and the "impossibility of reducing it," the integration of migrants became an important political issue. A dual policy emerged, which preached "the need to apply restrictive interventions towards new entries, promoting" integration into the social structures of the host society for already present migrants. In this context, from the second half of the 1980s, a debate began in Western Europe on the processes of integrating migrants and the role that policies can play in favoring it.

### Conclusions

In today's world, the challenges of integrating migrants into host societies have become increasingly complex. Factors such as globalization, technological advancements, and geopolitical dynamics shape migration patterns and affect the integration process. With migration flows becoming more diverse in terms of origin, culture, and socioeconomic background, the concept of integration needs to embrace diversity and promote inclusivity. Efforts to foster social cohesion should recognize and celebrate cultural differences while promoting common values and norms.

Governments and policymakers face the dual challenge of managing migration flows and promoting successful integration outcomes. Comprehensive and proactive policies are needed to address the diverse needs of migrant populations and facilitate their full participation in society. Integration is not solely the responsibility of governments but requires active engagement from local communities, civil society organizations, and businesses. Building inclusive communities where migrants feel welcome and valued is essential for successful integration outcomes. Upholding the human rights and dignity of migrants must be at the forefront of integration efforts. This includes ensuring access to education, healthcare, employment opportunities, and legal protection for all individuals regardless of their migration status. Promoting social cohesion and resilience is crucial for addressing tensions and conflicts that may arise in diverse societies.

Thus, investing in initiatives that foster intercultural dialogue, mutual understanding, and trust-building can help build resilient communities that embrace diversity.

Evidence-based policymaking and data-driven approaches are essential for designing effective integration policies and monitoring their impact over time. Continuous research and evaluation are needed to identify best practices and address emerging challenges in migration and integration. Given the transnational nature of migration, global cooperation and multilateral partnerships are essential for addressing migration challenges comprehensively. Collaborative efforts among countries of origin, transit, and destination are needed to ensure humane and sustainable responses to migration.

In summary, addressing the complexities of migrant integration in today's world requires a holistic and collaborative approach that recognizes diversity, upholds human rights, promotes social cohesion, and fosters inclusive societies for all.

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<sup>59</sup> Rosa P., *La svolta sociologica nelle relazioni internazionali: tre approcci e tre filoni di ricerca*, 2010, f. 200 e në vazhdim.

<sup>60</sup> Nevola G., *Politics, Identity, Territory. The "Strength" and "Value" of Nation-State, the Weakness of Regional Challenge*, 2011, f. 67 e në vazhdim.

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**İŞ SAĞLIĞI VE GÜVENLİĞİ KAPSAMINDA YETİŞKİN EĞİTİMİNE GÜNCEL YAKLAŞIM**

**CURRENT APPROACH TO ADULT EDUCATION WITHIN THE SCOPE OF OCCUPATIONAL HEALTH AND SAFETY**

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**ÖZET**

İş sağlığı ve güvenliği (İSG), her işyerinde öncelikli bir konudur. İşverenler, çalışanlarının güvenli ve sağlıklı bir ortamda çalışmasını sağlamakla yükümlüdür. Bu amaçla, çalışanlara İSG konusunda eğitim verilmesi oldukça önemlidir. Yetişkin eğitimi, çalışanların bilgi ve becerilerini geliştirmek için tercih edilen bir yöntemdir. İSG kapsamında yetişkin eğitime güncel yaklaşım, çalışanların değişen ihtiyaçlarını karşılamak ve işyerindeki riskleri en aza indirmek için önemlidir. Yetişkin eğitimi, iş yerindeki riskleri ve tehlikeleri tanımak, güvenli çalışma prosedürlerini uygulamak, acil durum prosedürlerini bilmek, kişisel koruyucu ekipmanı (KKD) doğru şekilde kullanmak, iş sağlığı ve güvenliği ile ilgili yasalara ve düzenlemelere uymak şeklinde sıralanabilir. Yetişkin eğitimi, iş yerinde kaza ve yaralanma riskini azaltmaya yardımcı olur. Ayrıca, çalışanların motivasyonunu ve üretkenliğini artırabilir. İSG kapsamında yetişkin eğitime güncel yaklaşım, çalışanların bilgi ve becerilerini geliştirmek ve işyerinde kaza ve yaralanma riskini azaltmak için önemlidir. Eğitim programı, çalışanların ihtiyaçlarının değerlendirilmesi, farklı öğrenme stillerinin dikkate alınması, güncel tutulması ve teknolojinin kullanımı gibi ilkeler göz önünde bulundurularak tasarlanmalıdır. Geleneksel İSG eğitimi yaklaşımları, genellikle teorik bilgilere ve pasif öğrenmeye odaklanmıştır. Bu yaklaşımlar, yetişkinlerin öğrenme stillerini ve ihtiyaçlarını tam olarak karşılamadıkları için her zaman etkili olmamıştır. Güncel İSG eğitimi yaklaşımı ise yetişkin öğrenenlerin özelliklerini göz önünde bulundurarak, aktif katılımı teşvik eden ve uygulamaya yönelik bir eğitim sunmayı amaçlar.

**Anahtar Kelimeler:** Yetişkin Eğitimi, İş Sağlığı ve Güvenliği, Güncel Eğitim Prensipleri

**ABSTRACT**

Occupational health and safety (OHS) is a priority in every workplace. Employers are obliged to ensure that their employees work in a safe and healthy environment. For this purpose, it is very important to train employees on OHS. Adult education is a preferred method to improve the knowledge and skills of employees. The current approach to adult education in OHS is important to

meet the changing needs of workers and to minimize risks in the workplace. Adult education can be listed as recognizing risks and hazards in the workplace, applying safe working procedures, knowing emergency procedures, using personal protective equipment (PPE) correctly, complying with laws and regulations on occupational health and safety. Adult education helps reduce the risk of accidents and injuries at work. It can also increase workers' motivation and productivity. The current approach to adult education in the context of OHS is important to improve workers' knowledge and skills and reduce the risk of accidents and injuries in the workplace. The training program should be designed taking into account principles such as assessing workers' needs, taking into account different learning styles, keeping up-to-date and using technology. Traditional approaches to OHS training have generally focused on theoretical knowledge and passive learning. These approaches have not always been effective as they do not fully meet the learning styles and needs of adults. The current OHS training approach, on the other hand, takes into account the characteristics of adult learners and aims to provide practical training that encourages active participation.

**Keywords:** Adult Education, Occupational Health and Safety, Current Education Principles

EMOTIONAL FEELINGS EXPERIENCED IN WOMEN AFTER PERINATAL LOSS:  
LITERATURE REVIEW

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**ABSTRACT**

**Aim:** Perinatal loss brings with it a complex and challenging process that deeply affects the woman and her family. Being aware of the emotions of women experiencing perinatal loss will be an important step in planning midwifery care. Therefore, this study was planned to examine the emotions experienced by women after perinatal loss.

**Method:** In this descriptive research, descriptive scanning method and content analysis were used. Research articles on perinatal pregnancy loss, the full text of which can be accessed in the Pubmed, Google Scholar, Cochrane, Medline and Science Direct databases between 2023 and 2019, constituted the research sample. The keywords "Perinatal loss", "Perinatal grief", "Midwifery care" were searched in Turkish and English and as a result, nine studies were included in the sample. The scanned studies were examined in line with the type, sample, type and findings of the research.

**Results:** Four of the studies are follow-up studies and six are descriptive studies. The results of research conducted on different sample groups indicate that women may experience grief, mourning, anxiety, hopelessness, depression, post-traumatic stress disorder and rumination during the perinatal loss process. Another result that has been reported is that these feelings gradually decrease over time. However, it has been pointed out that the emotional problems mentioned may be prolonged in women who have psychological difficulties or whose infrastructure is conducive to psychological discomfort or who have a history of previous loss.

**Conclusion:** The limitations of studies on perinatal loss in the last five years have attracted attention. It is extremely important for midwives, who take an active role in the perinatal and postnatal periods, starting from the preconception period, to be aware of the negative emotional feelings caused by perinatal losses in women, in terms of primary care and counseling and secondary women's health.

**Key Words:** Perinatal loss, Perinatal grief, Midwifery care

**INTRODUCTION**

Despite advances in health and technology, losses can occur during pregnancy, childbirth or in the early postpartum period for a variety of reasons. These losses are called perinatal losses and usually start from the 22nd week of pregnancy until the end of the 7th postnatal day. Deaths during this period are important for both maternal and infant health, and the World Health Organization (WHO) emphasizes that this process is closely related to both perinatal and maternal health (Gür et al., 2022). The Turkish Demographic and Health Survey (TDHS) reported that the rate of involuntary abortion in Turkey is 13%, the rate of induced abortion is 6% and the stillbirth rate is 1% (TDHS, 2018).

Perinatal loss is one of the most painful and unbearable life experiences for parents. It causes emotional reactions such as grief and depression. Fear, frustration, anger, self-pity, feelings of failure,

etc. are experienced during the mourning period. Gender, age, perception of loss, life changes, coping styles, support systems and rumination can affect the duration of grief (Gozuyesil et al., 2022). Women and their families may show different emotional reactions after perinatal loss. These reactions may include problems such as depression, post-traumatic stress disorder and social isolation in addition to the normal grief process. Therefore, as health professionals, it is of great importance to evaluate their reactions to loss and their adaptation to loss while caring for individuals who have experienced loss. This assessment process plays a critical role in providing appropriate support for the emotional and psychological needs of the individual and determining appropriate interventions (Yeşilçınar et al., 2019).

Midwives are health professionals who spend the most time with mothers and expectant mothers. For this reason, they undertake important tasks such as supporting women experiencing perinatal loss, helping them manage the grief process, creating memories of the lost baby, and providing support to the woman and her family throughout the process. In this process, midwives are responsible for opening space for women to express their feelings, stating that the emotions they experience are normal, identifying the coping methods they have successfully used before and encouraging them to use them again (Palas et al., 2020). In order to provide effective care and counseling, it is extremely important to understand the emotions of women who experience perinatal loss. Therefore, this study was planned as a literature review to address the emotions experienced by women after perinatal loss.

**METHOD**

In this descriptive study, descriptive screening method and content analysis were used. The sample of the study consisted of research articles on perinatal pregnancy loss, the full text of which could be accessed in Pubmed, Google Scholar, Cochrane, Medline and Science Direct databases between 2023-2019. The keywords "perinatal loss", "perinatal grief", "midwifery care" were searched in Turkish and English and nine studies were included in the sample. The scanned studies were analyzed in line with the type, sample, type and findings of the study.

**RESULTS**

Eight of the studies were research articles and one was a one-year follow-up study. The results obtained from the articles are as follows; perinatal loss is an event that deeply affects women and their families. It was observed that women experienced anger, hopelessness, helplessness, intense guilt, anxiety, and depression after the loss. It has been reported that most of the women experience anxiety about future pregnancies as a result of extreme sadness after perinatal loss. The articles examining the emotions experienced by women after perinatal loss are presented in Table 1 under the title "name of the study, author, year, type of study, sample size and research findings" (Table 1.).

**Table 1. Articles Examining the Emotions Experienced by Women After Perinatal Loss**

Research Title	Author	Year	Research Type	Sample Number of	Research Findings
The Grief Levels of Women Experiencing Perinatal Loss: The Descriptive Cross-Section Research	Gür, E. Y., Uzun Özer, B., & Ejder Apay, S	2022	Research Article	408	Women who experienced perinatal loss were reported to have low levels of grief. It was found that women frequently experienced active grief.
The level of grief in women with pregnancy loss: a prospective evaluation of the first three months of perinatal loss	Köneş MÖ, Yıldız H.	2021	Research Article	215	As a result of the study, it was reported that in women who experienced pregnancy loss, active grief levels decreased in the first three months after the loss of their child, while coping difficulties and hopelessness gradually increased.
Grief and ruminative thought after perinatal loss among Turkish women: one-year cohort study.	Gozuyesil E, Manav AI, Yesilot SB, Sucu M.	2022	One-Year Cohort Study	70	As a result of the study, it was reported that women had the highest level of grief and ruminative thinking style in the first 48 hours, grief tendency and ruminative thinking style decreased in repeated measurements during follow-ups, and women aged 20-29 years experienced the highest level of grief in the third month

					after perinatal loss.
Are women diagnosed with early pregnancy loss at risk for anxiety, depression, and perinatal grief?	Ozgen L, Ozgen G, Simsek D, Dincgez B, Bayram F, Midikhan AN	2022	Research Article	116	As a result of the study, moderate levels of anxiety, depressed mood and perinatal grief were found in women diagnosed with early pregnancy loss regardless of the type of abortion.
The psychological impact of Early Pregnancy Loss in Portugal: incidence and the effect on psychological morbidity	Mendes DCG, Fonseca A, Cameirão MS.	2023	Research Article	873	As a result of the study conducted to evaluate the clinical symptoms of perinatal grief, anxiety, depression and PTSD in women who experienced spontaneous loss in the 20th week of pregnancy, it was reported that in terms of depression symptoms, the scores decreased significantly in the group whose loss occurred 13-24 months before the participation, but the rates fluctuated without a major change in the other groups. For anxiety, there were small fluctuations but no significant decrease in symptoms over time.
Prognostic factors for post-traumatic stress, anxiety and depression in women after early pregnancy loss: a multi-centre prospective cohort study.	Farren J, Jalbrant M, Falconieri N, Mitchell-Jones N, Bobdiwala S, Al-Memar M, Parker N, Van Calster B, Timmerman D, Bourne T.	2022	Research Article	492	It has been found that women with a history of mental health problems or previous loss may be at higher risk of mental illness 1 month after pregnancy loss.
'You're never pregnant in the same way again': prior early pregnancy loss influences need for health care and support in subsequent pregnancy.	Koert E, Hartwig TS, Hviid Malling GM, Schmidt L, Nielsen HS.	2023	Research Article	15	The findings from the study emphasize that early pregnancy loss creates an increased need for monitoring and care in subsequent pregnancies. It highlights a gap in pregnancy care for people with a history of pregnancy loss, given that their need for monitoring and support is high before accessing antenatal care and before having multiple pregnancy losses and in the early weeks of a new pregnancy.
Perinatal Grief and Related Factors After Termination of Pregnancy for Fetal Anomaly: One-Year Follow-up Study.	Güçlü O, Şenormancı G, Tüten A, Gök K, Şenormancı Ö	2021	Research Article	46	It has been reported that perinatal grief symptoms may gradually decrease up to six months after termination and may last from six months to one year. It was found that the mean Perinatal Grief Scale scores of the women changed significantly from the sixth week to the sixth month and from the sixth week to the twelfth month.
Influence of farewell rituals and psychological vulnerability on grief following perinatal loss in monozygotic twin pregnancy.	Druguet M, Nuño L, Rodó C, Arévalo S, Carreras Moratonas E, Gómez-Benito J.	2019	Research Article	28	Women with a history of psychological difficulties were reported to be particularly vulnerable to a complex grief response after experiencing perinatal loss. Other reported results suggest that the intensity of grief did not differ significantly according to whether women performed some form of farewell ritual.

## DISCUSSION AND CONCLUSION

This study was conducted to evaluate research articles examining the emotions experienced by women after perinatal loss. Therefore, the results of the evaluation were discussed in line with the literature.

Perinatal loss can lead to a complex grief process in women. Complex grief leads to situations in which all areas of life are negatively affected, such as having difficulties in fulfilling daily activities and not being able to adapt to the environment even though at least six months have passed after the loss. The complex grieving process due to perinatal loss may have multiple causes. Termination of pregnancy due to fetal anomaly, unexpected and sudden perinatal loss, inability to overcome normal grief processes in a healthy way, ambivalent feelings experienced during pregnancy, and inadequate social support are important among these reasons (Palas et al., 2020).

When the studies obtained as a result of the literature review are examined, it is reported that perinatal mourning processes can be experienced between the first 48 hours and three months after perinatal loss, and may gradually decrease after six months (Gözüyeşil et al., 2021; Könes et al., 2021; Güçlü et al., 2021). Therefore, paying attention to these periods in midwifery follow-up and counseling after perinatal loss will be important in terms of evaluating women's mental health in prolonged periods. In another study, it was stated that women who had mental health problems in the past or who had experienced loss in the past may have a higher risk of psychological illness one month after pregnancy loss (Farren et al., 2022). Preventive Services Guidelines for Women prepared by the International Health Resources & Services Administration recommend screening for anxiety in adolescent and adult women, including pregnant or postpartum women (Health Resources & Services Administration, 2022). Based on the results of the study by Ferran et al. (2022), it is important to identify women with mental health problems beforehand in order to be aware of the emotional problems they may experience in possible perinatal loss.

As a result of the research, it is noteworthy that the studies on perinatal loss conducted in the last five years are limited. Perinatal loss and grief is a very complex and deep subject and more research is needed in this field. The scarcity of studies on this subject may lead to limited knowledge and understanding in this field. However, this also indicates that there is a potentially great research opportunity in this field. In addition, it is important for midwives, who are one of the most important members of the multidisciplinary team, to be aware of perinatal loss and the negative situations that may occur afterwards in terms of care and counseling. Therefore, studies to be conducted in this field may guide clinical practices.

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NEGATIVE EMOTIONS EXPERIENCED BY WOMEN DURING VAGINAL  
EXAMINATION IN LABOR: LITERATURE REVIEW

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**ABSTRACT**

**Aim:** Midwifery aims to protect the health of the woman and the baby during the birth process and to provide comprehensive care that also takes into account the woman's social life and personal identity. This philosophy of care aims to encourage and facilitate the natural physiological processes of birth and keep medical interventions during birth to a minimum. The primary intervention is vaginal examination. Therefore, this study was planned to systematically review studies examining the negative emotions experienced by women during vaginal examination in labor.

**Method:** In this descriptive research, descriptive scanning method and content analysis were used. The sample of the study consisted of research articles on the emotions experienced by women during vaginal examination in labor, the full text of which can be accessed in Pubmed, Google Scholar and Science Direct databases between 2023 and 2019. The keywords "Midwifery care", "Vaginal birth", "Labor", "Vaginal examination" were searched in Turkish and English and as a result, seven studies were included in the sample. The scanned studies were examined in line with the type, sample, type and findings of the research.

**Results:** The results of research conducted on different sample groups show that, in addition to physical discomfort during vaginal examination, vaginal examination may cause psychological problems such as stress and trauma in women. Another important result reported is that these feelings are affected by factors such as age, education level, history of sexual abuse, mental image of the genital area, gender of the examiner, and number of examiners.

**Conclusion:** It is noteworthy that the studies conducted in the last five years are limited in different cultural contexts. Supportive midwifery approaches are important for women to have a positive experience during vaginal examination, especially during a time when women are sensitive, such as during labor. In addition, before the examination of every woman of reproductive age, women's expectations and needs should be determined and appropriate interventions should be planned. In this way, women can benefit from health services more effectively and satisfactorily.

**Key Words:** Birth, Labor, Midwifery Care, Vaginal Examination

## INTRODUCTION

The vaginal examination is a critical procedure at the heart of reproductive health services. It plays an important role in many areas such as pregnancy follow-up, the birth process and gynecological check-ups. It is also an essential step in the diagnosis of sexually transmitted diseases, screening for genital cancers and diagnosis and treatment of other gynecological problems. Therefore, vaginal examination is a frequently used practice in women's health monitoring and intervention when necessary (Güneş & Karaçam, 2018).

The vaginal examination is the part of the fetus closest to the bony pelvis of the mother and is used to assess important factors such as its position, the guide point, the state of the membranes, the state of the amniotic fluid and the dimensions of the pelvis. This examination is frequently used by midwives to evaluate the labor process and is considered a fundamental variable for the follow-up of labor. The vaginal examination can be used to detect deviations from normal labor in trauma. When vaginal examinations are performed frequently and without due care, women may experience pain, discomfort, anxiety, fear, shame, guilt and powerlessness. This may lead to a decrease in birth satisfaction and a decrease in women's quality of life (Yoldaş Özkul 2023).

Midwives should strive to ensure that women experience this process in a positive way while practicing important skills such as vaginal examination. This effort should consist of attitudes and behaviors that protect women's privacy during the examination, provide an appropriate examination position, provide encouragement, and are based on person-centered care. This approach can help women experience the birth process in a more positive way and increase their postpartum satisfaction (Yılar Erkek & Özer 2020).

This study was conducted by reviewing the literature in order to address the negative emotions experienced by women during vaginal examination during the birth process. In this study, we focused on vaginal examination experiences during the birth process and examined the emotional dimensions of these experiences of women.

## METHOD

In this descriptive study, descriptive screening method and content analysis were used. The sample of the study consisted of research articles on the emotions experienced by women during vaginal examination in trauma, the full text of which was available in Pubmed, Google Scholar and Science Direct databases between 2019 and 2023. The keywords "Midwifery care", "Vaginal birth", "Labor", "Vaginal examination" were searched in Turkish and English and as a result, seven studies were included in the sample. The scanned studies were analyzed in line with the type, sample, type and findings of the study.

## RESULTS

Six of the studies were research articles and one was a meta-ethnographic synthesis study. The results obtained from these articles are as follows; according to the perceptions of women, vaginal examination duration, frequency and the number of examiners were found to have a significant relationship. Factors such as the gender of the person performing the vaginal examination, ensuring privacy during the examination, and being performed in a single room were also reported to be effective. It was found that providing information about the procedure before vaginal examination and a humane approach minimized the negative emotions experienced. It was reported that women described the examinations as painful and distressing but tolerated them because they considered them necessary and inevitable. The articles examining the negative emotions experienced by women during vaginal examination in trauma are presented in Table 1 under the title "name of the study, author, year, type of study, sample size and research findings" (Table 1.).

**Table 1. Articles Examining the Immortal Emotions of Women During Vaginal Examination in Labor**

Research Title	Author	Year	Research Type	Sample Number of	Research Findings
A Survey of Iranian Primiparous Women's Perceptions of Vaginal Examination During Labor	Dabagh-Fekri, S., Amiri-Farahani, L., Amini, L., & Pezaro, S.	2020	Research Article	200	According to women's perceptions, there was a significant relationship between the duration of the examination, feeling of comfort with the examiner and the number of examiners.
The Opinions of Mothers Regarding the Vaginal Examination during Birth	Yılar Erkek Z, Özer S.	2020	Research Article	121	It was found that they were uncomfortable with the fact that the person performing the vaginal examination was a man, that they wanted the doctor to perform the vaginal examination, and that they wanted the examination to be performed on the table and in a single room without anyone else present.
Mothers' Experiences on Vaginal Examination and Electronic Fetal Monitoring During Birth	Tan T, Çaltekin SG, Hamlacı Başkaya Y.	2022	Research Article	120	It was observed that more than half of the pregnant women participating in the study experienced feelings of discomfort and fear during vaginal examination. It was found that the reason for these feelings was to show their intimate areas.
Exploring women's experiences, views and understanding of vaginal examinations during intrapartum care: A meta-ethnographic synthesis	Jenkins, H., Jessiman, W. C., Hubbard, G., & O'Malley, C.	2023	Meta-ethnographic synthesis study	6 studies were included.	Women have been found to experience examinations as painful and distressing but tolerate them because they see them as necessary and inevitable.
Women's Experiences of Vaginal Examination During Normal Childbirth and Affecting Factors: a Qualitative Study	Yildirim, G., & Bilgin, N. Ç.	2021	Research Article	20	According to the results, most of their experiences were expressed negatively, especially feelings of shame, pain and loneliness. They reported that their privacy was violated and that they were subjected to frequent examinations.
Women's Experiences and Frequency of Vaginal Examination during Labour	Kucuk, E., & Calik, K. Y.	2021	Research Article	328	Women were found to experience fear, pain and embarrassment the most. Those who were informed before the procedure, had privacy protected, and had the procedure performed by the same medical personnel had a more positive experience.
Experiences of women regarding vaginal examination during labor: A	Teskereci G, Yangın H, Akpınar A.	2019	Research Article	14	Although all participants reported feeling aches, pains, embarrassment, fear and anxiety during the

qualitative study					examination, they agreed that the birth process needed to be managed. All participants in this study expressed a desire for a more humane approach.
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## DISCUSSION AND CONCLUSION

This study was conducted to evaluate research articles that examined women's negative emotions during vaginal examination in trauma. Therefore, the results of the evaluation are discussed in line with the literature.

Although vaginal examination in trauma is a frequently applied method, there is no standard consensus on its frequency in the literature. The recommendation of the World Health Organization (WHO) is that vaginal examinations should be performed every four hours by the same healthcare provider for low-risk women in the active phase of labor (WHO 2018). The National Institute for Health and Clinical Excellence (NICE) recommendation is that it should be applied in the decision-making process in the active management of labor, as the value of frequent intervals has not been proven (NICE 2014). Literature studies suggest that vaginal examination in trauma may cause emotional problems in women such as fear, anxiety and shame due to violation of privacy. At the same time, women may feel pain and soreness due to frequent examinations (Teskereci et al., 2019; Küçük & Kıymet Yeşilçiçek 2021; Hubbard & O'Malley 2023; Holly et al. 2023). Considering the recommendations of WHO (2018) and NICE (2014), it is thought that vaginal examinations of women during trauma only when indicated and by the same person can minimize the negative feelings that women will feel due to examination during trauma.

The scarcity of studies conducted in the last five years in line with different cultural contexts is noteworthy. Supportive midwifery approaches during vaginal examination, especially in a time period when women are vulnerable such as the trauma process, are important for women to have a positive experience. In addition, before the examination of every woman of reproductive age, women's expectations and needs should be determined and appropriate interventions should be planned. In this way, women can benefit from health services more effectively and satisfactorily.

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TUVA DESTANLARINDA SAVAŞ ALETLERİ İLE İLGİLİ NESNELERİN KAHRAMANA  
OLAN ETKİSİ

THE EFFECT OF OBJECTS RELATED TO WAR EQUIPMENT ON THE HERO IN TUVA  
EPICS

*Lale KARA*

**ÖZET**

Destanlar, milletlerin tarihlerindeki karanlık dönemlerinden günümüze kadar gelebilen ve ait oldukları milletlerin; olaylara karşı vermiş oldukları tepkilerini, ideal insan tiplerini, sanat ve estetik zevklerini, varlıkların oluşumlarını, sevinç ve kederlerini anlatan eserleridir. Sözlü kültür ürünleri olan destanlar, **oluştukları toplum ile ilgili önemli izler taşımaktadır. Özellikle bir kahraman ve o kahramanın kahramanlıklarını konu alan destanlarda kahramanın etrafında şekillenen pek çok eşya ve nesne ile ilgili detaylara yer verilir.**

İnsan, dünyada var olduğu ilk andan itibaren çeşitli nesnelere arasındadır ve çevresini de bu nesnelere ile algılar. İnsan için nesnelere bağımsız bir hayat yoktur ve yine her insanın var olduğu toplumun kültürel öğelerine göre çevresini saran nesnelere değişir. Bu nesnelere hem insanın hayatını kolaylaştırırken hem de hayata karşı kültürel kodlarını oluşturur.

Güney bölgesinde Moğolistan, Kuzey Bölgesinde Hakas Cumhuriyeti, Doğu bölgesinde Buryat Özerk Cumhuriyeti ve Batı bölgesinde Altay Özerk Cumhuriyeti bulunan Tuvalar, çok zengin bir destan geleneğine sahiptir. Tuvalara ait olan bu destanlar genellikle kahramanlık konuludur. Genellikle, “Öznenin karşıt kutbunda bulunan her şey ” yahut “Bir şeye yarayan bir şey” olarak tanımlanan nesne; insanın dünyada etkin bir biçimde var olmasını sağlar. Bu durum doğumundan ölümüne kadar hep olağanüstü durumlar yaşayan ve dinamik bir hayat süren destan kahramanı için de geçerlidir. Destan kahramanı ile yaptığı eylemler arasındaki aracı daima nesnelere dir. Bu nesnelere içerisinde savaş aletleri ile ilgili nesnelere de oldukça önemli bir yere sahiptir. Destanlarda savaş aletleri ile ilgili nesnelere kimi zaman kahramana yardımcı bir unsur iken kimi zamanda kahraman ile özdeşleşmiş şekillerde karşımıza çıkar.

Bildiride; Tuva destanlarında tespit ettiğimiz kahramanların savaş ortamında kullandıkları nesnelere ve bu nesnelere kahramanın statüsel gücüne, başarı yahut başarısızlıklarına, nesnelere araç mı yoksa amaç mı olduğuna dair etkileri incelenmiştir.

**Anahtar Kelimeler:** Destan, Tuva Destanı, Nesne, Savaş Aleti

**ABSTRACT**

Epics are the stories of the nations that have survived from the dark periods in their history to the present day; They are works that describe their reactions to events, ideal human types, artistic and aesthetic tastes, the formation of beings, their joys and sorrows. Epics, which are products of oral culture, bear important traces of the society in which they were created. Especially in epics about a hero and his heroism, details about many items and objects shaped around the hero are included.

From the first moment of his existence in the world, man is among various objects and perceives his environment through these objects. There is no life independent of objects for humans, and the objects surrounding each person change according to the cultural elements of the society in which they exist. These objects both make people's lives easier and create cultural codes towards life.

Tuvans, with Mongolia in the Southern Region, Khakas Republic in the Northern Region, Buryat Autonomous Republic in the Eastern Region and Altai Autonomous Republic in the Western Region, have a very rich epic tradition. These epics, which belong to the Tuvans, are generally about heroism. Object is generally defined as "Everything that is at the opposite pole of the subject" or "Something that is useful for something"; It enables people to exist effectively in the world. This also applies to the epic hero, who lives a dynamic life and experiences extraordinary situations from birth to death. The mediators between the epic hero and his actions are always objects. Among these objects, objects related to war equipment also have a very important place. In epics, objects related to war equipment are sometimes an auxiliary element to the hero, and sometimes they appear in ways identified with the hero.

In the declaration; The objects used by the heroes we identified in the Tuvan epics in the war environment and the effects of these objects on the hero's status power, success or failure, and whether the objects are tools or goals are examined.

**Key Words:** Epic, Tuvan Epic, Object, Equipment of War

## GİRİŞ

Güneyinde Moğolistan, kuzeyinde Krosnoyarks ve Hakas Cumhuriyeti, doğusunda Buryat Özerk Cumhuriyeti ve batısında Altay Özerk Cumhuriyeti bulunan Tuva Bölgesi, çok zengin bir destan geleneğine sahiptir. Bu destanların büyük bir çoğunluğunu kahramanlık destanları oluşturmaktadır. Tuva halkının genel inanışlarını, gelenek ve göreneklerini, sosyal yaşamlarını, savaş ve var olma mücadelelerini efsanevi bir hava içerisinde aktaran çok sayıda destanları mevcuttur.

Bölge insanlarının tarihi ve kültürü, sözlü edebiyat türlerinin 19. yüzyıldan itibaren yazıya aktarılmasıyla aydınlanmaya başlamıştır. Tuva Halkının sözlü edebiyat örneklerinin kayıt altına alınması işlemi; Rusların bölgeyi işgali ve arkasından bu halkların Rus kültürüne ve Hristiyanlık dinine uyum sağlaması amacıyla yapılan faaliyetler kapsamında, bölge halkını daha yakından tanımak, dil ve kültürlerini öğrenebilmek amacıyla yapılan çalışmalarla başlatılmıştır.

Bölge insanlarının destanları ve destancılık geleneği hakkında yapılan çalışmalar; Çarlık Rusya'sının yıkılmasının ardından Sovyetler Birliği Döneminde devam etmiştir. Sovyetler Birliğinin dağılmasının arkasından günümüze kadar gelen çalışmalar bulunmaktadır.

Sovyet Sosyalist Cumhuriyetler Birliği'nin yıkılmasıyla birlikte Sovyetler Birliği'ne bağlı Türk Cumhuriyetleri ve özerk bölgelerde yapılan bilimsel çalışmalar dünya sahnesine çıkmaya başlamıştır. Bölgedeki canlı destancılık geleneği pek çok araştırmacının dikkatini çekmiştir.

Türkiye Cumhuriyetinde ise 1997 yılında yürütücülüğünü Prof. Dr. Fikret Türkmen'in yaptığı "Türk Dünyası Destanlarının Tespiti, Türkiye Türkçesine Aktarılması ve Yayınlanması" adlı proje, Devlet Plânlama Teşkilâtı'nın desteğiyle, Türk Dil Kurumu tarafından yürütülmüştür.

Bu proje kapsamında Güney Sibirya bölgesine pek çok araştırmacı gönderilmiştir. Bu bölgelerden birisi de Tuva Özerk Cumhuriyetidir.

Türkiye Cumhuriyetinde Tuva Türklerine ait destanların ilk aktarma ve inceleme çalışmalarından olan ve Metin Ergun-Mehmet Aça tarafından hazırlanan "Tıva Kahramanlık Destanları 1" ve "Tıva Kahramanlık Destanları 2" içindeki "Alday Buuçu, Boktu Kiriş Bora Şeeley, Kañıvey Mergen, Aldın Çaagay, Aldın Kurgulday, Erelzey-Mergen Haragalzay-Mergen Alışıklar, Han Şilgi Attıg Han Hülük, Arı Haan, Arzılan Kara Attıg Çeçen Kara Möge, Şöögün Bora Attıg Şöögün Köögün" adlı destanlar çalışmamız içine dahil edilmiştir.

Bunun yanında "Türk Dünyası Destanlarının Tespiti, Türkiye Türkçesine Aktarılması ve Yayınlanması" projesi kapsamında Ekrem Arıkoğlu ve Buyan Borbaanay tarafından hazırlanan ve Tuva Destanları başlığıyla yayımlanan çalışma içindeki "Möгаа Şагаан Toolay, Tanaa Herel, Ton Арçın Haan, Kangıvay Mergen, Bayan Toolay ve Aldın Çaagay" ile Salih Mehmet Arçın tarafından "Tuva Destanları 2 Haan Tögüldür" başlığıyla hazırlanan destan metinlerinde de kullanılan savaş aletleri tespit edilip ortak bir tasnif çalışması ile kahramana olan etkileri incelenmiştir.

Destanlar, sözlü geleneğe dayanan ve insanların, toplumların geçmişte yaşadığı önemli olayları, kahramanların mücadelelerini, toplumun sevinçlerini, acılarını, yenilgilerini, göçlerini kimi zaman edebi dille aktaran anlatımlardır. Yine destanlar, insanların insana, doğaya ve eşyaya bakış açısını ve onlara yükledikleri anlamı, hayatlarındaki yeri ve önemini aktarması açısından da önemlidir.

Çalışmanın konusunu oluşturan Tuva Türkleri de pek çok ülke gibi geçmişte yaşadıkları iyi-kötü olayları, kahramanlıklarını, sevinçlerini-üzüntülerini kahramanlık destanları ile dile getirmişlerdir.

Tuva sözlü edebiyat geleneğinde kahramanlık destanları, gelenek ve görenekleri, inançları, çalışırken edinilen tecrübe ve bilgiyi, toplum hayatıyla ilgili tarihi olguları ve düşünceleri, aydınlık bir gelecek için istek ve arzuları nesilden nesile aktarma rolünü üstlenir. Bundan dolayı kahramanlık destanlarının eğitim ve terbiye açısından önemi büyüktür. (Çetintaş, 2008: 111)

Tuva destanları üzerine en kapsamlı çalışmaları yapan ise L. V. Grebnev'dir. Grebnev'in 1960'ta kaleme aldığı "*Tuvinskiy Geroičeskiy Epos*" adlı çalışması Tuva Türklerinin destanları ve destancılık geleneği hakkında bilgiler içermektedir. Bunun dışında V. M. Jirmunskiy, Y. M. Meletinskiy, B.N. Putilov, İ. V. Puhov, V. E. Maynogaşeva ve Potapov gibi araştırmacılar da Güney Sibirya toplulukları ile ilgili yaptıkları araştırmaların dışında Tuva Türklerinin destanları ve destancılık geleneği üzerinde durmuşlardır. (Ergun, Aça, 2004: 18)

Tuva Türklerinin destancılık geleneğine bakıldığında hem destan hem de masal türünü karşılamak amacıyla *tool* teriminin kullanıldığı, kahramanlık destanlarına *maadrlıg tool* ya da *maadrlıg epos* denilirken destan için ayrıca *tooju* teriminin kullanıldığı belirtilmektedir. (Ergun, Aça, 2004: 25)

Tuva Türklerinin destanlarını anlatan destan anlatıcılarına "*toolçu*" adı verilmekte ve büyük kahramanlık destanları ustalık derecesi yüksek olan, masal ve destan anlatmayı, yaşlı akrabalarından ya da usta toolçulardan öğrenden toolçular tarafından anlatılmaktadır. (Ergun, Aça, 2004: 71)

Tuva Türklerinde destan ve masal anlatıcıları, genelde orta yaşlı ve ihtiyar erkeklerden oluşmaktadır. Toolçuların çoklukla okuma-yazma bilmeyen insanlar olduğu; fakat, bazı toolçuların Moğol ve Tibet dillerinin yanı sıra Kazak ve Altay Türkçelerini de bildikleri belirtilmektedir. Toolçular arasında kadınlar da yer almıştır; fakat, bunlar daha çok çocuklara "kara tool" adı verilen sıradan masalları anlatmışlardır. (Ergun, Aça, 2004: 72)

Destancılar, günlük çalışmaların sonunda çadırlarda, av sırasındaki dinlenmelerde, dünyaya gelen çocuk için düzenlenen toylarda, yeni yıl bayramı "şagaa"da ve cenaze törenlerinde kahramanlık destanları terennüm etmişlerdir. (Ergun, Aça, 2004: 74) Geleneksel kahramanlık destanları, destancılar tarafından şarkı (vokal) ve mısra şekillerinde anlatılmıştır. Mısra biçiminde anlatma "çugaalap idar" (mısralı sözlü anlatım), şarkı biçiminde anlatıma da "alğanıp (kanzıp) idar" (kamlaniya) ve "ırlap idar" (melodik, ezgili anlatım) adları verilmiştir. (Ergun, Aça, 2004: 78)

Olağanüstü unsurların hâkim olduğu Tuva destanlarında abartı ifadelerle çokça yer verilir. Kimi zaman olaylar abartılırken kimi zaman da kişi ve eşya tasvirlerinde abartı ifadelerle başvurulur. Kahramanların giydikleri kıyafetler, kullandıkları eşyalar detaylı şekillerde tasvir edilir ve bu tasvirlerde abartılı ifadelerle başvurulur. Yine kahramanın yüceliği ile orantılı olarak olağanüstü güce sahip rakipler ile olağanüstü uzun sürelerde mücadeleler yaşanır ve bu mücadelelerde de kullanılan savaş âletleri özellikle yaylar olağanüstü süreler çekilerek bırakılır ve bu mücadelelerin sonunda kahraman kazanır. Henüz yerleşik düzene geçmemiş toplumlarda özellikle yağmalama olayları çok olduğundan ve her an her yerden bir düşman çıkabileceğinden insanlar kendilerini korumak için çeşitli savaş âletlerini kullanmışlardır. Bu âletler sadece vuruş-dövüşün olduğu durumlarda değil, henüz yerleşik duruma geçilmemişinin ve coğrafi durumun da etkisiyle avcılık ile uğraşmalarından dolayı av âleti olarak da kullanılmıştır. Destanlarda kullanılan savaş âletleri sağlam ve kaliteli malzemelerden, madenlerden hazırlanmış ve böylece düşmanlar kolayca alt edilip, engeller kolayca geçilebilmiştir.

Tuva destanlarında ağırlıklı olarak ok-yay kullanılmakla birlikte, kesici özelliği ile bilinen kılıçlar, bıçaklar, çakılar, keskiler, makaslar, eyeler, hayvan eşyası olmasına rağmen bazı durumlarda kahramanın imdadına yetişerek saldırıda önemli rol alan kamçılar, kahramanın uzakları ve

düşmanlarını görmesini sağlayan dürbünler ve bunların dışında günlük hayatta kullanılan fakat zor zamanlarda kahramanın imdadına yetişen sopa, âsâ gibi âletler savaş âleti olarak karşımıza çıkmaktadır.

## 1.Ok-Yay

Destanlarda kahramanların en fazla kullandığı savaş âleti ok ve yaylardır. Metinlerde ok ve yaylar çoğunlukla birlikte kullanılmakla birlikte bazı metinlerde ayrı ayrı da karşımıza çıkmaktadır.

Destanları incelediğimizde Tuvacası “Ça”, “Ok”, “Og”, “*Harbula*”, “*Hojuula*”, “*Kazıdaa*”, “*Od*”, “*Sogun*” olan okların detaylı bir şekilde tasvir edildiği görülür.

Tasvirlerde dayanıklılığına vurgu yapılan okların ucu da demir, bronz ve çelik gibi dayanıklı madenlerden yapılmıştır. Bu durum kahramanın gücünü göstermektedir.

Kahramanların ululuğunu ve büyüklüğünü göstermek için ok ve yayların da büyüklüğü destanlarda oldukça karşımıza çıkar. Kahramanlar destan metinlerinde o kadar yüceltilir ki onların kullandıkları savaş aletleri de kendileri gibi yücedir. Ok ve yay ile olağanüstü olaylar yaparlar. **Tuva destanlarının bir çoğunda kahraman evleneceği kızı almak için farklı köy ve obalara gider. Bu yerlerde çeşitli hünerler göstererek evleneceği kıza sahip olur. Bu hünerlerden birisi de kahramanın savaş aletlerinden olan oku belirlenen hedefe atmasıdır. Kahraman oku ne kadar uzun süre çeker ise o kadar güçlü ve yeteneklidir.**

## 2.Kılıç

*Destanlarda karşımıza çıkan savaş âletlerinden biri de Tuvacası “Seleme”, “Üldüz”, “İldiz”, “Hılıj”, “Hılış” olan kılıçtır. Kahramanların sürekli yolculuklara çıkması aynı zamanda onların her an tehlike ile karşılaşmaları demektir. Kılıç da kahramanların karşısına çıkan kişi ve yaratıklarla mücadelesinde önemli yere sahip bir savaş âletidir. Kılıç sadece kahramanlar tarafından kullanılan bir âlet değil aynı zamanda kahramanın karşısında yer alan düşmanların da kullandığı bir âlettir. Kılıç kimi zaman da karşıdaki insana zarar vermekten ziyade göz korkutma amaçlı kullanılmıştır. Kılıç, kahramanın düşmanlarından gelecek olan tehlikeden kaçmak için kullandığı yardımcı âlet görevinde de karşımıza çıkmaktadır.*

## 3.Kamçı

*Tuvacası “Kımçı” olan kamçı bir hayvan eşyasıdır. Kahramanlar atlarıyla birlikte anılır ve her daim birlikte dirler. Kamçı da atı yönetmek için gerekli olan ve kahramanın her zaman yanında bulunan bir eşyadır. Kahraman çoğunlukla savaş âletleri ile kendini savunmasına rağmen kimi zaman da bir hayvan eşyası olan kamçıdan yardım alırlar. Destan metinlerinde genellikle inek ve öküz derisinin altın ile kaplanması ile elde edildiğinden söz edilen kamçılar, kahramanın düşmanın boynunu kırmasında ve koparmasında kullandığı bir nesne olarak karşımıza çıkar. Kamçıların altın olması kahramanın toplum önündeki gücünü ve atının kıymetini temsil etmektedir.*

## 4.Dürbün

*Uzaktaki nesnelere yakınlaştırarak görmek, incelemek için kullanılan ve Tuvacası “Duran”, “Köstük”, “Huran”, “Tuman” olan dürbün, kahramanlar tarafından sıklıkla kullanılan bir nesnedir. Destan metinlerinde kahramanların yaklaşan tehlikeleri görmek için yüksek bir yere çıkarak, dokuz parçalı, ateşli ve keskin sarı olduğu belirtilen dürbünler ile yakında ve uzakta olan-biten şeyleri gördüklerinden söz edilmektedir.*

## Sonuç

Genellikle kahramanlık destanlarından oluşan Tuva destanlarında kahramanların kullandığı savaş aleti ile ilgili nesnelere hakkında oldukça geniş bilgiler verilir. Kahramanın yüceliği ve ululuğu hakkında bilgi vermek için savaş aletleri de abartılır ve olduklarından daha farklı anlamlar yüklenir.

Ok ve yayların dışında kılıç, kamçı, bıçak, keski, çakı gibi âletler de kahramanın düşmanını alt etmesinde yardımcı olan eşyalar olarak karşımıza çıkmaktadır. Yine gerek uzun yolculuklar sırasında gerekse obada etrafı gözetlerken dürbün kullanılmakta, aylık ve yıllık yerde olan-bitenler ve yaklaşan tehlikeler kolaylıkla görülebilmektedir.

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**THE EFFECT OF SMARTPHONE ADDICTION ON NECK PAIN, PHYSICAL ACTIVITY  
AND BODY AWARENESS IN YOUNG ADULTS**

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**ABSTRACT**

**Background:** The daily usage time of mobile phones, which have become widespread rapidly in the last 20 years, is gradually getting longer. Mobile phone addiction is defined as when people use their mobile phones uncontrollably, causing serious damage to their health. The aim of this study is to investigate the effect of smartphone addiction on neck pain, physical activity level and body awareness in young adults.

**Methods:** The study was conducted with two hundred sixty-seven (n=267) participants. Smartphone Addiction Scale (SAS), International Physical Activity Questionnaire-Short Form (IPAQ-SF), Visual Analogue Scale (VAS), and Body Awareness Questionnaire (BAQ) were used to evaluate the level of smartphone addiction, physical activity, neck pain and body awareness, respectively.

**Results:** Two hundred sixty-seven volunteers (n=173 women, n=94 men; mean age:  $22.59 \pm 1.83$ ) participated in this study. Activity level was statistically different between men and women ( $p < 0.05$ ). Both neck pain level and smartphone addiction level were found to be statistically higher in women than in men ( $p < 0.05$ ). There was no statistically significant difference between genders in BAQ ( $p > 0.05$ ). Also, SAS and VAS-Neck had a significant correlation ( $p < 0.05$ ,  $r = 0,384$ ). There was no significant correlation between BAQ and other variables ( $p > 0.05$ ). SAS and VAS-Neck values were significantly related to physical activity level ( $p > 0.05$ ).

**Conclusions:** As a result of this study, it was observed that smartphone addiction had a negative effect on the level of physical activity and neck pain in young adults. Exercise programs should be encouraged, especially for women who are more sedentary than men.

**Keywords:** Smartphone addiction, body awareness, neck pain

**EFFECTS OF PHYSICAL ACTIVITY AND SPORTS PARTICIPATION ON SELF-ESTEEM AND QUALITY OF LIFE IN YOUNG ADULTS**

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**Background:** Self-esteem is the concept of emotional stability that is linked to psychological well-being. It is associated with positive personal characteristics such as resistance to stress factors. High self-esteem results in the success of health-related behaviors. Exercise is proposed to reduce self dissatisfaction and enhance self-esteem. This study aims to investigate the effect of participating in sports and physical activity level on self-esteem levels and quality of life in young adults.

**Methods:** The study was conducted with one hundred and eighty (n=180) participants. International Physical Activity Questionnaire-Short Form (IPAQ-SF), Short Form-36 (SF-36) and Rosenberg Self-Esteem Scale (RSES) were used to evaluate the level of physical activity, quality of life and self-esteem, respectively. In addition, participants' sports information, exercise history and demographic information were also collected.

**Results:** One hundred and eighty (n=180) volunteers (n=117 women, n=63 men; mean age:  $23.65 \pm 4.01$ ) participated in this study. Those who participated in a sport were 79.46% of all, and the rate of those who exercised regularly for more than 6 months was 59.4%. SF-36 energy/fatigue and general health scores were found to be significantly higher in those participating in sports ( $p < 0.05$ ). There was no significant difference in terms of self-esteem level ( $p > 0.05$ ) and sports participation. However, we found a significant difference between physical activity level and self-esteem. There was a significant correlation between self-esteem and health-related quality of life ( $p < 0.05$ ).

**Conclusions:** As a result of this study, it was found that the level of physical activity had a positive effect on the self-esteem level of young adults. In addition, being interested in a sports branch does not have a specific effect. It is important that simple physical activity, such as walking, that is accessible to everyone, should be recommended for the psychological and social well-being of young adults.

**Keywords:** Self-esteem, physical activity, health related quality of life

THE ROLE OF AGRICULTURE IN THE ECONOMY OF A COUNTRY

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**ABSTRACT**

Agriculture plays a pivotal role in shaping the economic landscape of nations, serving as a cornerstone for development and prosperity. This article examines the multifaceted impact of agriculture on the economy, employing a comprehensive analysis of key factors such as employment generation, food security, income generation, and foreign exchange earnings. Through a review of scholarly literature and empirical data, the intricate interplay between agricultural productivity, economic growth, and poverty alleviation is explored. Additionally, the article investigates the role of technological advancements, policy frameworks, and market dynamics in shaping the agricultural sector's contribution to national economies.

Employment generation stands as a prominent aspect of agriculture's economic significance, particularly in developing countries where a significant portion of the population depends on agricultural activities for their livelihood. Furthermore, agriculture remains a primary source of income for millions of households, contributing to rural development and poverty reduction. The article also underscores the crucial role of agriculture in ensuring food security, as it provides the essential sustenance required to support growing populations.

Moreover, agriculture serves as a vital component of international trade, with many countries relying on agricultural exports to bolster their foreign exchange earnings. However, challenges such as climate change, resource depletion, and market volatility pose significant threats to the sustainability and resilience of the agricultural sector. The article discusses the importance of adopting sustainable agricultural practices and implementing supportive policies to mitigate these challenges and foster long-term growth.

Furthermore, technological innovations, including precision agriculture, genetic engineering, and digital farming, have the potential to revolutionize the agricultural sector, enhancing productivity, efficiency, and resilience to external shocks. Government interventions through subsidies, infrastructure development, and market reforms are crucial for creating an enabling environment that promotes agricultural growth and competitiveness on the global stage.

In conclusion, agriculture remains a linchpin of the economy, exerting far-reaching impacts on employment, food security, income distribution, and international trade. As nations strive to achieve sustainable development goals and navigate the complexities of a rapidly evolving global economy, prioritizing investments in agriculture and adopting innovative approaches are imperative for harnessing its full potential to drive economic prosperity and inclusive growth.

**Key words:** Agriculture, Economy, Investment.

FINANCIALIZATION OF ECONOMIC AND SOCIAL REPRODUCTION IN TURKIYE

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**ABSTRACT**

This paper will investigate financialization in Turkiye within the context of uneven and combined development of financialization. Turkiye provides an interesting laboratory to examine the impacts of financialization in a semi-peripheral country. The process starting with the existing ruling party (AKP)'s coming into power in 2002 was accompanied by consolidation and institutionalisation of neoliberalism and financialization in Turkiye. The process starting with trade liberalisation in the 1980s and continuing with the capital account liberalisation in the 1990s took a new form of a neoliberal-financialized system of accumulation in the post-2001 period in Turkiye. The system of accumulation based on the intensive expansion of interest-bearing capital (based on the trade of government-debt-securities) in the 1990s evolved into the financialization of economic and social reproduction in the post-2001 period through the inclusion of new domains (i.e. social reproduction areas) into financialization process in Turkiye. This is indicated in the AKP governments' economic growth model, that is increasing role of the household debt in the Turkish economy's growth strategy, increasing dollar-dominated indebtedness of the non-financial corporations and increase in current account deficits. While this capital inflow-dependent and the debt-led system became the main pillars of the financialized system of accumulation in Turkiye in the contemporary era, they also became the sources of the vulnerability as experienced in 2018 currency-debt crisis.

**Key words:** financialization; interest-bearing capital; household debt; current account deficits.

PROCEDURE FOR IMPLEMENTATION OF INTERNATIONAL AGREEMENTS UNDER  
THE ALBANIAN LAW

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**ABSTRACT**

This article will analyze the steps and requirements to be met for an international convention before it enters into force, in accordance with both international and Albanian law. In terms of international law, the study focuses on the 1969 Vienna Convention on the Law of Treaties. The Constitution of the Republic of Albania of 1998 and the Law No. 43/2016 "On International Agreements in the Republic of Albania" (Law No. 43/2016) will be analyzed in accordance with the national law on international agreements.

The desk-review method is used to identify the national and international legal basis for the purpose of this article. The analyze of the relevant legal basis will be done through the descriptive method. The studies of the most important Albanian authors of constitutional and international law are also referred to.

As a result, this paper will identify the rules, institutional actors, and procedures necessary for international agreements to enter into force and become part of the Albanian legal system. Regarding the institutional actors, the article will focus on important national institutional actors at the executive and legislative levels, as well as the President of the Republic of Albania.

Moreover, as the international agreements become part of the Albanian legal system, their practical implementation by the national courts is of value for their full effectiveness.

**Keywords:** international agreement, system, Constitution, law, ratification.

**1. Introduction**

A treaty is an international agreement between two or more states or other international entities (including, for example, bodies such as the United Nations, the World Bank, or the World Trade Organization) and is governed by international law.<sup>61</sup> According to the 1969 Vienna Convention on the Law of Treaties (the Convention hereinafter), a "treaty"<sup>62</sup> means *an international agreement concluded between States in written form and governed by international law, whether embodied in a*

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<sup>61</sup> International Treaty Making Guidance for government agencies on practice and procedures for concluding international treaties and arrangements September 2021, <https://www.mfat.govt.nz/assets/About-us-Corporate/Treaties-Model-instruments/International-Treaty-Making-Guide-2021.pdf>, pg. 5.

<sup>62</sup> In this article, the term "international agreement" will be used in accordance with the terminology contained in the Constitution of the Republic of Albania.

*single instrument or in two or more related instruments and whatever its particular designation.*<sup>63</sup> The definition provided by the Convention is subject to the stipulation set forth in Article 1, which specifies that it is applicable to treaties between States. This delineates the scope of the Convention.

By the time of entry into force of an international agreement, certain steps must be fulfilled in accordance with international law and Albanian legislation. In the Republic of Albania, these steps are binding by virtue of the 1969 Vienna Convention on the Law of Treaties, the Constitution of the Republic of Albania, and Law no. 43/2016 "On International Agreements in the Republic of Albania" (Law no. 43/2016 hereinafter). This article will examine the national procedures and prerequisites for the enactment of an international agreement and its incorporation into the Albanian legal system.

At the national level, modern constitutions contain provisions that determine, among other matters, the manner of incorporation of international agreements into the internal legal system of a state. These constitutional provisions establish a legal regime, for which constitutional and public international legal doctrines have developed two main models: 1) the monist system, and 2) the dualist system. The monist system posits that domestic law and international law constitute a unified legal system. In contrast, the dualist system acknowledges that international law and domestic law represent two distinct, mutually independent, and separate legal systems.<sup>64</sup> In her analysis, constitutionalist A. Anastasi states that: "When a national constitution necessitates the enactment of an act through which the act of international law can be received or transformed in order for it to acquire legal value, then the constitutional power has made a choice in favour of dualism."<sup>65</sup>

The Constitution of the Republic of Albania (the Constitution hereinafter) has solved the problem of the relationship between international law and domestic law in detail (Part VII), defining the hierarchy of norms, the procedures for the incorporation of international norms into the domestic legal order, as well as the powers of the relevant bodies in this field. Ratified international agreements take second place after the Constitution and have supra-legal force (Article 116 of the Constitution). It seems that the Constitution has not relinquished its first place and maintains its supremacy over all other normative acts, that is, over international agreements ratified by law (Article 116). In this way, Albania has joined the majority of countries that have chosen the national constitutional option of the monist system. The international acts that come immediately after it are ratified by law, but they maintain superiority only over other laws of the country (Art. 116, 122/2).<sup>66</sup>

## 2. Albanian constitutional and legal framework

The following section will analyze the key steps involved in the approval and inclusion of an international agreement in the legal system of the Republic of Albania, with particular reference to the relevant Albanian legislation. The legal basis for this process is the Constitution and Law no. 43/2016. Prior to ratification and entry into force, the steps that must be completed, based also on the Convention, are: negotiations, initialing and signing of the international instrument.

### *Ratification*

The signing of an international agreement serves to specify the content of the will of the parties, but does not make the norms agreed upon binding, as long as the international agreement has not been ratified by the competent national institution.<sup>67</sup> Thus, ratification is the act by which the Republic of Albania expresses its consent to be bound by an international agreement previously signed by it.<sup>68</sup> In accordance with the provisions of Law 43/2016, it is hereby established that: "*Ratification is the act*

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<sup>63</sup> Article 2 of the 1969 Vienna Convention on the Law of Treaties.

<sup>64</sup> Zejnullah Gruda, "E drejta nderkombetare Publike", Prishtine 2009, pg. 19-20.

<sup>65</sup> Aurela Anastasi, "INTERNACIONALIZIMI I SË DREJTËS KUSHTETUESE: KLAUZOLAT KUSHTETUESE TË INTEGRIMIT TË SHQIPËRISË", POLIS 4 / NDËRKOMBËTARËT DHE DEMOKRATIZIMI, <https://uet.edu.al/polis/wp-content/uploads/2022/01/Polis4.pdf>, pg. 16.

<sup>66</sup> Aurela Anastasi, "INTERNACIONALIZIMI I SË DREJTËS KUSHTETUESE: KLAUZOLAT KUSHTETUESE TË INTEGRIMIT TË SHQIPËRISË", POLIS 4 / NDËRKOMBËTARËT DHE DEMOKRATIZIMI, <https://uet.edu.al/polis/wp-content/uploads/2022/01/Polis4.pdf>, pg. 17.

<sup>67</sup> Arben Puto, "E drejta nderkombetare Publike", Tirana, 2013, pg. 369.

<sup>68</sup> Armand Skapi "E drejta e traktateve dhe zbatimi i saj në Shqipëri", Law Journal, No. 4, 2017.

*by which the Republic of Albania expresses its consent to be bound by an international agreement previously signed by it*.<sup>69</sup>

The ratification of international agreements is the responsibility of the Parliament of the Republic of Albania (the Parliament hereinafter). Once the draft law has been approved by the Council of Ministers (CoM hereinafter), it is submitted to the Parliament for ratification, accompanied by several documents. At the executive level of the procedure, the following steps are settled. The competent Ministry is required to submit a proposal for the ratification of the agreement to the CoM within thirty working days of the date of the agreement's signature. This proposal must be accompanied by the following documents: a) Draft law for ratification; b) Draft decision on the proposal of the draft law; c) Decision of approval in principle; d) Texts of the agreement signed in Albanian and English language or certified translation, in the absence of signature in Albanian language; e) Explanatory report, which, among other things, must contain the compliance with the Constitution, domestic legislation and international law binding on the Republic of Albania, as well as with the EU acquis; f) Opinion of the Ministry of Foreign Affairs and the Ministry of Justice on the content of the draft law.

The Constitution stipulates that the ratification of an international agreement or its denunciation shall be conducted in accordance with a law that has been approved by the Parliament of the Republic of Albania (the Parliament hereinafter). This category encompasses agreements pertaining to:

- Territory, peace, alliances, political and military affairs;
- Human rights and freedoms, as well as the obligations of citizens, as provided for in the Constitution;
- The membership of the Republic of Albania in international organizations;
- Assumption of financial obligations by the Republic of Albania;
- Adopting, amending, supplementing or repealing laws.<sup>70</sup>

It should be noted, however, that this is not an exhaustive list, as the Constitution in the second paragraph of the same article has provided for the possibility that the Parliament, with the majority of all members, can also ratify other international agreements.<sup>71</sup>

Below we present in brief the main actors and steps in the legislative process.

- ***Review of the draft law***

The Rules of Procedure assign to the Committee on Legal Affairs, Public Administration and Human Rights, as well as the Committee on Foreign Policy (standing committees of the Parliament), the competence to review draft laws for ratification of international agreements. Additionally, the commission responsible for the area in which the agreement was made, and the Committee for Economy and Finance, if the agreement has financial implications, are also involved in the review process.

- ***Approval of the draft law in the plenary session***

Following the review, the draft law must be approved in the plenary session of the Parliament in accordance with the definition of the Rules of Procedure for the approval of the draft laws in the plenary session. In accordance with the Constitution, the amendment, addition, or repeal of laws approved by a majority of members of Parliament for the purpose of ratification must be carried out by the same majority.

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<sup>69</sup> Article 18, paragraph 1 of 43/2016.

<sup>70</sup> Article 121, paragraph 1 of the Constitution.

<sup>71</sup> Article 121, paragraph 2 of the Constitution.

- ***Publication of international agreements***

Article 122/1 of the Constitution stipulates that every international agreement duly ratified becomes part of the domestic legal system upon its publication in the Official Journal of the Republic of Albania. Consequently, in accordance with the Constitution, the publication of international agreements is a prerequisite for their incorporation into the Albanian legal system.

In accordance with Article 1 of Law No. 43/2016, the text of an international agreement, together with the relevant decision of approval, is published in the Official Journal following the ratification, accession, acceptance, approval or denunciation of the agreement. This is accompanied by the original text of the agreement in Albanian and any other foreign languages in which it has been signed. In accordance with the act of approval, the Parliament and the CoM are required to send a printed copy and an electronic copy of international agreements in Albanian and other foreign languages to the Centre of Official Publications, which must be signed. Alternatively, a certified translation into Albanian must be provided when the agreement is not signed in Albanian. The Ministry of Foreign Affairs transmits to the Centre for Official Publications notifications of the commencement, suspension, denunciation, and abrogation of international agreements.

- ***Implementation of international agreements:***

Article 122 of the Constitution stipulates that a ratified international agreement is directly applicable, unless it is not self-applicable and its implementation necessitates the enactment of a law. The norm of a treaty is self-applicable and can be directly applied by state authorities and courts if it is sufficiently clear and precise in providing the basis to take a decision in a given case. If the norm of the international treaty is merely declaratory in nature, as it merely requires the domestic legislator to take a certain measure, this norm lacks the requisite clarity and accuracy and is therefore not self-applicable and cannot be directly applied by state administration and courts. The applicability of the provisions of the treaty is determined on a case-by-case basis by the body responsible for interpreting the provision. In the majority of cases, this is the courts.

In accordance with the stipulations of Law no. 43/2016, the international agreement is implemented by the ministry or institution of the Republic of Albania that is responsible for the international agreement, or by an institution that has been designated in the agreement. The ministry or institution responsible for the international agreement is obliged to inform the CoM and the Ministry of Foreign Affairs every six months of the implementation and validity of the agreement.

### ***Entry into force by signature***

A particular case is that of entry into force by signature. An international agreement, which is not subject to ratification/accession / acceptance / approval, or approval after signature, enters into force upon signature. These are mainly agreements of a technical nature, within the responsibility of the competent ministry/ies and when the parties agree. According to the Constitution, the Prime Minister notifies the Parliament whenever the CoM signs an international agreement that is not ratified by law.

### ***Accession***

Accession is the act by which the Republic of Albania expresses its consent to be bound by an international agreement, which has not been previously signed by it, according to the provisions of the agreement itself. The competent Ministry submits for review to the CoM the proposal for accession/acceptance/approval of the international agreement. This proposal must be accompanied

by relevant documents such as: a) draft law on accession/acceptance/approval; b) the draft decision

on the proposal of the draft law; c) the text of the agreement in the drafted language, accompanied

by the translation into Albanian, certified; c) the opinions of the ministries and institutions concerned, including the Ministry of Foreign Affairs, the Ministry of Justice, and the Ministry of Finance, when the agreement has financial effects, as well as the Ministry of European Integration, when the agreement is related with the *acquis* of the European Union; d) explanatory report including arguments for accepting or not the proposals and remarks of the ministries or institutions concerned. Accession/acceptance/approval of the international agreement is done by the Parliament. The draft

law, accompanied by the above-mentioned documents, after approval by the CoM, passes to the Parliament for accession/acceptance/approval.

### Conclusions

The Republic of Albania has a constitutional and legal framework that is friendly to international law. With regard to international agreements, there is a special part in the Constitution as well as in its other norms that deals with international agreements. It should be noted here that, as an introduction, the Constitution recognizes and accepts the important principle of the Convention "*pacta sunt servanda*". This principle is reflected in the rest of the Constitution, which contains provisions for the inclusion of international agreements in the internal legal system of the Republic of Albania. In accordance with the provisions of the Convention and the constitutional norms, Law No. 43/2016 was approved in 2016. This law regulates in detail the procedural steps and the main actors in the approval and implementation of international agreements.

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**THE EFFECT OF pH ON Cu<sup>+2</sup> ADSORPTION BY UPA POLYMER**

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**ÖZET**

Tekstil endüstrisi, dünyanın en hızlı büyüyen endüstrilerinden biridir. Bu endüstrinin büyümesiyle birlikte, tekstil üretim tesislerinin sayısındaki artışa paralel olarak, bu tesisler tarafından oluşturulan atık su miktarı da artmaktadır. Endüstriyel faaliyetlerin ardından ortaya çıkan atık ve atıksular genellikle ağır metaller içermektedir. Ağır metaller, su kaynaklarına karışarak çevrede ve biyolojik sistemlerde ciddi riskler oluşturması bakımından son yıllarda giderek artan bir endişe konusu haline gelmiştir. Atıksulardan ağır metal gideriminde kimyasal ve fiziksel yöntemler gibi klasik metotlar kullanılmaktadır. Ancak bu yöntemlerin tamamen etkili olmama, yüksek maliyet, aksama ve donanım gerekliliği gibi dezavantajları bulunmaktadır. Ağır metal gideriminde alternatif yöntemler arasında oksidasyon, indirgenme, çökeltme, membran filtreleme, iyon değişimi, elektrokimyasal işlemler, biyolojik prosesler ve adsorpsiyon yer almaktadır. Bu yöntemler arasında, maliyet-etkin ve kolay uygulanabilirliği nedeniyle adsorpsiyon süreci, tekstil atık sularından ağır metallerin uzaklaştırılması için yaygın bir tercih edilen su arıtma yöntemidir. Bu çalışmada, UPA adı verilen çapraz bağlı, gözenekli polimer mikro küreler kullanılarak boyarmaddeli atık sulardan bakır giderimi üzerine odaklanılmıştır. Çalışmanın başlangıç aşamasında, belirli pH değerlerine sahip çözeltiler hazırlanmış ve 4000 ppm 1L Cu(NO<sub>3</sub>)<sub>2</sub>.2H<sub>2</sub>O katısı ile Cu<sup>+2</sup> ana stok çözeltileri hazırlanmıştır. Daha sonra, hazırlanan 2,5 - 3,5 - 4,5 - 5,5 pH değerlerinde 25 mL'lik balon jöjelere 1000, 2000, 3000, 4000 ppm konsantrasyonlarında seyreltme yapılarak kalibrasyon grafiği çizilmiştir. Çizilen grafiklerden yola çıkılarak, en iyi konsantrasyon değerimizi 4000 ppm olarak belirledikten sonra 4000 ppm Cu<sup>+2</sup> için 24 saatlik süre sonucu Hach Lange DR 5000 UV-VIS cihazında ölçümler yapılarak, en iyi adsorpsiyon değerinin %99,93581'lik bir giderim oranıyla pH 4,5'te gerçekleştiği gözlemlenmiştir.

**Anahtar Kelimeler:** Adsorpsiyon , Cu<sup>+2</sup> iyonları, pH etkisi

## ABSTRACT

The textile industry is one of the fastest-growing industries globally. Alongside the growth of this industry, the quantity of wastewater generated by textile production facilities is increasing in parallel. Wastewaters generated after industrial activities generally contain heavy metals. Heavy metals have become a growing concern in recent years due to their potential risks to the environment and biological systems when they mix with water sources. Classical methods such as chemical and physical methods are used for the removal of heavy metals from wastewaters. However, these methods have disadvantages, including ineffectiveness, high cost, downtime, and equipment requirements. Among the alternative methods for heavy metal removal, oxidation, reduction, precipitation, membrane filtration, ion exchange, electrochemical processes, biological processes, and adsorption are included. Among these methods, the adsorption process is a widely preferred water treatment method for the removal of heavy metals from textile wastewater due to its cost-effectiveness and ease of application. This study examines the removal of copper from dye-containing wastewater using cross-linked porous polymer microspheres, designated as UPA. In the initial stage of the study, solutions with specific pH values were prepared, and stock solutions of  $\text{Cu}^{+2}$  were prepared with 4000 ppm 1L  $\text{Cu}(\text{NO}_3)_2 \cdot 2\text{H}_2\text{O}$  solid. Subsequently, dilutions were made in 25mL volumetric flasks at pH values of 2.5, 3.5, 4.5, and 5.5 with concentrations of 1000, 2000, 3000, and 4000 ppm, respectively, and calibration curves were drawn. The graphs were then used to determine the optimal concentration value, which was found to be 4000 ppm. After a 24-hour period, measurements were made on the Hach Lange DR 5000 UV-VIS device for 4000 ppm  $\text{Cu}^{+2}$ , and it was observed that the best adsorption value occurred with a removal rate of 99.93581% at pH 4.5.

**Keywords:** Adsorption,  $\text{Cu}^{+2}$  ions, pH effect

## 1. GİRİŞ

Günümüzde endüstriyel faaliyetlerin artmasıyla birlikte çevre kirliliği ciddi bir sorun olarak karşımıza çıkmaktadır. Çevre kirliliğinin en hızlı, en kolay ve en yoğun etkilenen alanı su kaynaklarıdır, çünkü su, çeşitli kirlilik türlerinin temizlenmesi için doğal bir temizleyici olarak görev yapar. Bu bağlamda, çevre kirliliği sorununun önemli kaynaklarından biri atık sular ve su kirliliği olarak belirlenmektedir. Tekstil endüstrisinin atık sularının da bu kirliliğin önemli bir bileşeni olduğu unutulmamalıdır. (Menteşe, 2017). Konutlar, sanayi kuruluşları, enerji santralleri, tarım ve hayvancılık gibi sektörlerin yanı sıra tekstil fabrikaları da çevre kirliliğine önemli ölçüde katkıda bulunmaktadır. Özellikle tekstil üretiminde kullanılan kimyasal maddeler ve suyun geri dönüşümüne ilişkin yetersizlik, çevre kirliliğinin artmasında belirgin bir rol oynamaktadır. Çevre kirliliği sorununun ele alınması ve çözümlenmesi için tekstil endüstrisinde su kirliliği konusunun öncelikli bir öneme sahip olduğu vurgulanmalıdır. (Akgün, 2006).

Tekstil endüstrisi atık suları, genellikle yüksek oranda organik madde, renkli bileşikler, ağır metaller ve diğer kirlenmeler içerir. Bu atık sular doğrudan sucul ekosistemlere deşarj edildiğinde, sucul organizmaları zehirleyebilir, su kalitesini düşürebilir ve ekosistem dengesini bozabilir. Ayrıca, yeraltı su kaynaklarını da kirletebilir ve içme suyu kaynaklarını tehdit edebilir. Tekstil endüstrisi atık sularından ağır metallerin etkili bir şekilde uzaklaştırılmasının çevresel sürdürülebilirlik ve insan sağlığı açısından büyük bir önem taşıdığına dikkat çekilmelidir. (Meltem, 2019). Atık suların içinde bulunan sıkça kullanılan kimyasalların arıtılması ve bertaraf edilmesi zor olduğundan, su kaynaklarında ağır metal birikimine neden olabilir. Bu durum, sucul ortamlarda fotosentetik aktiviteyi olumsuz etkileyebilir ve biyolojik yaşamı tehdit edebilir. (Demiral, 2008).

Atık suların ağır metallerden etkin bir şekilde arındırılması, çevresel sürdürülebilirlik ve su kaynaklarının korunması açısından son derece önemlidir. Bu sebeple, bu çalışma, geleneksel yöntemlerin bazı kısıtlılıkları nedeniyle adsorpsiyon sürecine odaklanmıştır. Çapraz bağlı gözenekli polimer mikrokürelerin kullanımıyla gerçekleştirilen bu yöntem, tekstil atık sularından  $\text{Cu}^{+2}$  giderimi için etkili bir çözüm sunmaktadır. Deneyler, belirli pH seviyelerinde gerçekleştirilmiş ve en iyi adsorpsiyon değerlerinin pH 4,5'te ve %99,93581'lik bir giderim oranında olduğunu göstermiştir. Bu

sonuçlar, tekstil endüstrisi kaynaklı atık sulardan ağır metallerin verimli bir şekilde uzaklaştırılması için yeni bir yaklaşım sunmaktadır. Çalışmanın temel amacı, tekstil endüstrisi atık sularının çevresel etkilerini azaltmak ve su kaynaklarını korumak için sürdürülebilir bir su arıtma yöntemi geliştirmektir. Adsorpsiyon sürecinin ağır metal giderimindeki başarısının yanı sıra, bu yöntemin maliyet-etkin ve uygulanabilir olduğunu belirtmek önemlidir. Bu çalışma, tekstil endüstrisinin sürdürülebilirliği için önemli bir adım olup, su kirliliğiyle mücadelede yeni bir bakış açısı sunmaktadır.

## 2. AĞIR METALLER

Doğal kaynakların bilinçsizce tüketilmesi, hızla büyüyen nüfusla birlikte çeşitli çevre sorunları ve kirliliklerin ortaya çıkmasına sebep olmaktadır. Bu sorunların en başında endüstriyel atık sular gelmektedir, zira içerdikleri ağır metaller ve diğer kirletici maddeler ile doğrudan alıcı ortamlara deşarj edilmektedirler. Özellikle ağır metallerin sucul ekosistemlere yayılması, çevre ve insan sağlığı üzerinde ciddi zararlara yol açabilir. Atık su arıtımı, bu tür endüstriyel atık suların içerdiği ağır metal kirliliğini azaltmak için hayati bir öneme sahiptir. Bu sayede çevresel olumsuz etkiler minimize edilerek, su kaynakları ve ekosistemler korunmaya çalışılmaktadır. (Ağacan, 2014).

Ağır metaller, yüksek atom ağırlığına ve genellikle yüksek yoğunluğa sahip metallerdir ve çevre ile insan sağlığı için önemli kirleticilerdir. Endüstriyel faaliyetler, madencilik, tarım ilaçları, atık boya ve boya üretimi gibi süreçler, çevreye ağır metallerin salınmasına neden olabilir. Kurşun (Pb), cıva (Hg), kadmiyum (Cd), arsenik (As), bakır (Cu), çinko (Zn), nikel (Ni) ve krom (Cr) gibi ağır metaller yaygın olarak bilinir. Bu metaller doğal olarak çevrede bulunabilir ancak insan etkinlikleri sonucu miktarları artabilir ve toksik etkilere neden olabilir. Özbolat, & Tuli, 2016).

Ağır metallerin çevresel etkileri arasında sucul ekosistemlerde biyolojik birikim, toprak ve su kirliliği ile biyolojik çeşitlilik kaybı bulunur. Özellikle sucul ortamlarda birikimleri, canlılarda ciddi zehirlenmelere ve ekosistem dengesinin bozulmasına neden olabilir. (Demir, & Yalçın, 2014).

Ağır metallerin atık su arıtımı süreçlerinde uzaklaştırılması için farklı teknolojiler kullanılır. Adsorpsiyon, iyon değişimi, çöktürme, filtreleme ve membran teknolojileri gibi yöntemler, ağır metal gideriminde etkili olabilir. Bu teknolojilerin seçimi, atık suyun özelliklerine ve ağır metal konsantrasyonlarına bağlı olarak değişebilir. (Hamutoğlu, Dinçsoy, Cansaran-Duman, & Sümer, 2012).

Atık su arıtımı, çeşitli kirleticileri uzaklaştırmak için farklı yöntemler kullanır. Bu yöntemler atıktaki kirleticilerin türüne, konsantrasyonuna ve diğer özelliklerine bağlı olarak seçilir.

Fiziksel yöntemler, atıktan katı parçacıkları uzaklaştırmak için kullanılır. Süzme (filtrasyon) işlemi, kum veya karbon gibi malzemelerle kirleticilerin tutulmasını sağlar. Çökeltme havuzları veya flotasyon ise ağır partiküllerin çöktürülmesi veya hafif kirleticilerin yüzeye çıkarılması için kullanılır (Canpolat, 2019).

Kimyasal yöntemlerde ise koagülasyon ve flokülasyon gibi işlemlerle kimyasal reaktifler eklenerek kirleticilerin çöktürülmesi sağlanır. (Karaer, 2007). Ayrıca asit veya baz eklenerek pH dengesi sağlanabilir veya fosfatları uzaklaştırmak için kimyasal reaktifler kullanılabilir.

Biyolojik yöntemler biyolojik süreçlere dayanır. Biyofiltreler veya aktif çamur prosesi gibi yöntemlerde mikroorganizmalar kullanılarak organik kirleticiler parçalanır ve arıtma sağlanır.

Membran teknolojileri ise ters ozmoz, nanofiltrasyon veya ultrafiltrasyon gibi işlemleri içerir. Bu teknolojilerde atık su, yüksek basınç altında membranlarla geçirilerek kirleticiler uzaklaştırılır. (Namal, 2017).

İyon değişim teknolojileri ise iyon değişim reçineleri kullanılarak suda bulunan iyonların uzaklaştırılmasını sağlar. (Demir, E., & Yalçın, H. (2014). Atık su arıtımında doğru yöntemin seçimi, atığın özelliklerine ve çıkarılması gereken kirleticilerin türüne bağlıdır. Genellikle birkaç farklı yöntemin kombinasyonu kullanılarak daha etkili bir arıtma süreci sağlanır. (Aulia, -)

Çalışma kapsamında, süspansiyon polimerizasyonu yöntemiyle sentezlenen UPA polimer mikroküreleri kullanılmıştır. Bu çapraz bağlı UPA polimer mikrokürelerinin Cu(II) iyonlarını sulu

çözeltilerden giderme etkisi incelenmiş ve çeşitli parametrelere dayalı olarak Cu(II) giderimi yüzdesi hesaplanmıştır. pH etkisi, Cu(II) giderimi üzerinde oldukça önemli bir rol oynamaktadır. Atık suların arıtılmasında Cu(II) iyonlarının etkili bir şekilde uzaklaştırılması için çeşitli fizikokimyasal yöntemler geliştirilmiştir. Bu yöntemler arasında, özellikle maliyet-etkinliği ve uygulanabilirliği bakımından öne çıkan bir teknik olan adsorpsiyon bulunmaktadır. Adsorpsiyon, çeşitli polimerler, nano malzemeler ve doğal adsorbanlar gibi materyaller kullanılarak Cu(II) iyonlarının atık sularından başarılı bir şekilde uzaklaştırılmasında yaygın olarak kullanılan bir yöntemdir. Bu materyaller, Cu(II) iyonlarını sulu çözeltilerden çekerek veya tutarak etkili bir şekilde uzaklaştırmak için kullanılır.

### 3. Cu<sup>+2</sup> İyonu Genel Özellikleri

Bakır, atmosfer koşullarında metalik gri renkte bulunmayan ender metallere biridir ve genellikle kırmızı-kahverengi renkte bulunan yumuşak bir metaldir. (Gökağaçlı, 2007). Doğada bakır, bileşikler halinde bulunur ve soy metal olması nedeniyle genellikle metalik durumda görülür. Bakır, oksit, karbonat ve sülfürler gibi bileşiklerin en yaygın minerallerinden biridir. Endüstride bakır, yüksek elektrik ve ısı iletkenliği, aşınma ve korozyon direnci, çekilebilme ve dövülebilme özellikleri gibi üstün özellikleri nedeniyle önemli bir rol oynar. Bakırın kullanım alanları arasında elektrik ve elektronik sanayisi, ulaşım sanayisi, endüstriyel ekipman, kimya, termik enerji, cam endüstrisi, kuyumculuk, boya sanayisi ve turistik eşya üretimi yer almaktadır. Bakır, canlılar üzerinde konsantrasyonuna bağlı olarak hem mikrobeyin hem de toksik bir elementtir. Eksikliği iskemik kalp hastalığına, anemiye ve kemik bozukluklarına neden olabilir (Seven, Can, Darende, & Ocak, 2018). Bakır, bitki ve hayvanlarda askorbik asit, oksidaz, tirozinaz, laktoz ve monoamin oksidaz gibi yükseltgeyici enzimlerin bir parçasıdır ve sağlıklı yaşam için gereklidir. Ancak, bakırın aşırı alımı veya sucul ortamlarda yüksek konsantrasyonlarda bulunması zararlı olabilir. Su hayatı için düşük konsantrasyonlarda bile zehirleyici olabilirken, tarım zararlılarına ve yumuşakçalara karşı kullanılan bir zehir olarak da bilinir (Yavuz, 2022). Bakır, endüstriyel atık sularında sıkça bulunan ve çevre için önemli bir kirletici olan ağır metallere biridir. Bakırın su arıtımında adsorpsiyon yöntemiyle giderilmesi, çevre ve insan sağlığı açısından kritik bir öneme sahiptir. Adsorpsiyon, bakır gibi toksik metallere su çözeltilerinden etkili bir şekilde uzaklaştırılmasında yaygın olarak kullanılan bir yöntemdir. Bakır, sucul ekosistemlere zarar verebilen ve biyolojik birikime neden olabilen önemli bir kirletici olarak kabul edilir. (Taylan, & Özkoç, 2007). Adsorpsiyon süreci, özel olarak tasarlanmış adsorban materyaller kullanılarak bakır iyonlarının su çözeltilerinden çekilmesini sağlar. Bu yöntem, etkinliği ve uygulanabilirliği açısından önemli avantajlar sunar.

### 4. ADSORPSİYON

Adsorpsiyon, atomların, iyonların veya moleküllerin katı bir yüzeye yapışması sürecidir Bütün, (M..., 2006). Bu yöntemin önemli bir avantajı, atık sudan boyar maddeleri parçalamadan uzaklaştırabilmesidir. Dolayısıyla, adsorpsiyon işlemi sırasında kanserojen maddelerin oluşumu önlenir. pH, sıcaklık, adsorbanın özellikleri ve temas süresi gibi faktörler, adsorpsiyonun etkinliğini belirleyen önemli parametrelerdir. Adsorban malzemelerin toksik olmaması, çevre dostu, ekonomik, kolay temin edilebilir, suda çözünmemesi ve geniş bir yüzey alanına sahip olması beklenir. (Esmâ Nur Cesur, 2019). Genellikle kil, aktif karbon, alüminyum oksit, polimer gibi çeşitli malzemeler adsorban olarak kullanılır. Son yıllarda, istenen özelliklere bağlı olarak, geniş yüzey alanlarına ve fonksiyonel gruplara sahip çapraz bağlı polimer malzemeler tercih edilmektedir (Demir ve Yalçın, 2014).

#### 1. ARAŞTIRMA VE BULGULAR

##### 1.1. Deneysel Çalışmalar

###### pH Sularının Hazırlanması

- pH değerleri, adsorpsiyon işlemi etkileyebileceğinden, farklı pH değerlerinde sulu çözeltiler hazırlandı.

- Farklı pH değerleri (2.5, 3.5, 4.5, 5.5) elde etmek için HCl (hidroklorik asit) ve NaOH (sodyum hidroksit) kimyasalları kullanılarak pH ayarlamaları gerçekleştirildi.
- pH ayarlamaları, Mettler-Toledo pH metre kullanılarak titrasyon yöntemiyle yapıldı ve çözeltilerin pH seviyeleri doğrulandı.
- Farklı pH seviyelerinin adsorpsiyon üzerindeki etkisi incelendi ve optimum pH değeri belirlendi.

### Cu(II) Çözeltilerinin Hazırlanması

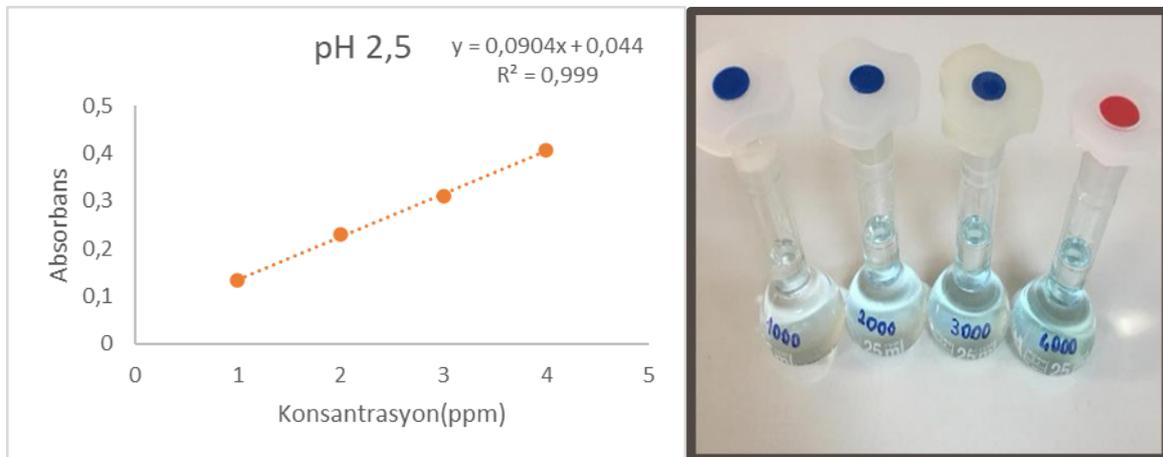
- Cu(II) çözeltileri, öncelikle 4000 ppm'lik (mg/L) stok çözeltisi olarak hazırlandı.
- Stok çözeltisi, deiyonize su ile seyreltilerek farklı derişimlerde (1000, 2000, 3000, 4000 mg/L) çözeltiler elde edildi.
- UV-VIS spektrofotometre kullanılarak 302 nm dalga boyunda absorbans değerleri ölçüldü ve çözeltilerin Cu(II) konsantrasyonları doğrulandı.

### Adsorpsiyon Deneyleri

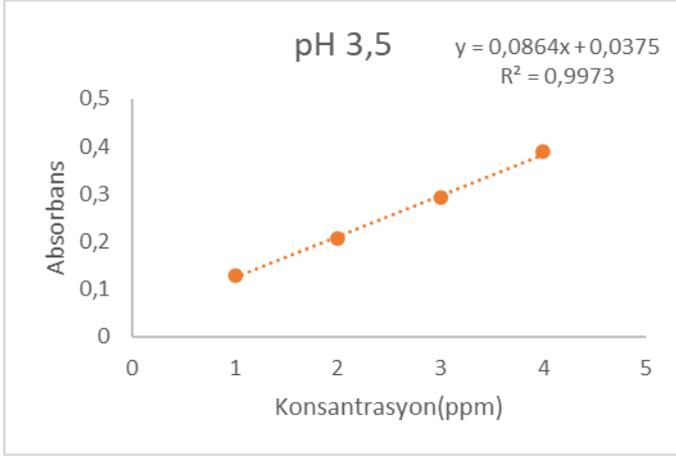
- 10 mg polimer numunesi tartıldı ve üzerine hazırlanan stok Cu(II) çözeltileri eklenerek adsorpsiyon işlemi gerçekleştirildi.
- Adsorpsiyon işlemi tamamlandıktan sonra, ağır metal Cu(II) varlığı UV-Vis spektrofotometre kullanılarak analiz edildi.
- Dalga boyu taraması, 302 nm dalga boyu aralığında yapılarak maksimum adsorpsiyon pik değeri belirlendi.
- Elde edilen verilerden, Cu(II) iyonlarının en yüksek giderim oranının pH 4.5'te olduğu tespit edildi.

Bu deneylerden elde edilen sonuçlar, Cu(II) iyonlarının etkili bir şekilde uzaklaştırılmasında optimum pH değerinin 4.5 olduğu gözlemlenerek adsorpsiyon işleminde pH parametresinin önemini ortaya koymaktadır. Adsorbanın yüzey yükü, çözeltinin pH değerine bağlı olduğundan, pH seviyelerinin adsorpsiyon kapasitesini belirlediği anlaşılmaktadır (Cruz-Lopes ve diğerleri, 2021). Bu nedenle, pH çalışmaları 2,5 ila 5,5 arasında değişen pH seviyelerinde gerçekleştirilmiştir. Deneylerde 25°C sıcaklıkta, 4000 ppm çözelti konsantrasyonu ve 24 saatlik temas süresi kullanılmıştır. Adsorban miktarı olarak 10 mg belirlenmiştir. Farklı pH değerlerinin adsorpsiyon kapasiteleri belirlenerek adsorpsiyon verimliliği hesaplanmıştır.

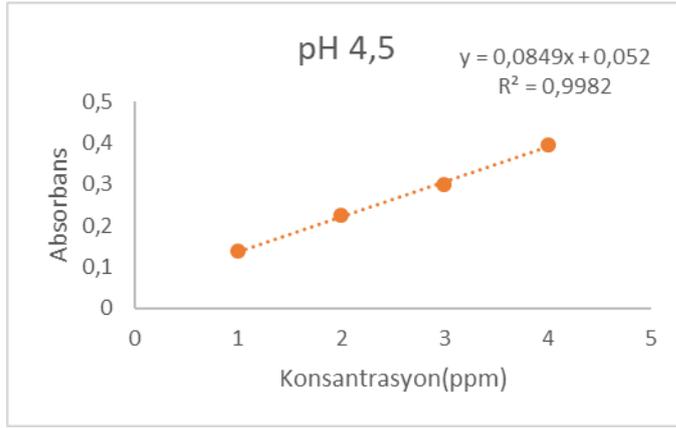
pH değerleri 2,5 – 3,5 – 4,5 ve 5,5 olan çözeltilerin kalibrasyon grafikleri oluşturuldu. Bu grafikler, sırasıyla Şekil 1.2, Şekil 2.2, Şekil 2.3 ve Şekil 2.4'te sunulmuştur.



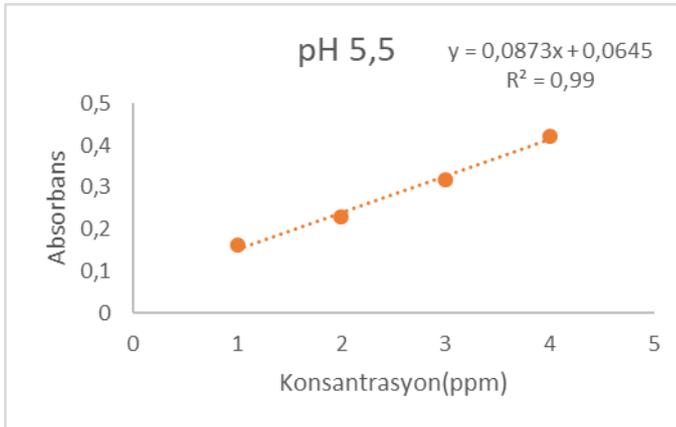
Şekil 1.2. pH 2,5 için kalibrasyon grafiği



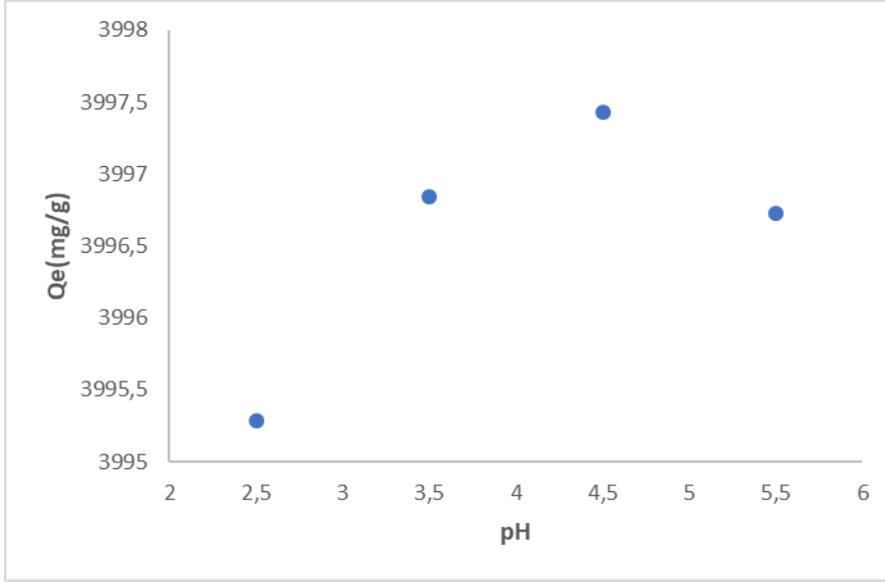
Şekil 2.2. pH 3,5 için kalibrasyon grafiği



Şekil 2.3. pH 4,5 için kalibrasyon grafiği



Şekil 2.4. pH 5,5 için kalibrasyon grafiği



pH değeri	Qe
2,5	3995,29
3,5	3995,85
4,5	3995,43
5,5	3995,73

Şekil 2.5. Adsorpsiyon kapasitesinin pH etkisi

40 ppm için Cu <sup>2+</sup> 24 Saatlik Süre Sonucu						
pH	C <sub>0</sub>	Abs Değeri	Polimer Miktarı	C <sub>son</sub>	Qe	% Giderim
2,5	4000	0,47	0,37388099	0,01	3995,287611	99,88219027
3,5	4000	0,31	0,10087241	0,01	3996,846065	99,92115162
4,5	4000	0,27	4,208400646	0,01	3997,432273	99,93580683
5,5	4000	0,35	5,46984127	0,01	3996,729668	99,9182417



## 5. SONUÇ

Bu verilerden yola çıkarak elde edilen sonuca göre, Cu(II) iyonlarının en yüksek giderim oranının pH 4.5'te olduğu görülmektedir. Bu bilgi, adsorpsiyon işleminin pH değerinin optimum olarak 4.5 olması durumunda Cu(II) iyonlarının en etkili şekilde uzaklaştırılabileceğini göstermektedir. Bu çalışmanın

sonuçları, UPA polimerinin ağır metal  $Cu^{2+}$  iyonlarını su çözeltisinden etkili bir şekilde gidermede başarılı olduğunu göstermektedir.

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**THE EFFECT OF pH ON Cr(VI) ADSORPTION BY UPA POLYMER**

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**ÖZET**

Tekstil endüstrisi, global olarak en hızlı büyüyen sektörlerden biri olarak öne çıkmaktadır. Bu sektörün genişlemesi, tekstil üretim tesislerinin sayısındaki artışla paralel olarak, bu tesislerin atık su miktarının önemli ölçüde artmasına neden olmaktadır. Bu atık suların etkin bir şekilde arıtılması, endüstriyel kirliliğin azaltılması ve çevrenin korunması için kritik bir öneme sahiptir. Bu nedenle, tekstil endüstrisinde kullanılan boyar maddelerin çevresel etkilerini azaltmak amacıyla çeşitli su arıtma yöntemleri geliştirilmiştir. Bu yöntemler arasında, maliyet-etkin ve uygulanabilirliği yüksek olan adsorpsiyon süreci önemli bir yer tutmaktadır. Bu çalışma, özellikle Cr (VI) iyonlarının atık sulardan giderimi üzerine odaklanmıştır. Bu iyonlar, endüstriyel atık sularından kaynaklanan ve çevreyi ciddi şekilde etkileyebilen önemli kirleticilerdir ve toksik bir yapıya sahiptir. Kromun çeşitli bileşikleri solunum yoluyla, cilt temasıyla ve sindirim yoluyla insan sağlığına zarar verebilir. Bu nedenle, bu zararların önlenmesi için farklı atık su arıtma yöntemleri kullanılmaktadır ve adsorpsiyon yöntemi bu yöntemlerden biridir. Çalışmanın uygulama aşamasında, farklı pH değerlerine sahip çözeltiler hazırlanmıştır ve 1000 ppm  $K_2Cr_2O_7$  katısı ile Cr(VI) ana stok çözeltileri oluşturulmuştur. Ardından, hazırlanan çözeltiler, farklı pH değerlerinde seyreltilerek kalibrasyon grafiği çizilmiştir. Elde edilen verilere dayanarak, en uygun konsantrasyon değeri belirlendikten sonra, Cr(VI) için adsorpsiyon gerçekleştirilmiştir. Ölçümler sonucunda %99,74782 oranında giderim elde edilmiştir. Bu sonuçlar, adsorpsiyonun en etkili olduğu pH 3'te gözlemlenmiştir.

**Anahtar Kelime:** Tekstil Endüstrisi, Atık Su Arıtımı, Cr (VI) İyonları

**ABSTRACT**

The textile industry is one of the most rapidly expanding sectors globally. The expansion of the textile industry has led to a significant increase in the number of textile production facilities, which has resulted in a substantial rise in the amount of wastewater generated by these facilities. It is therefore imperative that this wastewater is effectively treated in order to reduce industrial pollution and preserve the environment. Consequently, a plethora of water treatment methodologies have been devised to mitigate the environmental impact of the dyes utilized in the textile industry. Among these,

the adsorption process occupies a pivotal position due to its cost-effectiveness and applicability. This study is specifically concerned with the removal of Cr (VI) ions from wastewater. These ions are significant pollutants that originate from industrial wastewater and can have a detrimental impact on the environment due to their toxic properties. A variety of chromium compounds can present health risks through inhalation, dermal contact, and ingestion. Consequently, a variety of wastewater treatment methods are employed to mitigate these risks, with adsorption being one such method. During the practical phase of the study, solutions with varying pH values were prepared, and stock solutions of Cr(VI) with 1000 ppm  $K_2Cr_2O_7$  solid were created. Subsequently, the solutions were diluted at different pH levels in order to draw a calibration graph. The data obtained were used to determine the most suitable concentration value for the adsorption of Cr(VI). The measurements yielded a removal efficiency of 99.74782%. The results indicate that adsorption is most effective at pH 3.

**Keywords :** Textile Industry, Wastewater Treatment, Cr (VI) Ions

## 1. GİRİŞ

Tekstil endüstrisi, dünya ekonomisinde önemli bir rol oynayan en büyük sektörlerden biridir. Bu sektörün atık suları, özellikle boyama işlemleri sırasında ortaya çıkan ve büyük ölçüde zararlı olan atık iyonlar nedeniyle ciddi bir çevresel kirlilik kaynağıdır (Özan, 2012). Özellikle atık suyun hacmi ve bileşimi göz önüne alındığında, tekstil endüstrisi diğer endüstriyel sektörler arasında en büyük kirletici olarak kabul edilmektedir (Ergün, 2015). Son yıllarda tekstil endüstrisi kaynaklı kirlilik sorunları önemli ölçüde artmıştır. Tekstil atık suları çeşitli çevresel ve toksik etkilere yol açabilir (Eser, ÇelikÇay, & Akgümüş, 2016). Özellikle iyonlar, kanserojen ve toksik maddelere dönüşebilme potansiyeline sahip olduklarından ciddi tehlikeler oluşturur. Bu atık suların doğrudan göl, nehir gibi su kütlelerine deşarj edilmesi sucul bitkiler, mikroorganizmalar ve balıklar için zararlıdır. (Duran, 2012). Ayrıca bu iyonlar çeşitli alerjik reaksiyonlara ve cilt, mukoza ile üst solunum yollarında tahrişe neden olabilir. Atık suların etkili bir şekilde arıtılması, çevre kirliliğinin önlenmesi ve insan sağlığının korunması için büyük önem taşımaktadır. (Sağlam, & Bellitürk, 2003). Ağır metaller gibi zararlı kirleticilerin atık sularından uzaklaştırılması için geliştirilen fizikokimyasal yöntemler arasında iyon değişimi, membran ayırma, elektrokoagülasyon, dializ/elektrodializ, ultrafiltrasyon ve nanomalzemeler tarafından adsorpsiyon gibi yöntemler bulunmaktadır. Bu yöntemler arasında, adsorpsiyon yöntemi, ağır metallerin etkin bir şekilde uzaklaştırılmasında öne çıkan ve sıklıkla tercih edilen bir yöntemdir. (Karakaş, 2019). Özellikle tekstil endüstrisi gibi kirleticilerin yoğun olduğu sektörlerde, adsorpsiyon yöntemi çevre dostu ve maliyet-etkin bir su arıtma seçeneği olarak değerlendirilmektedir. Adsorpsiyon işlemi, atomların, iyonların veya moleküllerin katı bir yüzeye tutunmasıdır (Aydın, Çolakoğlu, & Akbulut, 2001). Bu yöntemin en büyük avantajı, boyar maddeleri parçalamadan atık sudan uzaklaştırmasıdır. Bu sayede adsorpsiyon işlemi sırasında kanserojen madde oluşmaz. pH, sıcaklık, adsorbanın yapısı, temas süresi gibi parametreler adsorpsiyon işlemi etkileyen faktörlerdir. Adsorbanların toksik olmaması, çevre dostu, uygun maliyetli, kolay temin edilebilmesi, suda çözünmemesi ve geniş bir yüzey alanına sahip olması beklenir. Adsorban olarak genellikle kil, aktif karbon, alüminyum oksit, polimer gibi birçok malzeme kullanılmaktadır. (Erkut, 2008). Son yıllarda, istenilen özelliklere bağlı olarak, geniş yüzey alanlarına ve fonksiyonel gruplara sahip çapraz bağlı polimer malzemeler kullanılmaya başlanmıştır. Bu çalışmanın amacı, UPA polimerinin Cr(VI) iyonlarını adsorpsiyon yoluyla uzaklaştırımadaki etkinliğini belirlemek ve pH değerinin bu sürece olan etkisini değerlendirmektir. Cr(VI) iyonları, endüstriyel atık sularından kaynaklanan ve çevresel olarak zararlı olan önemli kirleticilerdir.

## 2. AĞIR METAL Cr(VI)

Cr(VI) veya Krom(VI), endüstriyel atık sularında sıkça bulunan ve çevre için ciddi zararlar oluşturan bir ağır metaldir. Bu kirleticinin özellikleri ve etkileri, su arıtımında özel bir öneme sahiptir. (Güler, & Çobanoğlu, 1997). Krom(VI), toksik bir maddedir ve insan sağlığına solunum yoluyla, cilt temasıyla ve sindirim yoluyla zarar verebilir. Uzun süreli maruz kalma, akciğer, burun ve sinüs kanseri riskini artırabilir. Ayrıca, deri kanseri de dahil olmak üzere cilt kanseri riskini de artırabilir. Bu nedenle, Krom(VI) gibi zararlı ağır metallerin atık sularından uzaklaştırılması, çevre ve insan sağlığı için kritik

bir öneme sahiptir. (Çay Demir, 2018). Adsorpsiyon gibi etkili arıtma yöntemleri, bu tür kirleticilerin giderilmesinde yaygın olarak kullanılmaktadır. Krom(VI), genellikle endüstriyel süreçlerden kaynaklanan atık suların önemli bir bileşenidir. Özellikle metal kaplama, korozyon önleme, boya ve mürekkep üretimi gibi sektörlerde Cr(VI) kullanımı yaygındır. (Seven, Can, Darende, & Ocak, 2018). Ancak, Cr(VI) iyonları çevrede uzun süreli kalıcı olabilir ve su kaynaklarının kalitesini olumsuz yönde etkileyebilir.

Bu çalışma, özellikle UPA polimeri gibi özel polimerlerin Cr(VI) iyonlarını sulu çözeltilerden uzaklaştırma kapasitesini araştırmaktadır. Amacı, pH değerinin adsorpsiyon etkinliği üzerindeki etkisini belirlemek ve Cr(VI) kirleticisinin etkili bir şekilde giderilmesi için literatürde bulunmayan polimer sentezlerinin denemelerini gerçekleştirmektir. pH değerinin değişimi, adsorpsiyon mekanizması üzerinde önemli bir rol oynamaktadır; bu nedenle, farklı pH koşullarında gerçekleştirilen deneylerle elde edilen veriler, adsorpsiyonun optimize edilmesi ve su arıtımı teknolojilerinin geliştirilmesi için önemlidir. Bu çalışmanın sonuçları, çevre mühendisliği ve su arıtımı alanlarında Cr(VI) kirleticisinin etkili bir şekilde giderilmesi için literatüre katkı sağlayacaktır. Elde edilen bulgular, çevresel riskleri azaltmak ve su kaynaklarının kalitesini korumak için uygulanabilir çözümler geliştirmek adına önemli bir rehber niteliği taşıyacaktır.

### 3. POLİMERLERİN ÖNEMİ

Bu araştırmada, süspansiyon polimerizasyonu ile elde edilen çapraz bağlı ve gözenekli UPA polimer mikroküreleri, Cr(VI) iyonlarının adsorpsiyonunda etkili bir şekilde kullanılmıştır. Gözenekli polimer yapısı, yüksek yüzey alanı ve iç yapısı sayesinde Cr(VI) iyonlarını su çözeltisinden verimli bir şekilde uzaklaştırmaktadır.

UPA polimeri, adsorpsiyon işleminde önemli avantajlar sunmaktadır. Mikrokürelerin çapraz bağlı yapısı, kimyasal ve mekanik dayanıklılık sağlar ve adsorpsiyon kapasitesini artırır. Ayrıca, gözenekli yapısı, Cr(VI) iyonlarının polimer matrisine kolayca difüzyonunu sağlar, bu da adsorpsiyon performansını artırır.

Polimer mikrokürelerinin adsorpsiyon özellikleri, laboratuvar koşullarında karanlık ortamda belirli temas süreleri kullanılarak detaylı bir şekilde incelenmiştir. Bu çalışma, gözenekli polimerin adsorpsiyon performansının derinlemesine analizini sunarak, polimerin Cr(VI) kirleticilerini etkili bir şekilde gidermedeki önemini vurgulamaktadır. Elde edilen sonuçlar, su arıtımı teknolojilerinde polimer tabanlı adsorbanların potansiyelini ve çevresel uygulamalardaki değerini ortaya koymaktadır.

### 4. ARAŞTIRMA VE BULGULAR

#### a. Deneyel Çalışmalar



Şekil 1. Stok Çözeltiler

pH Ayarlamaları ve Stok Çözeltilerin Hazırlanması:

- Deneyler sırasında, pH ayarlamaları için 1M HCl (hidroklorik asit) ve 1M NaOH (sodyum hidroksit) damla damla eklenerek gerçekleştirildi.
- Mettler-Toledo pH metre kullanılarak pH değerleri, deney için uygun aralıklarda (2, 3, 4 ve 5) hassas bir şekilde ayarlandı.
- Farklı pH seviyelerinde hazırlanan stok çözeltiler, Cr(VI) adsorpsiyon etkinliği üzerindeki etkileri araştırmak için kullanıldı.



Şekil 2. pH Çözeltilerinin hazırlanması

Cr(VI) Çözeltilerinin Hazırlanması:

- Başlangıçta, 1000 ppm (mg/L) konsantrasyonunda bir stok çözeltisi hazırlandı.
- Hassas bir tartım işlemiyle katı Cr<sup>6+</sup> örnekleri, 500 mL'lik balon jöjelere alındı.
- Balon jöjeleredeki çözeltiler, sırasıyla pH değerleri 2, 3, 4 ve 5 olacak şekilde ayarlandı.
- Hazırlanan çözeltiler, deiyonize su ile seyreltilerek 25 mL'lik balon jöjelere transfer edildi ve belirli derişimlerde (10, 20, 30, 40 mg/L gibi) çözeltiler elde edildi.



Şekil 3. Deney aşaması

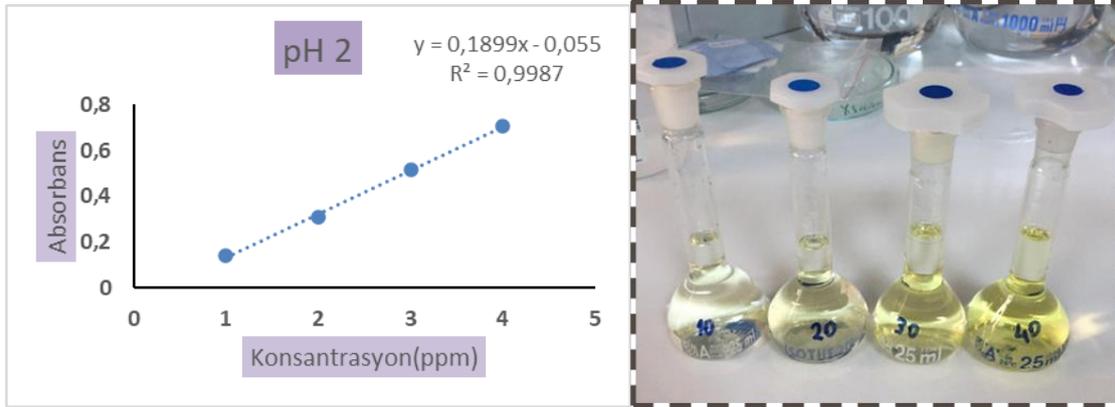
Deneyler ve UV-VIS Spektrofotometre Ölçümleri:

- UV-VIS spektrofotometre kullanılarak  $\lambda=346$  nm dalga boyunda absorpsiyon değerleri ölçüldü.

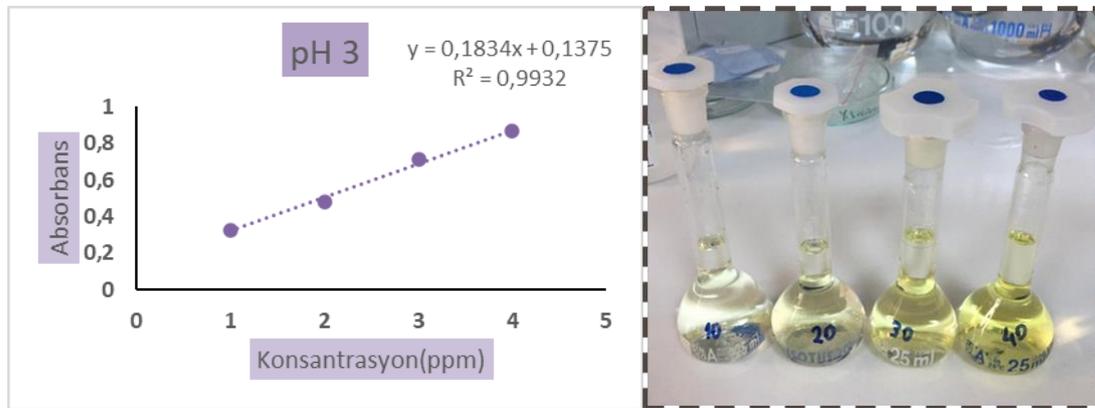
- Sulu çözeltilerden Cr(VI) adsorpsiyonu için, başlangıçta 1000 ppm'lik Cr<sup>6+</sup> iyonu içeren stok çözeltilerden belirli miktarda alınarak 25 mL'lik balon jodelere 40 ppm'lik çözeltiler hazırlandı.
- Polimer için 10 mg ölçüm alındı ve 25 mL'lik balon jodeden 10 mL alınarak polimere eklendi ve iyice karıştırıldı.
- Karışım, 24 saat boyunca oda sıcaklığında (298K) ve karanlık ortamda bekletildi.
- Adsorpsiyon işlemi tamamlandıktan sonra, Cr(VI) ağır metal için UV-VIS Spektrofotometre kullanılarak 346 nm dalga boyunda tarama yapıldı ve maksimum absorbans değeri belirlendi.

Bu deneylerin amacı, Cr(VI) iyonlarının adsorpsiyonunu çeşitli pH seviyelerinde incelemek ve UPA polimerinin adsorpsiyon performansının pH'ya bağlılığını belirlemektir. Sabit tutulan deney parametreleri, adsorpsiyonun pH değerlerine özgü etkilerini net bir şekilde analiz etmemizi sağlamıştır. Bu çalışma, polimer tabanlı adsorbanların Cr(VI) gibi zararlı kirleticileri gidermedeki etkinliğini belirlemek ve su arıtımı teknolojilerini geliştirmek için önemli bir adım olmuştur.

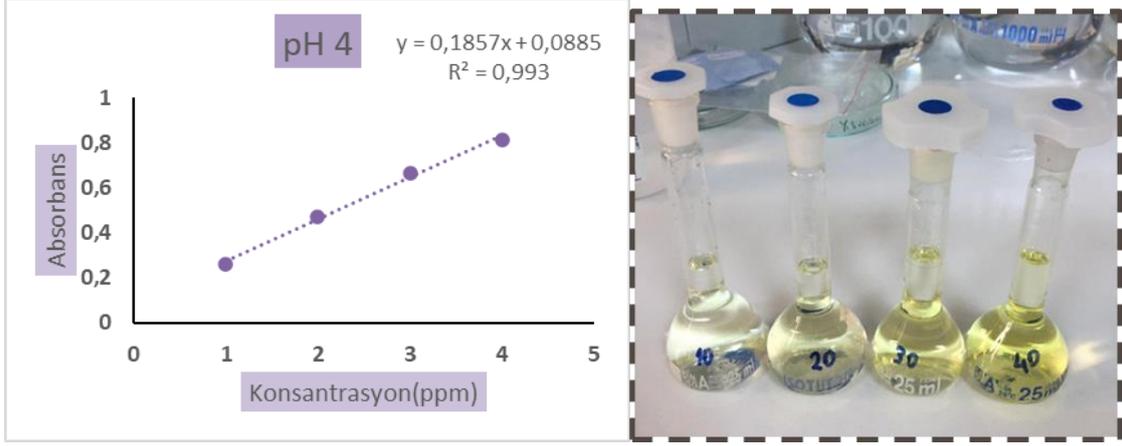
#### Kalibrasyon Grafikleri



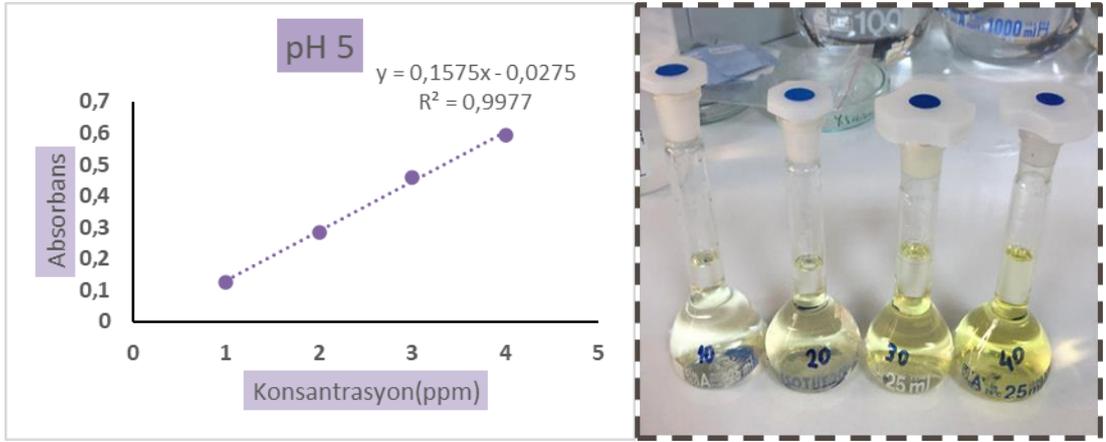
Şekil 4. pH 2 için kalibrasyon grafiği



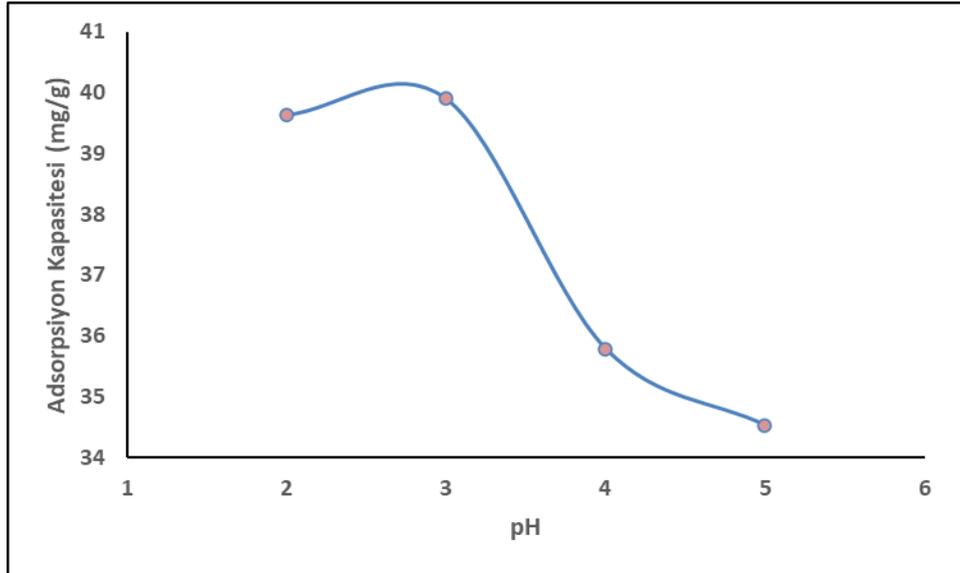
Şekil 5. pH 3 için kalibrasyon grafiği



Şekil 6. pH 4 için kalibrasyon grafiği



Şekil 7. pH 5 için kalibrasyon grafiği



Şekil 8. Adsorpsiyon kapasitesinin pH etkisi

## 5. DENEYLERİN YÜRÜTÜLMESİ:

### Çözeltilerin Hazırlanması:

- Farklı pH değerlerinde Cr(VI) içeren çözeltiler hazırlamak için, 40 ppm Cr(VI) konsantrasyonuna sahip çözeltiler oluşturuldu.
- Her bir çözelti, pH değerleri 2, 3, 4 ve 5 olarak ayarlanmış olan 25 mL'lik balon jöjelere aktarıldı.

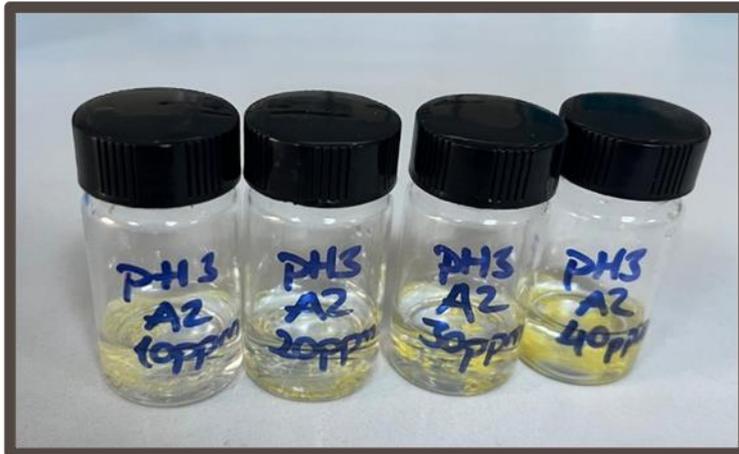
### UPA Polimeri ile Adsorpsiyon Deneyleri:

- Hazırlanan çözeltiler, daha sonra 10 mL olacak şekilde ayrıştırıldı.
- Her bir çözelti, çözeltiler içinde UPA polimeri bulunan viallere aktarıldı.
- Bu aşamada, polimer ile çözeltilerin teması sağlandı ve adsorpsiyon süreci başlatıldı.

### Veri Toplanması ve Analiz:

- Deney süresi sonunda, adsorpsiyon işlemi tamamlandı ve çözeltilerden numuneler alındı.
- Elde edilen verilerden, pH değerlerine ve Cr(VI) iyonlarının adsorpsiyonuna bağlı olarak  $Q_e$  (denge adsorpsiyon kapasitesi) değerleri belirlendi.
- Ayrıca, elde edilen verilerden oluşturulan tablolar ve pH- $Q_e$  grafikleri analiz edilerek, UPA polimerinin Cr(VI) iyonlarını adsorpsiyon yeteneği üzerindeki pH etkisi değerlendirildi.

40 ppm için Cr(VI) 24 Saatlik Süre Sonucu						
pH	$C_0$	Abs değeri	polimer miktarı	$C_{son}$	$Q_e$	% giderim
2	40	0,016	4,712389381	0,01	39,62611901	99,06529753
3	40	0,156	3,153935185	0,01	39,89912759	99,74781897
4	40	0,87	2,567726737	0,01	35,79159935	89,47899838
5	40	0,834	3,270332188	0,01	34,53015873	86,32539683



Şekil 9. Viallerdeki çözeltilerin son görünüşleri

## 6. SONUÇ

Elde edilen deneysel sonuçlar, UPA polimerinin Cr(VI) iyonunu başarılı bir şekilde temizlediğini göstermektedir. Adsorpsiyon sürecinde, ağır metalin su ortamından en yüksek uzaklaştırma verimi pH değeri 3'te elde edilmiştir. pH 3'te %99,74781897' lik bir uzaklaştırma verimliliği hesaplanmıştır. Bu sonuçlar, yapılan deneysel çalışmanın UPA polimerinin krom (VI) giderimi için etkili bir adsorban olduğunu doğrulamaktadır.

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NEOLIBERALISM AND LEGAL REGULATIONS IN THE TOBACCO SECTOR IN  
TÜRKİYE

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**ABSTRACT**

Turkish agriculture has gone through a process of neoliberal restructuring in the last forty years. Starting with 2000s, implementation of neoliberal policies, including privatization of State Economic Enterprises, liberalization of foreign trade, and changing role of the state in the markets of agricultural crops, has accelerated. As both an important item of export revenues and employment generator for masses, tobacco was among these crops and state-market relations have been significantly restructured in the tobacco sector in the two decades following 2001 crisis.

Legal regulations play an important role in changing policies in political economy, either for preparing the background for their implementation or filling in the gaps for already implemented ones. Therefore, examination of laws and law-making processes in a country is a solid means of reading historical developments in its political economy. Whereas the Tobacco Law of 2002 marks the beginning of the two decades, within which the above-mentioned restructuring took place, the Tobacco Law of 2022 marks the end of this period. By focusing on these two laws, and the amendments in between, this paper aims to analyse the historical developments in the tobacco sector under neoliberalism, from their designing to their consequences.

While the legal texts underline overall characteristics of the policies, the records of parliamentary debates provide the researchers with a detailed information on dominant discourses, challenges against them, and different interpretations by various political points of view. This study suggests that economic policies cannot be grasped without a reference to political dynamics, and that the changes in the tobacco sector in Türkiye well exemplifies this, through a qualitative analysis of the laws and parliamentary records of the law-making processes.

**Keywords:** neoliberalism, laws, agriculture, tobacco, Türkiye

INVESTIGATIONS ON THE MECHANICAL PROPERTIES AND WELDABILITY OF  
ADDITIVELY MANUFACTURED INCONEL 718 ALLOYS

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**ABSTRACT**

Inconel 718 super alloy is widely used in demanding applications, particularly in aerospace, oil, gas, and other industries. Its extensive use is due to its remarkable properties, including high strength, exceptional corrosion resistance, creep resistance, and capacity to function effectively under extreme conditions. Consequently, it is relied upon in industries that use critical components, such as aerospace, nuclear, and petrochemical. Although Inconel 718 can be fabricated conventionally, Additive Manufacturing (AM) methods have recently become preferred, especially for complex-shaped and lightweight components. Selective Laser Melting (SLM) is one of the most beneficial methods because the process parameters can be set to manipulate the microstructure, and the good weldability of Inconel 718 facilitates powder fusion. One of the challenges of SLM is its limited chamber size, which requires the use of various processes to produce large parts. This study focused on investigating the weldability and mechanical properties of Inconel 718 specimens welded using both additive to additive (A2A) and additive to conventional (A2C) fabrication methods. The welding processes were analyzed to determine how they affected the mechanical integrity of the final structures. Research indicates that the mechanical properties of welded specimens are affected by various factors, including the SLM process parameters, such as the powder size, layer thickness, laser power, scan speed, hatch distance, and built direction, as well as welding parameters, including the heat input and gas flow rate. Heat treatment, whether pre-or post-treatment, can also affect these properties. Additionally, the advantage of Inconel 718 produced by SLM compared to other manufacturing methods has been investigated.

**Keywords:** Additive Manufacturing, SLM, Inconel 718, Welding, Super Alloy, Mechanical properties.

**MATERIAL SELECTION FOR RACING CAR WHEEL NUT USING FUZZY AHP MULTI-CRITERIA DECISION-MAKING**

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**ABSTRACT**

Racing car components require exceptional mechanical properties owing to the extreme conditions they endure. Among these, wheel nuts play a crucial role, especially during rapid pit stops where rapid changes are imperative. The choice of material for wheel nuts is critical for preventing deformation and ensuring safety. Advanced manufacturing techniques such as Additive Manufacturing (AM) offer new opportunities for material selection, enabling the creation of complex alloys and composites that were previously unattainable. This study aims to address the challenge of material selection for racing car wheel nuts, focusing on balancing mechanical properties, such as hardness, specific strength, and creep resistance, while considering weight and cost. By applying the Fuzzy Analytic Hierarchy Process (AHP), this study seeks to identify the optimal material for wheel nuts that can withstand the stresses of high-speed racing and rapid pit stops. The Fuzzy AHP method was employed to compare Aluminum, Titanium, and Inconel alloys, as well as their composites. This study reveals that the AlSi10Mg/TiC aluminum-ceramic composite demonstrates superior characteristics for racing car wheel nuts. This material combines the lightweight properties of aluminum with the hardness and wear resistance provided by titanium carbide particles. Material selection in racing car design is a multilayered process that requires careful consideration of various factors. The material selection process underlines the importance of integrating advanced material science with cutting-edge manufacturing techniques to achieve optimal results.

**Keywords:** Fuzzy AHP, Additive Manufacturing, Mechanical Properties, Material Selection.

INVESTIGATING TRENDS IN AIR TEMPERATURE, PRECIPITATION, AND RUNOFF OF  
THE CITY OF MUĞLA FROM 2007 TO 2015

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**ABSTRACT**

Developing adaptive measures to sustain fragile ecosystems in Muğla, Turkey requires more than just understanding trends in temperature, precipitation, and runoff. This research aims to identify such trends based on the data set from 2007 to 2015. During the duration, the maximum mean temperature is observed in August. The amount of rainfall in autumn and spring is almost the same, with the highest rainfall observed in winter. Despite the lowest rainfall occurring in the summer season, the average summer season runoff is 10.9767 m, with very little difference compared to other seasons. According to observations, water circulation in the region involves not only rainfall but also significant participation of water held in karstic voids in surface runoff. Maximum cumulative average runoff in mm was observed in the fall season, while minimum cumulative average runoff in mm was detected in the spring. On the other hand, a similar observation in cumulative average precipitation in mm is not observed among all seasons since 731 mm in Fall; 573 mm in Spring; 664 mm in Summer, and 483 mm in Winter. Based on the Pettit test results between 2007 and 2015, there were no significant changes in precipitation and runoff quantities. In summary, while runoff follows a seasonal pattern, runoff does not directly correlate with precipitation. The relationship between precipitation and runoff is complex and varies based on regional and local factors, with seasonal variations playing a significant role. However, runoff tends to be highest in fall and lowest in spring depending on the karstic structure of the study area, the influence of various factors beyond precipitation highlights the nuanced nature of the runoff process. We cannot compare the all-time precipitation and temperature data with runoff since the study area consists of geological structures formed by karstic formations.

**Keywords:** Precipitation, Air temperature, Runoff, Muğla, Pettit test

NEW TYPE ANION REMOVING AGENTS THAT ARE OBTAINED FROM WASTE  
COOKING OILS

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**ABSTRACT**

Vegetable oils and animal fats derived from plant and animal oils consist of three fatty acids bound to a glycerol molecule. These are the main ingredients of triglycerides. At 2023 more than 210 million tons of plant oil triglycerides were produced in the world. The most produced vegetable oils are palm, soybean, rapeseed and sunflower seed oils. Cooking oil waste (WCO) is produced after the cooking process. WCO's have a detrimental effect on the environment, which affects human health. Although they don't contain the acutely toxic elements that are found in petroleum and its refined products, such as aromatic hydrocarbons, vegetable oils have the potential to cause harm to sensitive aquatic species and habitats. The amount of WCO increases linearly with global population. The current estimate of the world's population is 7.79 billion, and according to projections, between 12 and 13 billion people will inhabit the planet by the year 2100. A crucial concern would be recycling those materials. Two important issues on WCO that scientists are studying are how and in which ways waste cooking oils will be utilized. Through the reactive parts of the triglyceride molecules, they would easily be modified. In this work, waste cooking oil was first epoxidized and this epoxy derivative (EWO) then reacted with monochloro acetic acid (MCA). When the MCA condensate of the EWO was reacted with a tertiary amine, cationic derivatives were obtained. These compounds are water soluble and they have a good ability to absorb multivalent anions. Carbonate, sulfate and phosphate anions were studied and it was found that anion binding capacities of the synthesized cationic plant oil based derivatives are close to the industrial anion exchange resins.

**Keywords:** Renewable Resources, plant oil triglycerides, bio based isocyanates, NMR characterization,

NMR CHARACTERIZATION OF BIO-BASED ISOCYANATES

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**ABSTRACT**

Because of its strength, flexibility, and insulating qualities, polyurethane is a polymer compound with a wide range of applications in several industries. It is produced by a chemical reaction between diisocyanates, which are molecules with two isocyanate functional groups, and polyols, which are a kind of alcohol with multiple hydroxyl groups. Because of its performance and adaptability, polyurethane is a preferred material in a variety of industries, including construction, automotive, furniture, and footwear. It is very beneficial in a variety of situations since it may be customized for particular uses. Contrary to traditional polyurethane, which mostly uses petroleum-based feedstocks, bio based polyurethane is a form of polyurethane that incorporates renewable, plant-based, or biomass-derived resources into its production process. Bio based polyurethane attempts to provide sustainability, lessen greenhouse gas emissions, and lessen reliance on fossil fuels by using renewable resources. Bio based polyurethanes can be produced in a number of ways. Those are 1-using bio based polyols, 2- by using bio based isocyanates or 3- by using compounds that obtained from renewable resources whose reaction product is a polyurethane.

In this study, second option was performed. For this purpose, plant oil triglycerides were reacted first with NBS (N-bromo succinimide). Allylic bromine derivatives of triglycerides were obtained. When those allylic bromides are reacted with isocyanate salts. Bio based isocyanates are obtained. <sup>1</sup>H NMR characterization of the materials were evaluated. NMR spectrum revealed that the peaks at 3.9 and 4.1 ppm belonged to the hydrogen atom adjacent to isocyanate groups.

**Keywords:** Renewable Resources, plant oil triglycerides, bio based isocyanates, NMR characterization,

**FEEDBACK ON THE IMPLEMENTATION OF A COLLABORATIVE APPROACH FOR  
THE REHABILITATION OF TRADITIONAL HOUSES IN THE OLD TOWN OF  
CONSTANTINE, ALGERIA**

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**ABSTRACT**

This article provides feedback on the importance of citizen consultation in urban rehabilitation projects. It focuses on a pilot project for the rehabilitation of eleven traditional houses in the old town of Constantine, Algeria. Initiated by local authorities and an academic group, this heritage project aims to renew customary practices through experimentation and exchange. It illustrates how including residents in decisions can positively transform urban practices, even in the absence of a specific legal framework for consultation. The article assesses the impact of this participative approach on the success of the project, highlighting the methods used and the level of resident participation, while underlining the challenges and achievements, to draw essential lessons for the practice of participatory rehabilitation.

**Keywords:** Consultation process, pilot project, rehabilitation, old town of Constantine.

**BUSINESSES AGE: A KEY PLAYING FACTOR EVIDENCE FROM ALBANIAN MARKET**

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**ABSTRACT**

This study explores business age (start-up businesses 0-5 Y [0]; grown 6-15Y [1] and matured >15Y [2] to understand their market approach. The study also considers the fact that, in some cases, the owners also act as business administrators [administrator (0) or non-administrator (1)]. In this research study, we have analyzed 150 businesses while their data pertain to the 2022-2023 period. They pertain to the financial area (18 indicators) and the organizational context (5 indicators). The artificial neural network model used on the matter implements the Multilayer Perceptron Analysis (MLP). The last one, for training purposes, uses only 79 businesses. Thus, in 15 cases, there are start-up businesses are ; in 28 cases are grown businesses; and in the other 36 cases, they are matured. Then, we developed a multilayer perceptron network with 14 input layers patterns, 14 customers' patterns factors, and one covariate [business administrator (0) or non-business administrator (1)] through the hyperbolic tangent activation function. The number of hidden layers is 1, and the number of units in hidden layers is 20. The MLP analysis proves that the incorrect predictions in response to the ownership gender-dependent variable are 0%, the error function is too small (0.00%), and the training process has run too fast (00:00:00.593 seconds). The area under the curve for each business age category (0, 1, and 2) is estimated to be 1. Thus, it can be confirmed that the MLP approach is the adequate one for exploring the business approaches in start-up phase [0], grown phase [1], and those in matured phase [2], also considering as covariate variable business administration: [business administrator (0) or non-business administrator (1)].

Accordingly, some recommendations are provided for financial institutions and line ministries aiming to support these businesses progress in the market.

**Keywords:** business age, multilayer perceptron analysis, business market approach, business administration.

**INTRODUCTION**

Being in a step with the times and not becoming obsolete has been and remains a very important element for any business. The matured businesses (with more than 15 years of activity) not necessarily give way to younger and more dynamic competitors. Grown businesses (from 6 to 15 years of activity) design their actions aiming to reach the matured businesses market shares. Meanwhile the very fresh businesses (start-up with less than 5 years of activity) are eager to compete in the market as their only way to survive. However, the panorama of entrepreneurship in Albania is complex as the age of the business, of the entrepreneurs, but also of their children is relatively young. A transfer through generations would, in fact, be a very long-term strategy. And such a strategy is again risky and thus, should be supported from dedicated plans.

Referring to the year 2022 INSTAT [1] data we observe that in the Region 3 (composed by Berat, Fier, Gjirokastrë, Korçë and Vlorë districts) the number of active enterprises is the highest (88,840) followed by Region 2 (composed by Elbasan and Tirana districts) with 80,174. And the last in the list according to the number of active enterprises is Region 1 (composed by Dibër, Durrës, Kukës, Lezhë, Shkodër districts) with 41,177.

The same ranking between regions is maintained referring to start-up businesses registered during the year 2022. Concretely in the Region 3 the highest number of start-up businesses registered is evidenced in Fier (7,086), Korçë (4,692), Berat (3,377) and Vlorë (2,258). In Region 2 the highest number of start-up businesses registered is evidenced in Tirana (capital of Albania) with 9,629 followed by Elbasan with 3,477. It can be evidenced the fact that Fier and Elbasan districts show the highest number of start-up businesses registered compared with previous year figures. Thus, the number of start-up businesses registered during 2022 in Fier district increased with 82.25% while in Elbasan district increased with 62%.

Under these circumstances should be admitted that in Albania, the impact of the pandemic and the ongoing economic crisis has imposed rapid changes in social and economic life and this process obliges businesses to stay new (or become even newer). Thus, it worth understand the way how businesses act according to their age to pave their way and further expand in the market.

The literature on the matter (Coad et al. [2]; Ling [3]; Yildiz et al. [4]; Leyva-De la Hiz and Bolívar-Ramos [5]; Rafiq [6]; Ismail and Jenatabadi [7]) opt for various factors (organizational: owner age, ownership origin; internal operation and financial: leverage, profitability, technological investment, green approaches; R&D expenditures, etc) related to firm age worldwide. But there isn't any evidence based on Albanian market.

Thus, this paper can help filling the gap in literature in different ways. In this study we use business organizational characteristics and financial indicators to understand their relation with firm age (start-up; grown and matured businesses). The study also considers the fact that, in some cases, the owners also act as business administrators or not. This study implements an artificial neural network model through the Multilayer Perceptron Analysis for the exploration of firm age determinant aspects. The last one, is a dynamic and complex analysis that allow us to better understand the businesses approaches (the financial and organizational one). To test the businesses age approaches we have used the Albanian businesses environment data.

### RELATED WORKS

The businesses age plays an important role in the empirical and theoretical literature related to their existence and further progress in the market. Mainly the literature only considers the distinction between start-up and matured businesses. In this research we will add also evidences from grown businesses in order to provide a holistic review on the matter.

Generally, the probability of survival for start-up businesses is low and increases with start-up size. Thus, the start-up likelihood of survival is lower if it starts with low equity scale (Mata and Portugal [8]; Audretsch and Mahmood [9]; Taymaz [10]). Further, the start-up businesses that survive maintain higher growth rates in order to close the gap between their start-up size and the size of matured businesses. And this implies that Gibrat's law does not hold for small start-up firms (Audretsch et al. [11]; Santarelli and Vivarelli [12]).

While their market performance is measured referring to the early stage existence (Littunen et al. [13]) and achievement of initial goals (Doris et al. [14]). The study of Pirolo & Presutti [15] instead considers in the start-up businesses performance their portfolio product extension and this impacts their annual revenues. Meanwhile the research of Ju et al. [16] suggests that start-up firm performance is achieved when it has stable orders and is appreciated by partners. In their organizational context the pecking order aims at substantially maintaining existing ownership structure to reduce problems associated with moral hazard (Hechavarría [17]; Coad et al. [2]; Ling [3]).

The extensive studies of Kohlbacher [18] and Zaheer et al. [19] empirically explore the relationship between matured businesses process orientation and their performance. Concretely, these studies argue that the matured business process orientation is estimated referring to ten dimensions: 1. process design and documentation, 2. management commitment, 3. process owner, 4. process performance measurement, 5. corporate culture, 6. information technology, 7. organizational structure, 8. people and expertise, 9. human resources systems, and 10. coordination and integration of process projects. Additionally, firm performance is measured by customer satisfaction, product quality, time to market, delivery time and delivery reliability (Kohlbacher et al. [20]; Leyva-De la Hiz and Bolívar-Ramos [5]; Rafiq [6]; Ismail and Jenatabadi [7]).

In the managerial context the study of Mitchell et al. [21], suggests that the entrepreneurial cognition has an important role to play in the development of matured businesses. Others evidences (Busenitz and Barney [22]; Stewart et al. [23]) demonstrate that cognitive perspectives may provide a means of differentiating of owners from administrators and may provide a useful basis for understanding the opportunity identification process (Corbett [24]; Gaglio and Katz [25]). In this light is also important to know that owners use specific information to make leaps in the development of business (Busenitz et al. [26]). Further, the study of Allinson et al. [27] indicated that the cognitive perspective has the potential to make an important contribution to the study of entrepreneurship and that cognitive style in particular could provide a basis for identifying those individuals who have the potential to become successful entrepreneurs.

The grown businesses performance management instead encompasses management information systems that are used to evaluate both individual and firm performance. The study of Yildiz, Hotamisli and Eleren [28] link their performance with the ability of planning, directing and controlling the business operations. Worth admitting also that until lately, organizations have been focused mainly on the use of financial measures as the basis of performance evaluation. However, some scholars criticised over reliance on the use of accounting criteria as a measure of performance (Otley [29]). The non-performance indices are difficult to quantify from financial point of view, however, they have gained considerable application in many fields of endeavours (Berrah, Mauris, and Venadat [30]; Georgescu, Budugan, and Cretu [31]). By this way, evidences suggest that ownership also is a key driver of firm performance (Boubakri et al. [32]; Fitza and Tihanyi [33]; Zou and Adams [34]). In this context the corporate governance literature provides rich explanations as to why ownership involvement or not in management matters (Jensen and Meckling [34]; Boubakri et al. [32]).

This paper test the businesses approaches according their age in Albanian market based on various business organizational characteristics as well as in their financial indicators through the implementation of Multilayer Perceptron Analysis. In this study we also consider the fact that, in some cases, the owners also act as business administrators or not.

### **MATERIALS AND METHODS**

An artificial neural network (ANN) model is implemented in this research in order to artificially simulate the physiological structure and functioning of human brain structures for analyzing businesses approaches according to their age.

One of the most popular ANNs is Multi-Layer Perceptron (MLP). For analysis purposes of businesses approaches by age the "customer patterns-processing elements" known as a perceptron consists of a single neuron with "n" inputs and three outputs (start-up businesses 1-5Y [0], grown businesses 6-15Y [1], and matured businesses >15Y [2]).

The training process of the perceptron analyses the configuration (pattern) input and weights patterns through synapses, deciding which category of output is associated with the configuration (Taud and Mas [35]).

**The Multilayer Perceptron Analysis**

The Multilayer Perceptron analysis (Zhao et al. [36]), feed-forward signals propagate from input (business organizational characteristics and financial indicators) to output (firms age approaches) feedback.

This learning algorithm calculates the appropriate syntactic weights between inputs and neurons of intermediate layers and between them and Multilayer perceptron analysis, through a series of attempts, sometimes prolonged. And further allows modelling the weights that link the input (customers' patterns) with output (firms age approach: start-up businesses [0], grown businesses [1], and matured businesses [2]) through the hidden layers of neurons. In order to provide the MLP analysis results in this research we used the statistical package SPSS 21.0 version.

**Dataset**

This research elaborates 79 business data out of 150 business data collected. The data pertain to a panel of businesses of various activities (production, services, construction and trade) operating in Albania during the 2022-2023 period.

For Multilayer Perceptron analysis training, these 79 businesses are also considered valid (refer to Table 1). In 15 cases, the businesses are in start-up phase; in 28 cases are in grown phase; and in the other 36 cases, they are in matured phase.

**Table 1.** Case Processing Summary

		N	Percent
Sample	Training	79	100.0%
Valid		79	100.0%
Excluded		71	
Total		150	

Source: Authors` estimation through SPSS

**Businesses Data Information**

The businesses data collected (see Table 2) are classified into Organizational characteristics (5 patterns) and Financial indicators (18 patterns).

The last ones refer to Liquidity (5), Operational Efficiency (4), Leverage (4), and Growth (5) patterns.

These data are provided from the National Registration Centre (NRC) and Credit Registry of Bank of Albania (CRBA) databases of the year 2023.

**Table 2.** Research Variables Summary

		<b>Variable</b>	<b>Measurement</b>	<b>Abbr.</b>	
<b>Financial patterns</b>	<b>Organizational patterns</b>	Administrator Gender	Administrator's gender (female-0, male-1 and mixed genders-2)	AG	
		Business Ownership	Business owner (administrator -0 or no administrator-1)	BO	
		Equity Origin	Business equity origin (national-0, foreign-1 and joint-venture-2)	EO	
		Ownership Gender	Ownership gender (female-0, male-1 and mixed gender ownership-2)	OG	
		Borrower Status	Borrower Status (non-performing + 30 due days-0 /performing 0-29 due days-1)	BS	
	<i>indicators Liquidity</i>	Current assets	Short term assets/Short term debts	CA	
		Inventory	End of year inventory	INV	
		Short term assets	Cash+ trade securities portfolio+ receivable accounts + inventory	STA	
		Working capital	Short term assets- Short term debts	WC	
		Short term debts	Payable accounts, short term loans	STD	
		<i>Op.Efficiency indicators</i>	Gross profit margin	Gross profit/Net sales	GPM
			Net profit margin	Net profit/Net sales	NPM
			Assets turnover	(Net profit + interest expenses)/Average equity	AT
			Return on equity	Net profit/Average equity	ROE
		<i>Leverage indicators</i>	Long term debt/equity ratio	Long term debt/equity ratio	LTDER
			Interest coverage ratio	Earnings before interest and taxes / Interest expenses	ICR
	Total Leverage ratio		Total debts/Total assets	LEV	
	Long term debts		End of year long term debts	LTD	
	<i>Growth indicators</i>	CV	Collateral value	CV	
		Business size	Ln(total assets)	BoS	
		Age of firm	Analysis period-Business registration period (start-up: 0-5Years/0; growth: (6-15Years/1;maturity:>15Years/2)	FA	
		Return on assets	Net profit/Average assets	ROA	
		Equity	Business equity	EQ	

Source: NRC and CRBA elaborated data

**Network Information**

We developed a multilayer perceptron network with 14 input layers patterns (14 customers' patterns factors) to explore the firms' behaviour according to their age (in start-up phase/0; in grown phase/1

and in matured phase/2) through the hyperbolic tangent activation function. The number of hidden layers is 1, the number of units in hidden layers is 20 and the number of estimated units is 818.

**RESULTS AND DISCUSSIONS**

The MLP analysis (see Table 3) proves that the incorrect predictions in response to firms age-dependent variable are 0%, the error function is too small (0.00%), and the training process has run too fast (00:00:00.593 seconds). The area under the curve for the firms' age (0, 1, and 2) is estimated to be 1. Thus, it can be confirmed that the MLP approach is the adequate one for exploring the approach maintained by firms in start-up phase [0], in grown phase [1], and those in matured phase [2].

**Table 3.** Model Summary

Training	Sum of Squares Error	.018
	Percent Incorrect Predictions	.0%
	Stopping Rule Used	Training error ratio criterion (.001) achieved
	Training Time	00:00:00.593

Dependent Variable: Firm age

Source: Authors' estimation through SPSS

This reconfirms that the MLP analysis (see Table 4 in Annex 1) used in firm age approach is an objective statistical method. In addition, the calculation of the syntactic weights for each pattern/variable used in MLP needed for the hidden layer estimation (from 1-20), is obtained for the output estimation purposes [firms in start-up phase [0], grown phase [1], and in matured phase [2]]. This provides a concrete estimation for each firm's approach according to the age.

**Table 4.** Firm age parameters estimates

	Firm age		
	Start-up (0)	Grown (1)	Matured (2)
Bias	0.272	0.752	0.857
H (1;1)	0.064	0.024	-0.089
H (1;2)	-0.045	0.238	-0.222
H (1;3)	0.316	0.116	-0.372
H (1;4)	-0.116	-0.211	0.029
H (1;5)	0.019	0.370	-0.329
H (1;6)	0.161	0.018	0.067
H (1;7)	0.079	-0.070	0.155
H (1;8)	0.038	0.116	0.115
H (1;9)	0.107	-0.027	0.015
H (1;10)	0.324	-0.484	-0.115
H (1;11)	0.083	0.267	-0.552
H (1;12)	-0.107	-0.024	-0.204
H (1;13)	0.050	0.622	-0.765
H (1;14)	0.223	-0.356	0.110
H (1;15)	-0.067	-0.452	0.684
H (1;16)	-0.079	-0.118	0.253
H (1;17)	0.078	0.247	-0.243
H (1;18)	-0.120	0.143	-0.060
H (1;19)	-0.154	-0.354	0.577
H (1;20)	-0.362	0.518	0.084

Source: Authors` estimation through SPSS

**CONCLUSIONS**

The MLP analysis results confirm that the essential variables with the normalized importance estimation at a 95% confidence level, in the businesses approaches according to their age are: short term assets (100%), net profit margin (97.9%), short-term debts (97.3%), return on equity (95.8 %) as well as equity (95.7%). According to MLP approach parameters estimation, the businesses in start-up phase [0] are listed first, referring to the highest number of variables through those considered (13/21) that positively impact the business approach, followed by those in grown phase [1] (12/21) and in matured phase [2] (11/21). Thus, it is confirmed that businesses in start-up phase [0] face liquidity and equity constrains and are mainly managed by their owners. Meanwhile, businesses in grown phase [1] are specially oriented to a limited number of factors that influence their business approach. Concretely, they invest in assets and inventories. In the organizational context instead the administrators are in charge for managing these businesses activities. The matured businesses instead opt for high values of return of equity and net profit margins. They are managed by both administrators and business owners. In close reference to MLP lift chart results, it can be reported that businesses in start-up phase [0] are the most strategic ones with 0.98, followed by the grown phase businesses [1] with 0.24, and finally, those in matured phase [0] with 0.2.

In this context worth recommending to financial institutions and finance ministry to respectively support start-up businesses with short-term loan facilities and grants. Obviously these can help them to overcome the market challenges in addition to the implemented internal financial policies. While referring to grown businesses preferences specific loan products should be provided when financing inventories and assets. Meanwhile referring to matured businesses financial institutions should provide more consultancies to better orient them toward a sustainable future while line ministries should support them with dedicated trainings.

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**TÜRKİYE’DE YAŞAYAN KADINLARIN EVLİLİK ÖNCESİ CİNSEL İLİŞKİ  
TUTUMLARININ CİNSEL İŞLEV BOZUKLARIYLA İLİŞKİSİNİN ARAŞTIRILMASI**

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## **1.GİRİŞ**

Cinsellik, iki uyumlu insanın birlikteliğini içeren ve değerleri, sosyal kuralları, kalıp yargıları içeren psikolojik, sosyolojik ve biyolojik yönleri olan cinsel doyumunu yaşadığı özel bir yaşantı olarak tanımlanabilmektedir (Gülsün, Ak, Bozkurt, 2009). Cinselliğin, var olmak adına ve varlığını devam ettirmek adına içgüdüsel üreme faaliyetlerinin gerçekleşmesi anlamıyla tüm canlılarda ortak olduğuna işaret edilmektedir. Bununla birlikte, insanlar için diğer tüm canlılardan ayrı bir biçimde söz konusu eylemin içinde yaşanan toplumun kurallarına uygun olarak yapılması gerekliliği bulunmaktadır. Ayrıca insan söz konusu olduğunda cinsellik çoğalmak amacıyla gerçekleştirilen bir eylem olabildiği gibi haz amaçlı bir eylem olarak da varlığını sürdürmektedir (Veysal, 2010).

Cinsel davranış, her toplumun kültüründe var olan siyasi, kültürel, sosyo-ekonomik ve dini şartlara/normlara göre şekillenmektedir. Bütün bu faktörlerin, cinsellikle ilgili olan arzuların ve yaşantıların belirmesinde de rol oynadığı ileri sürülmektedir (İlkkaracan, 2015). Ancak, bireyin cinselliğini sadece toplumun belirlediği kurallar şekillendirmediği, aynı zamanda kişinin özgüveni, ilişkileri, hayat şartlarının da cinsel davranışını şekillendirdiği ifade edilmektedir (Eşel, 2006). Birçok ülkede olduğu gibi cinselliğin Türk toplumunda da Cinsel isteğin duyulması, evlilik öncesi cinsel ilişkide bulunulması günah olarak ifade edilebilmektedir. Konuşulması dahi konuşulması zor ve ayıp konular arasında kabul edildiği bildirilmektedir. (Ziya, 2015). Türkiye’de kadının cinselliği konusunu konuşmak oldukça zordur. Tartışmaya kapalı bir tabudur. Kadının cinselliği konusunda en çok tartışılan konu da bekarettir (Komut, 2011). Sakallı, Karakurt, Uğurlu’ya (2001) göre, Türkiye’de kadın cinselliği, evlilik çatısı altına yaşanmalıdır düşüncesi toplum tarafından kabul görmektedir. Bu düşünce, toplumsal kuralların ve ilkelerinin daha çok kadınlar üzerinde uygulandığı göstermektedir. (Sakallı, Karakurt, Uğurlu, 2001). Türk toplumuna bakıldığında kadın ve erkeklerden beklentilerin farklılaştığı gözlenmektedir. Erkekler cinsel davranış açısından daha özgürdür. Erkeklerde cinsellik açısından aktif olmaları beklenirken kadınların evleninceye kadar bakire kalması beklenmektedir. Bu sebeplerden ötürü, evlilik için bekareti olan kadın bekareti olmayan kadınlara oranla daha uygun görünmektedir (Yeni Yüzyıl’dan aktaran Sakallı ve ark.,2001). Cinselliğin, konuşulması zor ve utanılabilir konuların başında gelmesinin (İncesu, 2006), gençlerin cinsellik ve cinsel sağlık ile ilgili bilgi edinme yollarının önünü kestiği ifade edilmektedir (Aygin, Açıl, Yaman, Yılmaz, 2017).

Cinsellikle ilgili mitler, yaşanan toplumda yaygın görülen, abartılı olan, bilimsel hiçbir bilgi ile tutarlılığı olmayan, cinsellik yaşantısını sınırlandıran, doğru olmayan kalıpyargılardır. Bu mitler toplumdan topluma farklılık göstereceği gibi kişiden kişiye göre de oldukça farklılık gösterebilmektedir. Cinsel mitler, cinsel eğitimin ve cinsellikle ilgili bilginin zayıflığından kaynaklanmaktadır. Bu mitler, kişilerin gerçekçi olmayan beklentiler içine girmelerine sebep olurken kişiler gerçekleştiremeyen beklentiler karşısında kaygı duymakta ve sonuç itibarıyla cinsel işlev bozuklukları oluşumuna katkı koyan faktörler arasında yer alabilmektedir (Aygin, Açıl, Yaman, Yılmaz, 2017).

Cinsellikte olduğu gibi cinsel işlev bozuklukları da konuşulmasında zorluklar yaşanan, kişilerin çekince yaşadığı konulardan bir tanesidir. Yapılan bir çalışmada kadınların %43 erkeklerin %31’i cinsel işlev bozuklukları yaşadığını bildirmektedir (Güvel, 2002).

Kadınlarda yaşanan cinsel işlev bozukluklarına bakıldığında (Koroğlu, 2016)

1.1. Kadında Cinsel İlgil/Uyarılma Bozukluğu: Kadınların, cinsel bir etkinlik karşısından ilgisiz ya da çok ilgi göstermesiyle karakterizedir. Cinsel içerikli fantezilerin ya da düşüncelerin olmaması ya da çok az olması, partnerinin cinsel girişimlerine karşı karşılık verilmemesi, cinsel hoşlanmanın ya da coşkulanmanın olmaması ya da çok az olması, içten veya dıştan gelen cinsel simgelere karşı cinsel uyarılmanın ya da cinsel isteğin olmaması ya da çok az olması, cinsel eylem sırasında cinsel organlarda herhangi bir uyarılmanın olmaması şeklinde kendini gösterebilmektedir.

1.2. Cinsel Organlarda- Pelviste Ağrı/İçe Girme Bozukluğu: Cinsel birliktelik sırasında penisin vajinaya girmesinde zorluk çekme, penisin vajinaya girme girişimlerinde vajina, vulva ve pelviste ağrılar hissetme, penisin vajinaya girmesiyle ilgili korku ve kaygı duyma, penisin vajinaya girme sırasında pelvis kaslarının çok gerilmesi ile karakterize olan bir durumdur.

1.3. Kadında Orgazm Bozukluğu: Yaşanılan cinsel birlikteliklerin %75-100'ü arasında kadında orgazmın gecikmesi, seyrekliği ya da yokluğu veyahut orgazm çok düşük yoğunlukta hissedilmesi ile karakterize bir durumdur. "Anorgazmi" olarak da adlandırılmaktadır

Evlilik öncesi cinsel ilişkiyle ilgili tutumları araştıran bir çalışmada, ebelik öğrencileri "evlilik dışı ilişki bizim ahlaki ve kültürel değerlerimize zarar verir" önermesine %91,86'sı katılmıştır (Aydoğdu, Uzun, Öztürk, 2019). Ebelik bölümü öğrencileri ile yürütülen başka bir evlilik öncesi cinsel ilişkiyle ilgili tutum araştırmasında, katılımcıların %85,1'i evlilik öncesi cinsel deneyim yaşanmasını doğru bulmadığı, %57,5 i evlilik öncesi cinsel deneyimi normal olarak bulmadığı, %89,2'sinin ise bekarate önem verdiği bulunmuştur. Aynı çalışmada, katılımcıların %66,9'u erkeklerin evlilik öncesi ilk cinsel deneyimlerini yaşamalarını uygun bulmamakla beraber %81,2'si kadınların ilk cinsel deneyiminin evlilik öncesi yaşamalarını uygun bulmamaktadır (Evcili, Cesur, Altun, Güçtaş, Sümer, 2013). Evlilik öncesi cinsel ilişki tutumlarıyla ilgili yapılan başka bir araştırma da sağlık yüksekokulu öğrencileriyle yürütülmüştür. Katılımcıların %69,2'si bir kadının evlendiğinde bakire olması gerektiğini belirtmiştir. Aynı çalışmada katılımcıların %63,6'sı evlilik dışı cinsel ilişkilerin ahlaki ve kültürel değerleri tahrip ettiğini belirtirken, %66,9'u evlenmeden önce yaşanan cinsel ilişkinin yanlış olduğunu belirtmiştir (Tokuç, Berberoğlu, Saraçoğlu, Çelikkalp, 2011).

Literatürde evlilik dışı cinsel yaklaşıma olan tutumların cinsel işlev bozukluklarıyla ilişkisini ortaya koyan çok fazla çalışma bulunmamaktadır. Cinsel mitlerin bile cinsel işlev bozukluklarıyla ilişkisi olduğu ortaya konulmuştur. Ağrı bozukluğu tanısı almış katılımcıların cinsel anatomi ile ilgili inanışları cinsel işlev bozukluğu ile ilişkili olduğu tespit edilmiştir (Kocagöz, 2008). Bazı kaynaklar, cinsel işlev bozuklukların evrensel olduğunu savunmuş olsalar da son yıllarda yapılan çalışmalar cinsel sorunların, tek bir nedenini olmadığını göstermektedir. Ayrıca yapılan araştırmalar, cinsel sorunların kültürel etmenlerden de (Dini inanışlar, tutumlar, normlar) etkilendiğini göstermektedir (De Silva, Rodrigo, 1995). Yapılan bir çalışmada, katılımcıların cinsel işlev bozukluklarıyla sosyokültürel etmenleri karşılaştırılmıştır. Katılımcıların %86,2'si aile içerisinde cinsel konuların konuşulmadığını ifade etmiştir. Aynı çalışmada kadınların masturbasyon hakkındaki ve evlilik dışı cinsel ilişkilere olan tutumları sorgulanmıştır. Masturbasyonu olağan karşılayanlarla günah, ayıp olarak görenler arasında cinsel işlev bozukluğu açısından anlamlı bir ilişki bulunmamıştır. Aynı şekilde, evlilik öncesi cinsel birlikteliği olağan karşılayan ve karşılamayan katılımcıların cinsel işlev bozukluğu ile anlamlı bir ilişki tespit edilememiştir (Mert, Özen, 2011). 2004 senesinde 179 kadın katılımcının katılımıyla gerçekleştirilen bir çalışmada, %46,9'unda cinsel işlev bozukluğu olduğu tespit edildi. Katılımcıların %60,3'ünde istek cinsel işlev bozukluğu, %43'ünde uyarılma cinsel işlev bozukluğu, %38'inde ise lubrikasyon cinsel işlev bozukluğu, %45,8'inde orgazm cinsel işlev bozukluğu, %38'inde doyum cinsel işlev bozukluğu, %36,8'inde de ağrı cinsel işlev bozukluğu görülmüştür. %46,9'unda da kadın cinsel indeks ölçeğinden aldıkları toplam puan üzerinden cinsel işlev bozukluğu görüldüğü tespit edilmiştir (Çayan, Akbay, Bozlu, Canpolat, Acar, Ulusoy, 2004).

Araştırmada evlilik öncesi cinselliğe olan tutumların cinsel işlev bozukluklarıyla ilişkisini ortaya koymayı amaçlanmıştır. Evlilik öncesi cinsel ilişki tutumunun cinsel işlev bozukluğu üzerindeki etkisi hakkında yapılan araştırmaların sınırlı olduğu gerçeği, genellikle cinsel mitlerin ve cinsel tutumların cinsel işlev bozuklukları üzerine odaklandığı literatürden anlaşılmaktadır. Örneğin, Soydaş'ın (2016) yüksek lisans tezinde, katılımcıların cinsel tutumları ve evlilik uyumu ile cinsel işlev bozuklukları arasındaki ilişki incelenmiş, bu bağlamda katılımcıların farklı cinsel tutumlarının evlilik uyumu ve

cinsel işlev bozukluklarına etkisi değerlendirilmiştir. Şahbaz'ın (2017) tezinde ise cinsel mitlerin cinsel işlev bozukluğu üzerindeki etkisi araştırılmıştır; bu çalışmada cinsel mitlerin cinsel işlev bozukluğu ile ilişkisi üzerine kapsamlı bir değerlendirme yapılmıştır.

Benzer şekilde, Rui Yan ve diğerleri (2023) meme kanseri hastaları üzerinde yapılan çalışmada, meme kanseri ve cinsel aktiviteyle ilgili yaygın inançların cinsel işlev bozuklukları üzerindeki etkisi incelenmiştir. Türkçe literatürde de evlilik öncesi cinsel ilişkiye yönelik tutumlar üzerine yapılan araştırmalar bulunmaktadır. Örneğin, Sakallı ve arkadaşlarının (2012) çalışmasında, evlilik öncesi cinsel ilişkiye ve kadınların bu konudaki tutumlarına odaklanılmıştır. Kızılırmak ve Çakıcı'nın (2021) çalışmasında ise hemşirelik öğrencilerinin evlilik öncesi cinselliğe karşı tutumları ile kadına yönelik namus anlayışları arasındaki ilişki incelenmiştir.

Ancak, literatürde evlilik öncesi cinsel birlikteliğe olan tutumun cinsel işlev bozukluğu üzerine etkisi hakkında ya da bu değişkenlerin birbiriyle ilişkisi hakkında çok az sayıda araştırma bulunmaktadır. Bu eksiklik, evlilik öncesi cinsel birlikteliğe yönelik tutumların cinsel işlev bozuklukları üzerindeki etkisini daha derinlemesine anlamak için daha fazla araştırmanın yapılması gerektiğini göstermektedir.

Evlilik öncesi cinsel birlikteliklere yönelik tutumların, cinsel işlev bozuklukları üzerindeki etkisi üzerine yapılan araştırmaların sınırlı olması, bu alandaki bilgi eksikliğine dikkat çekmektedir. Bu durum, hem teorik hem de klinik açıdan önemlidir çünkü cinsel sağlık ve uyum, çiftler arasındaki sağlıklı bir ilişkinin temel taşlarından biridir. Evlilik öncesi cinsel birlikteliklere yönelik tutumlar, bireylerin cinsel ilişkiye ve cinselliğe bakış açılarını belirleyebilmesiyle ve bu da sonraki ilişkilerinde ve evliliklerinde nasıl davranacaklarını etkileyebilmesiyle önemlidir.

Bu konuda yapılan araştırmaların klinik açıdan önemi, cinsel danışmanlık ve terapi süreçlerinde daha etkili müdahalelerin geliştirilmesine yardımcı olabilecek yeni bakış açıları sunmasıdır. Örneğin, evlilik öncesi cinsel birlikteliklere karşı olumsuz bir tutumun, sonraki ilişkilerde veya evliliklerde ortaya çıkabilecek cinsel işlev bozuklukları riskini artırabileceği öne sürülebilir. Bu nedenle, klinik uygulamalarda bu konunun ele alınması, bireylerin cinsel sağlığına yönelik daha etkili müdahalelerin ve tedavilerin geliştirilmesine yardımcı olabilir. Konuya dair bilişlerin çalışılması müdahalelerin etkisini artırabilir.

Ayrıca, teorik açıdan bu konunun önemi, cinselliğin sosyal ve kültürel bağlamlarını anlamak ve cinsellikle ilgili olumsuz inançları sorgulamak için daha derinlemesine bir bakış açısı sunması olasılığıdır. Evlilik öncesi cinsel birlikteliklere yönelik tutumlar, toplumun cinsellikle ilgili normları ve değerlerini yansıtabilir ve bu da cinsel sağlık politikalarının ve eğitim programlarının şekillendirilmesinde önemli bir rol oynayabilir, doğru bilişler ve tutumlar oluşturmanın öneminde farkındalık yaratabilir. Bu nedenle, evlilik öncesi cinsel birlikteliklere yönelik tutumların cinsel işlev bozuklukları üzerindeki etkisi hakkında daha fazla araştırma yapılması ve bu konunun hem teorik hem de klinik açıdan daha fazla önemsenmesi gerekmektedir. Bu şekilde elde edilecek bilgiler, cinsel sağlık alanında daha iyi bir anlayış ve daha etkili müdahale stratejilerinin geliştirilmesine katkıda bulunabilir.

Bu araştırmanın odak noktası, bireylerin evlilik öncesi cinsel birlikteliğe yönelik tutumlarının cinsel işlev bozuklukları ile ilişkisini anlamaktır. Bulguların bu konuda teorik ve klinik anlamda faydalar sağlayacağı düşünülmektedir. Bu bağlamda, evlilik öncesi cinsel birliktelikle ilgili olumlu veya olumsuz tutumların, bireylerin cinsel işlevlerini nasıl etkilediğini daha iyi anlamak, cinsel sağlık uzmanlarına, danışmanlara ve psikoterapistlere bu konuda daha etkili müdahaleler geliştirme konusunda yol gösterebilir. Ayrıca, bu araştırma, evlilik öncesi cinsel birlikteliğe yönelik tutumların toplumsal ve kültürel bağlamlarda nasıl şekillendiğini anlamak ve cinsel sağlık politikalarını şekillendirmek için önemli bir teorik çerçeveyi sunmayı amaçlamaktadır. Bu şekilde hem teorik bilgiye hem de klinik uygulamalara yeni bir bakış açısı getirerek, cinsel sağlık alanında daha etkili ve bilgiye dayalı stratejilerin geliştirilmesine katkıda bulunmayı hedeflemektedir.

## 2.YÖNTEM/GEREÇ

### 2.1. Araştırmanın Modeli, Evreni, Örnekleme Yöntemi ve Örnekleme

Bu çalışmanın modeli ilişkisel tarama modelidir. Araştırma, yalnızca kadınlar üzerinde gerçekleştirilmiş ve Google Form aracılığıyla ulaşılmıştır. Evreni Türkiye’de yaşamakta olan kadınlardır. Örneklem, Türkiye'nin farklı bölgelerinden ve çeşitli yaş gruplarından kadınları kapsamaktadır. Örnekleme ulaşma yöntemi olarak “amaca uygun örnekleme” yöntemi kullanılmıştır. Belirlenmiş olan kriter çalışmanın amacına uygun olarak katılımcının yetişkin ve kadın olması şeklindedir.

Araştırma katılımcıları, farklı yaş gruplarından 116 kişiden oluşmaktadır: %62,1'i 18-25 yaş aralığında, %32,8'i 26-35 yaş aralığında, %3,4'ü 36-45 yaş aralığında ve %1,7'si 45 yaşın üstündedir. Örneklemdeki katılımcıların medeni durumu da çeşitlidir: %11,9'u evli, %37,9'u bekar ve ilişkisi olan, %50,9'u ise ilişkisi olmayan bireylerden oluşmaktadır.

Google Form aracılığıyla ulaşma yöntemi, katılımcılara daha kolay ulaşım sağlamak ve konuyla ilgili gizlilik ve mahremiyetlerini korumak amacıyla tercih edilmiştir. Artan teknoloji ve internet erişimi sayesinde, katılımcılar araştırma sürecinde daha rahat ve gizli hissedebilmişlerdir. Bu yöntem, katılımcıların araştırmaya katılımını artırarak sonuçların daha güvenilir olmasını sağlamıştır.

### 2.2. Veri Toplama Araçları

#### 2.2.1. Evlilik Öncesi Cinselliğe Bakış Ölçeği

2000 yılında Karakurt tarafından yüksek lisans dersi kapsamında evlilik önce cinsel ilişkiye karşı tutumları ölçmek amacıyla geliştirilmiştir. Likert tipi bir ölçek olup maddeler 1-5 arasında derecelendirilmiştir. 1 puan olumsuz tutumu gösterirken 3 puan kararsızlığı, 5 puan ise olumlu tutumu göstermektedir. Toplam 12 soru bulunmaktadır ve 6'sında ters puanlandırma söz konusudur. Ters puanlandırma soruları sırasıyla 1, 2, 5, 8, 9, 12. Geçerliliği göstermek adına faktör analizi yapılmıştır ve ifadeler tek bir faktörün ortaya çıktığını göstermiştir. Bu faktör için öz değer (eigenvalue) 8.71'dir. Bu faktör verilerin toplam %67'sini açıklamaktadır. İç güvenilirliği açısından Cronbach Alfa değerine bakılmış olup .95 olarak bulunmuştur (Sakallı ve Karakurt, 2001).

#### 2.2.2. Kadın Cinsel İşlev İndeksi

Rosen ve arkadaşları 2000 senesinde kadınların cinsel fonksiyonlarını değerlendirmek amacıyla sözü edilen ölçeği geliştirmişlerdir. Likert tipi bir ölçek olup toplam 19 sorudan oluşmaktadır. Toplam 6 alt boyuttan oluşmaktadır. İstek, uyarılma, lubrikasyon, orgazm, doyum ve ağrı alt boyutlarıdır. Her alt boyutun bir katsayısı vardır. İstek alt boyutunun katsayısı 0.6, uyarılma alt boyutunun 0,3, lubrikasyon alt boyutunun 0,3, orgazm alt boyutunun 0,4, doyum alt boyutunun 0,4 ve ağrı alt boyutunun katsayısı da 0,4'dür. Alt boyut soruları ise şöyledir; istek alt boyutu 1. ve 2. Soru, uyarılma alt boyutu 3, 4, 5, ve 6. sorular, lubrikasyon alt boyutu 7, 8, 9, 10. sorular, orgazm alt boyutu 11, 12, 13. sorular, doyum alt boyutu 14, 15 ve 16. sorular, ağrı alt boyutu 17, 18 ve 19. sorular. Alt boyut indekslerine, alt boyutu ölçen soruların toplam puanlarının katsayısıyla çarpımı sonucu elde edilir. Ölçekten alınabilecek en yüksek puan 36.0 iken en düşük puan 2.0'dır. Çayan ve arkadaşları 2004 senesinin kadın cinsel işlev bozukluklarının görülme sıklığını araştırmak için kadın cinsel işlev indeksi kullanılmıştır. Bu araştırmacılar her alt boyutların toplam puanları için ve ölçekten elde edilen toplam puan için kesme puan değerlerini hesaplamışlardır. Eğer toplam puan 22.7'den büyük ise normal cinsel işlevi göstermektedir. Eğer toplam puan 22.7 ya da 22.7'den düşük ise cinsel işlev bozukluğunun varlığını göstermektedir. Uyarılma puanı 3.9 ve aşağıda ise , istek puanı, kayganlaşma puanı, orgazm puanı ve doyum puanı 3.6 ve altında ise ağrı puanı 4.4 ve altı ise alt boyutlara ilişkin cinsel işlev bozukluğu olduğunu kabul etmişlerdir. Bu değerler kullanılarak olası cinsel işlev bozukluğu tanısı alanlarla almayanlar olarak katılımcıların kesme puanına göre bir kategorileştirme yapılmıştır.

Ölçeğin orijinal geçerlik ve güvenilirlik çalışmaları sonucunda, cronbach alfa değer .82 olarak bulunmuştur. Test tekrar test güvenilirlik çalışması sonucu ise korelasyon katsayısı 0.79-0.82 arasında

bulunmuştur. Yapı geçerliliği ise anlamlı olduğu ( $p<0.001$ ) tespit edilmiştir. Türkiye’de geçerlik ve güvenilirlik çalışmaları ise Aygin ve Aslan tarafından doktora tezi kapsamında gerçekleştirilmiştir. Çalışmalar sonucunda iç tutarlılık değerleri 0.70 ile 0.90 arasında belirlenmiştir. Aynı zamanda cronbach alfa değeri 0.98 olarak bulunmuştur. Bir ay ara ile test tekrar test uygulaması yapılmış ve güvenilirlik katsayısının 0.75 olduğu bulunmuştur. Çalışmalar sonucunda kadın cinsel işlev indeksi Türk kadınlara uygulanabilir olduğu bulunmuştur (Aygin ve Aslan, 2005).

### 2.3. Veri Analizi

Verilerin analizi için SPSS 22.0 version programı kullanılmıştır. Veriler normallik dağılımı göstermek amacıyla çarpıklık ve basıklık değerleri hesaplanmıştır. Skewness ve kurtosis değerleri +2 ile -2 değerler arasında ise verilerin normal dağılım gösterildiği söylenebilir (George ve Mallery, 2010). Yapılan analiz sonucunda, araştırmada kullandığımız verilerin +2 ile -2 arasında gösterdiği için verilerin parametrik analizinin uygun olduğu varsayılmaktadır. Ölçeklerden elde edilen puanların ilişkilerini ortaya koymak adına pearson korelasyon, kesme noktasına göre cinsel işlev bozukluğu olanlarla olmayanların evlilik öncesi cinsel ilişki tutumları arasındaki ilişkiyi tespit etmek amacıyla da T-test analizi ve ayrıca yordayıcı bağlantılar için regresyon kullanılmıştır.

### 3.BULGULAR

Çayan ve arkadaşlarının çalışmasında (2004) referans alınan kesme puanlarına bakılarak cinsel işlev bozukluğu olanlar ve olmayanların oranları tespit edilmiştir.

**Tablo 1. Cinsel İşlev Bozukluğu Olan ve Olmayan Katılımcıların Frekans Tablosu**

	Cinsel İşlev Bozukluğu Olan	Cinsel İşlev Bozukluğu Olmayan
	%	%
İstek	58.6	41.4
Uyarılma	48.3	51.7
Lubrikasyon	31.0	69.0
Orgazm	44.0	56.0
Doyum	38.8	61.2
Ağrı	52.6	47.4
Toplam	38.8	61.2

Katılımcıların kadın cinsel işlev indeksinden aldığı toplam puan üzerinden kesme puanlar değerlendirildiğinde %38,8’i cinsel işlev bozukluğu tanısı alabilir. Alt boyutlardan elde ettikleri puanlar üzerinden kesme puanlar değerlendirildiğinde ise istek açısından cinsel işlev bozukluğu olan, katılımcıların %58,6’sını oluştururken uyarılma açısından cinsel işlev bozukluğu olan %48,3, lubrikasyon açısından cinsel işlev bozukluğu olanlar katılımcıların %31’ni, orgazm açısından cinsel işlev bozukluğu olanlar %44’ünü, doyum açısından cinsel işlev bozukluğu olanlar %38,8’ini, ağrı açısından cinsel işlev bozukluğu olanlar %38,8’sini oluşturmaktadır.

Katılımcıların kesme puanlarından elde ettikleri sonuçlara göre gruplandırma yapıp gruplar arası evlilik öncesi cinsellik tutumları arasındaki ilişkiye bakılmıştır.

**Tablo 2. Cinsel İşlev Bozukluğu Olanlar ve Olmayanların Evlilik Önce Cinsel İlişki Puanlarının T-Test Analizi**

Grup	N	Ort. (ss)	t	sd	p
İstek Cinsel İşlev Bozukluğu Olan	68	51,02 (10,25)	-1,89	113,9	0,60
İstek Cinsel İşlev Bozukluğu Olmayan	48	54,14 (7,42)			
Uyarılma Cinsel İşlev Bozukluğu Olan	56	48,83 (10,69)	-4,09	87,34	,00***
Uyarılma Cinsel İşlev Bozukluğu Olmayan	60	55,56 (6,24)			
Lubrikasyon Cinsel İşlev Bozukluğu Olan	36	47,97 (11,64)	-2,99	47,67	,004**
Lubrikasyon Cinsel İşlev Bozukluğu Olmayan	80	54,27 (7,26)			
Orgazm Cinsel İşlev Bozukluğu Olan	51	49,90 (11,27)	-2,40	78,13	,019*
Orgazm Cinsel İşlev Bozukluğu Olmayan	65	54,21 (6,86)			
Doyum Cinsel İşlev Bozukluğu Olan	45	48,88 (10,87)	-3,03	69,82	,003**
Doyum Cinsel İşlev Bozukluğu Olmayan	71	54,49 (7,40)			
Ağrı Cinsel İşlev Bozukluğu Olan	61	50,39 (9,81)	-2,42	113,3	,017*
Ağrı Cinsel İşlev Bozukluğu Olmayan	55	54,45 (8,21)			
Cinsel İşlev Bozukluğu Olan	45	48,62 (11,38)	-3,21	63,81	,002**
Cinsel İşlev Bozukluğu Olmayan	71	54,66 (6,75)			

\*p<,05, \*\*p<,01, \*\*\*p<,001

Yapılan T- test analizi sonucunda, uyarılma alt boyutunun kesme puanına göre cinsel işlev bozukluğu olan ve olmayanların evlilik öncesi cinsellik tutum ölçeğinden aldıkları puanlar arasında anlamlı bir farklılık bulunmuştur ( $t(87,34) = -4,09, p=0.00$ ). Uyarılma cinsel işlev bozukluğu olanlar ( $\bar{x}=48,83$ ) uyarılma cinsel işlev bozukluğu olmayanlara ( $\bar{x}= 55,56$ ) göre evlilik öncesi cinselliğe daha fazla olumsuz tutum sergilemektedir. Katılımcıların evlilik öncesi cinselliğe tutumları lubrikasyon cinsel işlev bozukluğunun olması ya da olmamasına göre anlamlı bir farklılık göstermektedir ( $t(47,67) = -2,99, p= 0,004$ ). Lubrikasyon cinsel işlev bozukluğu olanların ( $\bar{x} =47,97$ ) evlilik öncesi cinselliğe tutumlarının lubrikasyon cinsel işlev bozukluğu olmayanlara ( $\bar{x} = 54,27$ ) göre daha olumsuzdur. Katılımcılar arasında orgazm cinsel işlev bozukluğu olanlarla olmayanların evlilik öncesi cinselliğe tutumları arasında anlamlı bir farklılık bulunmuştur ( $t(78,13) =-2,40, p=0,019$ ). Orgazm cinsel işlev bozukluğu olmayanların ( $\bar{x}= 54,21$ ) orgazm cinsel işlev bozukluğu olanlara ( $\bar{x}= 49,90$ ) göre evlilik öncesi cinselliğe tutumları daha olumludur. Katılımcılar arasında doyum cinsel işlev bozukluğu olanlarla olmayanların evlilik öncesi cinselliğe tutumları arasında anlamlı bir farklılık tespit edilmiştir ( $t(69,87)= -3,03, p=0,003$ ). Doyum açısından cinsel işlev bozukluğu olmayanların ( $\bar{x} =54,49$ ) doyum açısından cinsel işlev bozukluğu olanlara ( $\bar{x} =48,88$ ) göre evlilik öncesi cinselliğe olumlu tutum sergiledikleri bulunmuştur. Katılımcılar arasında ağrı açısından cinsel işlev bozukluğu olanlarla olmayanlar arasında evlilik öncesi cinselliğe tutumları açısından anlamlı bir farklılık bulunmuştur ( $t(113,3)= -2,42, p=0,017$ ). Ağrı açısından cinsel işlev bozukluğu olanların ( $\bar{x}=50,39$ ) ağrı açısından cinsel işlev bozukluğu olmayanlara ( $\bar{x} =54,45$ ) oranla evlilik öncesi cinselliğe tutumları daha olumsuzdur. Kadın cinsel işlev indeksinin toplam puan üzerinden kesme puanı ele alındığında, cinsel

işlev bozukluğu olanlarla cinsel işlev bozukluğu olmayanların evlilik öncesi cinsellik tutumları arasında anlamlı bir farklılık bulunmuştur ( $t(63,81) = -3,21, p=0,002$ ). Cinsel işlev bozukluğu olmayanlar ( $\bar{x}=54,66$ ) cinsel işlev bozukluğu olanlara ( $\bar{x} =48,62$ ) göre evlilik öncesi cinselliğe tutumları daha olumludur. İstek açısından cinsel işlev bozukluğu olanlarla olmayanların evlilik öncesi cinselliğe tutumları açısından anlamlı bir farklılık bulunmamıştır ( $t(113,9) = -1,89, p=0,060$ ).

**Tablo 3.Cinsel İşlev Puanları ile Evlilik Öncesi Cinsellik Tutumları Korelasyonları**

Değişken	N	r	p
EÖCT İCİİ	116	,287	,002**
EÖCT UCİİ	116	,305	,001***
EÖCT LCİİ	116	,242	,009**
EÖCT DCİİ	116	,254	,006**
EÖCT OCİİ	116	,280	,002**
EÖCT ACİİ	116	,235	,011*
EÖCT TCİİ	116	,299	,001***

\* $p<,05$ , \*\* $p<,01$ , \*\*\* $p<,001$  (Kısaltmalar: ACİİ: Ağrı Cinsel İşlev İndeksi, DCİİ: Doğum Cinsel İşlev İndeksi, EÖCT: Evlilik Öncesi Cinsellik Tutum, İCİİ: İstek Cinsel İşlev İndeksi, LCİİ: Lubrikasyon Cinsel İşlev İndeksi, OCİİ: Orgazm Cinsel İşlev İndeksi, TCİİ: Toplam Cinsel İşlev İndeksi, UCİİ: Uyarılma Cinsel İşlev İndeksi)

Yapılan korelasyon analizi sonucunda, evlilik öncesi cinselliğe tutumlar, cinsel işlev bozukluklarıyla pozitif düşük düzeyde anlamlı bir ilişki saptanmıştır ( $r=0,299, p=0,001$ ). Bu bulgu, evlilik öncesi cinsellik tutumlarından alınan puanlar arttıkça kadın cinsel işlev indeksi puanının da arttığını göstermektedir. Kadın cinsel işlev ölçeğinden alınan puanlar normal cinsel işlevi gösterir. Yani, evlilik öncesi cinselliğe olumlu tutum arttıkça normal cinsel işlev de artar. Aynı zamanda evlilik öncesi cinselliğe tutumla ölçek alt boyutları arasında da pearson korelasyon analizi yapılmıştır. Evlilik öncesi cinselliğe tutumla istek açıdan cinsel işlev bozukluğu arasında pozitif yönde düşük düzeyde anlamlı bir ilişki ( $r= 0,287, p=002$ ), uyarılma cinsel işlev bozukluğu arasında pozitif yönde orta düzeyde anlamlı bir ilişki ( $r=0,305, p= 0,001$ ), lubrikasyon cinsel işlev bozukluğu arasında pozitif yönde düşük düzeyde anlamlı bir ilişki ( $r=0,254, p= 0,009$ ), doğum açısından cinsel işlev bozukluğu arasında pozitif yönde düşük düzeyde anlamlı bir ilişki ( $r=0,254, p=0,006$ ), orgazm cinsel işlev bozukluğu arasında pozitif yönde düşük düzeyde anlamlı bir ilişki bulunmuştur ( $r=0,235, p=0,011$ ). Evlilik öncesi cinselliğe olumsuz tutum arttıkça istek, uyarılma, lubrikasyon, doğum, orgazm ve ağrı açısından cinsel işlev bozukluğu artmaktadır.

Evlilik önce cinselliğe tutum ölçeğinin cinsel işlev bozukluklarının yordayıcılığını tespit etmek amacıyla her bir alt boyut ile basit regresyon analizi yapılmıştır.

**Tablo 4. Katılımcıların Evlilik Öncesi Cinsellik Tutum Puanlarının Cinsel İşlev İndeksi Toplam Puanını ve Alt Boyutlarını Yordaması**

Değişken	B	SS	$\beta$	t	p
İCİB	1,826	0,619	-	2,950	
EÖCT	0,037	0,012	287	3,198	0,02*
UCİB	0,173	1,001	-	0,173	
EÖCT	0,064	0,019	0,305	3,416	0,001***
LCİB	0,0875	1,118	-	0,709	
EÖCT	0,056	0,021	0,242	3,313	0,009**
DCİB	0,696	0,982	-	0,709	
EÖCT	0,058	0,018	0,280	3,113	0,006**
OCİB	0,696	0,982	-	0,709	
EÖCT	0,058	0,018	0,280	3,113	0,002**
ACİB	0,565	1,184	-	0,477	
EÖCT	0,058	0,022	0,235	2,582	0,011**
CİB	4,339	5,275	-	0,823	
EÖCT	0,333	0,099	299	3,350	0,01**

$p<,05^*$ ,  $p<,01^{**}$ ,  $p<,001^{***}$  (Kısaltmalar: ACİB: Ağrı Cinsel İşlev Bozukluğu, DCİB: Doğum Cinsel İşlev Bozukluğu, EÖCT: Evlilik Öncesi Cinsellik Tutum, İCİB: İstek Cinsel İşlev Bozukluğu, LCİB: Lubrikasyon Cinsel İşlev Bozukluğu, OCİB: Orgazm Cinsel İşlev Bozukluğu, CİB: Cinsel İşlev Bozukluğu, UCİB: Uyarılma Cinsel İşlev Bozukluğu)

Yapılan regresyon analizleri sonucu, evlilik öncesi cinselliğe tutumların istek cinsel işlev bozukluğu üzerinde yordayıcı etkisi olduğunu göstermektedir ( $R=287$   $R^2= 0,082$   $F(1,114)=10,228$ ,  $p=0,02$ ). İstek cinsel işlev bozukluğuna ilişkin varyansın %8'nin evlilik öncesi tutum ile açıklandığı ifade edilebilir. Evlilik öncesi cinselliğe tutumların uyarılma cinsel işlev bozukluğu üzerinde yordayıcı etkisi olduğu tespit edilmiştir. ( $R= 0,305$   $R^2=0,093$   $F(1,114)= 11,671$ ,  $p=0,001$ ). Uyarılma cinsel işlev bozukluğuna ilişkin varyansın %9'nun evlilik öncesi tutum ile açıklandığı ifade edilebilir. Evlilik öncesi cinselliğe tutumların lubrikasyona cinsel işlev bozukluğu üzerinde yordayıcı etkisi olduğu bulunmuştur. ( $R=0,242$   $R^2= 0,058$   $F(1,114)= 7,853$ ,  $p=0,009$ ). Lubrikasyon cinsel işlev bozukluğuna ilişkin varyansın %6'sının evlilik öncesi tutum ile açıklandığı ifade edilebilir. Evlilik öncesi cinselliğe tutumların doğum cinsel işlev bozukluğu üzerinde yordayıcı etkisi olduğu bulunmuştur. ( $R= 0,254$   $R^2=0,064$   $F(1,114)= 7,853$ ,  $p=0,006$ ). Doğum cinsel işlev bozukluğuna ilişkin varyansın %6'sının evlilik öncesi tutum ile açıklandığı ifade edilebilir. Evlilik öncesi cinselliğe tutumların orgazm cinsel işlev bozukluğu üzerinde yordayıcı etkisi olduğu bulunmuştur. ( $R=0,280$   $R^2= 0,078$   $F(1,114)= 9,692$ ,  $p= 0,002$ ). Orgazm cinsel işlev bozukluğuna ilişkin varyansın %8'inin evlilik öncesi tutum ile açıklandığı ifade edilebilir. Evlilik öncesi cinselliğe tutumların ağrı cinsel işlev bozukluğu üzerinde yordayıcı etkisi olduğu bulunmuştur. ( $R=0,235$   $R^2=0,055$   $F(1,114)=6,669$ ,  $p= 0,011$ ). Ağrı cinsel işlev bozukluğuna ilişkin varyansın %6'sının evlilik öncesi tutum ile açıklandığı ifade edilebilir. Evlilik

öncesi cinselliğe tutumların cinsel işlev bozukluğu üzerinde yordayıcı etkisi olduğu bulunmuştur ( $R=0,299$   $R^2=0,090$   $F(1, 114)=11,222$ ,  $p= 0,01$ ). Cinsel işlev bozukluğuna ilişkin varyansın %9'sının evlilik öncesi tutum ile açıklandığı ifade edilebilir.

## 4. TARTIŞMA

Çalışma kapsamında yapılan analizler sonucunda, cinsel işlev bozukluğu olan ve olmayan katılımcılar arasında evlilik öncesi cinselliğe tutumları arasında farklılık gösterdiği bulunmuştur. Cinsel işlev bozukluğu tanısı alma olasılığı bulunan katılımcıların evlilik öncesi cinselliğe, cinsel işlev bozukluğu tanısı alma olasılığı bulunmayan katılımcılara göre daha olumsuz tutum göstermektedir. Literatürde Mert ve Özen 'in yapmış olduğu araştırmada (2011), evlilik öncesi cinselliğe tutum sorulmuş ve olmalı ve olmamalı şeklinde yanıt seçeneği verilmiştir. Evlilik öncesi cinselliği olağan karşılayanlarla olağan karşılamayanlar arasında kadın cinsel işlev indeksi ve alt boyutları açısından anlamlı farklılık bulunmamıştır. Bu zıt bulguların sebebinin bu çalışmada tutumu ölçen bir ölçeğin bulunması olabilir. Literatürde Mert ve Özen'in (2011) yapmış olduğu araştırmada, evlilik öncesi cinselliğe yönelik tutumların incelendiği ve katılımcılara "olmalı" ve "olmamalı" şeklinde yanıt seçenekleri sunulduğu belirtilmektedir. Araştırma, evlilik öncesi cinselliği olağan karşılayan katılımcılarla karşılamayan katılımcılar arasında kadın cinsel işlev indeksi ve alt boyutları açısından anlamlı bir fark bulunmadığını ortaya koymuştur. Bu zıt bulguların sebebinin her iki araştırmanın kapsamında kullanılan ölçüm araçlarının etkisi olabileceği öne sürülmüştür. Mert ve Özen'in (2011) çalışmasında, evlilik öncesi cinselliğe yönelik tutumları değerlendirmek için sadece "olmalı" ya da "olmamalı" şeklinde basit bir soru yöntemi kullanılmıştır. Ancak, bu çalışmada, tutumları daha kapsamlı bir şekilde değerlendirmek amacıyla bir tutum ölçeği kullanılmıştır. Tutum ölçeği, katılımcıların evlilik öncesi cinselliğe yönelik daha çeşitli ve detaylı görüşlerini ifade etmelerine olanak sağlamıştır. Bu şekilde, katılımcıların tutumlarının daha kapsamlı bir şekilde değerlendirilmesi ve analiz edilmesi mümkün olmuştur. Araştırma sonuçlarına bakıldığı zaman Çayan ve arkadaşlarının (2004) çalışmasında katılımcılarının %46,9'unda cinsel işlev bozukluğu olduğu tespit edildi. Katılımcılarının %60,3'ünde istek cinsel işlev bozukluğu, %43'ünde uyarılma cinsel işlev bozukluğu, %38'inde ise lubrikasyon cinsel işlev bozukluğu, %45,8'inde orgazm cinsel işlev bozukluğu, %38'inde doyum cinsel işlev bozukluğu, %36,8'inde de ağrı cinseli işlev bozukluğu görülmüştür. Yapılan bu çalışmada ise ölçek toplam puan üstünden elde edilen puan temelinde örnekleme oluşturan kadın katılımcıların %38,8'inde cinsel işlev bozukluğu tespit edilirken, %58,6'sında istek cinsel işlev bozukluğu, %48,3'ünde uyarılma cinsel işlev bozukluğu, lubrikasyon cinsel işlev bozukluğu %31,0, orgazm cinsel işlev bozukluğu %44, doyum cinsel işlev bozukluğu %38,8 iken ağrı cinsel işlev bozukluğu %52,6 olarak belirlenmiştir. Oranlar birbirine yakın olmakla birlikte, Çayan ve arkadaşlarının yaptığı çalışmada örnekleme oluşturan kadın katılımcı sayısı 179'dur. Bu küçük fark örneklem sayısının farklılığından kaynaklanıyor olabilir.

Araştırma sonucunda, katılımcıların evlilik öncesi cinselliğe tutum ile kadın cinsel işlev bozuklukları arasında bir ilişki tespit edilmiştir. Katılımcıların evlilik öncesi cinselliğe olan olumsuz tutumları artıkça kadın cinsel işlev bozukluğu yaşanması da onunla birlikte artmaktadır. Bir diğer sonuç ise, cinsel işlev bozukluğu olan katılımcıların ve olmayan katılımcılar arasındaki evlilik öncesi cinselliğe tutumlara bakıldığında, cinsel işlev bozukluğu olan katılımcıların evlilik öncesi cinselliğe olumsuz tutumlarının cinsel işlev bozukluğu olmayan katılımcılara göre daha fazla görülmüştür. Son olarak da, katılımcıların evlilik öncesi cinselliğe tutumlarının cinsel işlev bozukluklarının birer yordayıcısı olduğu tespit edilmiştir.

Bulguların kadın cinsel işlev bozukluklarının dayatılan toplumsal normlarla ilişkisi bakımından farkındalık yaratacağı umulmaktadır. Konuya dair gelecek bilimsel araştırmaların bu çalışmanın bulgularının yanı sıra teorik ve klinik anlamda faydalar sağlayacağı düşünülmektedir. Ayrıca bulunmuş ilişkilerin ve yordayıcı etkilerin, örneğin evlilik öncesi cinsel birliktelikle ilgili olumlu veya olumsuz tutumların, bireylerin cinsel işlevlerini nasıl etkilediği konusundaki farkındalığın konuyu daha iyi anlamada ve alanda çalışan, cinsel sağlık uzmanlarına, danışmanlara ve psikoterapistlere bu konuda daha etkili müdahaleler geliştirmede yol gösterebileceği umulmaktadır. Cinsel sağlık alanında

daha etkili ve bilgiye dayalı stratejilerin geliştirilmesi konusunda farkındalığa duyulan ihtiyacın altının çizilmesi de ayrıca önemlidir

## 5. KAYNAKÇA

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**İLKOKUL 4. SINIF İNSAN HAKLARI, YURTTAŞLIK VE DEMOKRASİ DERSİ KİTABI  
“İNSAN OLMAK” ÜNİTESİNİN ELEŞTİREL DÜŞÜNME STANDARTLARI  
ÇERÇEVESİNDE İNCELENMESİ**

**AN ANALYSIS OF THE "BEING HUMAN" UNIT OF THE 4TH GRADE HUMAN RIGHTS,  
CITIZENSHIP AND DEMOCRACY TEXTBOOK WITHIN THE FRAMEWORK OF  
CRITICAL THINKING STANDARDS**

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**ÖZET**

Günümüzde bilgi teknolojileri alanındaki hızlı gelişimle birlikte toplumu oluşturan bireylerin kazanmaları gereken bilgi ve beceriler bu gelişim sürecine eşlik edebilecek şekilde yeniden tanımlanma ihtiyacını doğurmuştur. Bunun sonucu olarak bireyleri toplum yaşamına ve geleceğe hazırlayan eğitim sistemleri de bu değişimden etkilenmekte, öğrencilere kazandırılacak bilgi, beceri ve kazanımlar da değişim yapılması zorunluluğu ortaya çıkmıştır. Eğitim alanında çalışmalar yapan çeşitli kuruluşlar tarafından bireylerin kazanmaları gereken 21. yüzyıl becerileri ortaya konulmuştur. Eleştirel düşünme, 21. yüzyıl becerilerinin en temel bileşeni olarak görülmektedir. 21. yüzyıl becerilerinin bireylere kazandırılabilmesi ancak demokratik, katılımcı, farklılıklara saygı ve hoşgörüye dayalı öğrenen merkezli eğitim ortamlarının oluşturulması ile gerçekleşebilir. İnsan hakları, yurttaşlık ve demokrasi eğitimi, bu nitelikteki eğitim ortamlarının oluşturulmasına katkı sağlamasının yanı sıra öğrencilerin topluma etik değerlere saygılı, sorgulayan, aktif katılımcı bireyler olarak hazırlanmasına olanak sağlamaktadır. Bu çerçeveden bakıldığında 21. yüzyıl becerileri, eleştirel düşünme, insan hakları, yurttaşlık ve demokrasi eğitimi kavramları birbirlerini besleyen ve geliştiren ayrılmaz unsurlar olarak görülmektedir. Bu bağlamda insan hakları, yurttaşlık ve demokrasi derslerinin okullarda işlenmesindeki temel materyallerden biri olan ders kitaplarının da eleştirel düşünme becerilerini destekleyen ve geliştiren bir nitelikte yapılandırılması önem kazanmaktadır. Bu çalışmada ilkökul 4. Sınıflarda 2023-2024 yılında okutulmakta olan “İnsan Hakları, Yurttaşlık ve Demokrasi” dersi kapsamında hazırlanmış olan ders kitabının “İnsan Olmak” ünitesi Gerald Nosich (2012) tarafından ortaya konulan eleştirel düşünme standartları çerçevesinde analiz edilmiştir. Çalışma örnekleminde incelenecek kitap olarak Millî Eğitim Bakanlığı (MEB) tarafından yayımlanan 2021 basımı “İlkokul 4.sınıf İnsan Hakları, Yurttaşlık ve Demokrasi” kitabı seçilmiştir. Betimsel yöntem kullanılan araştırmada verilere doküman incelemesi yöntemi ile ulaşılmıştır. Yapılan analiz sonucunda “İlkokul 4 İnsan Hakları, Yurttaşlık ve Demokrasi” kitabında bulunan “İnsan Olmak” ünitesinin Nosich’in eleştirel düşünme standartlarından açıklık, doğruluk, önem-alaka standartlarını karşıladığı, yeterlilik, derinlik/genişlik ve kesinlik standartlarını ise kısmen karşıladığı sonucuna ulaşılmıştır.

**Anahtar Sözcükler:** Eleştirel Düşünme, Eleştirel Düşünme Standartları, İnsan Hakları, İnsan Hakları Yurttaşlık ve Demokrasi Eğitimi, Ders Kitabı

## ABSTRACT

The rapid development in information technologies has necessitated the redefinition of the knowledge and skills that individuals in society need to acquire to keep pace with this development process. As a result, education systems that prepare individuals for social life and the future are also affected by this change, and the necessity of making changes in the knowledge, skills, and achievements to be acquired by students has emerged. Various organizations working in the field of education have put forward the 21st-century skills that individuals need to acquire. Critical thinking is seen as the most fundamental component of 21st-century skills. The acquisition of 21st-century skills by individuals can only be achieved through the creation of democratic, participatory, respectful to differences, and learner-centered educational environments. Human rights, citizenship, and democracy education contribute to the creation of such educational environments and enable students to be prepared as individuals who are respectful to ethical values, questioning, and active participants in society. From this perspective, 21st-century skills, critical thinking, human rights, citizenship, and democracy education concepts are seen as inseparable elements that nurture and develop each other. In this context, it becomes important to structure the textbooks, which are one of the main materials used in the teaching of human rights, citizenship, and democracy lessons in schools, in a way that supports and develops critical thinking skills. In this study, the "Being Human" unit of the textbook prepared for the "Human Rights, Citizenship and Democracy" course taught in the 4th grade of primary school in the 2023-2024 academic year was analyzed within the framework of critical thinking standards put forward by Gerald Nosich. The 2021 edition of the "Primary School 4th Grade Human Rights, Citizenship and Democracy" textbook published by the Turkish Ministry of National Education (MEB) was selected as the textbook to be examined in the study sample. The research findings, in which the descriptive method was used, were obtained by the document analysis method. As a result of the analysis, it was concluded that the "Being Human" unit in the "Primary School 4th Grade Human Rights, Citizenship and Democracy" textbook meets the standards of clarity, accuracy, and significance-relevance among Nosich's critical thinking standards, and partially meets the standards of sufficiency, depth/breadth, and precision.

**Keywords:** Critical Thinking, Critical Thinking Standards, Human Rights, Human Rights Citizenship and Democracy Education, Textbook

## GİRİŞ

Eğitim günümüz toplumunda bireylerin toplumsal süreçlerde daha aktif bir şekilde rol olmasını hedeflemektedir. Teknolojik gelişmelerle bireyin etkileşim içerisinde bulunduğu ortam giderek daha karmaşık bir hale gelmekte, bireylerden de bu sürekli ve hızlı değişime uyum sağlamaları beklenmektedir. İnsan hakları, yurttaşlık ve demokrasi eğitimi, bireylerden demokratik süreçlere aktif olarak katılmalarının ve insan hakları değerlerini desteklemelerinin beklendiği günümüzün küreselleşmiş dünyasında giderek daha önemli hale gelmiştir (Osler ve Starkey, 2017). Bu eğitim, bireylerin haklarını ve sorumluluklarını öğrenmelerini, demokratik değerleri benimsemelerini ve eleştirel düşünme becerilerini geliştirmelerini hedefler (Noula, 2018). Bireylerin kazanmaları gereken 21. yy becerilerinden biri olan eleştirel düşünme becerisi, sosyal adaletsizlikleri fark etme ve bunların üstesinden gelebilmenin de etkili yollarından biridir (Giroux, 1994, Mc Laren, 1994, Burbules ve Berk, 1999). Özellikle eleştirel pedagojik bakış açısı, eleştirel ve demokratik vatandaşlığı bir eğitim hedefi olarak vurgulamış ve toplumu dönüştürmeye odaklanmıştır (Ten Dam ve Volman, 2004). Bu açıdan bakıldığında insan hakları ve demokrasi eğitiminin eleştirel düşünmenin gelişimine katkı sağladığı, eleştirel düşünme becerisinin de insan hakları ve yurttaşlık eğitimi alanında gerekli becerilerden biri olarak görüldüğü değerlendirilebilir.

Türkiye’de geçmişten bu yana farklı düzeylerde ve derslerde ele alınan insan hakları eğitimi ilköğretim düzeyinde 2017-2018 yılında yapılan son değişiklikle 4. sınıf seviyesindeki “insan hakları, yurttaşlık ve demokrasi dersi” kapsamında ilkököl programına alınmıştır (Aslan ve Aybek, 2018). İnsan Hakları, Yurttaşlık ve Demokrasi dersi öğrencilere kavramsal bilginin öğretilmesinin yanında

insan hakları, yurttaşlık ve demokrasi ile ilgili temel değerleri kazandırmayı amaçlamaktadır. Dersin bir diğer amacı da öğrencilerin bu bilgi ve değerleri bir yaşam biçimi ve kültür hâline getirmelerini sağlamaktır (MEB, 2017). Öğretim programı; (1) İnsan Olmak, (2) Hak, Özgürlük ve Sorumluluk, (3) Adalet ve Eşitlik, (4) Uzlaşma, (5) Kurallar, (6) Birlikte Yaşama olmak üzere altı üniteden oluşmaktadır (MEB, 2018).

Bu çalışmada incelenmek üzere ele alınan “İnsan Olmak” ünitesi, insan olmanın nitelikleri ve bu niteliklerin haklarla olan ilişkisi ile başlayan birinci ünite, çocuk ile yetişkin arasındaki farklardan hareketle çocuk haklarına vurgu yapmaktadır. Öğrencinin hem kendisini hem de diğer insanlarla etkileşimini sorgulamasına imkân tanımaktadır. İnsan olmaktan kaynaklanan ve birbiri ile ilişkili üç kavram olan hak, özgürlük ve sorumluluk ise ikinci üniteyi oluşturmaktadır. Bu ünite de hak, özgürlük ve sorumluluk arasındaki ilişki belirlenmektedir. Öğrencilerin bu ilişkiyi içselleştirmelerine yönelik kazanımlarla devam edilerek hak, özgürlük ve sorumlulukların kullanıldığı, kısıtlandığı, ihlal edildiği durumlar ile bunların birlikte yaşama kültürüne etkisi değerlendirilmektedir (MEB, 2018).

Gelişen dünyaya uyum sağlamak adına öğrencilere kazandırılması gereken üst düzey düşünme becerilerinden biri olan eleştirel düşünme (Türkben ve Karaman, 2022) için farklı tanımlar yapılmıştır. Ennis (1989) eleştirel düşünmenin neye inanılacağına veya ne yapılacağına karar vermeye odaklanan mantıklı, yansıtıcı düşünme olduğunu belirtirken Ruggiero (2017), eleştirel düşünmenin özünü eldeki iddia ve argümanları değerlendirme ve karar verme süreci olarak nitelendirmektedir. Başka bir ifadeyle eleştirel düşünme arayış ve araştırmadır. Bu nedenle eleştirel düşünen birinin uygulayacağı en doğru tekniklerden biri araştırmacı soruları sormaktır. Faicone (2011), öğrencilere eleştirel düşünme yoluyla iyi kararlar almayı öğretmenin önemini vurgulamaktadır. İyi kararlar alan bireylerin topluma katkı sağlayan üyeler haline geldiği ve topluma yük olmak yerine, toplum yükünü hafifleten bireyler olarak desteklediklerini belirtmektedir. Eleştirel düşünme ve iyi karar verme becerilerinin, insanlara daha iyi bir yaşam, erdem ve ekonomik başarı şansı sunduğu ifade edilmektedir.

Nosich (2012) düşünmenin yüksek standartları karşılaması gerektiğini savunmuş, bu nedenle üst düzey düşünme becerileri içerisinde yer alan eleştirel düşünme ile ilgili standartlar ortaya koymuştur. Nosich’in belirlediği eleştirel düşünme standartları açıklık, doğruluk, önem/alaka, yeterlilik, derinlik/genişlik ve kesinlik olarak ifade edilmektedir.

Bütün bu değerlendirmeler doğrultusunda insan hakları, yurttaşlık ve demokrasi eğitiminde eleştirel düşünme becerisinden yararlanmanın önemi ön plana çıkmakta, insan hakları, yurttaşlık ve demokrasi eğitimi öğretim materyallerinin eleştirel düşünme standartları açısından değerlendirilmesi önem kazanmaktadır.

## AMAÇ

Bu çalışmada 4. Sınıf İnsan Hakları, Yurttaşlık ve Demokrasi Eğitimi kitabında yer alan “İnsan Olmak” ünitesinin eleştirel düşünme standartları açısından incelenmesi amaçlanmıştır.

## YÖNTEM:

Bu araştırma nitel araştırma yöntemlerinden doküman incelemesi modeli ile yapılmıştır. Doküman incelemesi, araştırılması hedeflenen olgu ve olaylar hakkında bilgi içeren yazılı materyallerin analizini kapsar (Yıldırım ve Şimşek, 2018)

Araştırmaya örneklem olarak 2022-2023 yılında okutulmakta olan MEB tarafından 2021 yılında bastırılmış “İlkokul 4 İnsan Hakları, Yurttaşlık ve Demokrasi” kitabı seçilmiştir. Ders kitabındaki ilgili bölümler incelenerek eleştirel düşünme standartlarına uygunluğu kıyaslanmış ve alıntılar yapılarak bulgular bölümünde paylaşılmıştır.

## BULGULAR

Aşağıda ünitenin her bir eleştirel düşünme standardını karşılayıp karşılamadığına yönelik örnekler verilerek bulgular sunulmuştur.

### Açıklık Standardına Dair Bulgular:

Nosich (2012)'e göre bir düşünce kolaylıkla anlaşılıyor ve yanlış anlaşılmalara meydan vermiyorsa açıklık standardını karşılamaktadır. Ayrıca bir düşüncenin ifadesinde verilmek istenen anlam açık bir şekilde ifade edilebiliyorsa ve hakkında ayrıntıya girilebiliyorsa, onunla ilgili örnekler ve görselleştirmeler sunulabiliyorsa bu düşüncenin açık olduğu kabul edilmektedir. Bunun yanında düşünce belirsiz, karışık, kolaylıkla yanlış anlaşılabilirse ya da onu takip eden şeyleri göremiyorsanız açıklık standardını taşımamaktadır.

4. Sınıf İnsan Hakları, Yurttaşlık ve Demokrasi kitabı “İnsan Olmak” ünitesi açıklık standardı açısından ele alındığında aşağıdaki sonuçlara ulaşılmıştır:

- İnsan olmanın özellikleri kavramı; düşünen bir canlı olması, sosyal bir canlı olarak ihtiyaçlarının olması, kültürel değerler üretmesi, duyguları olması nedeniyle sanat, estetik gibi değerler üretmesi açısından diğer canlı türleriyle olan farklı yönleri, çoğalmak, solunum yapmak, beslenmek, büyümek ve gelişmek, hareket etmek, yaşlanmak ve ölmek gibi diğer canlılarla olan ortak özellikleri hedef kitlesi olan ilkökul 4. sınıf öğrencilerinin anlayacağı şekilde açık olarak ifade edilmiştir.
- İnsan Hakları Eğitimi, Yurttaşlık Eğitimi ve Demokrasi Eğitimi kavramları bir disiplin olarak ele alındığında insanın doğuştan gelen hakları olması, bu hakların yasalarla güvence altına alınması, bu hakların vazgeçilemez, devredilemez ve vazgeçilemez olması ve bu hakların insan onurunu güvence altına alması açıkça ve anlaşılır bir şekilde ifade edilmiş, insanların gelişim çağları ile birlikte farklılık gösterebilen hakları ve sorumlulukları olduğu gibi konular örnekler ve etkinliklerle belirtilmiştir.

Bütün bu bilgilerin doğrultusunda «İnsan Olmak» ünitesinde ele alınan konuların ifade edilmiş ve sunuş şeklinin açıklık standardını karşıladığı söylenebilir.

### Doğruluk Standardına Dair Bulgular:

Nosich (2012)'e göre bir düşünceyi ya da ifadeyi doğruluk standardı açısından değerlendirebilmek için iki temel soru sorulmalıdır.

1. Düşünme doğru mu?
2. İfadeler doğru ve gerçek mi?

Ayrıca, bir düşüncenin doğruluğunu belirlerken duygular, arzular ve inkâr, kişisel deneyimlerden yola çıkılarak yapılan genellemeler gibi yanıltıcı kavramların kontrol altında tutulmasını, mantık süzgecinden geçirilmesini, doğrulanmış kaynaklara dayanmasını, kontrol edilebilir ve test edilebilir olmasını, doğrulayıcı örneklerin yanı sıra karşıt örneklerle de sınanmasını önermektedir (Nosich, 2012)

4. Sınıf İnsan Hakları, Yurttaşlık ve Demokrasi kitabı “İnsan Olmak” ünitesinde verilmekte olan bilgiler doğruluk standardı açısından incelendiğinde aşağıdaki sonuçlara ulaşılmıştır:

- Üniteye verilmekte olan hak, insan hakları, temel haklar gibi kavramlara “İnsan Hakları Evrensel Bildirgesi” (1948) kapsamında yer verilmiştir.
- Hedef kitleye yönelik olarak verilen “haklarım” konusu “Çocuk Hakları Sözleşmesi” (1989) ile ilişkilendirilmiştir.
- Üniteye verilmekte olan hak kavramı uluslararası geçerliliği olan ve üzerinde uzlaşmış bir çerçeveye dayandırılmıştır.

Yukarıdaki gerekçeler göz önünde bulundurulduğunda üniteye yer verilen bilgilerin doğruluk standardını karşıladığı söylenebilir.

## **Önem, Alaka Standardına Dair Bulgular:**

Nosich (2012)'in bir düşünmeyi eleştirel düşünme süzgecinden geçirmek için ortaya koyduğu standartlardan biri de önem-alaka standardıdır. Nosich bir düşünmenin önem, alaka standardına uygunluğu açısından iki soru sormaktadır.

1. Düşünme önemli olan şey üzerine odaklanıyor mu?
2. Düşünme mevcut problemle ilgili olarak ne kadar alakalı, merkezi ve önemli?

Nosich (2011)'e göre düşünme, eldeki sorunun ele alınmasıyla doğrudan alakalı olduğunda önemlidir.

4. Sınıf İnsan Hakları, Yurttaşlık ve Demokrasi kitabı “İnsan Olmak” ünitesi önem, alaka standardı açısından incelendiğinde aşağıdaki sonuçlara ulaşılmıştır:

- “İnsanı İnsan Yapan Nitelikler” kısmında insanın fizyolojik ve duygusal özelliklerine yer verilmektedir.
- Konuya insan hakları bağlamında bakıldığında insanların haklarını gözetmek, iyiye yönelmek, adil ve eşit davranmak gibi özelliklerin insanları erdemli kılan özellikler olduğuna da değinilmektedir.
- Bu özelliklerin yanı sıra karşılıklı sevgi ve saygı, anlayışlı olma, yardımlaşma, dayanışma, vefa, duyarlılık gibi değerlerin de insanı insan yapan özelliklerden olduğu belirtilmektedir.
- Ünitenin son bölümünde hak kavramının yanı sıra toplumda yaşayan bireylerin sorumluluklarına ve bunları yerine getirmenin önemine vurgu yapılmaktadır.

Yukarıdaki açıklamalar doğrultusunda ünite de değinilen konuların insan hakları eğitimi bağlamında önem-alaka kriterini taşıdığı görülmektedir.

## **Yeterlilik Standardına Dair Bulgular:**

Nosich (2012), eleştirel düşünme bağlamında yeterlilik kriterini de iki soru ile ele almaktadır.

1. Bu, yeterli şekilde düşünüldü mü?
2. Konuya mantıklı bir şekilde karar vermek için bunu yeterince mantıklı düşündüm mü?

Bir soru veya bir konuyla alakalı düşünmeniz, elinizdeki amaç için onu yeterince geniş bir biçimde mantıklı düşündüğünüzde, gerekli olan şey için yeterli olduğunda ve tüm faktörleri göz önünde bulundurduğunuzda yeterlidir. Bunun aksine düşünmeniz gerekli olan noktaları dışarıda tuttuğunda veya konunun ihtiyaçlarını karşılayacak yeterlilikte düşünmediğinizde yetersiz olarak değerlendirilir.

4. Sınıf İnsan Hakları, Yurttaşlık ve Demokrasi kitabı “İnsan Olmak” ünitesi yeterlilik standardı açısından incelendiğinde şu sonuçlara ulaşılmıştır:

- Konu ve kavramların öğretiminde açıklamaların görsellerle desteklendiği, konu anlatımı ve etkinlikler boyunca verilen 15 adet görsel ve grafiklerle konuların görselleştirilmesine yeterli sayıda görsel unsura yer verildiği görülmektedir.
- Ünitenin İnsan Olmak konusunda 1, Doğuştan Gelen Haklarımız konusunda 1, Haklarımız konusunda 1, Çocukluk ve Yetişkinlik konusunda 2, ünitenin sonunda bulunan değerlendirme kısmında 5 adet etkinlik olmak üzere toplam 12 etkinliğe yer verildiği görülmektedir. Bu etkinliklerden 3'ü yazılı anlatım, 2'si eşleştirme, 1'i boşluk tamamlama, 1'i çoktan seçmeli, 1'i doğru/yanlış, 1'i harf bulmacası şeklinde dağılım göstermektedir. Ayrıca 1 etkinlik yazılı anlatım, eşleştirme ve boşluk doldurma, 1 etkinlik de yazılı anlatım ve eşleştirme olacak şekilde karma etkinliklerden oluşmaktadır. Etkinlikler sayısı olarak yeterli gibi görünse de söz konusu etkinliklerin tamamı öğrencilerin kavramsal düzeydeki bilgilerini aktarmaya yönelik kalem-kâğıt etkinliklerinden oluşmaktadır.

Oysa; İnsan hakları ve demokrasi gibi konuların eğitiminde öğrencilerin sürece aktif katılım sağladıkları, gerçek hayat problemleri ile ilişkilendirilmiş, kavramsal öğrenmenin yanı sıra öznel ve duygusal tepkileri içeren, tutum ve davranış değişikliklerinin özendirildiği, öğrenilenlerin pratikte uygulandığı beceri temelli uygulamalara da yer verilmelidir (Flowers, 2009, s.27)

- Bunun yanında etkinliklerde grup tartışması, rol yapma, beyin fırtınası, problem çözme, örnek olay inceleme yöntemi, görüş geliştirme tekniği, fikirleri farklı şekillerde ele alma yöntemi, bütün faktörleri göz önünde bulundurma yöntemi, sonuçlar yöntemi, alternatifler yöntemi, kararlar yöntemi,

öncelikler yöntemi, altı şapkalı düşünme tekniği gibi eleştirel düşünme becerisini geliştiren, öğrencinin sürece aktif katılımını sağlayan yöntem ve tekniklerin bulunmadığı görülmektedir. “İletişim, eleştirel düşünme, savunuculuk, sorumluluk, hoşgörü ve başkalarına saygı ile ilgili tutum ve değerler geleneksel yöntemlerle öğretilemez; bunlar deneyim yoluyla öğrenilmelidir. Bundan dolayı iş birliğini, katılımı ve aktif öğrenmeyi geliştirecek etkinliklere yer verilmelidir. Bu etkinlikler çocuğun zihninin, kalbinin ve ellerinin bütüncül bir katılımını hedeflerler. Sadece insan haklarının temel insan ihtiyaçlarından doğduğunu anlayan ve diğer insanlara empati duyan bir çocuk, başkalarının insan haklarını korumak için kişisel sorumluluk alacaktır.” (Flowers, 2011, s.38).

Yukarıdaki bulgular doğrultusunda üniteye veriler konular öğretim ve işleniş açısından yeterli sayıda etkinlikten oluşsa da insan hakları eğitimi ve eleştirel düşünmenin doğasına uygun etkinliklerin bulunmaması nedeniyle ünitenin yeterlilik standardını kısmen karşıladığını söylemek mümkündür.

## **Derinlik-Genişlik Standardına Dair Bulgular:**

Nosich (2012), bir düşüncenin eleştirel düşünmenin derinlik ve genişlik standardını karşılayıp karşılamadığını sınamak için konuya ilişkin 4 soru sorulması gerektiğini ifade eder.

1. Bunu yeterince derinlemesine düşündüm mü?
2. Problemin altında yatan teoriler, açıklamalar ve karmaşıklıkları uygun bir şekilde dikkate aldım mı?
3. Bunu yeterince geniş bir şekilde düşündüm mü?
4. Durumun diğer yönlerini, problemin diğer bakış açılarını, alakalı diğer konuları uygun bir şekilde dikkate aldım mı?

Bir konu hakkında derinliği karşılamak için;

- a) Hedefe ulaşmak için problemin yüzeyinin altına inmeniz gerektiğinizi fark etmeniz,
- b) Derinde yatan karmaşıklıkları belirlemeniz,
- c) Problemi ifade ederken bu karmaşıklıkları ve derinde yatan noktaları dikkate almanız gerekmektedir.

Bir konu hakkında genişliği sağlamanız için;

- a) Diğer yönlere, bakış açılarına ve problemlere bakma ihtiyacını fark etmeniz,
- b) Onları tanımlamanız,
- c) Problemi düşünürken onları uygun bir şekilde hesaba katmanız gerekmektedir.

4. Sınıf İnsan Hakları, Yurttaşlık ve Demokrasi kitabı “İnsan Olmak” ünitesi derinlik ve genişlik standardı açısından incelendiğinde aşağıdaki sonuçlara ulaşılmıştır:

- Üniteye yönelik ilk konu olan “İnsan Olmak” konusunda insan olmanın özelliklerine dair hedef kitleye yönelik olarak yeterli açıklamalar verildiği görülmektedir.
- İkinci konu olan “Doğuştan Gelen Haklarımız” konusunda insanın dünyaya gelmesi ile birlikte kazanılan başka hiçbir şarta bağlı olmayan hakları ve “İnsan Hakları Sözleşmesi” (1948) ile sahip olduğu hakların hedef kitlenin düzeyine uygun derinlikte ve genişlikte verildiği görülmektedir.
- Üçüncü konu olan “Haklarım” bölümünde ise Çocuk Haklarına Dair Sözleşme ile kazandığı çocuk hakları kavramları ve bu hakların çıkış noktaları yeterli olarak aktarılmaktadır ancak çocuk haklarının neler olduğuna yönelik yalnızca bir etkinlik görselinin verildiği görülmüştür.
- “Çocukluk ve Yetişkinlik” başlığı altında insan hayatının bebeklik, çocukluk, gençlik, yetişkinlik, yaşlılık gibi evreleri olduğu belirtilmiştir. Hak, özgürlük, sorumluluk ve görevlerimizin bu evrelere göre değişkenlik gösterdiği söylenmiştir. Ancak insan hakları, yurttaşlık ve demokrasi eğitimi kavramlarının öğretildiği bir derste çocukluk ve yetişkinlik dönemlerinin yasal sınırlarının da belirtilmesi beklenmektedir. Kitapta sözü edilen gelişim evreleri haklar ve sorumlulukların neler olduğunun bilinmesi açısından muğlak kalmaktadır. Öğrencilere çocuk kavramının yasalara göre tanımı verilmeli, bireylerin yasalar çerçevesinde kaç yaşına kadar çocuk, kaç yaşından sonra yetişkin olarak kabul edildiği açıklanmalıdır.

Konuların başında bulunan hazırlık soruları ve sonda bulunan değerlendirme sorularının etkinlik ağırlıklı olarak kavramsal düzeyde yanıtlanması istenen geleneksel öğrenme ortamlarına dayalı soru-

cevap temelli olduğu, öğrenciyi üniteye hazırlamak ve ünite sonunda edindiği eğitsel çıktıları değerlendirmek için derinlemesine düşünmeye, tartışmaya ve araştırmaya yöneltmediği görülmektedir.

Yukarıda belirtilen açıklamalar doğrultusunda 4. Sınıf İnsan Hakları, Yurttaşlık ve Demokrasi Eğitimi kitabında bulunan “İnsan Olmak” ünitesinin eleştirel düşünme standartlarından genişlik ve derinlik standardını kısmen karşıladığı söylenebilir.

## **Kesinlik Standardına Dair Bulgular:**

Nosich (2012), kesinlik kriterine uygunluğu belirlemek amacıyla iki soru sormaktadır:

1. Düşünce Kesin mi?
2. Mantıklı düşünme yeteri kadar ayrıntılı mı?

Sınıf İnsan Hakları, Yurttaşlık ve Demokrasi kitabı “İnsan Olmak” ünitesi kesinlik standardı açısından incelendiğinde şu sonuçlara ulaşılmıştır:

- Üniteye uluslararası sözleşmeler ve belgelere dayalı olarak bilgilerin sunulmasının kesinlik standardını karşıladığı söylenilebilir.
- Üniteye değinilen uluslararası sözleşmelerin tarihsel arka planına, bu sözleşmelerin bir gereklilik olarak ortaya çıkma nedenlerine değinilmemesi nedeniyle “Mantıklı düşünme yeteri kadar ayrıntılı mı?” sorusunun cevabını karşılamadığı görülmektedir.

Yukarıdaki açıklamalar doğrultusunda üniteye değinilen konuların insan hakları eğitimi bağlamında kesinlik kriterini kısmen karşıladığı ifade edilebilir.

## **SONUÇ ve ÖNERİLER**

Yapılan analiz sonucunda “İlkokul 4 İnsan Hakları, Yurttaşlık ve Demokrasi” kitabında bulunan “İnsan Olmak” ünitesinin Nosich’in eleştirel düşünme standartlarından açıklık, doğruluk, önem-alaka standartlarını karşıladığı, yeterlilik, derinlik/genişlik ve kesinlik standartlarını ise kısmen karşıladığı sonucuna ulaşılmıştır.

Araştırma bulguları ve sonuçları doğrultusunda insan hakları, yurttaşlık ve demokrasi eğitiminde kullanılmak üzere geliştirilen kitapların, yazılı ve basılı materyallerin geliştirilmesinde eleştirel düşünme standartlarına uygunluğu açısından aşağıdaki önerilere yer verilmiştir:

- İnsan hakları eğitimine yönelik ders kitapları eleştirel düşünme standartları dikkate alınarak hazırlanmalı aynı zamanda eleştirel düşünme becerilerini geliştirmeye yönelik beceri temelli etkinliklere yer verilmelidir.
- Hak, sorumluluk gibi soyut kavramların öğretiminde kavramsal düzeydeki açıklamalar yerine konular gerçek hayatla ilişkilendirilmelidir. İnsan hakları ve demokrasinin gerekliliğinin insanlık için neden gerekli olduğu tarihsel süreç içerisinde ele alınmalı, bu kavramların yaşatılmadığı dönemlerde ortaya çıkan durumların olumsuz sonuçları hakkında örnekler verilmelidir. Bu sayede yurttaş olarak insan haklarına ve katılımcı demokrasiye sahip çıkmamızın gerekliliğinin tutumlara ve davranışlara yansması daha kolay hale gelecektir.
- Ders kitaplarının hazırlanması aşamasında eleştirel düşünme standartlarına uygunluğunu sağlamak adına ders kitabı komisyonlarında eleştirel düşünme alanında çalışan uzmanlara da yer verilmelidir.

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**TÜRK TOPLUMUNDA A. FACIALIS'İN ÜÇ BOYUTLU BT ANJİYOĞRAFİ İLE  
DEĞERLENDİRİLMESİ**  
**EVALUATION OF THE FACIAL ARTERY WITH 3D CT ANGIOGRAPHY IN THE  
TURKISH POPULATION**

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**Giriş:** A. facialis, çene ve yüz bölgesinin arteriyel beslenmesinden sorumlu ana damardır. Bu arterin varyatif seyrinin bilinmesi, yüz bölgesine yapılan intraarteriyel dolgu enjeksiyonu gibi klinik uygulamalar sonrası komplikasyonların önlenmesi açısından fazlaca önemlidir. Bu çalışmanın amacı, Türk toplumunda 3D BT görüntülerinde a. facialis'in anatomisini incelemek ve yüz bölgesine yapılacak işlemlerde oluşabilecek komplikasyonlara karşı elde edilen veriler ışığında klinisyenlere kılavuz oluşturmaktır.

**Yöntem:** Çalışmaya 18 ile 65 yaş arası 72 erkek, 38 kadın olmak üzere 110 birey dahil edildi. Çalışma olguları Fuji PACS'tan Syngo.via (software version syngo.via VB30A\_HF06, Siemens, Germany) iş istasyonuna yüklendi. İncelenen BT Anjiyografi görüntüleri üzerinden a. facialis'e ait çeşitli parametreler değerlendirildi.

**Bulgular:** A. facialis tipleri sağda 13 solda 5 adet tip 1, sağda 92 solda 87 adet tip 3, sağda 1 solda 1 adet tip 4 ve sağ tarafta 2 adet tip 5 tespit edildi. Tüm tiplerde sağ ve sol taraflar arasında istatistiksel olarak anlamlı fark bulundu ( $p < 0,001$ ). A. facialis'in ala nasi inferior'una, canthus medialis'e, orbita orta noktasına olan uzaklıkları ve arterin mandibuladan çıkış noktası ile comissura labiorum arasındaki mesafe ölçümlerinde sağ ve sol taraflarda anlamlı farklar gözlemlendi ( $p = 0,042$ ,  $p = 0,010$ ,  $p = 0,005$ ,  $p < 0,001$ ). Bununla beraber a. facialis'in sulcus nasolabialis'e göre seyri incelendi. Buna göre sağda 82 solda 77 medialde seyreden, sağda 13 solda 6 lateralde seyreden, sağda 7 solda 6 medialden laterale doğru, sağda 7 solda 8 lateralden mediale doğru geçen tip görüldü. Tüm tiplerde sağ ve sol taraflar

arasında ve sağ-sol simetrisi arasında anlamlı farklar bulundu ( $p<0,001$ ). Derinlik ölçümlerinde sulcus a. facialis'te deri-arter arası mesafe ve ala nasi'nin inferior'u seviyesinde kemik-arter arası mesafe sağ ve sol taraflar arasındaki fark istatistiksel olarak anlamlıydı ( $p=0,001$ ,  $p=0,021$ ).

**Sonuç:** Bu çalışmanın sonucunda a. facialis varyasyonlarının ve sıklıkla uygulama yapılan bölgelerdeki derinliğinin bilinmesi klinisyenlere işlem sırasında güvenlik sağlayacağı düşünülmektedir. Ek olarak derinlik ölçümlerinin radyolojik yöntemlerle yapılabilmesi kadavra çalışmaları için gereken sürenin minimum düzeye indirilmesi açısından da değerlidir.

**Anahtar kelimeler:** A. facialis, A. facialis tipleri, BT Anjiyografi, Sulcus nasolabialis, Derinlik

## ABSTRACT

**Introduction:** Facial artery is the main vessel responsible for the arterial nutrition of the jaw and face area. Knowing the variable course of this artery is great importance in preventing complications after clinical applications such as intra-arterial filler injection into the facial area. The aim of this study is to examine the anatomy of the facial artery in 3D CT images in the Turkish population and to provide guidance for clinicians in the light of the data obtained against complications that may occur in procedures to be performed on the facial area.

**Method:** Individuals, 72 men and 38 women, between the ages of 18 and 65, were included in the study. Study cases were loaded Fuji PACS onto the Syngo.via (software version syngo.via VB30A\_HF06, Siemens, Germany) workstation. Various parameters of the facial artery were evaluated through CT Angiography images.

**Results:** Facial artery types 13 type 1, 92 type 3, 1 type 4 and 2 type 5 were seen on the right, while 5 type 1, 87 type 3 and 1 type 4 were seen on the left. A statistically significant difference was detected between the right and left sides in all types ( $p<0,001$ ). In the distance measurement of the facial artery to the lower level of the ala of nose, the medial canthus, midpoint of the orbit and the distance between the artery's exit point from the mandible and the labial commissure. ( $p=0,042$ ,  $p=0,010$ ,  $p=0,005$ ,  $p<0,001$ ). Additionally, the course of facial artery to nasolabial fold was also examined. Accordingly, while 82 medial, 13 lateral, 7 medial to lateral, 7 lateral to medial transition types were seen on right, 77 medial, 6 lateral, 6 medial to lateral, 8 lateral to medial transition types were seen on the left. Significant differences were found between the right and left sides in all types and between the right-left symmetry of all types ( $p<0,001$ ). In depth measurements, the difference between the skin-artery distance at groove of the facial artery and the bone-artery distance at the lower level of the ala of nose between the right and left sides was statistically significant ( $p=0,001$ ,  $p=0,021$ ).

**Conclusion:** As a result of this study, it is thought that knowing the variations of facial artery and its depth in frequently applied areas will provide safety to clinicians during the procedure. In addition, the ability to make depth measurements using radiological methods is also valuable in minimizing the time required for cadaver studies.

**HOSPITAL INFORMATION SYSTEM: A PILLAR OF SUCCESS IN COVID-19  
VACCINATION IN MOROCCO**

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**ABSTRACT**

In response to the Covid-19 pandemic, Morocco has implemented a national vaccination campaign, relying on an information system established in all Moroccan regions. This study evaluates the effectiveness of this system through a comprehensive analysis process, including surveys of healthcare personnel and vaccinated individuals. The results demonstrate that the information system is essential for coordinating efforts among various stakeholders, optimizing vaccine logistics management, and facilitating the collection and analysis of crucial data. The system has enabled real-time monitoring of the campaign's progression, quickly identifying risk areas and adjusting strategies accordingly. However, despite the observed successes, the study also reveals some constraints of the system that, once addressed, could enhance the effectiveness of future vaccination campaigns.

**Keywords:** Covid-19, vaccination campaign, information system, effectiveness, Morocco

THE IMPACT OF HIDDEN AGREEMENTS ON FREE AND EFFECTIVE COMPETITION

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**ABSTRACT**

Competition policy has been considered the primary and most important element in the establishment and functioning of the common market since the inception of the European Economic Community (EEC). The benefits of effective competition are reflected in low prices, quality goods, choice opportunities, stimulation of production efficiency, and innovation in entrepreneurship, all of which benefit consumers.<sup>72</sup> From this perspective, the competition policy of the EU aims to protect consumer welfare as its ultimate goal.<sup>73</sup> The objective of Article 101 of the TFEU is to protect competition in the market as a means to increase consumer welfare and ensure the efficient allocation of resources. According to this treaty, agreements that significantly impede, restrict, or distort competition within the EU internal market are prohibited.<sup>74</sup> The provisions (Articles 101 and 102) of the Lisbon Treaty establish the most important rules of competition law, specifically targeting cartel conduct. Article 101 of the Treaty stipulates that "all agreements between undertakings, decisions by associations of undertakings, and concerted practices which may affect trade between Member States and which have as their object or effect the prevention, restriction or distortion of competition within the internal market are prohibited." This provision encompasses a general prohibition in paragraph one and an exemption in paragraph three. The latter is also formulated in general terms and includes undefined economic terms such as "improvement of production or distribution of goods" and "economic and technological progress." These paragraphs can be seen as substantial parts of this provision, as they contain the rule and its exemption. They are joined by the second paragraph, which provides for automatic invalidity as a "civil penalty" for agreements that restrict competition in the market of EU countries. Competition authorities may order the prohibition of such agreements and may impose fines on undertakings for entering into such agreements. This rule applies to both written and unwritten agreements. However, not all types of agreements between undertakings are considered prohibited by law. There may be agreements between rival undertakings aimed at improving products or services, developing new products, or improving new methods of production. These agreements may be allowed as they have a positive effect on development in favor of the consumer. To delve deeper into this discourse, an analytical and comparative method has been used to achieve the objective of the theme regarding secret agreements and their impact on competition, bringing cases from both Albanian and European practices.

**Keywords:** Competition Policy, Treaty on the Functioning of the European Union (TFEU), anti-competitive agreements, Competition Authority, enforcement mechanisms.

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<sup>72</sup> M. Horspool, M. Humphreys, *European Union Law*, seventh edition, Oxford University Press, 2012, p. 429

<sup>73</sup> *Ibidem* p.430

<sup>74</sup> E. Papajorgji,, *International and Albanian Competition law*, First Edition, ILAR, Tiranë, 2013, fq.37

## 1. Introduction

Articles 101 and 102 of the Treaty on the Functioning of the European Union (TFEU) are designed to regulate the conduct of private enterprises that, through their actions and inactions, impede free competition in the market. Article 101 delineates that: "All agreements between undertakings, decisions by associations of undertakings, and concerted practices which may affect trade between Member States and have as their object or effect the prevention, restriction, or distortion of competition within the common market shall be prohibited." Although the Court of Justice of the European Union (CJEU) has not provided a specific definition of agreements, it has made it clear that agreements consist of the combination of three cumulative elements: cooperation between undertakings resulting in a restriction of competition. Given that we are dealing with three concepts which often encounter misinterpretations in practice, it is necessary to clarify the meaning of each of them. In order to clarify the meaning of the aforementioned elements in the context of competition law, we will now proceed to define each of them. The first element is that of "undertakings." The second element is that of "cooperation." The third element is that of "restriction of competition."

## 2. The concept of enterprise

The concept of "enterprise" is fundamental in competition law, although there is no universally accepted definition in the Treaty on the Functioning of the European Union (TFEU). According to the Court of Justice, the notion of an enterprise includes "any unit engaged in economic activity, regardless of its legal status and method of financing."<sup>75</sup> Economic activity encompasses both the production and distribution of goods as well as services." Thus, the key criterion defining an enterprise is its engagement in economic activity itself. The alignment of national legislation with EU law has resulted in the elaboration of Article 101 of the TFEU, particularly in Article 3 of Law No. 9121, dated July 28, 2003, "On the Protection of Competition," which provides a definition of agreements and the actions they encompass. In the context of this law, the concept of an agreement in competition law differs from its classical civil law interpretation. Therefore, the concept of an enterprise is associated with its essential economic character, where the formal autonomy of entities operating in the market is less important than the degree of independence with which they can operate within the market. A formally independent enterprise endowed with its legal personality does not constitute an undertaking under the application of competition law when the degree of control exercised over it by another enterprise is such that it prevents it from acting as an independent economic subject.<sup>76</sup> Thus, the criteria of economic activity and the independence of determining the behavior of the enterprise in the market establish the threshold for assessing the existence of an agreement between enterprises in the market. According to developed jurisprudence year after year, there can be no agreements between enterprises if there is no independence among economic operators. The Court, focusing on the autonomy of the entities' behavior, has directed that Article 101 of the TFEU does not apply to agreements or concerted practices between enterprises belonging to the same group as parent companies and subsidiaries if these enterprises form an economic unit within which the subsidiary lacks true autonomy in determining its market exit strategy.<sup>77</sup> Based on strict and careful analysis of the economic activity of an economic unit regarding its independence and autonomy, the legal classification of agreements between them is realized, thereby affecting the application or non-application of Article 101 of the TFEU. Continuing with European jurisprudence, the Court of Justice of the EU has also emphasized that organizations whose activities are not of an economic nature but of a social nature are not relevant to the classification of enterprises. Thus, the concept of an enterprise does not cover agencies with clear social objectives that are not involved in economic activities. An individual will be considered an "enterprise" under Article 101 of the TFEU as long as they engage in economic or commercial activities, such as in the case of self-employed individuals, consultants, sole traders, etc. The Commission has confirmed that self-employed individuals or artists may be considered enterprises. In the Meca-Medina case, C-519/04, Rec. I-6991, dated July 18, 2006, the Court provided the same solution for professional sports activities. Additionally, the public or private

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<sup>75</sup> Case GJED, April 23, 1991, Hofner and Elser v. Macrotron, C-41/90, Rec. I-1979.

<sup>76</sup> Decision of the GJED, July 12, 1984, Case 170/83, Hydritherm, summary 1984, I-2999

<sup>77</sup> Case Centrafarm BV, 15/74, rec.I.147, October 31, 1974

nature of the operator has no influence on the assessment of whether it carries out economic activity. State-owned corporations may be considered enterprises when operating in a market context, but this cannot be said in cases where they exercise their legal and public powers. Under the influence of the application of Article 101 of the TFEU and consequently Article 3 of Law No. 9121, dated July 28, 2003, "On the Protection of Competition," enterprises are also those that change legal form. In this case, the new legal unit cannot evade responsibility for the actions of its predecessor if there is an economic function and continuity between the original enterprise and the unit with which it has merged.

### 3. The concept of "agreement"

The concept of "agreement" is defined in Article 3 of Law No. 9121, dated July 28, 2003, "On the Protection of Competition." According to this article, the term "agreement" encompasses:

- Agreements,
- Decisions or recommendations of groups of undertakings,
- Coordinated practices.

In essence, agreements must be established between undertakings operating in a relevant market, between any natural or legal persons, whether private or public, engaged in economic activities.<sup>78</sup> The European Court of Justice has a broad jurisprudence concerning cases of agreements. According to it, and in the context of Article 101 of the Treaty on the Functioning of the European Union (TFEU), to consider the existence of an agreement, it is sufficient that the undertakings have expressed their joint intention and willingness to enter the market in a certain manner. The expression of this willingness takes various forms in different cases. But even without this formal element, such as signing, an agreement will be considered as such as long as it is implemented by the parties and reflected in their behavior in the market. Therefore, the formal element does not carry particular importance, as the agreement can be written or verbal. Of course, when it is formalized in its classical form, i.e., through a formal contract, there is no difficulty. The difficulty lies in detecting the agreement when it is informal, but the undertakings agree to accept the instructions of one of the parties silently but expressed through actions that result in the same behavior in the market. Another case where this silent willingness can be expressed is when verbal commitments are accepted or in the form of moral commitments, such as so-called gentlemen's agreements, under which the parties express confidence in pursuing a common goal related to their behavior in the market. Therefore, as observed, agreements in terms of competition law are a broad concept and differ from the classical understanding in civil law, where several elements, including formal ones, must be met for a contract (agreement) to exist. This has led to every action involving more than one undertaking in the market potentially being seen as an agreement that needs to be evaluated. However, this also significantly increases the difficulty of proving those agreements which, in themselves, are expressions of joint will in various forms with the aim of limiting or hindering competition.

The Law on the Protection of Competition also prohibits decisions of groups of undertakings, which may be of any legal or factual form, whether or not they are legal entities, private or public, profit-making or not, protecting the interests of member enterprises.<sup>79</sup> According to this understanding, such decisions may be specific rules or norms to be applied to participants in this group, recommendations, or compulsory decisions for the members of the group who express the desire and willingness to act in a coordinated manner according to the status of this grouping or association. Here, we can mention

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<sup>78</sup> Law Nr.9121, date 28.7.2003 Article 3/1 "For the protection of competition" specifies that an "Undertaking" is a natural or legal person, private or public, who performs economic activity. As an enterprise, the bodies of central and local administration, as well as public entities or institutions, are considered when carrying out economic activities.

<sup>79</sup> Article 3/2 of legal act Nr.9121, dated 28.7.2003, "For the protection of competition" specifies that: "a group of undertakings" groupings of enterprises of any form, legal or factual, which can comprise of legal entities, private or public, with a profitable or not purpose, which protect the interests of the member enterprises".

groups such as associations, unions, and any other voluntary grouping that makes decisions aimed at and resulting in the detriment of competitive conditions.

The most challenging form of agreements to identify are undoubtedly coordinated practices, difficulties that exist both conceptually, meaning what will be understood by a coordinated practice, but also in practice because the forms in which it can manifest through behaviors in the market are diverse. A coordinated practice is considered to be behavior that falls neither into the category of agreements nor that of decisions of groups of undertakings, and which is partially distinguished by taking into account acting in the same and simultaneous manner by different economic operators.<sup>80</sup> A coordinated practice is more informal than an agreement, in cases where undertakings, without drafting and signing a true agreement, maintain a stance that subjectively resembles a coincidence of spontaneous and responsible wills, and objectively consists of similar positions. A coordinated practice not necessarily will exhibit all the elements of an agreement (such as written forms, the existence of penalties in case of breach, or legal obligation to enforce), but the behaviors in the market between undertakings may result from coordination.<sup>81</sup> An agreement may exist if the parties have reached a consensus, even in silence and implied, to pursue a plan that restricts, or could restrict, their trade freedom by determining ways of acting or not acting reciprocally in the market. But, as explained earlier, the agreement necessarily requires the convergence of the will of at least two undertakings or entities to distinguish them from unilateral actions, regardless of how they manifest, but with the sole condition that it is a faithful expression of the common purpose of the parties. Parallel behavior between two or more undertakings is an indicator of the existence of a coordinated practice, but it cannot be the only credible explanation for the case, because such behavior, without further economic and structural analysis, could be the result of market transparency or oligopolistic market structure. Distinguishing between coordinated practice and parallel behavior (which is not prohibited) is quite difficult. In normal competitive markets, firms are unlikely to set prices at the same levels without making some kind of secret agreements due to differences in cost structures and expenses. But this can happen in oligopolistic markets, which exhibit characteristics such as the existence of a limited number of suppliers, high barriers to entry, minimal product differentiation, and price transparency, to the extent that price changes are easily noticed by competitors. In such conditions, firms tend to set prices at the same level not because of a secret agreement, but because each firm knows its reciprocal interdependence. This strong interdependence among enterprises means that none of them can take action without the knowledge of competitors and therefore without their response. If a firm were to lower prices and consequently increase its market share, this behavior would be followed by other firms, resulting in a spiral of price decreases, but not an increase in market shares for the involved firms. In these circumstances, none of the firms would unilaterally seek to raise prices because consumers would change their choices by turning to another competitor. Therefore, such behaviors arise as a result of a specific market structure, which dictates this mode of operation and is not a consequence of coordinated behavior.<sup>82</sup>

#### 4. Restriction of Competition

According to Article 101 of the Treaty on the Functioning of the European Union (TFEU), "all agreements between undertakings, decisions by associations of undertakings, and concerted practices which may affect trade between Member States and which have as their object or effect the prevention, restriction, or distortion of competition within the common market shall be prohibited."

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<sup>80</sup> Business Law in the EU, fq. 277, Cyril Nourissar, Third Edition 2010, Publishing house Papirus, albanian edition 2012

<sup>81</sup> The Court of Justice has defined the term "co-ordinated practice" in the case of *Imperial Chemical Industry Litigation v Commission 619/72* as a form of coordination of enterprise activity, which without being postponed until a genuine agreement, constitutes in practice responsible cooperation between the enterprises themselves, to the detriment of competition.

<sup>82</sup> *Petrofina SA v Commission* 1991 p. 1087 summerizes that... "The Court of First Instance has proved that the plaintiff had participated in the meeting with the object of setting prices and sales amounts during which the participating companies had exchanged information about the prices and they were willing to have and that they would practice in the market. In the court's opinion, such participation constitutes a co-ordinated practice aimed at influencing the position of the parties in the market."

This provision has been adapted in the case of Albania in Article 4 of Law No. 9121, dated July 28, 2003, "On the Protection of Competition," which states: All agreements that have as their object or effect the prevention, restriction, or distortion of competition in the market are prohibited, especially agreements that:

- a) directly or indirectly fix purchase or selling prices, or any other trading condition;
- b) limit or control production, markets, technical development, or investments;
- c) share markets or sources of supply;
- d) in commercial relations with other parties, apply different conditions for similar transactions, putting them at a disadvantage;
- e) condition the conclusion of contracts upon acceptance by the other contracting parties of supplementary obligations which, by their nature or by commercial usage, have no connection with the subject of these contracts.

Agreements prohibited under paragraph 1 of this Article and not exempted under Articles 5, 6, and 7 are void. For an agreement to be considered prohibited, it must have as its object or effect the prevention, restriction, or distortion of competition in the market. Determining the consequence of an agreement on the market is more difficult compared to determining its object. Agreements aimed at restricting competition are those that, due to their nature, have the potential to restrict competition, regardless of the effects these agreements may have on competition.<sup>83</sup> From the content of this provision, it is understood that it refers to both actual and potential breaches of competition rules. Therefore, for this provision to be applicable, it is not necessary for a breach (thus, a consequence) to have occurred; it is sufficient to assess in advance that a specific consequence could arise if the agreement were implemented. These agreements are considered anticompetitive regardless of whether they are between competitors operating at the same market level or at different market levels. Thus, assessing whether an agreement has as its object the restriction of competition or not is done by analyzing several factors related both to the content of the agreement as a whole and to the objectives or aims sought by the signatory subjects of this agreement. Both the intention and the anticompetitive effect must be assessed according to a hierarchical order. If the restrictive intent cannot be clearly distinguished, the assessment shifts to the examination of the restrictive effect.<sup>84</sup> The Court of Justice has clarified: "... competition rules must be viewed within the real framework. It is understood that for the court, the assessment of this intent or this restrictive effect of competition is made through an economic and pragmatic analysis, which in a way is quite relative. This is also the meaning of its statement when it insists that the restrictive intent must be assessed 'taking into account the economic context in which it will be applied' and that the restrictive effect must be examined 'in the real framework where it would occur if the problematic agreement did not exist.'<sup>85</sup> Thus, in the beginning, it is verified whether an agreement, in terms of its object, constitutes an infringement of competition rules by studying the objectives that the agreement aims to achieve in the economic context that will be applied. If this fact is verified, then the agreement must be prohibited without needing to verify its consequences, which may have occurred or may potentially occur in the future. However, when during the verification of an agreement its object does not seem to be anticompetitive, then the consequences that the agreement may have on damaging competition must be analyzed. According to Article 4 of Law No. 9121, dated July 28, 2003, paragraph 2, the penalty provided for agreements that violate competition rules is their nullity, as a civil penalty. Regarding the regime of nullity, the issue is resolved according to applicable national legislation, which determines the type and procedures followed for this declaration. It is important to specify whether this nullity extends to the entire agreement or only to those clauses that have as their object or effect the restriction or distortion of

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<sup>83</sup>Commission Notice on Guidelines for application of Article 81/3, paragf.21.I.( <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do>)

<sup>84</sup> Business Law in the EU, fq. 277, Cyril Nourissar, Third Edition 2010, Publishing house Papirus, albanian edition 2012, fq.264

*Grundig et Consten* (GJDKE 13 korrik 1966, Grundig et Consten, 56 and 58/64, Rec.337)

<sup>85</sup> *Ibid*, p. 264

competition. In the Consten-Grundig decision of July 13, 1966, the CJEU stated: "Absolute nullity, as sanctioned by Article 81(2) (Article 101 TFEU), affects only the elements of the agreement or the prohibited subject matter or the agreement as a whole, when such elements are essential to the agreement itself." Therefore, if an agreement contains clauses that restrict or undermine competition but can be separated from the rest of the agreement, the nullity will be partial, only for those clauses.

## 5. Exemption from the Prohibition of Agreements

According to Article 101 of the Treaty on the Functioning of the European Union (TFEU), paragraph 3, it is provided that paragraph 1 of this article may be inapplicable if certain cumulative conditions are met, such as contributing to economic progress, benefiting consumers, absence of unnecessary restrictions, and maintaining a certain level of competition<sup>86</sup>. In this sense, the agreement may be exempted either individually or by category. Until the adoption of Regulation (EC) No 1/2003, which entered into force on May 1, 2004 (providing for the decentralized application of Article 101 TFEU), these exemptions from prohibition were the exclusive competence of the European Commission. In this regard, even before the amendments to the Competition Protection Law No. 10317 dated September 16, 2010, "On some additions and amendments to Law No. 9121 dated July 28, 2003, 'On competition protection,' as amended, exemptions from the application of relevant sanctions were granted to three categories of agreements:

- Horizontal agreements;
- Vertical agreements;
- Licensing agreements.

With the entry into force of Law No. 10317 dated September 16, 2010, in order for the law to comply with community acts, agreements in block, individually, and those of minor importance are exempted from prohibition. With the authorization of the Council, the Commission has adopted numerous exemption regulations related to vertical agreements, horizontal agreements, technology transfers, and agreements in the field of car sales and insurance. When companies enter the scope of these regulations, they may benefit from exemptions and do not need to apply for notification procedures. Article 5 of Law No. 9121, dated July 28, 2003, "On competition protection," provides that: "Any agreement that contributes to improving the production or distribution of products or promotes technological or economic progress may be exempted from the application of paragraph 1 of Article 4, if a sufficient part of these benefits accrues to customers and consumers and when:

- It does not contain restrictions on the activities of participating undertakings that are not necessary to achieve the above objectives;
- It does not significantly restrict competition in relation to the products or services, the subject of these agreements."

Regarding the block exemption of agreements, the assessment is carried out by the Competition Authority, for which a decision is made by the Commission based on the relevant exemption regulations for the categories of agreements. These regulations specify in detail the conditions that agreements must meet to benefit from the exemption from the prohibition provided for in paragraph 1 of Article 4 of Law No. 9121, dated July 28, 2003, "On competition protection".

## 6. Case of Exemption from Prohibition in the Motor Insurance Market

The Competition Authority of Albania, with Decision No. 499, dated February 15, 2018, "On the exemption from prohibition of the agreement between insurance companies for the green card," decided to exempt from prohibition the cooperation agreement between insurance companies regarding the sale and administration of the green card. The exemption was granted with conditions and obligations based on Article 50, paragraph 2 of Law No. 9121/2003, with the aim of ensuring sufficient competition in the relevant market and ensuring that the agreement does not restrict the

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<sup>86</sup> Business Law in the EU, p.276

product or sales, does not divide the market, and does not allow customers to agree on sales premiums. The exemption period for the implementation of European Commission Regulation 267/2010, "On the application of Article 101(3) of the TFEU to categories of agreements, decisions, and practices in the insurance sector," and the regulation "On the implementation of Article 6 of the law on competition protection against certain categories of agreements, decisions, and practices in the insurance sector," is granted for a period of 2 (two) years. In case of non-compliance by participating undertakings with the conditions and obligations specified in paragraph 2, the Competition Authority will exercise its competence to revoke this exemption.

## 7. Conclusions

From the above, it can be concluded that the restriction of trade independence or freedoms of the parties may be interpreted as a limitation of competition. Furthermore, these agreements can affect the production, prices, or innovation of products and the parties involved, thus influencing the welfare of consumers. In conclusion, based on this logic, competition is, first and foremost, an economic concept that can be understood, measured, and evaluated in various ways.<sup>87</sup> For an agreement to be considered unlawful, it must significantly restrict competition. To assist companies in assessing their position in the market, whether they have restricted competition or not, the Commission published the "de minimis" guideline in 2001.<sup>88</sup> Agreements containing basic restrictions cannot benefit from the Commission's "De Minimis" Guideline. For them, it is assumed that they significantly restrict competition. The link between national and EU competition laws lies at the heart of the European Integration process.<sup>89</sup> The higher the level at which a coordinated system of national and Community competition laws is developed, which achieves effective prevention of national distortions within the "unified" market and protection against competition restrictions, the more the European integration process will be supported. On the other hand, if this system fails or is seen as ineffective, it will have negative consequences for the European integration process itself. An agreement that does not significantly restrict trade between states does not fall within the scope of application of the EU Cartel. In this case, the right of the national Cartel is applied.<sup>90</sup>

The Court of Justice in each case declares that the content of the object or effects will be read separately, which means that when an agreement has the object of "restricting competition," it is unnecessary to prove that it will produce anti-competitive effects. Only if it is not clearly demonstrated that the object of an agreement foresees the restriction of competition, the effect it causes must also be taken into consideration.

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THE EFFECTS OF LOSS OF BODY WEIGHT ON ELITE BOXERS. REVIEW

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**ABSTRACT**

**Background and study aim:** Although boxing is one of the sports that decently represents Albania in the world arenas, there are still deficiencies in the nutritional regime of boxers, as it is known and quoted in many studies that maintaining a boxer's body weight plays a primary role in his performance. **Methodology:** This paper aims to provide a systematic review of the available literature on physiological and performance responses to the specific activity of Olympic boxing. After a search in the databases EBSCOhost, Claravita, PubMed, Google Scholar, Elsevier, Scopus, Journal citation reports, etc., 81 articles were reviewed. To be included in the review, studies were required to meet the following criteria: 1- studies that included competitive amateur boxing matches 2- studies that monitored the physiological response and sports performance 3- the versions of the articles with full text which were accessible in prestigious journals mainly with impact factor in the English language. **Conclusion:** The most popular method of acute weight loss is increased exercise and restriction of fluid and food intake. To reduce weight, many athletes use the dehydration protocol to remove excess water from the body .One of the methods of reducing total body water is fluid restriction relative to normal daily lossesonditioning.

**Key words:** boxing, boxing and anthropometry, weight loss, nutrition

**INDRUDACTION**

According to the rules of amateur boxing, there are ten weight categories, from less than 46 kg to more than 91 kg for junior boys and elite men, and from less than 45 kg to more than 81 kg for girls of young and elite women. For little boys and girls, there are 13 weight categories from 46 to 80 Kg. (Langan-Evans et al., 2011). The Olympic rules of boxing have undergone some modifications of the performance of the match. Although boxing is one of the sports that decently represents Albania in the world arenas, there are still deficiencies in the nutritional regime of boxers, as it is known and quoted in many studies that maintaining a boxer's body weight plays a primary role in his performance. (Ozturk Agirbas, 2019 James P. Morton, 2010. Hall, C.J., & Lane, A.M. 2001).

**Methodology:**

To be included in the review, studies were required to meet the following criteria:

- 1- studies which include competitive amateur boxing matches
- 2- studies that monitor the percentages of muscle mass in high-level boxers and nutrition.
- 3- versions of articles with full text of studies which could be accessed in prestigious journals mainly with impact factor in the English language.

## Literature search strategies:

A literature review was conducted following the guidelines of preferred articles. A computerized search was performed on MEDLINE, web of Science, SPORTDiscus™, Google Scholar, Scopus, PubMed, Punlons and Journal citation reports. Databases (up to January 2023) are in English. The keywords used were as follows: "boxing, boxing and anthropometry, weight loss, nutrition." References cited are selected from original studies, studies were requested. Only scientific research relating to key components of boxers' fitness (ie, body composition and aerobic and anaerobic profiles, muscular strength and power) and using accepted methods that provide relevant practical applications to training and/or performance of the fitness of a boxer included in the current review. 81 studies were used for the realization of this study.

## Main points:

### □ Percentages of muscle mass in high-level boxers and nutrition.

Amateur boxing is a sport that in every bout requires athletes to meet a body mass limit by maximizing lean mass and minimizing body fat. Many studies have shown that top level amateur boxers of both sexes have shown a tendency towards low levels of body fat. (Chaabène et al., 2014).

It has long been believed that excess body fat is detrimental to overall performance as it is essentially "dead weight" This is perhaps most important in weight sports. Excess body fat in an athlete relative to someone of the same body mass equates to less muscle mass to support their weight. This results in a reduced power-to-weight ratio, possible reductions in movement speed and temperature regulation (Hansos E. et al 2009). The few publications that have reported data on anthropometry in combat sports; have used a number of different body density equations as well as measuring different skinfolds. One of the most commonly used equations involves measuring 7 skinfolds (Jackson A, et al 1980). The average range of body fat percentage in non-sporting individuals ranges from 10 to 20% for men and from 20 to 30% for women (Brouns F. 1994). From the studies presented, the average body composition of international level male boxers is approximately 12% fat. (Chaabène et al., 2014). Another author Smith M. S. (2006). reported greater body fat (mean  $10.1 \pm 2.6$  %) and fat pad sum (mean  $23.8 \pm 5.9$  mm) among elite youth boxers than among those of the high level of the elite (average  $9.1 \pm 2.3$  % and  $22.3 \pm 4.4$  mm for the fat layer). The authors suggested that this difference may be related to the fact that top-level boxers used weight loss procedures more often as well as differences in training regimen between the two age groups; for example, older boxers perform training sessions with higher loads (Trutschnigg et al., 2008). Weight loss procedures are commonly practiced by combat sports athletes (Morton et al., 2010), but only one study has found about the prevalence of weight loss at the level of Olympic boxers (Pero'n A et al. , 2009). This study showed that 100% of Olympic-level boxers from the Brazilian national team reported weight loss before the match (for this group, the average weight lost was 5.8 kg). Hall and Lane (Reljic et al., 2013) reported that boxers usually reduce (on average  $5.6 \pm 1.06$  %) of their body mass before competition. During weight loss, most athletes try to lose weight quickly (Franchini et al., 2012), so an important aspect during this process is the control of the food diet (Morton et al., 2010). The influence of the number of meals per day (two or six) with the same total energy intake during 2 weeks showed that the group consuming more meals per day reduced more body fat (mean  $2.6 \pm 0.4$ kg) as well as reduced body weight (mean  $\pm$  SD  $2.4 \pm 0.3$  kg) than the group that consumed only two meals per day (mean reduction in body fat  $1.4 \pm 0.4$  kg; reduction in body weight  $1.5 \pm 0.2$  kg) (Reljic et al., 2013). All these results indicated that consuming more frequent meals may be important for boxers to maintain their weight (Reljic et al., 2013). The nutritional requirements for boxers are higher than for the average population. In combat sports, the recommended nutrition and intake of energy substrates may further exceed levels for people who do not train (Barley et al., 2019). The key component to optimizing athletic performance in sports such as boxing is ensuring adequate energy consumption. Caloric needs for boxers training at moderate or high intensity can reach 40-70 kcal/kg/day depending on the intensity and frequency of training. For elite boxers, recommended energy intake may further exceed these levels (Kerksick et al., 2018). It should be mentioned that the fundamental factor of sports nutrition is the diet regimen and especially the time of nutritious meals. Timing of intake of nutritional substrates can improve muscle maintenance, protein synthesis, tissue recovery and repair

(Kerksick et al., 2018). Because of the influence of carbohydrates, fats, proteins, vitamins, minerals and water on energy availability and health, it is essential that boxers consume these nutrients to ensure optimal performance during training. Water is particularly important because of its involvement in nutrient transport, temperature regulation and most other physiological processes of the human body. The main source of energy for athletes is carbohydrates. The level of carbohydrates in a diet is related to muscle force production and muscle and liver glycogen storage. (Iraqi J et al., 2019). The recommended carbohydrate intake in a boxer's diet is related to the type and intensity of training and should range from 4–5 g/kg to 8–10 g/kg body mass. High intensity and endurance sports are associated with higher carbohydrate intake (Kerksick et al., 2018). Boxing as a combat sport involves aerobic and anaerobic metabolism during exertion and can deplete glycogen stores during training (Harris M, et al., 2018). In high-intensity sports, such as boxing, carbohydrate intake is recommended to be 10-12 g/kg body weight every day (Artoli G, et al., 2019). Carbohydrates are the most important macronutrient in the pre-workout meal. Pre-exercise carbohydrate intake has been shown to improve endurance and increase muscle and liver glycogen (Foskett A, et.al., 2008). Dietary proteins provide the building blocks of the body for the synthesis of muscular structures. Under ideal conditions, protein would never be the main source of energy during activity. This presents one of the main nutritional concerns for boxers practicing weight loss, the need for protein. Boxers may need 3 or 4 times more dietary protein than the average person, a daily protein intake of 0.8 – 1.0 g/kg body weight is needed to maintain adequate nitrogen balance, facilitate muscle synthesis and improve of muscle strength under stress (Hoffman et al., 2009). The Academy of Nutrition and Dietetics suggests that boxers consume between 1.2 – 2.0 g/kg body weight of protein each day, consistent with the demands of their training sessions (Academy of Nutrition and Dietetics, American College of Sports Medicine and Dietitians of Canada , 2016 (Campbell et al., 2007). It has been shown that the requirements for athletes who are losing weight can be higher and the recommended level of protein intake can gain 1.8-2.7 g/kg body weight to prevent loss of muscle mass during energy deprivation (Hector & Phillips, 2017). Each high-quality protein elicits different digestibility, physiological responses, and muscle retention (Dangin, M, et al 2002). whey and soy are digested quickly, which leads to a large increase in the amount of amino acids in the blood. In contrast, casein precipitates and coagulates in stomach acid, and absorption and digestion are lower. Furthermore, protein of whey and milk (containing whey and casein) are able to stimulate superior muscle protein synthesis than soy or casein (Eilkinson, S.B et al 2007). Deliberate water restriction is a very common practice among boxers for weight loss. (J. R. Hoffman & Maresh, 2011). Furthermore, several studies have found that many combat sports athletes, at various levels of competition, are insufficiently hydrated (Matthees & Nicholas, 2017). Researchers have observed the association of dehydration with disturbances in physiological functions such as increased heart rate and body temperature in dehydrated athletes who compete in high-intensity activities (Maughan R.J 2003). In 2017, the National Collegiate Athletic Association (NCAA) established several standards and regulations related to weight (National Collegiate Athletic Association, 2017). According to these NCAA guidelines, urine specific gravity (USG) must be used as a check for eligibility to be weighed before wrestling competition. Currently, college wrestlers are required to determine hydrated weight through weight measurement and urine specific gravity. To do this, college wrestlers must be present for weigh-ins and provide urine samples to be analyzed using a digital refractometer, providing an assessment of hydration status based on USG (Halfacre 2020).

To compensate for exercise-induced water loss, athletes should consume approximately 0.5–2 L/hr of water or 4–8% glucose and electrolyte solutions during and after exercise. (Browns, 1993) A good strategy to monitor changes in fluid balance is to weigh athletes before and after a training session in order to ensure the proper level of hydration and increase sports performance (Kerksick et al., 2018) . In the study by Stefanovsky et al. (2019) authors have shown that hydration status in young combat sports athletes during an off-season was not optimal. Similar results were shown in Petterson and Berg's research (Petterson & Berg, 2014) where 89% of combat sports athletes who participated in the study were hypohydrated on the morning of competition day. An effective method for improving short-term performance after acute hypohydration may be passive heat acclimation protocols (Barley et al., 2019). Sports supplements can also have an impact on strength, endurance and body composition. There are many substances that have a proven impact on training effectiveness (Halfacre

2020). The use of supplements can delay the onset of fatigue and allow an athlete to train at a higher intensity (Artioli et al., 2013). According to the Australian Institute of Sport, supplement ingredients are ranked into 4 groups to determine if the product is safe and effective in improving sports performance. Substances classified in group A have been scientifically proven to support and improve sports performance and prevent or treat clinical problems, for example sports nutrition, vitamin D, calcium, iron, caffeine or creatine. Substances listed in Group B are based on emerging scientific support and merit further research. This group includes for example: food polyphenols, fish oils, carnitine, vitamins C and E or branched chain amino acids. In group C, supplements do not support benefit among athletes and substances classified in group D are prohibited for use by athletes (The AIS Sports Supplements Framework. (2019) Substances such as stimulants, prohormones and hormone enhancers, releasers GH and peptides are on the World Anti-Doping Agency (WADA) list and should not be injected by athletes (WADA 2021)

### **Reduction of body weight:**

In most combat sports, athletes are classified into weight divisions according to their body weight. Most athletes tend to cut bodyweight in order to qualify for the same weight class as their opponent. (Reljic et al., 2013). Weight loss can be achieved through chronic or rapid weight loss strategies. Rapid weight loss involves the protocol when the body mass is reached a few days before the weigh-in. Both strategies can affect sports performance and provide negative health outcomes. Chronic weight loss is mainly related to lack of energy and can negatively affect immune function, metabolic rate, bone health, hormone processing, and lean body mass (Artioli et al., 2017). Studies have shown that weight loss can affect testosterone, cortisol, growth hormone, sex hormone-binding globulin, and insulin levels. Influence on the hormone process can result in decreased bone mineral density, adolescent development and interfere with blood glucose regulation (Barley et al., 2019) Other authors have shown that gradual weight reduction is more than two times less common than rapid weight loss in the wrestling community (Kordi et al., 2011). However, gradual weight loss is more preferable (Reale et al., 2017). If strictly necessary, rapid weight loss may be the method of choice to reduce body mass, but it should not exceed 5% of body mass. Moreover, it can only be reflected if the time from entering the weight in the competition is sufficient to feed and rehydrate (more than 3 hours) (Artioli G, et al., 2019). The most popular method of acute weight loss is increased exercise and restriction of fluid and food intake. To reduce weight, many athletes use the dehydration protocol to remove excess water from the body (Reale et al., 2017). One of the methods of reducing total body water is fluid restriction relative to normal daily losses. The reduction of body water can derive from extracellular and intracellular stores, that is, free and bound water (in glycogen stores and intestinal space) (Reale et al., 2017). The body's natural loss of water is caused by urination, defecation, breathing and sweating. Urination, as the main method of regulating water balance, is controlled by the renal system. The main hormones that influence fluid regulation are aldosterone and antidiuretic hormone-vasopressin (Sawka et al., 2005). Other authors showed that more severe weight loss strategies, including training in the heat environment, water restriction, use of plastic clothing and saunas, were practiced by professional and amateur boxers at the highest level (Amatori et al., 2020).

The effects of dehydration can be improved by using a low sodium diet. High sodium intake has been proven to lead to increased fluid retention. Reducing sodium intake a few days before weigh-in can intensify weight loss (Reale et al., 2017). Another effective weight loss method in combat sports is glycogen depletion (Reale et al., 2017). Glycogen is a branched polymer of glucose stored in the liver and skeletal muscles associated with water in a ratio of 1:3 g (in some cases this ratio can be higher) (Fernández-Elías et al., 2015). Glycogen storage can contribute 1-2% of skeletal muscle and up to 8% of liver weight. Another diet strategy to reduce body mass before the competition is reducing the total volume of food and fiber intake. Consuming high energy dense foods with a small amount of fiber can increase the loss of body mass. It has been proven that compared to high fiber diets, 2 days of low fiber intake helps cleanse the bowels. Intake of less than 10 g of fiber per day is known to be as effective as a way to reduce body weight without affecting performance (Reale et al., 2017).

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**THE RELATIONSHIP BETWEEN ON-JOB-EMBEDDEDNESS AND TURNOVER INTENTION AMONG HEALTHCARE PROFESSIONALS IN ETHIOPIA**

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**ABSTRACT**

Recent empirical research findings indicate that job-related turnover intentions are increasing alarmingly in most firms in emerging nations, posing problems in accomplishing organizational goals. This also applies to healthcare professionals. As a result, this study aimed to investigate the relationship between on-the-job embeddedness and turnover intention among healthcare professionals in Ethiopia. A correlational, explanatory study design was adopted to achieve this, with data collected using questionnaires and semi-structured interviews. The study's target population comprises ten regional states and two city administrations in Ethiopia. Four regional states were purposefully chosen and included in the study due to their many healthcare facilities and diverse professional populations. Stratified & random sampling, respectively, were used to identify 385 healthcare workers from 29 hospitals. In addition, six hospital higher officials and five human resource managers were interviewed (n=11). The survey results were analyzed using descriptive and inferential statistics. The data revealed that of the three components of on-the-job embeddedness, on-the-job fit has a solid negative significant relationship with turnover intention. In contrast, on-the-job sacrifice and on-the-job links have a mild negative relationship with turnover intention. Following the research findings, relevant recommendations were provided.

**Key Words:** On- the-job embeddedness, On-the-job fit, On-the-job link, On-the-job sacrifice, Turnover Intention

**MOBILE HEALTH: PROMOTING SEXUAL REPRODUCTIVE HEALTH AMONG YOUTH**

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**Abstract**

The promise of M Health interventions to promote sexual and reproductive health (SRH) is now widely recognized and evidenced by the rapid proliferation of mobile applications for a range of information, behaviors, products and services related to SRH.

As a result, this study evaluated the usability and acceptability of mobile health applications among Moroccan students from the Higher Institutes of Nursing and Health Professions (ISPITS) in Essaouira and Tetouan.

The questionnaire we used is self-administered, it targeted an accidental sampling of young students.

The main results of the present study showed that there is a predominance of participants who accept mobile health in general (92.2%), almost all of the participants (88.2%) accept to use mobile health for promoting their sexual and reproductive health (SRH), as well as the majority of participants (82%) feel ready to use mobile health related to sexually transmitted infections (STIs). Indeed, there is a perceived need in this regard, the respondents find that information is limited because these subjects are still considered taboo in Moroccan society. In addition, they expressed concerns about some issues that may prevent them from using mobile health applications related to SRH and STIs.

The operation, presentation and discussion of the results made it possible to formulate recommendations and suggestions, as well as to specify the priorities of actions aimed at promoting sexual and reproductive health and improving the prerequisites related to sexually transmitted infections among young people.

**Keywords:** mobile health, sexual and reproductive health, sexually transmitted infections.

DOES MONETARY POLICY AFFECT INCOME INEQUALITY IN TURKIYE?

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**ABSTRACT**

This paper explores the impact of monetary policies implemented by the Central Bank of the Republic of Turkey (CBRT) on income inequality from 1980 to 2020. Using a regression analysis with data from the World Bank, the International Monetary Fund, and the World Inequality Database, this study assesses how broad money supply, GDP, inflation, and unemployment rates correlate with changes in income distribution, measured by the Gini Index. The analysis begins with a comprehensive literature review, establishing that both conventional and unconventional monetary tools exert significant but diverse effects on income inequality, influenced by various internal and external factors such as economic growth, globalization, business cycle fluctuations, inflation, and socio-economic disparities such as unionization, gender, and educational gaps. Despite the lack of consensus on the primary determinants of income inequality, this paper identifies a distinct pattern in which expansive monetary policy in Turkiye has helped reduce income disparities. These findings contribute to the broader discourse on the efficacy of central bank interventions in managing economic inequalities and advocate for a more nuanced approach that considers the complex interplay between monetary policy and structural socio-economic factors. The results underscore the importance of a multifaceted policy framework that addresses not only economic indicators but also structural inequalities to effectively combat income disparities in Turkey.

**Keywords:** monetary policy, income, inequality, turkiye.

**1. INTRODUCTION**

After the Great Recession, the adapted monetary policies starting from the advanced economies to developing ones has drawn attention to neutrality of monetary policy towards income inequality. Although it has been known fact that there has been dramatic increase in income inequality in developed economies since the 1980s, reaching almost same level as beginning of 1800s, in other words 50% of global income concentrated in the top 10% in 1820 while this figure 55% for the top 10% earners in 2020 (Piketty, 2021). Global income inequality has reached the same level as in the early of the 19th and 20th centuries.

The post-crisis period has shown severe outcomes in terms of economic and financial stability by having negative effect on the income distribution and concentrating wealth concentration. Due to with this relevance, the great amount of various of studies carried out negative effects of adapted unconventional monetary policy after the crisis on income and wealth inequality in developed economies (Furceri et al., 2018; Stiglitz, 2015; Coibion et al., 2017; Mumtaz and Theophilopoulou, 2017; Hahm, Joon-Ho et al., 2022). Indeed, the negative economic effect of inequality on social peace and income distribution investigated in both conventional monetary policy (CBM) and unconventional monetary policy (UMP) by scholars. The interest rate channel and expected inflation examined in selected advanced and developing economies from 1990 to 2013 and the empirical results showed that the shocks of the CBM on income inequality has impact on inequality with consideration business cycles (Furceri et al., 2018). While Mumtaz and Theophilopoulou (2017) highlight the relationship between the Quantitative Easing (QE) program and income inequality in the UK that adapted after the post-crisis period, giving emphasis that the QE program widened the income gap between high- and low-income earners; Saiki, Ayako and Frost, Jon (2020) examined the financial market channel of the UMP towards inequality and the results showed that the stock and asset price movements widened

income inequality in Japan. The unconventional measures such as lowering political interest rates or unprecedented asset purchase programs from central banks across the globe in the crisis period aimed to pull the economic growth and inflation up the desired level. The main purpose is boosting aggregate consumption via aggregate demand. These aggressive monetary policies consequently had an impact on wealth and income distribution. The central bankers overlooked the side effect of their policies on inequality when they are shifting from conventional tools to unconventional ones. The one of the most prominent conventional tools is the political interest rate and that is determined by the Taylor rule , aiming price stability. However, after the Great Recession the aim replaced by financial stability and unconventional tools such as asset purchases programs, forward guidance to maintain the financial stability and restoring monetary mechanism (Saiki and Frost, 2014). Due to the differences in terms of economic and financial, these tools would vary between developed and developing countries. However, the tools are varied among central banks, the financial stability and restoring monetary mechanism aim was the same. To reach this goal, central banks lowered interest rates that was unseen level and then injected liquidity into financial markets by asset purchase programs and credit growth. This enabled to overvalued asset and stock price movements and benefited mostly to the households who are in high income group and has more access financial markets than the lower ones. Thus, the high-income earners experienced increase their income while in contrast the lower income groups have negatively experienced from that policy action because their income mostly composed of labor income and have a less access to the financial markets than high income earners (Saiki and Frost, 2014). On the other hand, while the stock and asset prices movements widened the gap between high-income earners in developed economies, this phenomenon experienced mostly for developing economies via lowering interest rates and credit growth. Because the lower tail of income affected negatively from the credit constraint in financial markets (Cetin et al., 2021). Moreover, their currencies are not reserve currency, thus, the central bankers of developing economies have also considered the exchange rate movements on inflation in their conducted policies (Gürkaynak et al., 2021).

Therefore, as a one of the G20 country and developing economy, the financial markets and monetary policy in Turkey has been examined by scholars for a long time. An increasing popularity of inequality among scholars worldwide, the impact of monetary policy on inequality in Turkey have been investigating. Although the main objective of Turkish Central Bank (CBRT) is a price stability, the CBRT has adapted various unconventional tools to maintain financial stability after the crisis by increasing money supply and credit growth as the FED, The Bank of England, the European Central Bank.

This study aims to investigate the impact of conducted monetary policy of the CBRT on income inequality over the period 1980 to 2020. With the using the model from Aye et. al. (2020) and data from the World Bank Database, International Monetary Fund World Economic Outlook, and World Inequality Database, the OLS regression is performed to analyze the impact of the monetary policy on income inequality in Turkey for the period. The Gini Index is used as dependent variable while the broad money sector (%GDP) is independent variable and denotes as broad money supply. The GDP, annual inflation rate and annual unemployment rate are used as control variable in the model. The stationary of the variables is checked with the Phillip Perron unit root test while the heteroskedasticity and the autocorrelation is examined with the Breush- Pagan test and Durbin-Watson test , respectively. Therefore, the income inequality in Turkey is examined with the money supply for the period.

The rest of the paper structured as follows: Section 2 aims to explain theoretical framework of monetary policy and income inequality while Section 3 devoted to the literature overview. Section 4 and 5 expresses the conducted monetary policy and income inequality in Turkey. Section 6 explains the data and econometric framework and the empirical results are given in Section 7. Section 8 summarizes our findings and concludes the research.

### 3.1 MONETARY POLICY

Monetary policy's main objective is price stability by controlling monetary base in the economy. Increasing or decreasing monetary supply in the economy are carried out according to maintain price

stability and this policy increase predictability and confidence towards policy and policymakers; consequently, it leads to promote to sustainable economic growth and employment Steigum (2004). This mechanism boosts the credibility of monetary policy and consequently have significant impact of rationale decision-making of public.

To execute this objective, the political interest rates for the interbank money market is set by central banks. In related to that, government securities are used to increase or decrease money supply in the economy. Central banks carry out this operation in open-market and while selling government securities aims to decrease money supply, buying has an opposite effect. Another instrument is to adjust the reserve requirements of banks Steigum (2004). Altering the requirements of banks implies to degree of credit growth of the banks and thus monetary supply is controlled. The execution of these instruments via central bank has a purpose on reaching desired level of price level and economic growth Mathai (2012). Therefore, it can be said that the prioritizing price stability in policy actions leads predictability for market participants and credibility for policy makers.

### 3.1.1 OPTIMAL MONETARY POLICY “TAYLOR RULE”

The Taylor rule is an inflation-targeting monetary policy which prioritizes price stability in policymaking and guideline for central banks to execute that policy. Central banks adjust nominal-short term political interest rates according to the Taylor Rule. The rule implies that when central banks set the interest rate according to the desired level inflation and output gap Taylor (1993). There is a trade-off between price stability and output in the short term and this stated in the rule as inflation and output gap. The aim is to increase predictability and credibility towards conducted monetary policy in the future via managing forward expectations rather backward expectations. Altering inflation expectations from backwards to forward enable central banks to be able to cope easily with inflation and maintain price stability. To execute that, monetary policy decisions anchored targeted inflation. The Taylor Rule can be expressed:

$$i = r^* + \pi^* + \alpha (\pi - \pi^*) + \beta (y - y^*) \quad (1)$$

Where  $i$  stands for short-term nominal interest rate;  $r^*$  is neutral interest rate in equilibrium;  $\alpha$  is coefficients for attributed to the inflation gap while  $\beta$  is output gap;  $(\pi - \pi^*)$  -  $\pi$  is actual inflation, and  $\pi^*$  is the inflation target ;  $(y - y^*)$  -  $y$  is actual output, and  $y^*$  is potential output (Lønning & Olsen 2000).

The rule suggests that if there are no inflation and output gap, central banks set their interest rate at same level as neutral rate Woodford (2001). If the current inflation is higher than the expected inflation, the central bank increases the short-term interest rate which will be higher than neutral rate. In the contrary case, the interest rate is dropped to maintain the price stability. Anchoring monetary policy decisions on expected inflation and bringing inflation expectations forward looking comes at the cost of trade-off between price stability and output in the short term. This cause conflicting views about the conducting monetary policy among central banks. Especially, during the Great Recession, with the guideline of the Taylor Rule, central banks cut their interest rate and reached zero lower bound where nominal short-term political interest rate could not drop further by central banks. Consequently, the insufficiency of Taylor Rule via interest rate decisions has become clear with the zero lower bound in environment of financial crisis and after that aside from the rule, various tools adapted to execute monetary policy decisions Gali (2008).

### 3.2 UNCONVENTIONAL MONETARY POLICY

As it mentioned earlier in the Great Recession, when conventional monetary policy actions are insufficient, the central banks adapted unconventional monetary policies and unprecedented tools. The

guideline of the Taylor Rule by constricting monetary policy decisions on the short-term interest rate has become inefficient when the interest rate reached to the zero lower bound. Wu and Xia, (2016). To overcome with that issue, central banks adapted unseen and untested measures such as large asset purchase programs (the QE), credit growth, macro prudential measures to increase liquidity of financial markets for maintaining financial stability. As an instrument, the quantitative easing programs has been implemented to restoring financial stability by develop economies' central banks across the globe. The Bank of Japan, the Bank of England, the European Central Bank, the FED adapted this tool to execute their monetary policy decisions. To carry out that aim, the needed liquidity injected to financial markets in unprecedented level by asset purchases (Bank of England, 2017). The mechanism behind these programs is that when central banks purchase the large amount of long-term assets from financial markets, and this increases money supply at the same time decreases of long-term interest rate. As a result, the cost of borrowing is reduced in the financial markets. The goal of QE is to affect the long-term interest rate rather than short time as it is in conventional monetary policy (Bowdler & Radia 2012). Similar with QE, another instrument is credit easing. However, it differentiates from the QE with composition of the balance sheet rather than size of it. To stabilize financial markets, as a market player, the central bank buys and sells various assets to change the composition of the balance sheet. Thus, the price of financial assets increases although vice versa for the yields Cecchetti et al. (2011). The forward guidance, as an unconventional instrument, is based on communications of central banks to public and aims to increase the confidence of consumers and investors in the individuals and corporates level via announcements about the direction of monetary policy in the future. Managing future expectations and encouraging consumption and investment through forward guidance has a direct effect on the economy. However, the credibility of the central bank plays a key role because it is crucial to be accountable, independent, and transparent in its previous policy decisions for public in order to be seen as commitment of the announcement of the central bank for future. (Filardo and Hofmann, 2014).

To maintain credibility and effectiveness, it is crucial for central banks to fulfill the expectations set by their public announcements. The public bases their economic and financial market decisions on these announcements, making it essential for the central bank to communicate its policies clearly. This communication should clearly convey the objectives, rationale, and duration of the policy to prevent misinterpretation that could lead to unintended market reactions and damage the bank's credibility (Filardo and Hofmann, 2014). Additionally, when central bank announcements are made with transparency and accountability, they align the bank's forward guidance with public expectations, significantly enhancing financial stability. This alignment supports macroeconomic improvements by boosting consumption, encouraging investments, and increasing employment (Plosser et al., 2013). The narrative form of forward guidance, in contrast to other unconventional monetary instruments, uniquely bolsters confidence in both the real economy and financial markets. The effectiveness of unconventional monetary policy (UMP) instruments like Quantitative Easing (QE) also plays a critical role. QE primarily impacts the economy through the portfolio channel by altering the asset composition of the private sector, which shifts from holding financial products to bank deposits (Gagnon et al., 2011). In scenarios where traditional tools like the Taylor Rule are inadequate, such as during a financial crisis or when interest rates are at the zero lower bound, QE aims to increase money supply, demonstrating its critical role in monetary policy. Due to the insignificant effect in monetary expansion, the long-term assets and bonds are preferred rather than short time because of the impact of maturity. The influence of short-term asset purchases on monetary supply would be marginal. However, long-term purchases have a substantial and direct impact on money creation and financial markets via impacting supply of assets and yields (Bowdler & Radia 2012). In addition to this, the conducted the UMP through large asset purchase programs affects economy via signaling and liquidity channel. In the presence of financial crisis, financial markets lose the confidence while financial equities lose their values due to the uncertainty of the amount of the risk which will be encountered by investors and lack of the liquidity of financial equities. Because investors seek higher return in their financial investments towards future risk and also the assets and bonds are expected be liquid in financial market. With the large asset purchase programs, the central bank increases the liquidity for the financial market to reduce risk premia of liquidity. Moreover, giving signals to the market which

direction will be taken with the clear communication and commitment adjust the expectations and decrease the uncertainty and future risk for investors in financial markets (Bowdler & Radia 2012).

For forward guidance, the main effect on the economy takes place through two channel, inflation, and consumption channel. The central bank affects the inflation expectations via announcements and as the higher expected inflations from public occurs, this has a diminishing effect on real interest rate. Because what is expected from the central bank commits its announcement. As a result, while saving decreases, consumption rises. Similar with inflation channel, in the presence of financial crisis, the central bank cut the short-term interest rate and what signal is giving to public is that financial stability and economic growth has gaining importance in the conveyed policy. As same in inflation channel, public increase their spending and decreasing their savings Plosser et al. (2013).

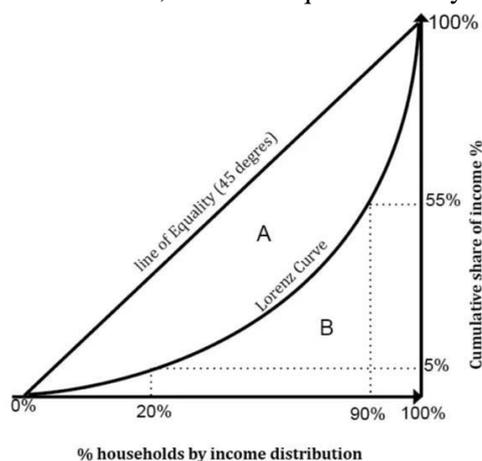
### 3.3 THE CRUX OF THE ECONOMIC POLICY : THE IMPORTANCE OF INEQUALITY

The debate on inequality has gained popularity due to the slow but steady growth in developed economies since mid-1980s. With economic policies after the Great Recession, the increase has gained momentum and as a result, numerous of studies conducted to investigate this economic phenomenon and its reasons. The reasons are ranging from economic growth, globalization, stickiness of wages to inflation , monetary policy, financial development. (Kuznets , 1955; Destek et al., 2021; Koçak and Uzay, 2019; Davtyan, 2017; Erosa and Ventura, 2002; Piketty, 2014). The one of the most known studies on inequality is investigated by Kuznets (1955). In the paper, he investigates the relationship between inequality and economic growth and emphasizes that the inequality first shows an increase as economic growth until the point of advanced progression in terms of economic development. After that point, in contrast early stages of the growth, when there is seen advance developments in the economy the inequality shows a decrease. According to argument, the inequality takes shape of inverted U shape curve as the economic growth progresses. Although the study states the detrimental effects of inequality, it also implies that it is necessary to economic growth and development and in the long-term, these effects will be lessened via broaden income distribution. In relation with that, Greenwood and Jovanovic conducted research on financial development and income inequality (Destek et al., 2021). Similar with the Kuznets, they found the similar relationship income inequality with financial development as economic growth. As the financial development growth occurs, the income dispersion is widened between high-income and low- income earners due to the accessibility of financial markets and the constraints in credit market. When the financial development reaches its maturity level, the income inequality is diminished. The accessibility of credit market and financial market for lower tail income has an improving effect on inequality overall. The phases of income inequality take the shape of inverted U as financial development arrive at its maturity.

On the other hand, various studies point out the detrimental effects of income inequality on economy in the long run. Keeley (2016) highlights the importance of income inequality on social mobility and education; Tansel et al. (2019) is giving emphasis on wage mobility and inequality; Brueckner and Lederman (2015) examine the negative effect of income inequality on economic growth and what is found contrasting with Kuznets is that the income inequality influenced growth negatively in the long run. Related to that, Tomita (2022) found the evidence that the rule of law and independence of central bank in its policy affects income inequality in the long run. The interrelation between income inequality and various economic indicators is investigated increasingly in different dimensions by scholars as the income dispersion is widened.

### 3.3.1 MEASURING INCOME INEQUALITY

There are various metrics and methods to measure and evaluate income inequality and the differences of measuring in inequality stems from property of these methods which investigate income inequality in different dimensions and preference of data collection according to the measures and metrics. While some of the measures focuses on cumulative income inequality in a society, some examine the income dispersion between top 1% income earner and average median income. For this reason, the studies on income inequality could come to different conclusion from each other because the focus was given particular component of inequality. As a result, adapted economic policies which can be whether fiscal or monetary, have a distinct impact in comparison with other components. Among the measurements, the most used ones are indices, ratios, and income shares. The Gini coefficient, Hoover index (also known as Robin Hood Index), Atkinson index and Theil index are common among indices. Ratios compares the different income groups such as 90/10, 50/10, 80/20. Similar with ratios, the income shares investigate particular income group over total income in population. In this paper, the income inequality in Turkey will be evaluated from the Gini coefficient. Before mentioning the Gini index, which is the most known and used, if necessary to mention other indices; the Hoover Index measures to income inequality by the assumption that in order to equal income earners into mean income in the society, how much income should be re- distributed in terms of percentage from high-income earners. Therefore, it is also called as “Robin Hood Index” because it gives information about how much the income from the upper tail of income redistributed to lower tail of income in order to equalize all incomes in the mean income (Rogerson & Plane 2013). Similar with the Hoover Index, the Theil index measures the distance of optimal income, which is equal for everyone, among different income group



in population. The Atkinson index gives importance on the lower tail of income distribution in income inequality. Determining how much weight is given to the lower tail of

**Figure 1 :** The Lorenz Curve and measurement of Gini coefficient

**Source:** <https://www.economicshelp.org/blog/glossary/lorenz-curve/>

income distribution, the income inequality of lower-income earners from the distribution is studied via the Atkinson Index (De Maio 2007). The Gini index estimates income inequality in population by overall income distribution. (Galbraith, 2012). The Gini coefficient takes value between 0 and 1 which taking value of 1 implies that all the wealth and income are concentrated in one individual and rest of the population has nothing in terms of wealth and income. While taking value of 0 is meant that all wealth and income in population are distributed equally among population, in other words, there is no income and wealth differences. It can be understood that as it goes from 0 to 1, inequality among society increases overall and for the contrary case, the overall income inequality decreases (Proctor et. al. 2016).

To measure Gini Index, the Lorenz Curve ought to be mentioned. The Lorenz Curve is way of illustrating income inequality in population, measuring and comparing cumulative household by income distribution to cumulative income share of income. To reflect better contrast of income inequality, the perfect equal distribution line (45 percent line) is drowned with actual distribution of income. In figure 1, it can be seen that, the Lorenz curve is taken shape as the income distribution as the share of income goes 100 per cent. According to the graph, the Gini coefficient equals to the area of A over A plus B. As for demonstrating the Gini coefficient in mathematical formula, it is represented :

$$G = \frac{\frac{1}{n^2} \sum_{i=1}^n \sum_{j=1}^n |Y_i - Y_j|}{2\mu} \quad (2)$$

Where  $n$ ,  $Y_i$ ,  $Y_j$ , and  $\mu$  represents number of observations, household income of  $i$ , household income of  $j$  and average household income, respectively (Kendall et al. 1946).

Unlike Atkinson index, the Gini index could not capture the income inequality in the upper and lower tail of income. However, the Gini coefficient captures the income distribution in the middle, and the changes in the middle-income shares could be examined by the Gini coefficient. Another property of the coefficient is that although it gives information about the overall income inequality in population, the Gini coefficient does not inform about which part of the income share is affected from inequality. Therefore, it is hard to make an in-depth analysis across countries about because even if the Gini index could be the same, it is irrelevant to make an analysis without knowing which part of the distribution causing and being affected from the income inequality (Rycroft 2013). On the other hand, the Gini index is easy to interpret and enables us to grasp the overall income inequality in population. Thus, it is often used to make the across country analysis in studies (Galbraith 2012).

Furthermore, the income ratios and shares approach for measuring income inequality provides an opportunity for studying particular groups. Investigating upper and lower tail of income distribution is primary difference than the Gini coefficient. The core meaning of the ratios and income shares is that how many times the particular income group earns more than other group. To be more precise, the 90th/10th ratio is one of the most frequently used and it analyzes that how many times the top 10% income group earns more than the lowest 10% income earners. Another is that 90th/50th ratio and it investigates that how many times the top 10% income group earns more than median income. Similar with the ratios, the income shares enable us to analyze the top of income distribution on total income, such as the top 1% or the top 0.1% over total or median income. With the sensitivity of the upper and lower tail of income distribution in measurement, the income ratios and shares interpret the changes in the distribution over the long horizon. However, unlike the Gini index, they are not capable across countries to study because they measure the income groups or shares over other ones in a country and therefore it creates relativity on the measurement of income inequality for that country. Thus, they are not appropriate for international comparisons (Bank, 2008).

### 3.4 INCOME INEQUALITY AND MONETARY POLICY

As we mentioned of monetary policy transmission channels into economy, we will explain how the conduct monetary policies whether it is conventional or unconventional have an impact on the income distribution. The leading idea in the monetary policy was that although the nominal indicators in the economy such as price level and wages could be adjusted by the executed policies, the real indicators such as aggregate output growth or long-term GDP growth could not be affected from it. Thus, the effect of monetary policy on economy is seen as transitory in the short-term and neutral in the long-term. However, after the Great Recession, the numerous studies disproved that idea in different perspectives for various economic indicators. When it comes to inequality, the monetary policy affects

the income distribution in population through various channels which are the income composition channel, the portfolio channel, the saving redistribution channel, financial segmentation channel and earning heterogeneity channel.

The income composition channel illustrates how households with diverse income sources react differently to monetary policy changes. While labor income constitutes a major part of household earnings, higher-income households also derive significant income from business profits and financial gains. Consequently, these households benefit disproportionately from expansionary monetary policies, which tend to increase profits and financial gains more than wages, thus widening income inequality (Lenza and Slacalek, 2018). Additionally, the earning heterogeneity channel shows that monetary shocks affect labor income differently across income levels, with lower-income groups also relying on government transfers. During recessions, expansionary policies can reduce income inequality by decreasing unemployment and increasing work hours, whereas tightening policies have the opposite effect (Hahm et al., 2022).

The third channel is financial segmentation channel. The high-income groups have better access to financial markets than low-income earners. Due to the heterogeneity of income across households, the higher-income earners hold financial assets and liabilities more than low-income earners. In the case of accommodative monetary policy, the increase in the money supply increases the general price level. What is meant that the high-income earners preserve and increase their income and wealth through financial markets while the low-income groups experiences loss in their income and wealth (Hahm et al., 2022). The saving redistribution channel impacts the income inequality through the interest rate decisions in the monetary policy. Due to the fact that the higher-income groups are more prone to have high saving ratio than low-income earners, the adjustments in the interest rate decisions could have an effect on income inequality. The decision of increase in interest rate benefits the savers, high-income groups, while it hurts borrowers, low-income groups, by making difficult to access bank loans and it results in widening inequality (Hahm et al., 2022).

The fifth channel is portfolio channel, and it is defined as the effect of monetary policy developments and shock on income inequality through financial assets and liabilities. While low-income households hold more currency than high income ones, their portfolio composition in terms of financial is relatively poor. With the unexpected monetary shock and increase in inflation, the lower tail of income earners will be affected negatively than higher income tail (Erosa and Ventura, 2002). Moreover, the amount and maturity of financial assets and liabilities varies across households. A drop-in interest rate reduces the discount rate of assets and liabilities. Therefore, loosening monetary benefits the savers who they hold long-term duration of asset and debtors who they have short-time duration of financial liabilities (Hahm et al., 2022).

Besides, the degree of leverage also has a prominent role for income distribution in portfolio channel. The lower-income groups are prone to be dependent on borrowing for their asset purchases, especially housing, and an increase in asset prices will benefit more high-leveraged households than low-leveraged households. It emphasizes that the increase in asset prices, which are distributed more equally such as housing, decreases the wealth inequality due to the high leverage of low-income households. The rise in asset prices that are mostly unequal distributed such as financials assets and bonds increase the wealth inequality (O'Farrell and Rawdanowicz, 2017).

#### 4. LITERATURE REVIEW

As we mentioned in previous chapter, increasing and spreading inequality after the Great Recession becomes more apparent and common economic issue for policy makers across advanced economies (Bernanke; 2015a ; Draghi, 2016). It aroused attention of scholars in order to give insight into the primary reasons of inequality and this leads contradictory views about the causes. Some argues that

the loosening monetary policy increased the income and wealth inequality in post-crisis period (Stiglitz, 2015; Domanski et. al., 2016; Mumtaz and Theophilopoulou 2017) while some argued that the effect of monetary policy on income inequality is transitory. It has negative impact on income inequality in the short period of time, however, it has no effect in the long period of time (Bernanke, 2015a ; Bernanke 2015b). Others argues that the conducted policy decrease the inequality overall (Lenza and Slacalek, 2018; Casiraghi, 2018, Colciago et. al., 2019). As the European Central Bank (ECB) president, Draghi (2016) quoted:

“... Monetary policy has positive distributional effects through macroeconomic channels. Most importantly, it reduces unemployment, which benefits poorer households the most.”

Due to the indigenous factors that has an impact on inequality for across countries, the prominent effect of monetary policy on inequality is hard to determine whether it is conventional or unconventional. In this chapter, we will make a literature review in order to investigate the relationship between monetary policy and income inequality and give place to conflicting views. In Eurozone, Lenza and Slacalek (2018) investigated the effect of unconventional monetary policy on inequality by examining the ECB asset purchase program. To determine the relationship, aggregate time series and country specific variable was used, and they used the VAR method for France, Germany, Italy, and Spain. They found that after the announcement of the QE, the monetary policy affected inequality through the income composition channel, the portfolio channel, and earning heterogeneity channel. Evaluating the asset prices and their effect on macroeconomic variables area reveals that the QE program in the euro area reduces the inequality in the lowest tail of income distribution, increasing total employment share and wages. After the one year of the announcement, there is an improvement in the Gini coefficient, decreasing from 43.1 to 42.9. Moreover, the study points out that although the monetary policy has no impact on income and wealth inequality in the long run, it has a positive effect on the aggregate consumption in the short run. The households which they have high propensity consume and low level of income or liquid assets benefited from the expansionary monetary policy that promote their employment and income. Related to that, Casiraghi (2018) supports the idea of the distributional effect of monetary policy varies according to income composition and the balance sheet of households. In his study, the effect of the ECB's the UMP investigated in Italy. To do this, the Survey of Household Income and Wealth data was used. The micro-level data not only income but also financial wealth for households in the Italian Household Survey. It provided a basis precise measurement for the relationship between the monetary policy and income inequality. What study highlights is that as the realization of execution of ECB's unconventional ultra-loosening policy benefited at the lowest tail of income distribution via financial markets. The increase in employment and economic activity improved their income because the creation of jobs and wages are sensitive to business cycles, and moreover, it also provides basis for bank loan growths for the lower tail of income earners. Besides, the upper tail of income earners also benefited from the policy via rising asset and bond prices due to the balance sheet. The increase in asset and bond prices stimulates their financial wealth. Therefore, the study emphasis that the effect of the UMP is U-shaped; while less wealthy households benefited from economic activity, the top income earners benefited financial gains mostly. As the lower income wealth households benefited from the loosening policy via the reduction in cost of borrowing, higher income households increase their wealth due to their balance sheet. Thus, it is stated in the study that the impact of the policy on inequality is unimportant. Colciago et al. (2019) found out that the empirical studies on the effects of conventional and unconventional measures of monetary policy on inequality are ambiguous in Europe and there is a need for further research in future. The study highlights that as wage rigidities, income heterogeneities across households and imperfect markets conditions are linked to rise in inequality through monetary policy. The transmission mechanism of monetary policy and the multiple distribution channels are examined in isolation . Therefore, the impact of the monetary policy on inequality causes contradictory findings. Although it is known fact that higher inflation, above particular level, increases inequality, this is not valid for the unconventional measures which are taken in crisis and post-crisis period by central banks.

Because the accommodative policy boosts the employment and the decline in earning inequality overall offsets the negative effect of earning heterogeneity.

## 4.1 MONETARY POLICY IN TURKIYE

In this section, the monetary policy together with the policy objectives and instruments of the CBRT will be explained. In order to draw proper frame for the relationship between monetary policy and income inequality in Turkey, the conducted policies from 1980 to 2020 is explained in four subsections. The major shift in monetary policy starting from 1980 will be addressed until the 2001 Financial Crisis. Following that, the period of the 2001 Financial Crisis until the Great Financial Crisis (GFC) will be evaluated. Afterwards, the policy actions in the pre and during the GFC period will be examined. Lastly, we will be given insight into the conducted monetary policy from post-GFC period until 2020. As its counterparts in developed and developing economies, the CBRT has main aim in its policy actions is to maintain price stability after 2001 with the legislation decree in that same year. The major step towards in the way of that legislation was taken to execute policy actions as modern sense for the CBRT in 1980 as the major changes in the economic structure and policy in Turkey has begun. The neo-liberal view of economic policies was adapted, altering from the import- substitution economic policy towards to export-led growth economic policy. The liberalization of economy and implementing neo-liberal policies on real economy and financial markets has continued until 1989 with the full liberalization of the financial market. In line with these policy actions, the CBRT started to conduct open market operations in 1987. In 1989, the CBRT announced that the fixed exchange rate system abandoned due to the liberalization process of the Turkish economy, and the flexible exchange rate system adapted for that purpose (The CBRT, 2023a). In the environment of unregulated capital outflow and its speculative attacks on financial market, the fixed exchange rate regime and constantly increasing current account deficit led to macroeconomic and financial instability and this economic turbulence for Turkey ended up at first in 1994 Economic Crisis and then in 2001 Financial Crisis (Orhangazi and Yeldan, 2021). This resulted in the major structural reforms for the Turkish economy and the CBRT. After the 2001 Financial crisis, the CBRT has gained its independence in its policy decisions and its policy instruments with new legislation (Gürkaynak et. al. 2022). To maintain price stability, the CBRT adapted the inflation-targeting policy framework. Until the Great Recession, with the unprecedented level of capital flow to the financial market and growing external debt, the Turkish economy has shown constant economic growth. In this general framework of the Turkish economy, the CBRT maintained the price stability until the crisis (Orhangazi and Yeldan, 2021). During the crisis and post-crisis period, the Turkish economy recovered with high pace relatively other developed and developing economies. However, the macroeconomic indicators have showed negative signals through foreign exchange rate, unemployment, and inflation starting from 2012. Growing political pressure for the CBRT in its policy actions, the independence of the CBRT has been questioned with the 2018 exchange rate shock. In August 2018, the Turkish lira lost its value against USD about approximately 35%. Lowering the short-term interest rate against the soaring inflation and the significant increase in the credit growth had a dramatic consequence for Turkish economy and households. Abandoning the common heterodox monetary policy view via lowering political interest rates under the inflation rate after 2018 worsened the economic conditions (Gürkaynak et. al. 2022). Before analyzing the conducted monetary policy in detail during that period, the policy instruments of the CBRT will be presented. Alike with other developed and developing economies' central banks, the CBRT has three conventional main policy instruments when carry out its policy actions which are open market operations, rediscount rate and reserve requirement ratio. With the Great Recession, new policy framework was implemented by the CBRT and the new policy instrument of macroprudential measures adopted in its policy-action mechanism (Özgür and Yeldan, 2021). The open market operations are mainly used for increasing or decreasing money supply in the economy through financial markets. The CBRT purchases or sells securities in the open market to control and put the money supply up the desired level for the economy. Besides that, increase and decrease of the short-term political interest rate decisions also is used for the same purpose. The short-term political interest rate represents the cost of the borrowing for banks from the CBRT and the interest rate has a direct impact on the economy, impacting aggregate demand and supply (The CBRT, 2023b). According to the desired direction of the economy and price level, the interest rate is adjusted. When the aggregate supply exceeds the aggregate demand, the CBRT increases the interest rate, and this increases the

monetary supply in the economy. In contrast, when the demand exceeds the supply, the CBRT increases the interest rate, and this decreases the money supply. The CBRT gives direction to inflation, aggregate output, and employment via the short-term political interest rate decision (The CBRT, 2023b). The function rediscount rate as an instrument is to decrease or increase of the money supply via adjusting rate of loans that the CBRT provides credit to banks. Increasing the discount rate has a tightening effect on the money supply while decreasing of it has loosening effect (Berument, 2007).

The reserve requirement ratio describes that the degree of deposit of banks hold in cash in the CBRT. Although there is no reasoning to hold the large amount of cash in the hands of the CBRT from the perspective of banks, the ratio enables the CBRT to control money supply in the economy (Aysan et. al., 2014). The increase of the requirement ratio is mean that instead of lending credits, banks are required to hold more bank deposit in cash. Thus, the money supply is decreased through credit growth. When The CBRT decreases the ratio, banks are allowed to give more credits to market and there the money supply in the economy is increased. Another instrument of the CBRT is macroprudential measures. The adaptation of the macroprudential measures in the CBRT as a policy instrument was a need arise from the consequences of the Great Recession. With the announcement of new policy framework in 2010, the CBRT adapted another policy objective of financial stability together with primary one, price stability. Therefore, the main purpose of macroprudential measures for the CBRT is to overcome the negative effect of short time capital inflow movements on the financial market and maintain financial stability and macroeconomic stability. To do so, the macroprudential measures implemented according to the policy actions such as interest rate corridor and reserve option mechanism. The main purpose of the interest rate corridor is to eliminate the negative effect of shift in the supply of international capital flows. The reserve option mechanism is to stabilize the demand for the foreign exchange (Aysan et. al., 2014).

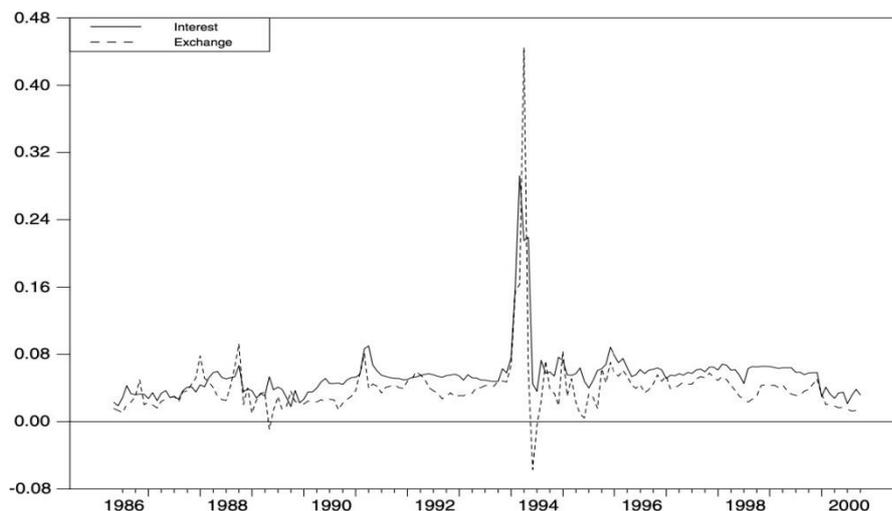
## 4.2 THE DEVELOPMENTS OF MONETARY POLICY IN TURKIYE

### 4.2.1 THE PERIOD OF 1980 AND THE 2001 FINANCIAL CRISIS

After the economic crisis and political turmoil during 1970s, the Turkish economy experienced major shift in its economic policy, giving direction from import-substitution economic policy to export-oriented growth economic policy. Moreover, the wave of the liberalization process of the developed and emerging market economies worldwide was on the horizon. Therefore, starting from 1980, the economic policy together with the monetary policy has been adjusted according to the economic and political conjuncture. From the monetary policy side, the shift in the monetary policy and liberalization of the financial markets brought its pros and cros. The liberalization process was conducted fractionally. The open market operations of the CBRT begun in 1987 while the full liberalization financial market with the capital flows movements realized in 1989. At the same year, the fixed exchange rate was abandoned, and the flexible exchange rate mechanism was adapted with the announcement of the CBRT. However, similar with countries that experienced the liberalization process, the unregulated capital inflows encourage the economic growth significantly via affecting boosting business cycle. In the environment of liberalized financial market and unregulated capital inflows under the semi-pegged exchange rate mechanism, the short-term speculative attack of capital inflows harmed the macroeconomic and financial stability (Özgür and Yeldan, 2021). Therefore, unlike its counterparts in developed economies, the CBRT had to take the financial stability and exogenous exchange rate shocks consideration with its policy actions. As Berument (2007) pointed out that the central banks in emerging economies have to pay necessary attention to exchange rate movements in its policy actions in order to maintain price stability in high inflation periods. Due to the high inflation periods, public prefers using foreign currency to protect themselves from the inflation and preserve the value of their wealth. If the central bank set the short-term interest rate under from the inflation, this causes the depreciation of the domestic currency and increases in the dollarization. Moreover, the central bank observes the foreign currency reserve level in order to prevent balance of payment crisis or the short-term speculative attacks of capital flows. Therefore, setting the interest rate decision have a direct impact on the foreign exchange rate movements. Foreign currency reserves increase as the increase in the interest rate decisions above the inflation rate via reducing demand from

households or encouraging capital inflows. A cut in the interest rate below inflation rate has contrary impact. Between 1975 and 2000, Turkey experienced a significant average annual inflation rate of 52.3%. This persistent high inflation did not escalate into hyperinflation but continually impacted price stability, highlighting the relevance of currency substitution in policy discussions. The Central Bank of the Republic of Turkey (CBRT) saw its monetary strategies heavily influenced by inflation, interest rates, and foreign exchange rates from 1986 to 2000. A key tactic involved setting interest rates in relation to the depreciation rate of the Turkish Lira; lower interest rates compared to depreciation encouraged public preference for foreign currencies, reducing the CBRT's foreign currency reserves. Conversely, higher interest rates had a tightening effect on monetary policy. Political instability from 1987 to 1991, marked by frequent elections, led to fluctuating economic policies—typically expansionary pre-election and restrictive post-election. The new government in 1993 prioritized financial over price stability by cutting short-term interest rates, aiming to spur growth and reduce unemployment. However, this approach was unsustainable, contributing to economic vulnerabilities and the 1994 economic crisis. Subsequently, an IMF stand-by agreement was implemented to stabilize the financial market, though political pressures continued to induce short-term policy decisions.

**Figure 2:** *The Interbank Interest Rate and Depreciation Rate*



**Source:** Berument, Hakan (2007). “Measuring monetary policy for a small open economy: Turkey”, *Journal of Macroeconomics*, Vol.29

As a result of this, The IMF program was abandoned in 1995. The CBRT announced that the primary objective would be financial stability in 1996, neglecting the price stability. However, this policy shift resulted in high external debt and with the Russian financial crisis 1998, the monetary policy has tightened again until 1999 when Turkey faced the biggest earthquake happened. This negative social and economic effects of the natural disaster along with political and economic instability for during 1990s led Turkey the internal financial crisis in the 2001 (Berument, 2007). The poor governance, lack of institutional reforms, lightly regulated financial market, high level inflation and increasing external debt were main reasons of the 2001 Financial crisis. From the monetary policy view, the short-sighted in policy actions, the lack of independence of the CBRT in its policy and neglecting price stability during were the main issues. The crisis resulted in more than 50% devaluation of Turkish Lira, more than 60% inflation and 7.4% decrease of the GDP (Özgür and Yeldan, 2021).

After the 2001 crisis, the orthodox economic and monetary policies were returned via the implementation of the new IMF stand-by agreement, reducing external debt, controlling inflation, liberalization, and marketization of the domestic economy. For the monetary policy, the independence

and credibility of the CBRT was crucial to maintain price stability and therefore it was restored with the new legal framework. In order to bring high inflation down to desired level the inflation-targeted monetary policy framework adapted. With the increasing real interest rate and the independence of the CBRT reduced the risk premium of Turkey and attracted capital inflows through financial market and this had a reducing effect on inflation. Moreover, maintaining price stability boosted aggregate consumption and encouraged investment and as a result, led Turkey for balanced economic growth together with the fiscal policy (Özgür and Yeldan, 2021).

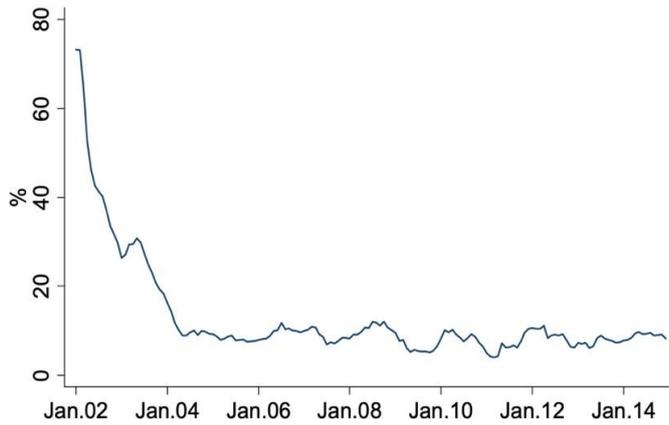
### 4.2.2 FROM THE 2001 FINANCIAL CRISIS TO THE GREAT RECESSION

The main determinant during period for economic and monetary policy are determined as getting out of the vicious circle of inflation spiral during 1990s, maintain price stability and sustainable, balanced economic growth. Firstly, the IMF stand-by agreement implemented by making no concessions and it was the first major step to restore the financial stability and stabilize macroeconomic variables. The agreement was consisted of three main steps which are to decrease government spending, recapitalize of the banks and giving independence to the CBRT. Therefore, the aim of the agreement was defined as restraining fiscal policies, restoring the financial system, and forming monetary policy as in the modern sense. With this purpose in mind, the fixed exchange regime was abandoned, and the floating exchange rate regime was adapted (Gürkaynak et. al. 2015). With that improvement, the exogenous shocks of the exchange rate movements were reduced in the inflation-targeting monetary policy framework. The triggering deflationary pressure of high inflation on Turkish Lira through foreign exchange were brought under control with the floating exchange rate mechanism and therefore, policy actions of the CBRT were taken according to the primary objective, price stability.

In order to bring inflation down, the CBRT tightened the money supply via increasing real interest rate. The Figure 3 shows that annual inflation rate in percentage in the post-2001 crisis period. After the crisis, the inflation rate almost was 80 per cent in the beginning of 2002 while after the execution of the IMF program and the restored credibility of the CBRT bring inflation down under 20 per cent in 2004. Besides, the credibility of the CBRT and increase in the political interest rate attracted the capital flow in the unprecedented level and as a result, it boosted investment and aggregate consumption. After restraining the government spending with maintaining political stability, the average real GDP growth between 2002 and 2006 reached 7.2% per cent (Gürkaynak et. al. 2015).

From the view of monetary policy, the CBRT set the real interest rate high in order to maintain price stability and control the inflation via targeting bring inflation down to the target of 5 per cent. In post-2001 period, the real interest rate of government securities remained above 10 per cent for that purpose until the Great Recession (Özgür and Yeldan, 2021). Between 2002 and 2006, the main priority for the CBRT in the inflation- targeting monetary policy framework was given weight into the inflation gap rather than output gap (Duran and Karahasan, 2022). Therefore, the economic growth was partly stemmed from the increase in the short-term capital inflows, which are sensitive to interest rate, and the external debt. In that macroeconomic environment and the level of the political interest rate, the Turkish Lira appreciated against foreign currencies, and this had direct impact on inflation and import. Due to being given weight the price stability, the CBRT saw the appreciation of the lira as a contributory factor on its policy in keeping under control of inflation. On the other side, the import of consumption and intermediate goods was shown dramatic increase during that period and the dependency of the import of Turkish economy increased overall.

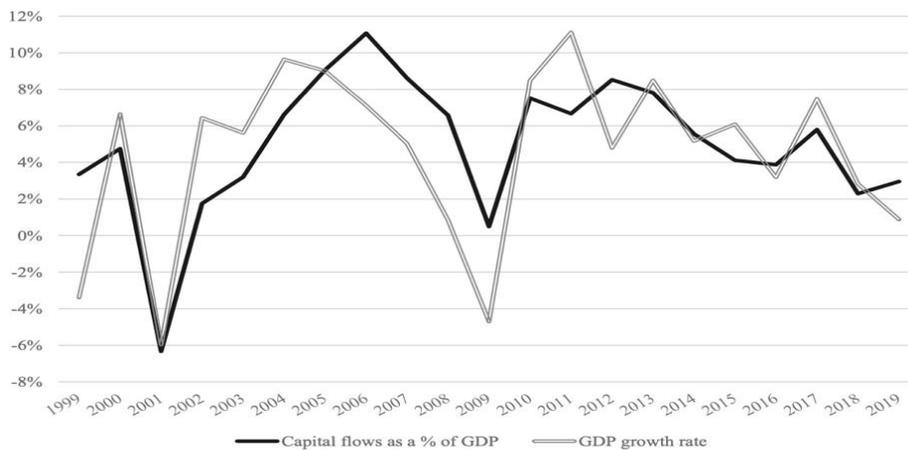
**Figure 3: The Inflation Rate**



**Source:** Gürkaynak, Refet S. et al. (2015). “Monetary policy in Turkey after Central Bank independence”, CFS Working Paper Series, No. 520.

However, Özgür and Yeldan (2021) pointed out that the real GDP growth occurred due to the increase in the short-term capital inflows and soaring external debt. The level of increase in the capital inflows stemmed from of the rise in the global liquidity from advanced economies to emerging market economies. Moreover, the increase in the global liquidity and low interest rate environment globally reduced the cost of borrowing and therefore, the external debt of Turkish economy increased similar with the capital inflows.

**Figure 4: Foreign Capital Inflows as a Percentage of GDP and GDP Growth Rate**



**Source:** Gürkaynak, Orhangazi, Ozgür and Yeldan, A. Erinç (2021). “The Re-making of the Turkish Crisis”, Development and Change

Related with that, after the beginning of the liberalization process, the current account deficit of Turkey was negative but remained in the low level. However, it shown a constant increase during post-2001 crisis period and the external debt rose from just over 100 USD billions in 2002 to over 250 USD billions in 2007 (Özgür and Yeldan, 2021). The composition of the external debt reveals that fragility of the economy and conducted monetary policy. The fiscal discipline which was built in the post-2001 period remained stable by showing low level in the texternal debt. Besides, although the financial sector’s debt was low, the debt of non-financial sectors increased rapidly. In the upward phase of the business cycle during mid-2000s , this debt composition was overlooked by the policy

makers because the improvements in the financial market and increasing credit growth were the main components of the economic growth during period. As we will mention, due to the dependency of economic growth on the credit growth during this period, the output gap in the policy actions of the CBRT would be gained more importance with the global financial crisis. Moreover, the foreign exchange rate movements would be monitored closely by the CBRT because of the import dependency of the aggregate consumption and net export revenues.

### 4.2.3 THE PERIOD OF THE FINANCIAL CRISIS

Before the Great Financial Crisis (GFC), Turkey experienced low economic growth signals due to global financial developments. Despite strong growth post-2001, structural issues like high inflation, unemployment, current account deficits, low savings, and high foreign debt persisted. While price stability was achieved through IMF programs and CBRT policies until the GFC, other macroeconomic indicators continued to show problems. Post-GFC, major central banks, including the FED and ECB, set historically low interest rates to stimulate consumption and stabilize finances, leading to unprecedented global liquidity. The CBRT also reduced its policy rate from 16% in 2009 to 5% in 2011, aiming to maintain financial stability and stimulate the economy. However, Turkey's rates remained relatively high due to the significant impact of short-term capital inflows on economic growth and inflation, which were influenced by foreign exchange rates and the cost of imported goods. The output gap became a more prominent consideration in the CBRT's inflation-targeting framework post-crisis, as it struggled with inflation rates higher than its target during the crisis period from 2010 to 2014.

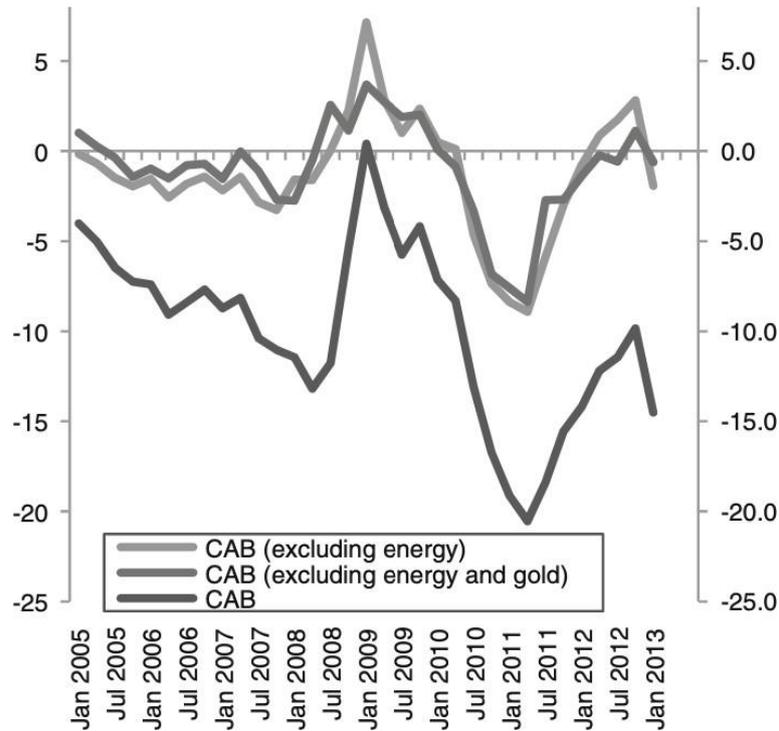
Due to the volatility of the capital flows in the during and post-crisis period, the emerging market economies' central banks adapted new unconventional policy instrument, macroprudential measures, in order to maintain financial stability in the volatile global financial environment. In this sense, the CBRT adapted various macroprudential measures such as active use of reserve requirements, asymmetric interest rate corridor between overnight borrowing and lending rates, reserve option mechanism in its policy tools (Aysan et. al., 2014). The interest rate corridor measure was mainly related to movements of the short-term capital inflows. The purpose of the interest rate corridor was to determine the risk factor of the changing level capital accumulation into financial market according to the changing global risk factors. The reserve option mechanism was to reduce the vulnerability of the foreign currency movements on financial markets and economy. When the global liquidity was relatively high, the reserve requirements of banks were provided with foreign currencies instead of the lira into the reserve of the CBRT by their own will. Rather than extending credit growth with the foreign capital accumulation, banks held the foreign funds in the CBRT. The Figure 4 reveals that the current account deficit was approximately 10 per cent of the GDP in 2011, while this figure dropped significantly to 6 per cent level (Aysan et. al., 2014). However, due to the QE program of the advanced economies, the Turkish lira along with other emerging market economies' currencies appreciated by 20 per cent between 2009 and 2010.v Due to the adapted macroprudential measures, the depreciation of the lira realized smoothly without increasing the volatility of foreign exchange rate. Besides, the movements in the political interest rate were also stemmed from the shock of capital outflowsthat has begun in mid 2011 with the Eurozone debt crisis (Cevik and Erduman, 2020).

With announcement of the FED in 2013, the signal of global tightening monetary policy was given, and capital outflows were seen from emerging market economies to advanced economies. Besides, starting from beginning of the 2013 to end of the 2020, the political turmoil in Turkey increased constantly because of corruption scandals, wide public demonstrations, terrorist attacks, political polarization due to the local and general election and the coup attempt. Consequently, the increase of uncertainty from both external and internal factors affected financial market negatively and dampened the impact of adapted monetary policy actions.

Moreover, as the tightening monetary policy of advanced economies progressed, the negative effect of volatility in the capital outflows on the credit growth and the pressure of the foreign exchange rate movements on inflation restrained the policy actions of the CBRT. As we will mention in next chapter, the loss of the independence in conducted monetary policy and prioritizing primarily financial stability

rather than price stability in policy actions in post-GFC period led the foreign currency shock in 2018 and following that high inflation and depreciation of the Turkish Lira.

**Figure 5:** Comparing to European Union countries and US market and disposable income

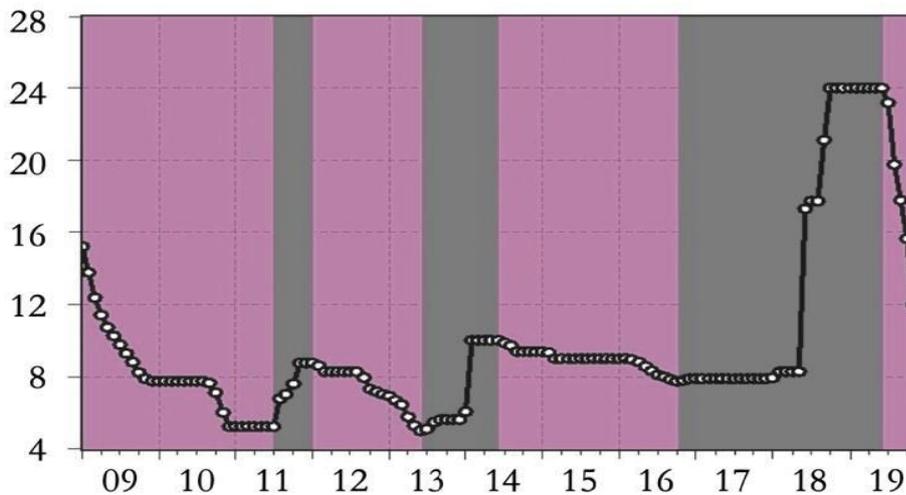


**Source:** Aysan, Ahmet F. et al. (2014). “Managing Short-Term Capital Flows in New Central Banking: Unconventional Monetary

Policy Framework in Turkey”, Eurasian Econ Rev, Vol. 4

#### 4.2.4 FROM POST-GLOBAL FINANCIAL PERIOD TO 2020

After economy recovery from the crisis, the tightening policy of the advanced economies' central banks caused capital outflows in emerging market economies. The reflection of this on Turkish economy was to slow the economic growth down through the credit growth because the economic growth after 2000 mainly was pro-cyclical and it was significantly driven by credit expansion. The financial market has become more fragile. Therefore, in order to minimize the volatility in the financial market, the CBRT maintained to use of interest rate corridor and reserve option mechanism until 2016 (Cevik and Erduman, 2020). Related with that, the interest rate was increased from 5 per cent to 10 per cent to attract capital inflow between 2013 and 2014. Besides, as an internal factor, the implementation of election economies one by one due to the local and general elections increased credit expansion exceedingly. Therefore, the CBRT kept to prioritize

**Figure 6:** The CBRT Political Interest Rate from 2009 – 2019

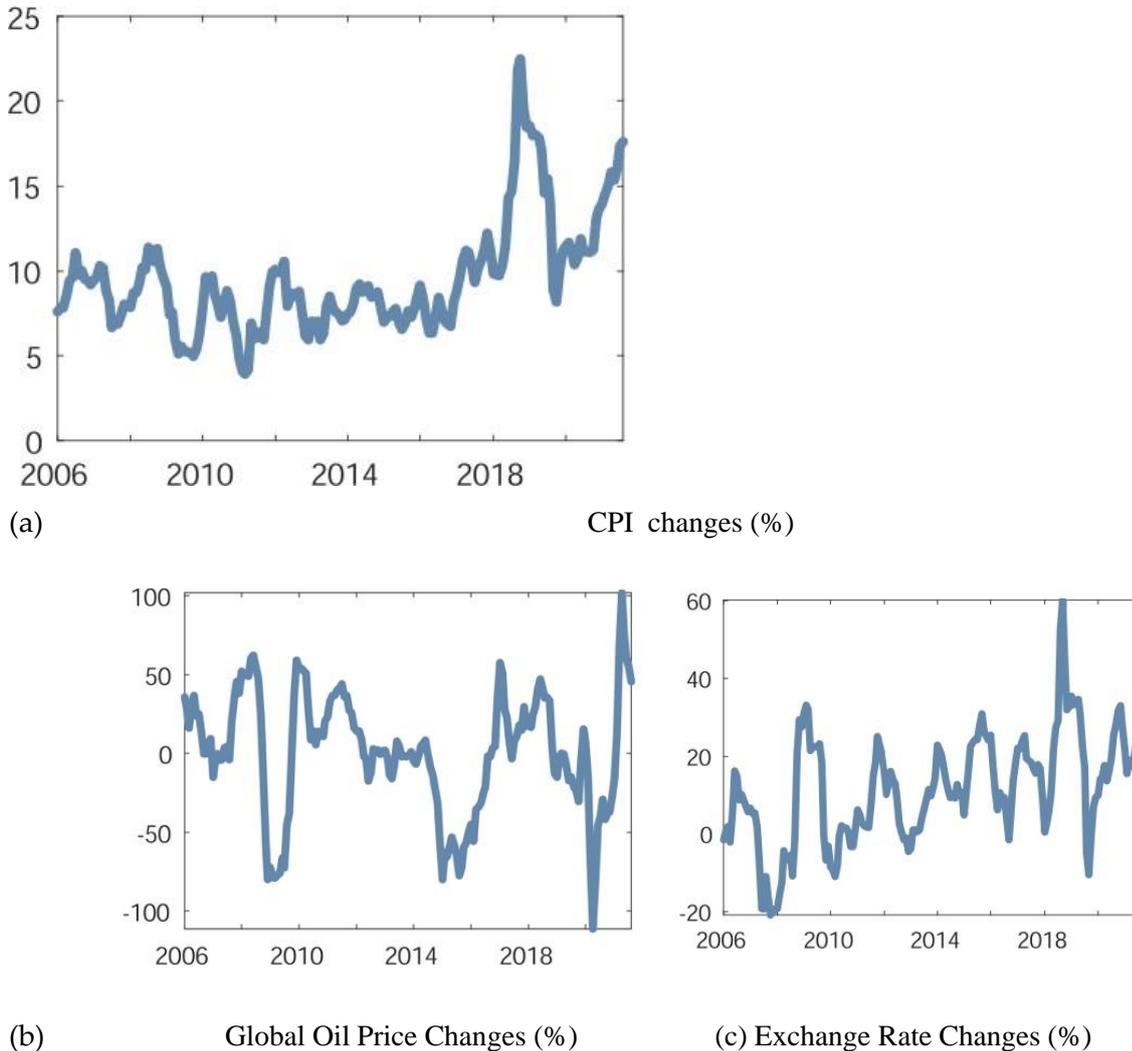
**Source:** Duran, Hasan E. and Erdem, Umut (2014). “Regional Effects of Monetary Policy: Turkey Case”, *Regional and Sectoral Economic Studies*, Vol. 14-1

financial stability with loosening monetary policy action. However, this caused the increase in the inflation. After being around 6.5 per cent pre-crisis and 8 per cent level post-crisis period, the annual inflation rate almost doubled itself from 8.9 per cent in 2014 to 16.8 per cent in 2018. Constant pressure of the politicians for upcoming elections and other internal political shocks such as corruption scandal, public demonstrations, terrorist attacks significantly increased the uncertainty towards monetary policy makers. The political pressure and uncertainty that are stemming from both developments in the global financial market and political atmosphere in Turkey led the CBRT to lower interest rate. Thus, the interest rate decreased and remained stable until the foreign currency shock in 2018. This can be seen from the Figure 6. Between 2014 and 2018, the interest rate decreased from 10 per cent to 8 percent gradually in 2014 and due to the foreign currency shock and soaring inflation in 2018, there was a sharp increase in the political interest rate by 24 per cent. Other side effect of this conventional loosening policy decision was that the Turkish lira losing its value against foreign currencies. In general, the exchange rate movements and global energy prices are seen as the main cause of the inflation in Turkey (Yılmazkuday, 2022). Similar with pre-2001 period, the increase in value of foreign currencies against lira lessened the impact policy actions through currency substitution and also it affected positively on inflation rate along with the increasing global energy prices. It can be seen from the Figure 7 that the increase in the global oil prices and exchange rate movements have positively affected to inflation rate from 2014 to 2018.

In addition to that, although the CBRT has started to use its foreign currency reserves to control credit growth and foreign exchange rate movements for maintaining financial stability since 2010, this was perceived transitory measure in order to control price and financial stability in the post-GFC period (Orhangazi and Yeldan, 2021). However, with the decrease in real interest rate and increase in political pressure, the CBRT used his foreign currency reserves in order to keep stable the foreign exchange rate movements via back-door policy tightening. This harmed the credibility and independence of the CBRT. Although float exchange rate regime was applied, it was not valid because the real value of lira could not be determined from the market participants. With these developments, the independence of the CBRT and credibility of policy actions has been questioned from public and financial markets. Cevik and Erduman (2020) pointed out that the uncertainty and volatility towards economic activity from the CBRT’s policy actions remained high between 2011 and 2016 due to the external and internal factors which are mentioned. Therefore, decrease in predictability of policy actions from the public view made a negative impact on economy through business fluctuations.

In 2018, The Turkish economy witnessed two main fundamental development. In the summer of 2018, the foreign currency shock was experienced due to the political crisis between Turkey and the United States, and the Turkish lira lost 30 per cent of its value against the USD (Orhangazi and Yeldan, 2021). Although this currency shock affected some of the main macroeconomic variables negatively via increase in unemployment and inflation, the most prominent detrimental effect on the economy and financial markets came from deepening the external debt. Because the economic growth in Turkey was mainly driven credit growth since the post-2001 crisis period and it was pro-cyclical. With currency shock, the soaring external debt had an adverse effect on banking system and financial stability. The response for this external shock from the monetary policy side was that the CBRT increased political interest rate 625 base point at first and then with other tightening policy decisions, the political interest rate was arisen and remained at 24 per cent. Moreover, the government re-structured the bank loans in unprecedented levels in order to avoid default of the bank loans and bankruptcy of banks (Sancak, 2021).

**Figure 7:** (a) CPI changes(%) (b) Global Oil Price Changes(%) (c) Exchange Rate Changes(%)



**Source:** Yilmazkuday, Hakan (2022). “Drivers of Turkish inflation”, Quarterly Review of Economics and Finance, Vol.84, pp. 315–323.

Other major development came from the political structural changes of Turkey. The political pressure on the monetary policy makers for upcoming local and general elections led boosted the money supply via credit growth. Moreover, while the state institutions' credibility was eroded with populist political

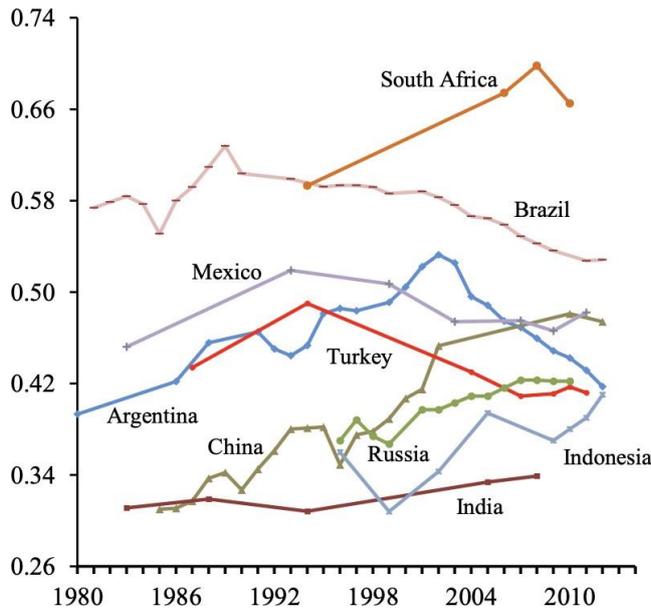
agenda, this also reflected to the conducted monetary policy (Orhangazi and Yeldan, 2021). The loss of the independence in the policy actions significantly harmed the predictability and independence of the CBRT toward future policy actions. With the changes in the government regime from parliamentary to presidential, this has become more apparent. It can be seen from the duration period of the Governor of the CBRT. According to the decree of the central bank law, the governor of the CBRT is appointed for four-year period and this appointment can be renewed for further four-year period. While three governors were appointed to govern the CBRT from 2001 to 2016, the average duration of the governor of the CBRT was eighteen months between 2016 and 2020 (Sancak, 2021). As we mentioned in the second section, the guidance role of the CBRT plays significant role to rationalize and adjust the market players' expectations. Thus, the increase uncertainty towards policy actions from market participants and loss instrument independence due to the political pressure lessened the effect of the adapted policies. After increases to 24 per cent in 2018, the interest rate decreased 8.25 per cent gradually in 2020 due to the political pressure. The purpose of the policy action was to increase money supply in order to increase the economic growth and decrease unemployment via credit expansion. Thus, although the annual inflation rate dropped with the tightening policy of the CBRT in 2018, it was remained its level by above 12 per cent in 2020.

## 5. INCOME INEQUALITY IN TURKIYE

According to the Piketty et. al. (2022), Turkey has one of the most unequal income and wealth distribution across the globe. The study reveals that the top 1 per cent own 36.9 per cent of total income and wealth in 2021 while this figure for the top 10 per cent is 18.8 per cent of total income and 67.5 per cent of total wealth for same year. In contrast, the income and wealth share of middle-income groups is 54.5 per cent and 28.9 per cent, respectively. The share of the bottom 50 per cent is 11.9 per cent for income and 3.7 % per cent for wealth.

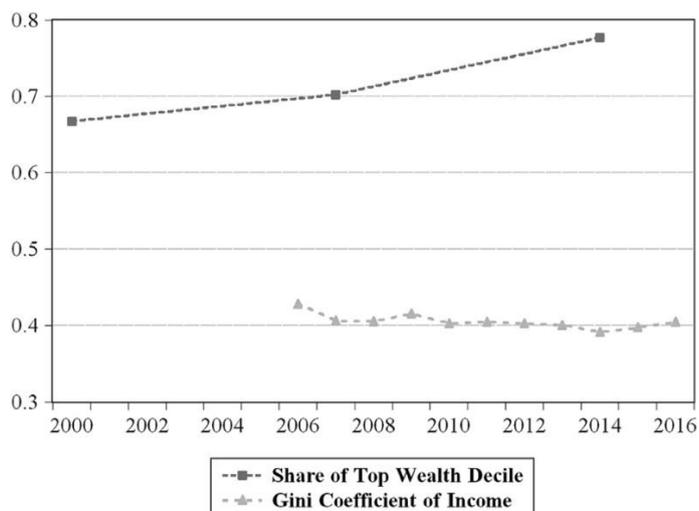
The fact that concentration of income and wealth in the upper tail of income worldwide after 1980 has also been experienced in Turkey. After the GFC, the global inequality shown a dramatic increase starting from advanced economies to emerging market economies due to the negative consequences of the crisis and adapted monetary policies. As we mentioned in the chapter 3, this phenomenon attracted the attention of many scholars worldwide and also Turkey. As it can be seen from the Figure 8, the Gini Index in Turkey shown an increase from mid-1980s to mid-1990s and decreased gradually until 2010. Attar (2021) investigated the economic growth and distribution income from 1923 to 2015 in Turkey. The study points out that in order to understand the income distribution in Turkey, the historical developments and structural changes in the economic policy should be investigated along with other indicators such as increase in real wages or wealth capital ratio. Transformation of political system to a single-party regimes to multi-party election system together with changing economic policy from etatism to import-substitution and export-led economic growth model had affected income distribution in Turkey during period. As an inequality indicator of comparing urban wages to per capita GDP in the study indicates that the period of 1923-1950 when single-party political regimes with economic policy of etatism, the income distribution was affected negatively. In contrast, the urban wages to per capita GDP shown an increase in the period of 1950-1980. Moreover, it was seen deterioration of the distribution for the period of 1980-2015 when liberalization process of the economy and financial markets has been experienced and macroeconomic policy was export-led economic growth model.

*Figure 8: Trend in Income Inequality in the Emerging Market Economies*



**Source:** Derviş, Kemal and Quereshi, Zia (2016). “Income Distribution within Countries: Rising Inequality”, Global and Economy, Brookings.

After the liberalization of the economy and financial markets in post-1980 period, the income distribution disrupted significantly in on the contrary of common view which is that globalization and liberalization of the economy and financial markets increases the real wages through increase in investment and rise productivity. However, the opposite has been experienced in Turkey. Increase in wealth gap through financial market, the negative impact of the export-led economic growth model on real wages and structural issues of labor market between rural and urban areas from 1980 to 2000s widened the income gap between upper and lower tail. Moreover, soaring inflation worsened the income disparity against the lower income groups. According to the IMF data, the annual inflation rate did not below 60 per cent during 1990s while the highest rate was over 100 per cent in 1994. Despite of this developments, the unemployment rate shown gradual decrease over the period, falling from 8 per cent in 1990 to 6per cent in 2000. With the 2001 Financial Crisis and implementation of the IMF stand-by program afterward the crisis, the unemployment and inflation have reached alarming level, reaching 9.8 and over 50 percent in 2002 and this has significant effect on the income inequality in Turkey. As the economic growth and financial development has shown an improvement between 2002 and 2006, the annual inflation rate has been brought high two-digit figures to under 10 per cent. During that period, the annual unemployment rate remained stable at the level of the post-2001 crisis. Although the income distribution has improved by strong economic growth, the wealth inequality between upper and lower tail of income broadened (Torul and Oztunali, 2018). The Figure 9 demonstrates the changes in the wealth inequality and Gini index in the post-2000 period for Turkey. Although overall income inequality decreased slightly over time despite of the GFC, the wealth inequality concentration in the top income earners shown an upward trend during the period.

**Figure 9:** *Wealth and Income Inequality in Turkey*

**Source:** Torul, Orhan and Oztunali, Oguz (2018). “On income and wealth inequality in Turkey”, Central Bank Review 18, pp. 95- 106.

When the labor market structure and wage inequality is investigated in Turkey, the wage inequality between subgroups, such as male and female or young and old or educated and less educated is considered high during the period of 2005 and 2011 (Tansel et. al., 2019). According to the study, despite of the high wage inequality, the observed wage mobility in Turkey between subgroups during that period is less than monitored average of the EU countries. Therefore, it is pointed out that the importance of the labor market structure and wage rigidities on income inequality. The improvements in legislations which are unionization, unemployment benefit and minimum wage benefits the lower tail of income earners, and this reduces the income inequality.

In contrast, Bakis and Polat (2021) found considerably decrease in the wage inequality from 2002 to 2019. The most important reason behind according to the study is that the increase in the real minimum wage in 2004 and 2016. Other reasons are stable demand during this period and wage composition differences across industries. Besides, what the study emphasizes that minimum wage adjustments have become a major role in the wage bargaining. Independently from whether high or low level, the increase in wages is carried out according to the rise in minimal wage. As the economic growth was mainly driven by credit expansion starting from 2002, the lower tail of income earners suffered from the credit market restrains while the upper tail income earners have more access to credit markets and financial markets. Moreover, the composition of financial asset, such as dividends or bonds rather than housing, also widened this wealth concentration in Turkey. Although the improvements in the real minimum wage and labor force participation decreased in income inequality during 2000s, the negative effect of during and post- GFC period, the income inequality widened. After the GFC, the monetary easing policies for economic recovery in Turkey broadened the wealth inequality through portfolio channel. The low economic growth after the GFC and monetary easing policies aimed to maintain financial stability and credit growth in order to increase economic activity and decrease unemployment. However, the external and internal political and economic factors that we mentioned resulted increase in the Gini Index starting from 2015. According to the World Inequality Database, the Gini Index came back to the same level as in the early 2000s, reaching 0,61 in 2020 due to the 2018 foreign currency shock, two-digit inflation and unemployment rate.

6. DATA AND METHODOLOGY

The Data which are used to analyze the relationship between monetary policy and income inequality in Turkey are from the World Bank Database, International Monetary Fund World Economic Outlook, and World Inequality Database. The Data that will be used in our model are the Gini Index, GDP (current prices in USD) , broad money sector (%GDP), annual inflation rate and annual unemployment rate.

The pre-tax income Gini Index comes from the World Inequality Database and is used as dependent variable for measuring income inequality during the period in Turkey. In our sample, the pre-tax income Gini Index is used and is ranging from 0.57 to 0.67.

In reference to impact of the monetary policy, the broad money sector (%GDP) comes from World Bank Database and is used as main independent variable and determinant of money supply that is expected to influence income inequality. It includes the cash, bank, and other type of deposits (M2) along with near money which is easily convertible financial assets. Therefore, it is the most comprehensive indicator to analyze money supply.

The data of GDP (current prices in USD), annual inflation rate and annual unemployment rate come from the International Monetary Fund World Economic Outlook, and they are used as control variables. The reason behind of being selected these variables is that they have significant impact on income inequality. As we mentioned in chapter 2 and 3, an increase in the GDP has negative effect on income inequality due to the improvement in income distribution while an increase in the inflation and unemployment rate has a positive effect via widening the gap between upper and lower of income tail.

In order to find the relationship between monetary policy and income inequality in Turkey, the dependent variable of Gini Index is investigated through independent variable of broad money sector supply and control variables of gross domestic product with current prices, annual inflation rate and annual unemployment rate. The econometric framework and methodology have been selected according to Aye et. al. (2020). The model is given:

$$Y_t = \beta X_t + \theta_1 Z_t + \theta_2 Z_t \dots \theta_k Z_t + \mu_t \quad (3)$$

where;

$Y_t$  is the dependent variable is Gini index at time  $t$ ,

$X_t$  is the main independent variable of monetary policy measured as money supply, broad money (%GDP),

$Z_t$  are the control variables are GDP (current USD), unemployment rate (annual %), inflation rate (annual %),

$\beta$  and  $Z$  are parameters are to be estimated,

$\mu_t$  is the stochastic term.

Before describing the model that will be used, the mathematical demonstration of the model follows as it is :

$$LGINI_t = \beta_1 I GDP_t + \beta_2 I BROAD_t + \beta_3 I UNEM_t + \beta_4 I INF_t + \beta_5 I BROADGDP_t + \varepsilon_t \quad (4)$$

The Gini coefficient has been used to measure income inequality as a dependent variable. In reference to the impact of monetary policy, we used the broad money sector (%GDP) (BROAD) variable that measures the supply money in Turkey. The variable GDP measure the level of income in the country that can have an impact on the inequality. Also, to measure of the impact of inflation on income



7. RESULT AND DISCUSSION

In order to make a comprehensive analysis with obtained data, we use regression analysis. To minimize the unbiasedness of the estimators, the Ordinary Least Square was chosen and performed. The result of the estimators from model follows as it is:

Figure 11: Empirical Results

Coefficients:	Estimate	Std. Error	t-value	Pr(> t )
(Intercept)	0.524416	0.244428	2.145	0.038931 *
IGDP	-0.186027	0.043922	-4.235	0.000157 ***
IBROAD	-0.208344	0.072519	-2.873	0.006866 **
IUNEM	0.002545	0.001926	1.321	0.194969
LINF	0.012304	0.004298	2.863	0.007044 **
LBROADGDP	0.036829	0.012570	2.930	0.005931 **
p-value: < 2.2e-16				
R-squared: 0.9361				
Adjusted R-squared: 0.927				
F-statistic: 102.6 on 5 and 35 DF, p-value: < 2.2e-16				

The regression analysis result reveals that the coefficient associate BROAD is equal to -0.208, hence the result mean that the money supply has a negative impact on the inequality. On other hand, as the money supply has increase by 1 unit the inequality decreases by 0.208 in Turkey. Aside from that, the probability associate to the coefficient is inferior to 5% which mean that the money supply has a significant impact on the inequality. Other variable of interest log BROADGDP, is also significant. The coefficient positive of LBROADGDP means that as the variable GDP increases, BROAD increases on the dependent variable. The coefficient associate to the variable the IGDP is equal to -0.18, which mean that if the GDP increase by 1 unit, then the inequality decreases by 0.18. Besides, the IINF and IUNEM have a positive on the inequality.

All the variable that indicated in the model is significant except the LINF. The Fisher test is significant, and we conclude that our model is globally significant. The R-squared is equal to 93.61%, which mean that 93.61 percentage of variation of inequality is explained by the independent variable which included in the model.

The result of the regression suggests that economic growth and accommodative monetary policy decreases the income inequality in Turkey. Similar view with Lenza and Slacalek (2018) and Casiraghi (2018), the loosening monetary policy of the CBRT increases the economic activity and total employment share. Therefore, this reduces income inequality through the lower tail of income distribution. Because increasing money supply triggers the boosting aggregate consumption of the lower income groups whose the marginal propensity consumption is higher than higher income groups, and hence this lead increase the economic activity and decrease unemployment.

8. CONCLUSION

In this study, the impact of the monetary policy on income inequality in Turkey is investigated for the period of 1980 and 2020. Starting with the theoretical framework and literature review, the common view in the literature is that the conducted monetary policies of the central banks which might be

executed via conventional or unconventional instruments have an effect on income distribution. However, although the income inequality has link with various internal and external factors which are ranging from economic growth, globalization and business cycle fluctuations to inflation, degree of unionization, gender and educational pay gap, there is no consensus about the main determinants of the income inequality in the literature. The reason behind is that the impact of various factors on income inequality differs in the terms of structural and economic factors across countries. With this notion in mind, this view also has reflected on the impact of the monetary policy on income inequality. After the GFC, scholars' studies resulted in conflicting views about the effect of conducted unconventional monetary policy on income distribution. Some argues that the accommodative monetary policy has widened the income inequality through mainly portfolio and income composition channel while others suggests that the accommodative monetary policy had improved the income distribution and decreased the income inequality through the lower tail of income distribution.

In this sense, the main purpose of this study is to investigate rising income inequality in Turkey from the monetary policy view. The result of the OLS regression reveals that the accommodative monetary policy of the CBRT have a negative impact on income distribution. Moreover, it is found that an increase in the GDP have significant impact on income inequality in Turkey, while inflation and unemployment positive impact on income inequality with less significance impact. These findings are coherent with Lenza and Slacalek (2018), Casiraghi (2018), and Colciago et. al. (2019). Boosting economic activity and consumption via increasing money supply leads to job creation which have increases the employment share for the lower income groups. Therefore, the loosening monetary policy had decreased the income inequality in Turkey. Aside from the impact of the impact of monetary policy on income inequality in Turkey, the economic structure, and socio-economic indicators such as structure of the labor market, education and gender gap should be investigated in order to analyze better on the underlying reasons for rising income inequality in Turkey.

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**A PROGRAM EVALUATION TO FOSTER PARTNERSHIPS FOR AN EQUITABLE  
ACCESS TO HEALTHCARE IN NEVADA, USA**

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**ABSTRACT**

Access to healthcare services is essential for maintaining long-term health. Nevertheless, obstacles impede households from getting these services. Results from an elaborate the process evaluation revealed that social determinants of health (SDoH) and dimensions related to health equity were factors that contributed to the inequities in health outcomes after the COVID-19 pandemic. In Nevada, there are inequalities in disadvantaged areas that have a negative influence on healthcare and the rates at which treatments are adopted. Nevada and many organizations are working together to solve the issue of unequal access and provide fair access to services and benefits for all communities. The process evaluation employed a mixed method approach based on the RQFSM Model (program reach, quality control, implementation fidelity, consumer satisfaction, program management). Twenty-four partner organizations delivered services in Nevada. Qualitative data were collected through interviews with project personnel, community members, and focus group discussions from July 2021 to March 2024. Topics covered information, barriers, experience, resources, compliance, and adherence to guidelines. Gap analysis revealed three key themes, 1) Health Equity Strategies: Organizations scored well (low gap) in management and adherence to health equity strategies (90%), 2) Operational Activities: Quality operational activities had a medium gap (60%), and 3) Project Continuation: Ensuring project continuity had a high gap (50%). Addressing disparities and health inequities is essential in high-risk and underserved communities. Strategies include empowering community-based organizations and bridging gaps to achieve better health outcomes. These results emphasize the significance of community-based organizations in carrying out awareness efforts to tackle misinformation and health-related consequences in marginalized areas. Additional variables include inter-agency cooperation between public and commercial sectors, as well as coordination to prevent redundancy and optimize the effectiveness of services.

**Keywords:** social determinants of health, process evaluation, gap analysis.

EVALUATION OF HEALTHCARE WORKERS' KNOWLEDGE OF VACCINATION  
IN PROFESSIONAL ENVIRONMENT IN A HOSPITAL IN Sfax, TUNISIA

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**Introduction:**

Vaccination in the workplace protects healthcare workers (HCWs) exposed to a biological risk that may be caused by exposure to pathogenic agents but it also has a collective interest in helping to reduce the spread of microbes and viruses. In fact, Vaccination is part of an overall approach to prevent occupational hazards. For HCWs, In Tunisia, compulsory vaccines are BCG, hepatitis, Tetanus, and diphtheria vaccines, while recommended ones are measles and influenza.

**Aim:**

Our study aimed to evaluate the knowledge of HCWs about compulsory and recommended vaccines in the professional environment.

**Materiel and methods:**

This was a cross-sectional descriptive study carried out in February 2024 among a sample of healthcare professionals working in the Habib Bourguiba Hospital in Sfax, Tunisia, using an anonymous self-questionnaire. We collected their social-professional characteristics and their knowledge about compulsory and recommended vaccines for healthcare workers. We established an overall average score out of 100 for compulsory and recommended vaccines. We also used the evaluation criteria of Essi and al 2013 (1) to assess the knowledge levels of HCWs.

**Results:**

We surveyed 108 HCWs, divided into 44.4% nurses (N=48), 28.7% senior technicians (N=31), and 26.9% doctors (N=29), with an average age of  $38.2 \pm 11.4$  years and a sex ratio of 0.33. We noted that 41.7% of participants (N=45) had a professional seniority under five years. According to the sector of activity, 33.3% (N=36) were working in medical departments, 47.2% (N=51) in surgical departments, and 21% (N=19.4) in intensive care units. We noted that 78.7% of all the participants (N=85) have not received training on vaccination since the end of their studies. The overall average knowledge score

was  $66.48 \pm 17.68$  for mandatory vaccines and  $70.93 \pm 23.741$  for recommended vaccines. The assessment according to knowledge levels revealed that 45 participants (41.7%) had a good knowledge score about mandatory vaccines and 57 (52.8%) had a good knowledge score about recommended vaccines. The univariate analysis of factors influencing the knowledge of HCWs about vaccination showed that the prevalence of good knowledge was three folds higher in HCWs with a seniority under five years (48.9% vs 23.8%; OR=3.05; 95% Confidence interval (CI) [1.34;6.99];  $p=0.007$ ), and two folds higher in medical than paramedical HCWs (51.7% vs 27.8%; Odds ratio (OR)=2.77; 95% CI [1.15;6.66];  $p=0.02$ ).

### **Conclusion:**

These results show incomplete knowledge of vaccination among HCWs, especially paramedical HCWs. Thus, a great deal of effort should be made such as training sessions for paramedical HCWs and for those who have a professional seniority superior to five years to improve their knowledge and to raise their awareness.

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**Keywords:** healthcare workers, vaccination, knowledge, Tunisia

**THE ROLE OF THE GEORGIAN MIDDLE CORRIDOR OF THE GREAT SILK ROAD IN INTERMODAL TRANSPORTATION**

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**Abstract**

The Middle Corridor is considered to be one of the best, effective and reliable the West and the East connection route initiatives. The tangible result of this initiative will be the unification of the transport space of China, Central Asia, the South Caucasus (Azerbaijan and Georgia), Turkey and Europe to ensure safe and commercially profitable cargo transportation.

The challenges of realization of the Middle Corridor are divided into three main groups: 1. Directly caused by technical operation; 2. Caused by Competitive environment; 3. Challenges arising from the complex security situation.

In recent years, due to global changes in the world (Russia-Ukraine war; the Covid pandemic; the unstable situation in the Middle East), the role of the Middle Corridor has significantly increased. The emerging geopolitical conditions obviously made it more urgent to mobilize political-financial capital for the realization of the Middle Corridor.

Many challenges (economic, enviromental, workforce) still remain for transforming Georgia and the Middle Corridor in general into a regional transit and logistics hub (center).

The main land road of Georgia is an important part of the the Middle Corridor. Georgia has a big potential for transforming into regional transit and logistics hub (center), important transport route between Europe and Asia and a connecting corridor between China and Europe. To achieve this, it is necessary to develop logistics infrastructure and introduce new technologies. The first task in this direction, as well as our goal is to create a network of freight transportation centers in the corridor (Georgian Section) and to include them in the global system of intermodal transportation. This kind of transportation refers to moving freight by two or more modes of transport (rail, ship, aircraft, and truck).

The system of freight forwarding centers includes the consolidation of cargo and vehicles at terminals (stations), transportation and distribution from the terminal to the customer.

With the introduction of the combined logistics transport system for cargo transportation by rail and road transport in Georgia, the level of traffic safety on the roads will increase dramatically, freight transportation costs can be reduced by an average of 30%, the ecological situation will improve, since the pollution of the atmosphere with toxic substances emitted by cars will be drastically reduced.

**Keywords:** Middle Corridor; Freight Forwarding Centers; Intermodal Transportation.

The Middle Corridor is considered to be one of the best, effective and reliable the West and the East connection route initiatives. The tangible result of this initiative will be the unification of the transport space of China, Central Asia, the South Caucasus (Azerbaijan and Georgia), Turkey and Europe to ensure safe and commercially profitable cargo transportation.

One of the transport routes connecting Europe and Asia - Middle Corridor - passes through Georgia. The country is believed to have been part of the Silk Road from the beginning, but in the recent past the route through the Caucasus has carried much less cargo than the northern route that connects China to Europe via Russia.

In recent years, due to global changes in the world (Russia-Ukraine war, the Covid pandemic, the unstable situation in the Middle East), the role of the Middle Corridor has significantly increased. The emerging geopolitical conditions obviously made it more urgent to mobilize political-financial capital for the realization of the Middle Corridor.

The cornerstone of the function of Georgia and other countries of the region in the world political ecosystem are the transport arteries, the cross-border networks of energy carriers and communications.

The Georgian section is only 7% of the entire corridor, and the rest passes through various countries: Turkey, Azerbaijan, Kazakhstan, Turkmenistan, etc. On the European side – on Bulgaria and Romania, which are the countries of the corridor.



The challenges of realization of the Middle Corridor are divided into three main groups: 1. Directly caused by technical operation; 2. Caused by Competitive environment; 3. Challenges arising from the complex security situation.

Efforts to improve transport infrastructure and services should continue until the existing limiting factors are completely eliminated. Low quality of service, outdated logistics infrastructure and equipment, inefficient supply chain management, as well as lack of workforce organization and qualified personnel are an incomplete list of economic and environmental problems in the field of transport and logistics.

The competition factor puts the supporters of the Middle Corridor, including the Georgian side, in a mode of constant readiness for possible changes. This is not surprising, if we remember the high instability and unpredictability of geoprocesses.

We also note a fact that at the beginning of 2023 the Middle Corridor "has beaten" its competitors due to several circumstances. One of them is the need to rearrange the global supply chain in the post-pandemic economic structure and the need to diversify this network due to the unexpected effects of the pandemic.

The growth of the Middle Corridor prospect was particularly facilitated by the fallout of a key participant in the Northern Route - Russia as a connecting link between Europe and China, which was sanctioned for the Russia-Ukraine war. Moreover, the hostilities between Israel and the countries of

the Middle East have created an insurmountable obstacle for the movement of large cargo flows through the south route to Europe, but an additional advantage for the Middle Corridor .

The emerging geopolitical conditions have obviously made it more urgent to mobilize political-financial capital for the realization of the Middle Corridor.

The main land road of Georgia is an important part of the the Middle Corridor. Georgia has a big potential for transforming into regional transit and logistics hub (center), important transport route between Europe and Asia and a connecting corridor between China and Europe. To achieve this, it is necessary to develop logistics infrastructure and introduce new technologies. The first task in this direction, as well as our goal is to create a network of freight transportation centers in the corridor (Georgian Section) and to include them in the global system of intermodal transportation. This kind of transportation refers to moving freight by two or more modes of transport (rail, ship, aircraft, and truck).

Two infrastructural projects are worth mentioning in order to promote the growth of cargo capacity of Georgia:



1. New Railway Route: Baku - Tbilisi - Kars. Participants are Azerbaijan, Georgia and Turkey.



## TRANSPORT NETWORK IN GEORGIA



## 2. Anaklia Port - Deepwater port on the Black Sea coast of Georgia.

Many challenges (economic, environmental, workforce) still remain for transforming Georgia and the Middle Corridor in general into a regional transit and logistics hub (center).

The system of freight forwarding centers includes the consolidation of cargo and vehicles at terminals (stations), transportation and distribution from the terminal to the customer.

Freight forwarding centers should perform the following basic and secondary functions:

**Basic functions.** Intermodal and long-distance cargo transportation by all types of transport (especially using combined cargo transportation) and local cargo transportation (collection and distribution of cargo in the region) storage of cargo of all types, shapes and physical conditions at different times, especially in terms of using synergy effects in special warehouses (e.g. dangerous cargo and cold storage), cargo handling services (e.g. packing and commissioning).

**Secondary functions.** Preparation, maintenance, service and repair of vehicles, containers, handling and shipping equipment.

Preparation of specific location infrastructure, such as rail links, parking lots, transport and cargo management systems, cabling, supply and waste disposal networks, spaces and buildings for internal services compatible with the system; such as customs and post offices, public transport, banks and insurance, control and security services, supply and waste removal services, parking for trucks and dangerous goods.

A large part of cargo enters Georgia by road and sea transport, and then their transportation continues by land transport, both inside and outside the country. Research has shown, that 65-70% of cargo on the Transcaucasian highways is transported by medium and heavy-duty motor vehicles. This situation in the corridor creates the following challenges:

1. Highways are overloaded with several thousand trucks every day.
2. Due to the congested mode of traffic, the amount of energy used in freight transportation is increased by about 30% compared to the possible amount of energy that could be used in transportation.

3. The level of air pollution with harmful substances emitted from transport has increased dramatically, which has a negative impact on human health, as well as on the surrounding flora and fauna.

This problem can be solved by the cooperation of two competing types of freight transport - truck and rail transport chains, when the strengths and advantages of these two transport systems are combined into one, as a combined logistics transport system: rail transport, which transports cargo over long distances efficiently according to schedule, without polluting the environment, and truck - vehicle that is flexible in terms of transportation and provides door-to-door delivery of cargo, which also carries separate cargo streams to the combined transport terminal (station). Such a solution to the problem is relevant in many developed European countries.

With the introduction of the combined logistics transport system for cargo transportation by rail and road transport in Georgia, the level of traffic safety on the roads will increase dramatically, freight transportation costs can be reduced by an average of 30%, the ecological situation will improve, since the pollution of the atmosphere with toxic substances emitted by cars will be drastically reduced.

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IDEOLOGICAL ASPECTS OF FASHION

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**ABSTRACT**

Fashion style can be seen as an example of creativity, good taste, adaptation to the specific occasions, but also as ideology. We can recall the times when, in the past, various countries had national wear specific to men, women, as well as social status. For example, the Japanese kimono was a symbol of this culture, and the status, as well as personality were suggested through the symbols present on it. Communist regimes such as the Soviet one tried to make wearing style simple, through which types of clothes were available. Then they realized that fashion cannot be without style. We can see the influence of certain countries and cultures, e.g. that of American culture through the wearing of blue jeans and denim clothes in other countries. Other cultures are well known through soft power for their specific fashion style, e.g. French culture is associated with elegant, chic style. Currently, we appreciate innovative style which can be associated with the individualist mindset. The individualist mindset is spreading all over the world. It is reflected in various components of lifestyle, including the way we dress. This is called streetwear, and we have alternative sources of inspiration and style other than the mainstream ones. Subcultures are currently accepted alongside mainstream style.

**Keywords:** Mainstream, Subcultures, Individualism, Streetwear

**INTRODUCTION**

Ideology can be defined as a set of beliefs and values of a society (Šuvaković, 2014).

Fashion is, regardless of how much we are preoccupied with it personally, an inevitable part of our everyday lives. While we may not give special attention to what we wear, and make a big deal of whether or not we are dressed according to what is considered stylish at a certain moment, what we wear can be seen as part of the influence of ideology at a given time.

We can find, as a matter of fact, visible differences between the way gender has been perceived in society across history just by looking at what people wore at the time. In past ages, women's wardrobes and fashion options were restricted to dresses, crinolines, and corsets. Victorian ladies show us this understanding of gender roles just by what they are wearing. They were never allowed to wear trousers, the way we are used to see today and consider this normal. Women were also reduced, as far as their activities were concerned, mainly to the private, or domestic sphere, and it was only later that they were gradually allowed into the public sphere, the way we know our lives today. It was with French Coco Chanel (Radner & Smith, 2013) that the fashion for women radically changed. She was considered a rebel, introducing simplified outfits for women, and also trousers.

The gradual change from women wearing exclusively dresses and skirts, into allowing them to wear pants when they wanted to, and the simplification of their garments, making them more and more comfortable and practical to wear is part of the ideology of equal rights for gender roles (Shorman, 2003).

The strive towards equality is visible in the way fashion looks throughout the ages and goes through various changes. We notice how the distinction between social classes gradually disappears, at both social, individual rights' level, as well as regarding the clothes they can wear. In the past, working classes and noblemen were clearly distinguished by their clothes. Gradually, we may have only the

distinction between high end company brands and accessible to anyone brands. Even so, we can find accessible versions of high end brands and also the so-called fakes, especially when it comes to purses that are accessible to anyone as a price but imitate expensive items.

In our times, we may also consider the distinction between high fashion and practical fashion, yet, nowadays, we notice less pressure for us to feel we need to conform to what is fashionable. The very structure of society is changing, and the mainstream is not the only option, as it accommodates in parallel other subcultures and it allows anyone to feel that they belong to a group. Today, individual differences are not only tolerated, but also encouraged, and this is also visible with respect to our fashion choices. We wish, more and more, not to be like the others, by not wearing entirely what the others do, just because it is fashionable. Even not long ago rebellious fashion items such as leather jackets and leather pants (Szymkowska-Bartyzel, 2015) are incorporated into usual, everyday style, and even elegant or business style.

Everything, we could conclude, is accepted. We can think about the ideology imposed through today's global values of accepting those that think, live, and behave in a different way. Since we deal with contact that is frequent among cultures, it is significant to be aware of differences, accept them, and behave understandingly and politely towards the others.

### **MATERIALS AND METHODS**

Nowadays, going on social media and even on specific online fashion communities such as Lookbook.nu are part of the current everyday life practices. There, young people post their own outfits for public view and as examples of their creativity and personal style. We are used to looking up street fashion or street style and to getting our inspiration. Additionally, when we go out in the city we can see, in the Western world, young people wearing creative outfits. On various fashion clothes stores we can find usual staple items such as denim shorts and skirts with a creative spin, e.g. combined with streaks of leather, in two or more shades of colour, or with a similar ending with lace tying on one or both sides of the hips as the tying was done on old times corsets for ladies. We can also find accessories ranging from creative jewelry items to purses, scarves and hats.

Clothes become in this case more than utilitarian items. They are given special attention, they become a hobby, a means of self-expression and a part of our public image.

All the freedom and creativity expressed today through such outfits can be related to the individualist mindset, which encourages self-expression, personal opinions, creativity, and standing out from the crowd. In collectivist societies, individuals are expected to conform to conventions and be like the others.

If we compare this situation we know today with those of past ages, we can see how people related differently to their clothes. Clothes and outfits were expressing a different mindset.

We can think of the times when the world looked differently at a highly visual level, when not only the architecture was different in different parts of the world, but also the clothes varies function of the country and culture. What we now call national costumes and which are worn only at special occasions, commemorating various historical events, on national days, or on various holidays, are worn as symbols and as attempts to preserve traditions, as well as to show respect for the past. The now national clothes are symbols of the respective countries and cultures, and mark their distinct identity. In the past, however, they were worn on an everyday life purpose. We can consider the way in which clothes in the past clearly marked the distinctions between social classes, as well as status in life, e.g. the way married or unmarried women would dress. We can now think of the Chinese hanfu, Japanese kimono, and Korean hanbok as being worn only during special occasions: on national, public holidays, during personal and family events, such as marriages, or during cultural promoting events for members of other cultures, e.g. presenting various traditional dances, explaining how to dress a kimono and its symbols, during tea ceremonies, etc. Tourists are presented with staple cultural identity elements such as traditional garments.

Fashion has become part of popular culture, or of a distinct, even stereotypical cultural image associated with a certain culture. As an example, French ladies are associated with an image of elegance and perfect sense of fashion style (DeJean, 2007). We can think of fashion style icons such as

Coco Chanel and Audrey Hepburn, which are both representative for French culture, although the latter was a British actress. Still, Audrey Hepburn became an ambassador for French elegance since she was the muse of Givenchy (Kirilchuk, N., & Pet'ko, 2021). These styles are never considered to be outdated. Instead, they are considered staple styles, whose staple items can always be taken over and incorporated, according to today's mindsets, into creative styles. As an example, from Audrey Hepburn's style, fashion magazines constantly mention the staple, timeless item which is the little black dress. Every woman should have one in her wardrobe, as it is a sign of simple, refined fashion style for any special occasion. We can never go wrong if we choose a simple yet elegant little black dress. Afterwards, function of our personal style and of the trends of the age we live in, we can further on add what accessories we want and what we consider suitable for our body type, occasion, and season. We can choose, for example, fuchsia shoes to feel that we can stand out, as at some point in time they were considered extremely fashionable, or we can choose nude colour shoes, or even black. Then we can add a jacket, a statement necklace, meaning a large one, that would make the dress even further stand out. We can see the promotion of French culture through this distinct fashion style as an example of soft power. Soft power (Nye, 1990) makes a certain culture attractive to other cultures, through promoting and borrowing those cultural products which are considered special, but also adaptable and allowing to be incorporated into the practices of other cultures.

At the same time, Coco Chanel and Audrey Hepburn, through their style, presented a versatile image of the woman we still adopt today. They could wear both classy, elegant, feminine dresses and pants, which we considered, at the time, a rebellious clothing item for women.

During Communist regimes, limited fashion styles and clothing items were available as far as designs were concerned, and usually everyone looked the same. Here we see a strong difference between individualism and collectivism. The countries under Communist regimes were collectivist societies, and asked everyone to conform. In Romania, during the Communist regime, the fashion industry, together with the only store where clothes were available for buying, Romarta, were owned by the state (Orzac, 2021). The role of designers was then fulfilled by craftsmen and tailors. Those who had the material possibilities would attempt to have something different to wear by having access to materials from abroad, to fashion magazines from abroad, and by asking tailors to create something similar to the outfits they saw in magazines (Orzac, 2021). Romanians under the Communist regime dreamt of being stylish like those from abroad, the German and the French, yet the textile industries allowed only two collections per year, and the entire fashion choice and design possibilities were under restriction (Orzac, 2021). The Western of Soviet fashion appears with items such as furs, yet they are available to the Party members only (Orzac, 2021). The leaders of the Communist regime realized, however, that style was a significant part of fashion.

What has been called the Western influence on Romania and which has also included fashion style is visible in the 1960s, when items like the miniskirt were brought by the influence of British model Twiggy's style (Orzac, 2021). She was considered, as we hear now, a fashion icon, and remains one among the others. Fashion can be considered a domain or subculture, since an entire community is formed around this preoccupation, and it has, like any culture, what Baciu (2012) called culture identity manifestations, whose grid include symbols, personalities, rituals, traditions, practices, and values.

Other influences on Communist Romania coming from the West were those represented by hippie and rock'n'roll, which were visible in the way young people dressed (Orzac, 2021). We can see the emergence of separate trends for young people and various subculture being tolerated next to the mainstream trends ever since those times. Additionally, we start seeing the soft power influence of one of the world powers, America. Fashion is one way of them exercising their soft power.

Other items which have become increasingly available in Romania especially after the fall of Communism were the denim clothing pieces, such as jeans, shorts, denim skirts, and denim jackets. Nowadays we are still all wearing them, as staple items, and which can be incorporated into any style, since they are so adaptable.

The way we dress can show, visually, how ideologies and world power situations, as well as political regimes, changed.

Still, one common element we see throughout all historical times and conditions is the need for being creative with our clothes. Even in the repressive Communist regimes, people tried to knit, sew, modify, combine or make their own clothes at home, or at the tailor's, function of their financial situation and occasions to have available material and examples from fashion magazines. Even with what we now call national costumes, we could find certain ways in which the wearers tried to make themselves distinct from the others. The young girls and women would try new hairdos, or wear a specific ribbon, flowers in their hair, etc. Additionally, since they would make their clothing themselves, as there was no clothing industry during the old days, they had the possibility to put a creative spin on the traditional, conventional way in which blouses, skirts, scarves, kimonos, hanfu, or hanbok were made. In the case of Japanese culture, the wearers would be distinguished by having certain symbols on their kimonos which would say something about their personality, virtues, generally positive features. Certain flowers, birds, insects, animals would stand as symbols for various personality traits in the wearers. They would also symbolize the seasons, occasions on which the kimono was worn, and they would also include good omen symbols.

We can claim that we have reached the peak for creative possibilities nowadays, due to stable economic conditions, technological development, good social organization which can ensure a comfortable lifestyle, allowing us to resort to other activities, which are part of the refined cultural practices, situated in the same category as art. Choosing our outfits can be seen, after all, as a means of artistic expression, the same way as we may express ourselves through paintings, photographs, others visual arts, or through writing fiction and poetry. This is especially true in the case of streetstyle, which can include outfits and items associated with influence of various subcultures, e.g. hipster, rock, punk, chic, etc.

The rising individualist mindset (Santos et al, 2017) is visible through fashion and it is also reflected in our individual as well as collective mindset all over the world nowadays.

### RESULTS

The changes in fashion style reflect the changes at large, world level political and economic situations. These all lead, in turn, to changes in mentalities about gender roles, as well as equality, from all points of view in society: gender, class-related, as well as when it comes to individual differences which should be accepted. In time, with the progress of technology, and economic, as well as politically stable living conditions, our needs move towards the top of Maslow's pyramid. We have the need to be recognized socially and at the level of our achievements, as well as to have hobbies and other activities, together with having the right to self expression.

Items which were rebellious and unusual during some times, such as pants for women, or leather items, are now integrated within the mainstream, or common, everyday life clothing style.

All these changes can be summed up as a world moving, globally, and progressively, towards individualism.

While, in the past, we considered social differences as part of the normal mindset, nowadays making any differences is considered discriminatory and to be condemned. Fashion serves as a means to show how free we are today, as far as our mindset is concerned.

### DISCUSSION AND CONCLUSIONS

The influence of ideology on our everyday lives can be considered difficult to believe at first. We may think that we are not politically involved, and that we are living completely with no connection to political life as a topic. Still, the very way we are educated, the very way we are taught about how to think about, how to treat and how to relate to the others, together with the values present in the society of our times are all influenced by ideology. Standards of behaviour and beauty are also part of ideology. The way we are allowed to dress is also related to ideological influences.

We can clearly see this in the diversity of styles we see in our everyday, urban life. In the past, we may recall, in the 19th century Western world, the chic and elegant style of dressing being adopted on a large scale. Afterwards, we noticed the emergence of the rebellion of the young generation in the United States, with the Baby Boom generation, when youth culture emerged. Starting with those

times, the young generation had their own world, with their own clothing style, and own values, marking their differences from their parents' way of thinking and way of dressing. The world was changing, and mentalities and lifestyle with it, so we could consider this rebellion as a means of adapting to a new world of the young generation.

Fashion is an aspect of everyday life that can be changed and that can adapt to the changing world in which we live, with its mentalities and economic possibilities. Streetwear fashion can, nowadays, be considered as adapted to and reflecting the current lifestyle concentrated in urban areas and related ways of thinking.

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**A DREAM COUNTRY: PERCEPTIONS OF CANADA AMONG IRANIAN LGBTI+ IMMIGRANTS IN TÜRKİYE**

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**ABSTRACT**

Türkiye has experienced significant immigration from the Middle East, Central Asia, and Africa in recent years. Iranian LGBTI+ individuals were also part of the migration to Türkiye. The primary objective of these immigrants, who predominantly view Türkiye as a transit nation and temporary residence, is to establish permanent residency in Western European and North American countries. Canada is notable among these countries.

Individuals who have departed from Iran, their country of citizenship, due to their sexual orientation, find themselves in a waiting period, often extending for several years, in Türkiye, a significantly more progressive nation in comparison to Iran. Nevertheless, Iranian LGBTI+ immigrants residing in Türkiye experience a range of violence and prejudice due to their dual identities as immigrants and members of the LGBTI+ community. Additionally, they have a multitude of obstacles, particularly when it comes to pursuing asylum and navigating the migration procedure.

What are the motivating elements that drive Iranian LGBTI+ immigrants to seek asylum in Canada? What sets Canada apart from all other countries? The primary goal of this study is to understand the perspectives of Iranian LGBTI+ people regarding Canada, a nation renowned for its progressive stance on the LGBTI+ community, and to analyze the elements that influence their opinions on relocating to Canada as a dream country. This study utilizes qualitative research methods to conduct interviews with Iranian LGBTI+ immigrants in Türkiye. Its significance lies in its ability to shed light on the personal experiences, perspectives, and expectations of these individuals prior to their immigration to Canada.

**Keywords:** Migration, Iran, Türkiye, Canada, LGBTI+

**Introduction**

Recently, there has been an increase in discourse concerning the notion of the body within the framework of a heteronormative society. Acquiring a thorough understanding of the human anatomy, specifically with regard to investigating human sexuality within the LGBTI+ (lesbian, gay, bisexual, transgender, intersex, and plus) community, has been a critical element. Furthermore, beyond its traditional function as a physical enclosure, the body has come to represent an individual's sense of self and approach to engaging with the external environment. When an individual who identifies with multiple sexual orientations is unable to clarify his sexual orientation to patriarchal dominant members of his birth society, he is forcibly relocated to a foreign culture and society, becoming entangled in a second vortex.

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\* This study is derived from the Master's Thesis authored by the first author at Aydın Adnan Menderes University Graduate School of Social Sciences, and titled "An Evaluation of the Social, Economic and Political Problems Faced by Forced Migrants: The Case of LGBTI+ Individuals in Denizli"

This essay focuses on the perception of Canada among LGBTI+ forced migrants from Iran who are currently residing in Denizli, Türkiye. It explores the reasons that motivate them to choose Canada as their destination. What are the underlying factors that propel LGBTI+ migrants from Iran to pursue asylum in Canada? What distinguishes Canada from every other nation? The main goal of this research is to gain an understanding of the viewpoints held by Iranian LGBTI+ individuals regarding Canada, a country known for its progressive attitude towards the LGBTI+ community. Additionally, the study seeks to examine the factors that impact these individuals' aspirational country status of relocating to Canada. This research employs qualitative methodologies to gather data through interviews with LGBTI+ immigrants from Iran residing in Türkiye. The importance of this text resides in its capacity to shed light on the expectations, personal experiences, and viewpoints of these individuals before their migration to Canada.

### **Methodology**

The research was predicated on in-depth interviews with 22 individuals residing in Denizli's Çınar, Merkezefendi, and İstiklal districts and localities, which are densely populated with immigrants. The field research commenced in September 2021, concomitant with the initial encounter with Iranian LGBTI+ individuals residing in Denizli, and concluded in December 2023, coinciding with the final field study date. It is important to note, however, that the peak data collection period occurs from October 2023 to December 2023. On prior occasions, interviewees attempted to establish rapport and earn their trust by venturing into the field.

The Iranian LGBTI+ forced migrants participating in the in-depth interviews are between 20 and 45 years old. Based on the educational background of the 22 respondents, it can be inferred that 16 of them obtained a university degree, 4 graduated from high school, 1 individual held a master's scale, and 1 interviewee completed their study at two separate universities. Prior to arriving in Türkiye, the respondents had obtained diverse occupations that are recognized in Iranian culture. We found that 18 interviewees in Iran held high-status vocations such as architect, physiology specialist, electronics engineer, computer engineer, hairdresser, psychologist, football player, model, and lawyer. Out of the respondents, four had been enrolled as university students in Iran before moving to Türkiye. However, only two of them are currently pursuing their studies in Türkiye, as they are awaiting approval for their refugee petitions in another country. One respondent abandoned his second year of study at the Faculty of Medicine and escaped from Iran because of his sexual orientation and the imminent threat of murder. Nevertheless, all participants are not currently engaged in their previous occupations.

Table 1: List of Interviewees

No. of Interviewees	Birth of Year	Education	Gender	Sexual Orientation	Profession	Occupation in Türkiye
INT1	1991	University Grad.	Woman	Lesbian / Femme	Physiology Specialist	Online Data Processing
INT2	1990	University Grad.	Transgender Man	Heterosexual	Physiology Specialist	Online Data Processing
INT3	1979	University Grad.	Man	Bisexual	Electronics Engineer	Textile Worker
INT4	1983	High School Graduate	Transgender Woman	Lesbian / Butch	Football Player	Waiter
INT5	1986	University Grad.	Woman	Lesbian / Femme	Physiology Specialist / Football Player	Textile Worker
INT6	1990	University Grad.	Man	Pansexual	Computer Engineer	Not Working
INT7	1997	High School Graduate	Transgender Man	Gay	Hairdresser	Textile Worker
INT8	1988	University Grad.	Woman	Lesbian	Chemist / Model	Waiter
INT9	1997	University Grad.	Man	Gay	Student	Student
INT10	1993	University Grad.	Transgender Woman	Lesbian / Femme	Clinical Psychologist / Model	Work in a Social Association
INT11	1990	University Grad.	Woman	Lesbian / Butch	Architect	Beauty Expert
INT12	1980	Post-Graduate Degree	Man	Gay	Industrial Design Engineer	Work in a Social Association
INT13	1997	High School Graduate	Man	Gay	Student at Medical School	Work in a Social Association
INT14	1986	University Grad.	Transgender Woman	Complicated	Computer Engineer	Remote Work
INT15	2000	University Grad.	Man	Gay / Demisexual	-	Student
INT16	2003	High School Graduate	Complicated	Gay	-	Not Working
INT17	1978	University Grad.	Woman	Lesbian / Butch	Lawyer	Textile Worker
INT18	1991	(Two Diff.) University Grad.	Man	Gay	Psychologist	Online Data Processing
INT19	1994	University Grad.	Transgender Man	Gay	Fashion Designer	Textile Worker
INT20	1991	University Grad.	Woman	Lesbian / Femme	Accountant	Textile Worker
INT21	1998	University Grad.	Woman	Lesbian / Butch	Interior Designer / Photographer	Textile Worker
INT22	1985	University Grad.	Woman	Lesbian / Butch	Agricultural Engineer	Textile Worker

We presented the interviewees with a set of 10 questions to answer: a) What was your experience like living in Iran? What was the reason for your departure from this country? b) What were the reasons and means by which you arrived in Türkiye? c) In which country do you intend to reside after Türkiye? What are your expectations for the country you are contemplating residing in? d) Does this country ensure the preservation of the rights of immigrant individuals who identify as LGBTI+? e) Do you anticipate being socially embraced as an LGBTI+ individual in the nation where you intend to seek asylum? f) Do you intend to work in the nation where you propose to seek asylum? What is your intended profession or career? How did you come across this job opportunity, or do you intend to actively search for it? g) Has your accommodation been prepared in the nation where you intend to seek asylum? Has the government of the nation where you plan to seek refuge provided assistance with your lodging, or will your network of friends in that country be providing support? h) Do you desire to get citizenship in the country where you have applied for refugee status? Are you familiar with the language, constitution, political system, and social structure of that country? i) Envision your life in the country where you plan to seek asylum; j) Are you intending to get into marriage as an LGBTI+ individual in the nation where you intend to establish permanent residence? Do you plan to have children in the future that align with your sexual orientation? Regarding marriage, do you have intentions to pursue adoption at some point in the future?

Out of the 22 interviewees, 20 expressed their desire to seek asylum in Canada, while the remaining individuals indicated a preference for Germany and the USA. Undoubtedly, Canada is the primary destination for Iranian LGBTI+ individuals who are forced to immigrate and temporarily reside in Türkiye.

### **The Motivation Behind Migration**

The primary reason for LGBTI+ Iranians' migration is their inability to openly express their adopted sexual orientations in a country with a theocratic structure like the Islamic Republic of Iran. While it may appear that the most significant factor influencing their decision to migrate is their LGBTI+ identity, the underlying cause is the lack of freedom to openly embrace their sexual orientations.

Iran occupies a complex position due to its historical and social construction, dominant cultural structure, political operation, and religious dynamics. A regime change ensued in the early 1980s as a consequence of political and social developments, which led to the ousting of Shah Mohammad Reza Pahlavi, the representative of the Iranian monarchy, in less than a year. The demise of the monarchy led to the implementation of a stringent Islamic administration, heavily emphasizing Shiite doctrines (Boztaş 2014: 6). This event marked the end of the modern Iranian state, and the nation gradually came under Islamic governance thereafter (Sancar, 2016: 25). Since the 1979 Revolution, Iran has been a theocratic republic. The government is founded on the unequivocal supremacy of the religious leader Ayatollah. The government possesses extensive authority to quell political opposition, regulate media outlets, and impose a stringent set of moral standards. The stringent regulations enforced in Iran have compelled several individuals with diverse religious, political, intellectual, and sexual orientations to flee Iran and seek asylum in foreign nations (Coşkun ve Eski, 2019: 46).

This authority is particularly enforced with severity against those involved in acts of “sexual deviation”. Homosexual partnerships are subject to severe penalties, including whipping and death (Human Rights Watch, 2010), (İran Human Rights, 2023). The law’s endorsement of such persecution encourages extensive acts of violence by both the government and society against the LGBTI+ population. The death penalty applies to individuals who refuse to undergo gender reassignment surgery. Iran is among the six nations that enforce capital punishment for individuals based on their sexual orientation. The countries that also enforce capital punishment for consensual same-sex relationships include Brunei, Mauritania, Nigeria, Saudi Arabia, and Yemen (Center for Human Rights in Iran, 2021). In January 2011, Ali Larijani, who was the Speaker of Parliament at the time, expressed his belief that the death penalty for engaging in homosexual sexual intercourse served as an efficient measure to safeguard society from deviant behavior. Hate speech functions as a de facto policy of the Iranian regime (Center for Human Rights in Iran, 2011).

Social pressures, violence, psychological well-being, opportunity disparities, and feelings of despair also influence the migration decisions of LGBTI+ individuals in Iran. In addition to the Iranian government, the judicial system and non-state actors, including families, communities, and institutions, also commit abuses. This circumstance induces LGBTI+ people to migrate. In fact, both LGBTI+ individuals and individuals from various backgrounds, including human rights activists, journalists, and members of different religions, have emigrated from Iran to countries like Western Europe, the USA, Canada, and Türkiye in search of freedom. Türkiye stands apart, particularly due to its proximity as a neighboring country and greater emphasis on individual liberties. Türkiye has also emerged as a transit hub for Iranians who identify as LGBTI+.

### **Perception of “Dream Country”**

Fieldwork undertaken with LGBTI+ individuals who have chosen to migrate and have arrived in Türkiye also indicates that they have identified Canada as their desired destination. The majority of the interviewees, specifically 20 out of 22, expressed a desire to relocate to Canada. Interviewees expressed a preference for settling in Canada due to several factors, including political stability, economic prospects, high quality of life, robust social safety nets, societal acceptance, inclusivity, multiculturalism, and the recognition of LGBTI+ family rights, such as same-sex marriage. Nevertheless, as a result of prevailing circumstances, they utilize Türkiye as an “intermediate stop.” Regarding the rationale behind their decision to be in Türkiye rather than Canada, the interviewer in question No. INT5 provides the subsequent statements:

*“I have no money! I have already run away from my family, and I can’t get any aid. I previously escaped from Iran for my own safety. This is the nearest country we can reach. Those who travel directly from Iran to Canada pay tens of thousands of dollars for this.”*

Iranian LGBTI+ individuals residing in Türkiye for an extended period have a distinct social, cultural, and political journey while awaiting the processing of their asylum requests to Canada. Interviewees who attempt to conform to the social system run the risk of encountering violence and hostility from certain segments of society. In contrast to Iran and Türkiye, they are confident that this discrimination will cease once they establish themselves in Canada, where they can lead a tranquil existence.

The motives and methods of the 22 interviewees traveling from Iran to Türkiye differ. The duration of one’s stay in this country also varies. No. INT2, the interviewee who has been in Denizli since 2013, holds the record for the longest stay in Türkiye among the interviewees. However, he is currently awaiting the processing of his asylum application to Canada. The interviewee with the shortest duration of stay in Türkiye arrived in 2019 and was officially recorded by the Presidency of Migration Management in Denizli city. It is evident that Türkiye, which serves as a transit point for Iranians migrating to Canada, has become a permanent residence for certain Iranians who identify as LGBTI+.

Out of the 22 Iranian LGBTI+ individuals that were questioned throughout the research, 3 individuals have been granted conditional refugee status. There are now 19 individuals who have submitted applications for international protection and are waiting for the application process to be completed. Furthermore, all of the individuals being interviewed have submitted applications to different Non-Governmental Organizations (NGOs) and/or official institutions and organizations, such as *Rainbow Railroad*, the *United Nations High Commissioner for Refugees (UNHCR)*, and the *Application for an Offshore Humanitarian Visa*. They have also contacted these entities to request assistance in relocating to a third country. It is important to clarify that UNHCR does not act as a facilitator for the transfer of refugees and immigrants to a third nation. UNHCR collaborates with the *Ministry of Interior Presidency of Migration Management* to identify sensitive files. The accepting countries have the ultimate authority to make the final decision about settling in a third country (Help UNHCR, 2023).

The duration of the immigration process in Canada has progressively increased over time. Since 2018, the *Ministry of Interior Presidency of Migration Management* in Türkiye has taken over the responsibility of processing asylum petitions, which were formerly conducted in collaboration with third nations under the guidance of UNHCR. However, the current process is experiencing significant delays. Another contributing cause is the dense concentration of applications and the inadequate

availability of NGOs to provide support for these applications. However, immigrants are dissatisfied with this condition. For example, the interviewee in question No. INT5 provides the following statements regarding this subject:

*“Since 2018, UNHCR has delegated a significant portion of its authority to the Presidency of Migration Management. This institution is currently accepting applications. The mechanism operated more efficiently during the previous existence of UNHCR.”*

The life narratives, aspirations, encounters, and future prospects of each interviewee vary. Furthermore, there are those who hold divergent viewpoints regarding this matter:

INT7: *“We do not have the right to choose. The United Nations determines the country. They’ve already directed us to Canada. We also wish to go to Canada.”*

INT15: *“I did not formally request asylum in Canada. I occasionally go to Iran to visit my father. If I applied, the government would see it, and I would never be able to visit Iran again. Instead, I came to Türkiye. I’ll stay here till my father’s finances improve. After that, I’ll head to Canada.”*

Migrants regularly monitor Canada’s immigration policies. Their primary focus is on scrutinizing legal protocols. Furthermore, individuals who have already established residences in Canada shape their perceptions of life there. No. INT7 is monitoring Canada’s progress, but No. INT14 expresses a lack of optimism about living there:

INT7: *“Yes, we comprehend the legal procedure. We learn from our friends there while also conducting our own study. Everyone is treated equally there. People show respect for one another. Suppose you have sought refuge there; upon the evaluation and acceptance of your application, your rights align with those of the local citizens.”*

INT14: *“I’ve applied for asylum in Canada, but thousands of other individuals have as well. That’s why I have little prospect of going there. I am so desperate that I didn’t need to look at the procedure.”*

The housing issue is a major challenge encountered by Iranian immigrants in Türkiye. They are under the impression that they will not have any housing issues upon their arrival in Canada. As an example, No. INT8 and No. INT9 say that:

INT8: *“The state provides us with our accommodations. So there’s nothing to worry about. Canada is a powerful state.”*

INT9: *“According to Canadian law, asylum seekers have certain rights. Housing is one of these. If your financial condition is poor, you will be accommodated.”*

Hence, the economic advantages and prospects for job possibilities and entrepreneurship render Canada appealing to these immigrants. They also intend to work in Canada at the professions they studied in Iran. In this context, No. INT4’s statement holds significant importance:

*“When we get there, my friend and I want to open a large gym, but not right away. We don’t have any money. When we initially arrive, we will need to apply for unemployment benefits. According to reports, there are social service buildings throughout the provinces. You can apply from there. They do research and pay you accordingly. When I last spoke with my friend, he was receiving 600 Canadian dollars. I’m not sure how much now.”*

What are the reasons for choosing Canada? The prevailing response to this query is the notion that Canada provides or is perceived to provide these persons with the opportunity to openly explore and express their sexual orientations. The interviewees provided varying responses regarding the country in which they sought asylum or their entitlement to select a certain country for seeking asylum. Canada distinguishes itself from other nations when it comes to freedom of choice. The interviewees’ statements are significant because they reflect the immigrants’ perspectives on this nation prior to their arrival in Canada.

INT8: *“There are numerous rights there. Everyone has the same rights before the law. You can pursue whatever occupation you desire. You can do whatever you want. You can go to university to study. You can live however you choose.”*

INT13: *“In Canada, someone cannot approach you and say, ‘You are not Canadian.’ For example, you could argue, ‘Your father was not a Canadian either; he came here, killed the natives, and immigrated here.’ And not understanding how to minimize is an extremely valuable skill for me. That is why I prefer Canada for asylum.”*

INT2: *“Nowhere else handles LGBTI+ individuals better than Canada. That place really respects the rights of the community. He looks after individuals extremely well, not just LGBTI+ people. He provides excellent care for everyone in that state.”*

INT1: *“Imagine that we both work in Canada. For example, suppose you are a married man. As a transgender person, I also work with you. You don't know anything about my sexual orientation or identity. One day, I am telling you that I feel like it. You can't stare at me! The state would penalize you. They'd fire you. Do you understand?”*

INT17: *“I haven't sought asylum in any nation yet since the lines are too long. My LGBTI+ friends have been waiting for their turn in Türkiye for ten years. But if it were my turn, I'd want to live in Canada. Because it's difficult to live somewhere else. I have a friend there; he told me. He works at a market in Toronto, Canada. A customer humiliated him for being LGBTI+. The cops arrived and fined this individual. Can you believe it? We have no right to express our opinions here.”*

INT22: *“I wish to go to a safe place. Iran isn't safe. Actually, Türkiye is not safe either. However, Canada is more appealing in this regard. Is there any homophobia out there? Of course there is, but not as much as in Iran or Türkiye.”*

Canada's acknowledgment of LGBTI+ family rights, including same-sex marriage, adds to the appeal of this country. The respondents provided affirmative responses to the inquiry, “Do you possess any intentions of entering into matrimony or starting a family in Canada?” For instance, No. INT7 and No. INT13 utter the subsequent statements:

INT7: *“In fact, I wish to wed a man. My want is for kids as well. I will have this chance thanks to Canada.”*

INT13: *“I'm thinking of getting married in Canada. I also really want to get married. I enjoy sharing my life. When I'm alone, I'm not motivated to live. I can get these in Canada. Kid... I'm not sure; maybe in the future.”*

## Conclusion

In recent years, substantial influxes of immigrants from the Middle East, Central Asia, and Africa have entered Türkiye. LGBTI+ individuals from Iran were also among those who migrated to this country. The principal aim of these immigrants, who primarily perceive Türkiye as a transit country and transitory domicile, is to obtain permanent residency in countries located in North America and Western Europe.

Those who have emigrated from Iran on the basis of their sexual orientation are frequently subjected to a protracted waiting period in Türkiye. Despite this, Iranian LGBTI+ forced migrants residing in Türkiye are subjected to a variety of acts of violence and discrimination on account of their dual status as LGBTI+ community members and immigrants. Furthermore, they encounter an extensive array of challenges, specifically in regards to seeking asylum and traversing the migration process. Canada has emerged as a highly sought-after immigration destination in recent years.

Multiple factors contribute to this appeal. Canada's attractiveness as a destination for migrants stems from its notable qualities, including political stability, promising economic opportunities, excellent quality of life, strong social welfare systems, societal acceptance, inclusivity, multiculturalism, and the recognition of LGBTI+ family rights.

First of all, Canada exhibits a high degree of political stability. A management team that upholds democratic principles and respects human rights leads the organization. In this case, the organization guarantees long-term planning and investment for immigrants. As for economic opportunities, Canada provides immigrants with a robust economy and a secure employment market. The nation provides lucrative employment prospects across several industries, enabling immigrants to leverage their expertise and background to establish a prosperous livelihood for themselves and their families. Canada also boasts an extensive social safety net. This network provides access to fundamental social services, including healthcare, unemployment benefits, and pensions, for immigrants. So, Canada provides an exceptional standard of living. Environmental sanitation, well-developed infrastructure, and societal safety characterize the nation. Due to these elements, immigrants are able to enjoy a secure and joyful existence in Canada.

Canada is an inclusive and multicultural society. The country welcomes and treats individuals of various cultures and ethnic backgrounds with dignity. This fosters a sense of familiarity and comfort for immigrants as they adjust to life in a foreign nation. Additionally, Canada boasts a society that is characterized by inclusivity and acceptance, providing a safe and unrestricted environment for LGBTI+ individuals to live authentically and without hindrance. Several LGBTI+ NGOs and activist groups are active in the country. Moreover, Canada enforces federal and provincial laws that prohibit any kind of discrimination against gays. These rules provide parity in domains like education, employment, housing, and public services. The country has laws in place that specifically forbid hate crimes, which include acts of hatred directed towards those who identify as LGBTI+. Over and above, Canada achieved the distinction of becoming the first significant North American nation to allow same-sex marriage in 2005. This country grants full equality to LGBTI+ families in areas such as adoption and reproductive support.

Despite the fact that asylum seekers have the expectation that the Canadian government will take on responsibilities that it may not have a legitimate obligation to fulfill, such as providing shelter and ensuring employment, all these prospects render Canada an ideal destination for Iranian LGBTI+ individuals, making it a “dream country.”

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**SURGICAL SITE INFECTIONS: PREVALENCE AND RISK FACTORS**

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**Introduction**

Surgical site infections (SSIs) are a major cause of morbidity and mortality. Suitable control and prevention measures can have a positive impact on the management of these infections. This study aimed to determine the prevalence of SSIs in two university hospitals (UH) and to identify their risk factors.

**Methods**

This was a cross-sectional prevalence study of patients who underwent surgery in the last 30 days or in the year following a surgery involving the insertion of a medical device and who were hospitalized in two university hospitals during March 2023. SSIs were defined based on the criteria established by the Centers for Disease Control and Prevention (CDC).

## Results

The study included 164 patients, with 33 (20.1%) admitted to the obstetrics and gynecology department. The median age was 47.5 years (interquartile range = [28 - 65.25 years]). The sex ratio was 1.02. Surgery involving the insertion of a medical device was performed in 25 (15.2%) patients. In 9.1% (n=15) of cases the surgery was septic. We noted that 11 patients were infected, giving a prevalence of SSI of 6.7%. The clinical signs observed were fever (36.4%; n=2), pus discharge (36.4%; n=2), pain (36.4%; n=2), oedema with local redness (9.1%; n=1), and suture dehiscence (9.1%; n=1). The diagnosis of SSI was microbiologically documented in 45.4% of patients (n=5), of which *Pseudomonas aeruginosa* was the most isolated pathogen (40%; n=2). Antibiotic therapy was empirically prescribed in 54.5% of patients (n=6). Imipenem was the most prescribed drug (45.5%; n=5).

Multivariate analysis using binary logistic regression showed that diabetes (adjusted odds ratio (AOR)=10.5; IC95%=[1.9-55.6]; p=0.006), septic-type surgery (AOR =10.2 ; IC95%=[1.5-68.6]); p=0.017) and previous hospitalization in the last three months (AOR = 26.1; IC95%=[2.86-43.9]); p=0.004) were independently associated with the occurrence of SSI.

## Conclusion

The study showed a high prevalence of SSIs. The identification of clinical and operative risk factors highlights the significance of strict post-operative monitoring, particularly for at-risk patients, to prevent these infections and ensure a safe and optimal care.

**Key words:** surgical site infections / prevalence / risk factors

USING DIGITAL TOOLS IN TEACHING ENGLISH ONLINE

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The article explains the digital resources that are used in real-world English classrooms. The importance of online education has been demonstrated by recent worldwide gatherings like COVID-19. It demonstrated how important it is for the majority of the educational field to shift to online learning, and we can see that digital technologies play a significant part in the development of distant learning courses, electronic learning resources, and study materials. Digital tools are utilized in practical English classrooms to capture audio and video resources for listening, produce exams to evaluate the knowledge students have learned, and construct lessons and teaching materials. The writers compile a list. The writers enumerate the most practical and effective platforms, apps, and systems accessible in the field of education.

The writers outline different work formats for developing abilities in reading, writing, speaking, and listening as well as the benefits of digital resources including Google Classroom, YouTube, Padlet, Mentimeter, Edpuzzle, Calameo, and Quizlet. The digital tools under consideration facilitate the creation of interactive online tasks, the development of novel pedagogical approaches for structuring the learning process, the objective evaluation of knowledge and ongoing monitoring of study group outcomes, the sharing of assignments and information between teachers and students, and the streamlining of the pre-class preparation process.

**Keywords:** e-learning, online, digital technologies, teaching English, remote learning .

**Introduction.**

Every person on the planet has experienced the COVID-19 global pandemic throughout the past three years. The epidemic has exposed weaknesses in the educational institutions of several nations, making it clear that these systems were not prepared to transition to distant learning (online). But to look on the bright side of this

Hence, we can observe that the forced, widespread shift to online learning aided in the development of IT skills in the classroom. Authorities and educational institutions started to reconsider teaching methods and rethink learning methodologies. However, low-quality education is the outcome of both the world's lack of readiness for the online transition and the gap in IT competency in the field of education. As per the research by Human Rights Watch, an astounding 1.4 billion pupils were excluded from their pre-primary, primary, and secondary education in over 190 nations, with the aim of mitigating the spread of the new coronavirus. While some countries or jurisdictions saw a reopening of schools for in-person instruction while the pandemic continued, others saw schools remain closed indefinitely, with learning occurring mostly online or through other remote means. [1]. Thus, it is evident how the pandemic impacted equality and equity in schooling.

This article's practical value stems from the Republic of Azerbaijan educational system's modernization process, which is linked to the country's move to remote learning and the utilization of new information technologies. The development of information and communication competencies, the planning of independent work, independent critical thinking, and the formation of abilities and skills required to carry out professional activities are all impacted by the active use and introduction of new information technologies into the educational process. The authors hope to facilitate learning and organize useful resources for educators by providing a list of online learning platforms here.

Enhancing information technologies necessitates adjustments to all aspect of human endeavor, not just the general education process. During the epidemic, mobile digital devices were essential for all forms of activities. The use of digital gadgets suggests constant and personal accessibility, information storage, search and processing capabilities, interactive and multimedia applications, task planning, and connectivity to other devices.

Compared to more traditional forms of learning, distance learning, or online learning, offers a fantastic opportunity to use digital technology for learning. Benefits of online learning include group projects, oral presentations, individual work presentations, and collaborative work between the instructor and students on an interactive whiteboard. In summary, many forms of work and interactive forms serve as representations of the learning process. Furthermore, taking classes online offers plenty of chances to utilize several Learning Management System (LMS) platforms at once to create a variety of speech activities. Learning, administration, and e-system are the three main tenets of an LMS (Learning Management System).

The second part of the 20th century saw the development of LMS in the field of education. The goal of developing an LMS is to provide instructional resources in both traditional and remote learning formats, while also streamlining and clarifying the educational process [2]. It's fascinating to note that the history of distance learning dates back to 1728, when American professor Caleb Phillips advertised for students to enroll in correspondence classes from anywhere in the nation [3].

### Research methods

The goal of the study paper was to conduct a survey and analysis of recent publications, publicly available data, and details regarding the digital teaching resources that are now in use. The study was conducted using systematic methodologies as part of this effort, and a comparative examination of current remedies to the problems discovered was employed. The pros and benefits of using these platforms were reviewed, along with information on each of the learning environments and platforms that was organized and listed. The work's objective was to demonstrate an evolutionary shift in the teaching profession's role in the context of the use of instructional digital tools. This work's methodology consists of reviewing and analyzing literary texts related to the research topic.

### Discussion

Distance learning is a distinct type of education since it primarily relies on multimedia, new information and communication technologies, video communications, and other forms of engagement between students and teachers as well as between students. This kind of instruction is predicated on cutting-edge information technology, whose use enables quick and adaptable adjustments to the student's evolving demands [4].

Due to the arrangement of communication and learning processes between the teacher and students over the Internet, the primary feature of distance learning is the ability to get educational services without physically being present at an educational institution. Utilizing contemporary digital tools to facilitate communication with the teacher-coordinator and other learners is essential to the network's arrangement of distance learning.

A subset of digital technologies called "digital tools for education" are being created to enhance the effectiveness, velocity, and appeal of information transfer in teaching and learning [5]. These consist of:

E-learning systems: Google Classroom, Stepik, Coursera, Canvas, Udemy, etc.

Social networks: Facebook, Instagram, Telegram, Twitter, tiktok, Vkontakte, Odnoklassniki

Video services: Youtube;

Infographic platforms: Piktochart, Canva, PosterMyWall, DesignCap, Wordle, etc.

Game-based learning resources: LearningApps, Telltale, Institute of Play, OER Commons  
etc.

The goal of developing these resources is to make it easier to track students' progress and learning outcomes. Additionally, because there are many different ways to acquire, reproduce, analyze, and apply knowledge, children are more interested in and motivated to participate in the learning process, which promotes open and accessible education. Improving the quality of education is the primary objective of utilizing digital tools in the classroom. Teachers must be aware of the functional and pedagogical capabilities of digital tools and be able to appropriately use them throughout the learning process in order to use them effectively. The main characteristics of digital tools are as follows:

1. Inform parents and pupils of pertinent educational information. Presenting and compiling organizational data is part of the teacher's role as the manager and leader of the classroom in any kind of learning environment. Teachers can interact with students, remind them of upcoming activities, and stay in touch with parents by using virtual whiteboards, messengers, and forums.

2. Creating comfortable settings for distance study. When everyone involved in the process exchanges information on time, without compromising their privacy or health, and for the sake of progress, that is when comfortable conditions for distant learning exist. In this scenario, social network chat rooms, file storage and notification features in e-learning systems, and other online video libraries can all be used.

3. Assistance in fostering an emotional bond with pupils. Cloud storage, video conferencing, virtual whiteboards, forums, social media and messengers, and video conferencing all help to foster an emotional bond with students.

4. Developing student interest, engagement, and passion. Interest in learning grows when a student can play, choose, experience the joy of discovery, and foster independence. To attract students' attention, to increase their interest, the teacher is helped by digital tools that are implemented in the form of games. 5. Development of own professional freedom. The freedom of a teacher and an educator is such a set of skills and knowledge, which allows solving educational tasks depending on the requests and level of students' enthusiasm. There are always children in the classroom who only want a basic level of subject matter, but there are also those who aspire to win the All-Russian Olympiad [6].

Currently, learning management systems like as Google Classroom, YouTube, Padlet, Mentimeter, Edpuzzle, Calameo, Quizlet, and others are widely used worldwide following the epidemic. The teacher can use multiple digital tools at once when teaching remotely.

According to I.V. Fyodorova, the correct mix of teaching formats and techniques can help students reach their full potential, become more involved in learning a foreign language, perform better academically, and be motivated by a range of teaching formats and resources [7].

Google Classroom is a complex tool that may be used with other apps like as Google Disc, G-mail, YouTube, Duo, Meet, Hangouts, and Jamboard. As a result, the instructor can plan a class utilizing the applications that are provided by Google Classroom. To instruct students, the teacher can create a dedicated individual class, assign homework, set up master classes and discussions, complete

individual and group assignments in the system and attach the finished product, assess the work, provide feedback to students so they can make necessary corrections, leave comments, and grade (assess). Furthermore, all assignments are preserved in Google Drive and are accessible at any moment via the passed material.

Digital tools facilitate the development of language proficiency in all domains, including reading, writing, speaking, and listening. Every course uses YouTube to help students form and improve their speech perception abilities. One of the most successful learning methods is audiovisual learning since videos include visual information such as setting, circumstance, participant nonverbal cues, gestures, facial expressions, and other visual features. YouTube is a goldmine of didactic videos for teaching English. These include brief lessons that break down grammar principles, conversations about vocabulary, conversations with native speakers, phonetic exercises to practice pronouncing words correctly, news, and other professional resources. Another platform that enables the creation of an online collection of visual bookmarks for self-study is called Padlet.

Visual bookmarks serve as the required materials' notebook. Padlet can be used to organize a variety of learning resources in any format, including group projects, surveys, tests, quizzes, presentations, texts, hyperlinks, audio, video, and photos as well as handwritten images, maps, screenshots, notes, and more.

Mentimeter allows you to create interactive presentations, surveys, quizzes, and polls, vote, and receive immediate feedback. During the reflection stage of teaching English, teachers frequently utilize this tool to verify words and expressions or choose associations on a specific lexical issue as an update of the previous knowledge.

Calameo is an incredibly useful tool for working remotely in collaboration with pupils. Calameo has all the study materials you need, including instructional materials for the subject you're studying, primary and secondary sources to read, student projects, essays, reports, presentations, and creative works. This tool's vibrant and intuitive UI makes reading more engaging. Students can highlight areas of interest, flip pages, and enlarge photos and presentations with this tool.

The ability to design different tasks and make original movies is what makes Edpuzzle special. With the help of this tool, you may create and add assignments based on the content you've learned, include videos, trim segments, record your own voice, add audio commentary, and more. The instructor can arrange for group projects with pupils, specify due dates, and see assignment and performance data. When using Edpuzzle, the teacher's primary responsibility is to carefully choose the video content based on the target language's current cultural context and the thematic focus.

When teaching English, Quizlet is used to review the lexical material. This includes reviewing all speech tasks, including speaking, listening, writing, and reading. This is an independent tool that students can utilize after class. The teacher creates practice modules based on newly learned vocabulary units. The modules are cards with words on them along with definitions, translations, and pictures. Quizlet uses a variety of integrated operating modes (listen, repeat, spell, match the translation or definition) to help practice and solidify the lexical content.

As a result, using digital tools in English instruction aids students' development of autonomous cognitive activity in addition to speaking abilities.

## Conclusion

The authors of the research examined the ways in which digital tools might be used and introduced into the teaching process. The article offers a brief recommendation for incorporating a novel strategy into the teaching and learning process along with verbal and semantic forecasting, analysis, and comparison skills development and critical thinking skills development [5]. In order to solve complex problems during the study process, students can utilize the resources that are covered in practical English classes, such as Google Classroom, YouTube, Padlet, Mentimeter, Edpuzzle, Calameo, and Quizlet.

The employment of digital tools in education also shows how adaptable and mobile the current educational system is—that is, how quickly it can adjust to new technology for distant learning.

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COMPARISON OF LAPAROSCOPIC AND OPEN METHODS IN INGUINAL HERNIA SURGERY

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**ABSTRACT**

**Objective:** The objective of this study was to compare the Lichtenstein hernia repair (LHR), which is an open surgical method for inguinal hernia repair, with the transabdominal preperitoneal (TAPP) hernia repair technique, which is one of the laparoscopic methods.

**Materials and Methods:** The study included a total of 104 patients who underwent elective surgery for inguinal hernia at our general surgery clinic between June 2020 and July 2022. Fifty-three patients underwent the LHR procedure, while 51 underwent the TAPP hernia repair technique. The data were retrospectively reviewed and analyzed. The mean duration of the operation, length of hospital stay, and postoperative complications among patients who underwent one of these two different operation methods were evaluated by comparing them with each other.

**Results:** The mean age of the patients was  $50.87 \pm 10.87$  years in the LHR group and  $48.24 \pm 10.66$  years in the TAPP group. The mean duration of operation was  $47.58 \pm 7.06$  minutes in the LHR group, which was less than the TAPP procedure group ( $p < 0.05$ ). The mean duration of hospital stay was  $1.78 \pm 0.90$  days in the TAPP group, which was shorter than in the LHR ( $p < 0.05$ ). There was no statistically significant difference between the groups in terms of postoperative wound infection, hematoma and hernia relapse ( $p > 0.05$ ). Chronic pain and seroma complications were less in the TAPP group ( $p < 0.05$ ). There was no mortality in the patients.

**Conclusion:** Our study findings indicate that the TAPP procedure showed superiority over LHR in terms of chronic pain, seroma complications, and length of hospital stay. However, LHR demonstrated a shorter duration of operation time. Based on these results, we recommend that the TAPP procedure be preferred for inguinal hernia repair when operation time is not a limiting factor.

**Keywords:** Inguinal hernia, Lichtenstein hernia repair, transabdominal preperitoneal (TAPP), open, laparoscopic

**INTRODUCTION**

As with many branches of medical science, there have been continuous innovations and the emergence of new surgical methods in general surgery over the years(1, 2). With the advancement of laparoscopy, surgeries that were traditionally conducted using open techniques are progressively being replaced by laparoscopic methods, which are considered minimally invasive (3, 4). Hernia surgery is also affected by this trend. The transabdominal preperitoneal hernia repair technique (TAPP), examined in our study, is a technique which has been frequently used in surgical clinics in recent years(5).

The hernia incidence rate in adults increases with age (6, 7). Hernia repair surgery is one of the most commonly performed operations in general surgery (7, 8). Inguinal hernias are the most common ones among abdominal wall hernias (9)

Lichtenstein hernia repair (LHR) is the most commonly used surgical method for the treatment of inguinal hernias (10). The Lichtenstein hernia repair technique which is a traditional open surgical method performed by incision over the skin, was first described and performed by Irving L. Lichtenstein in 1989 (11, 12). The transabdominal preperitoneal (TAPP) hernia repair technique is a

laparoscopic surgical method performed by placing trocars into the abdomen through small incisions made in the skin. It was first introduced by Arregui and Dion in 1992 as a new surgical technique(13-15).

In this study, we aimed to compare two different methods of inguinal hernia repair, namely the open Lichtenstein hernia repair and the laparoscopic transabdominal preperitoneal (TAPP) hernia repair, in terms of duration of the operation, length of hospital stay, postoperative complications, and relapse rates.

## MATERIALS AND METHODS

In this study, the data of patients who were operated on for inguinal hernia between June 2020 and July 2022 in the general surgery clinic of Selçuk University Faculty of Medicine were retrospectively analyzed. Patient data were accessed through the hospital's electronic operating system and archived patient files. Patients with incomplete or missing data were excluded from the study to ensure the reliability and accuracy of the analysis.

A total of 104 patients who underwent elective surgery were included in the analysis. Among them, 53 patients underwent the LHR procedure, while 51 patients underwent the TAPP. Demographic and clinical characteristics, mean duration of the operation, and length of hospital stay were recorded and analyzed. Furthermore, early and late postoperative complications were also recorded and analyzed. Patient follow-ups were conducted during the postoperative hospitalization period and at the outpatient clinic visits on the 10th day, 6th month and 1st year postoperatively. Chronic pain, infection, seroma, hematoma and relapse status were looked into during follow-ups.

## Statistical Analysis

Statistical analysis of the study data was performed with the IBM SPSS (Statistical Package for the Social Sciences) version 20.0 program. Whether the data had normal distribution was evaluated with the Kolmogorov-Smirnov test, histogram and Skewness-Kurtosis coefficients. Nominal and ordinal variables were compared using the Pearson chi-square test or Fisher Exact test. These data were presented as numbers and percentages. Student's T-test was used for variables with normal distribution in the comparison of paired groups. The results were considered statistically significant when  $p < 0.05$ .

## RESULTS

A total of 104 patients who underwent surgery, 53 with LHR and 51 with TAPP procedures, were included in the study. The mean age of the patients was  $49.58 \pm 10.80$  years and there was no statistically significant difference between the groups ( $p = 0.216$ ). Five (9.4%) patients in the LHR group and six (11.8%) patients in the TAPP group were female and gender distribution was similar between the groups ( $p = 0.758$ ). When the groups were compared in terms of mean duration of operation, it was  $47.58 \pm 7.06$  minutes in the LHR group and statistically significantly lower than in the TAPP group ( $p = 0.001$ ). When the duration of hospital stay was analyzed, it was  $1.78 \pm 0.90$  days in the TAPP group, which was statistically significantly lower than in the LHR group ( $p = 0.003$ ) (Table 1).

**Table 1.** Demographic and Clinical Characteristics of Patients

	<b>Lichtenstein N=53 (mean±SD)</b>	<b>TAPP N=51 (mean±SD)</b>	<b>p</b>
<b>Age (years)</b>	50.87±10.87	48.24±10.66	0.216
<b>Gender (n%)</b>			
Female	5 (9.4)	6 (11.8)	0.758
Male	48 (90.6)	45 (88.2)	
<b>Mean duration of surgery (minutes)</b>	47.58±7.06	53.06±9.32	<b>0.001</b>
<b>Duration of hospital stay (days)</b>	2.43±1.24	1.78±0.90	<b>0.003</b>

In the comparison of complications between groups, no statistically significant difference was found between the groups in terms of postoperative wound infection, hematoma and hernia relapse ( $p=0.495$ ,  $p=1.000$ ,  $p=0.618$ , respectively). Postoperative chronic pain and seroma complications were statistically significantly lower in patients who underwent the TAPP procedure compared to the LHR group ( $p=0.015$ ,  $p=0.031$ , respectively). Although the incidences of wound infection, hematoma, and relapse were numerically and proportionally higher in the group undergoing inguinal hernia surgery with LHR compared to the TAPP group, no statistically significant difference was found between the groups ( $p>0.05$ ) (Table 2).

**Table 2.** Comparison of complications between groups

	<b>Lichtenstein N=53 (n%)</b>	<b>TAPP N=51 (n%)</b>	<b>p</b>
<b>Chronic Pain</b>			
Yes	11 (20.8)	2 (3.9)	<b>0.015</b>
No	42 (79.2)	49 (96.1)	
<b>Infection</b>			
Yes	2 (3.8)	0 (0)	0.495
No	51 (96.2)	51 (100)	
<b>Seroma</b>			
Yes	8 (15.1)	1 (2)	<b>0.031</b>
No	45 (84.9)	50 (98)	
<b>Hematoma</b>			
Yes	1 (1.9)	0 (0)	1.000
No	52 (98.1)	51 (100)	
<b>Relapse</b>			
Yes	3 (5.7)	1 (2)	0.618
No	50 (94.3)	50 (98)	

## DISCUSSION

There have been many methods in the past for inguinal hernia repairs, which are among the most commonly performed surgeries in general surgery. Despite the variety of methods available, there is currently no consensus on which is the best approach for inguinal hernia repair. Just like in other surgical procedures, research in inguinal hernia repair surgery continues in order to find the method that has the shortest operating time and hospital stay, the lowest complication rate, the lowest cost, and the highest impact on improving the patient's quality of life.

In a study by Eklund et al., the patients undergoing the LHR procedure had a mean operation duration of 55 minutes (16). In our study, this value was 47.58 minutes, which was found to be shorter compared to their study. In the same study, hematoma developed in 79 patients (12.9%), seroma in 5 patients (0.8%), and pain complications in 8 patients (1.3%) during the first postoperative week. Accordingly, in our study, seroma and pain complications were proportionally more common in patients who underwent LHR, while hematoma was less common.

In their prospective study, Picchio et al. reported that the mean age of patients who underwent the TAPP procedure was 57.7±11 years and the mean duration of operation was 49.6 minutes. Among postoperative complications in their study, hematoma was observed in 2 patients (3.8%), pain in 5 patients (9.6%) and seroma in 3 patients (5.8%)(17). Accordingly, compared to our study, the mean age of the patients included in the study by Picchio et al. was higher. The mean duration of operation was shorter, and hematoma, pain, and seroma complications were less common in our study.

In the study by Sultan et al. comparing LHR and TAPP procedures in terms of postoperative infection and relapse rates, no significant difference was found between the two methods (18). In this respect, our study was found to be in line with the literature.

There are numerous studies in the literature comparing laparoscopic methods used in inguinal hernia surgery with the open surgical method LHR(19-25). While some studies have concluded that there is no clear superiority between laparoscopic methods and LHR, an increasing number of studies have demonstrated the superiority of laparoscopic surgery (16, 24-28).

In conclusion, LHR and TAPP procedures are reliable methods frequently preferred by surgeons in inguinal hernia repair surgery. While LHR offers a shorter duration of operation, the TAPP procedure is preferred due to its shorter hospital stay and lower complication rates. Taking into account patient-related factors and the surgeon's experience, we recommend that the TAPP procedure should be preferred in patients for whom the duration of surgery and associated anaesthesia exposure will not pose an issue.

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**THE IMPACT OF TRADE GLOBALIZATION, FACTOR INCOME TAXATION ON  
INCOME INEQUALITY: EVIDENCE FROM POST-SOVIET COUNTRIES**

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**ABSTRACT**

This study investigates the impact of globalization, and factor taxation on income inequality across different income groups in Post-Soviet countries. The study employs an auto-regressive fixed effect framework with Driscoll Kraay standard errors technique to examine how trade globalization, and effective tax rates are associated with income shares of the top 0.01%, top 1%, top 10%, middle 40%, and bottom 50% and 60% of the population. The findings reveal that trade globalization is linked to a decline in the income share of the top segment of the population, while it is associated with an increase in the income share of the middle class. This suggests that globalization might contribute to a modest redistribution of income in the sample countries. Moreover, the combined effect of trade globalization and higher reliance on the effective tax rate on capital is negative for top earners, suggesting that higher tax reliance on capital compared to the labor mitigates the negative impact of globalization on income inequality, probably due to the channel of increased capital taxation ability of government on capital. Furthermore, higher government expenditure is linked to a decrease in the income share of the top segment of the population, while it is associated with an increase in the income share of the middle and the bottom groups. This suggests that government expenditure funded by taxes might contribute to income redistribution. These findings highlight the potential of trade policies and tax structures to address income inequality. The study provides several policy implications.

**Keywords:** Income Inequality, Globalization, Taxation, Factor Income Taxation

**EFFECTS OF *CRYPTOCARYA MOSCHATA* FRACTIONS ON PLANKTONIC CELLS AND BIOFILMS OF *CANDIDA ALBICANS* AND *STREPTOCOCCUS MUTANS***

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**ABSTRACT**

This study aimed to evaluate the antimicrobial activity of *Cryptocarya moschata* fractions on planktonic cells and biofilms of *Candida albicans* and *Streptococcus mutans*. Initially, *C. moschata* extracts were produced and then fractionated using the liquid-liquid extraction method. Four fractions were prepared: 100% Hexane, Acetate/Hexane 1:1, 100% Ethyl Acetate, and Water. The effect of *C. moschata* fractions on planktonic cells was assessed by counting colony-forming units. Biofilm tests included colony-forming unit assay (n=10), cellular metabolism assay (n=10), and qualitative analysis through confocal laser scanning microscopy (n=2). Results were analyzed using the Mann-Whitney U statistical test ( $\alpha = 0.05$ ). The fractions contained lipophilic constituents, stilbene compounds, mainly goniotalamin, glycosylated flavonoids, and alkaloids. The findings revealed that Acetate/Hexane 1:1 and 100% Ethyl Acetate fractions reduced the planktonic cells of *C. albicans*, statistically differing from other fractions. However, the *C. moschata* fractions had no effect on *S. mutans* planktonic cells. Regarding biofilms, the fractions were able to reduce the CFU/mL and the cellular metabolism. Additionally, the fractions caused damage to the extracellular matrix of biofilms. It is concluded that the Acetate/Hexane 1:1 and 100% Ethyl Acetate fractions exhibited antimicrobial effects against single biofilm of *C. albicans* and dual-species biofilm.

**Keywords:** *Cryptocarya*, *Candida albicans*, *Streptococcus mutans*, Biofilms, Extracellular Polymeric Substance Matrix.

**BREAKING AWAY FROM SOCIALIST REALISM: PETRO MARKO'S *THE LAST CITY***

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**ABSTRACT**

Petro Marko's *Qyteti i Fundit (The Last City)* was published in 1960 in communist Albania. It depicts the tragic life of Ana Maria Monti, the spiritually chaste and emotionally crippled Italian prostitute around 1940's, who wins the heart of Leka, a young Albanian communist, in spite of his ideological convictions and socio-ethical expectations, as well as imposed Albanian Communist Party guidelines. Almost immediately after its publication, Petro Marko's novel was heavily criticised by Party officials for breaking away from the strictly imposed socialist realism. The novel was removed from all public libraries and banned, a banning which lasted for the next three decades, until the fall of communism in 1991. This paper will look into some of the novel's themes, arguing how Petro Marko's treatment of the female protagonist, Ana Maria Monti, along with Leka's portrayal and attitude towards the Italian prostitute and enemy, break away from communist ideals and socialist realism patterns, revealing influences of literary naturalism and humanism similar to Thomas Hardy's *Tess of the d'Urbervilles*, as Marko plainly puts the blame on the society for her tragic fall and death, advocating the victim and communicating messages of humanism, justice and redemption through love.

**Keywords:** Petro Marko, socialist realism, literary naturalism, censorship, humanism.

Petro Marko (1913-1991) was one of the greatest personalities of modern Albanian literature, who had the misfortune of living and writing under political persecution and communist censorship, even though an international freedom fighter, an idealist and humanist at heart to the end of his days. His novels are cornerstones of Albanian modernist literature, particularly his second novel *The Last City*, which is generally considered the first modernist novel in the history of Albanian literature. Published in 1960, it was heavily criticised for breaking away from the socialist realism schematic guidelines, leading to its complete banning for over thirty years. This paper will focus on *The Last City*, maintaining the argument that Marko intentionally chose to break away from the forcefully established socialist realism, representing the first and most obvious example of literary modernism and naturalism in Albanian novel-writing, in spite of the political pressure. Qualitative methods will be used, such as visiting Petro Marko's own recollections, recorded in his honest confessional novel *Interviewing Myself: Clouds and Stones (2000)* (*Alb. Intervistë me veten: Retë dhe Gurët*), along with various documents and periodicals, to present and compare Marko's own views on his intentional departure from the socialist realism restraints and the novel itself, which unequivocally conveys messages of universal humanism, naturalism, freedom and justice.

**SOCIALIST REALISM LITERATURE OR FORCED LABOUR?!**

There is a symbiotic association between history and literature, with history often dictating or shaping literature and literature influencing and recording history itself. This is especially true in the case of Albanian history and literature. Robert Elsie, a renowned scholar of Albanian literature has rightly observed that:

*Establishing a literary culture in Albania has never been an easy task, though not for want of artistic endeavour and creative impulses. All too often the tempestuous course of Albanian history has nipped the flowers of Albanian literature in the bud and severed the roots of intellectual culture [1].*

Almost all pre-communist Albanian literature was either the product of religious endeavour or patriotic commitment, mainly covering religious, folkloristic and nationalistic themes, as instruments of enhancing social education and cultivating national pride and consciousness. Essentially a free and uncoordinated endeavour of numerous Albanian intellectuals and religious personalities, their literary contributions were varied in style and themes, reflecting influences from their countries of education or residence, such as Italy, Austria, Turkey, Greece, America, Romania, etc., whether they wrote in Albania or abroad. But this was to change radically, once the communists came to power in 1944. A typical feature of the new regime was the need to assert their difference, *the newness* that the communist mindset was about to implement vis a vis the old, conventional, feudal or capitalist mindset, following in the steps of other Eastern communist countries. Almost as soon as the war was over, the Communist Government of Albania undertook an extensive campaign of a new psychocultural war against all pre-existing national ethos, seeking to reform the entire cultural, artistic and literary landscape of the country.

The notorious People’s Court Decision of 1948, published in the *Bashkimi* newspaper on 27<sup>th</sup> March of that year, banned a long list of Albanian and international authors and their works. It declared them regressive and hostile to the new communist regime and it is sufficient historical evidence to understand the enormity of this crazy war on all Albanian literature and the madness of the ushering communist era, which was followed by numerous imprisonments, persecutions and executions of the most prominent Albanian writers and intellectuals [2]. What ensues is a systematic, concerted and state-coordinated endeavour to write a completely new page in the history of Albanian literature and arts, encompassing all other areas of creativity, from cinematography, to painting, photography, journalism, architecture, sculpture. Numerous Party decisions sanctioned socialist realism as the ‘*most progressive*’ literary theory, producing a long list of so-called Party recommendations, which determined themes, character typology, settings, techniques and style. The sanctioned socialist realism was not a matter of choice or an alternative set before writers, just as communist guidelines and recommendations were not advisory, but final orders, demanding unnegotiable execution. A few months after Marko’s *The Last City* was published, the Politbureau of the Central Committee of the Labour Party of Albania adopted a Decision, signed by Enver Hoxha himself, addressed to the Ministry of Education and Culture, listing Party’s expectations from artists and writers. Classified as secret information until recently, this 1961 Decision provides a direct and authentic view on the political context which commanded the development course of Albanian arts and literature [3].

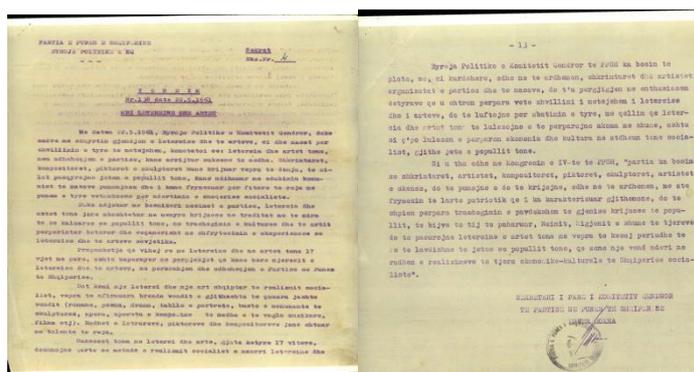


Figure 1. The 1<sup>st</sup> and 13<sup>th</sup> page of the Decision of the Politbureau of the Albanian Labour Party No. 138, of 22.05.1961, “On Literature and Arts”, signed by the communist dictator himself. (Source: Central State Archive of the Republic of Albania, F. 511, Y 1961, Fol. 69, p./pp. 1-13)

The decision states that arts and literature are Party instruments for the communist education of the masses, whereas artists and writers are expected to be loyal supporters of the Party, unwavering fighters on the ideological front against all ideological enemies, internal or external. They are referred to in military terms as loyal fighters on the frontline, a brigade of artists growing into an army, which confirms that they were not expected to be just writers, but first and foremost ideological and political

soldiers of the Party line. Comprehensibly, many of them were members of the communist Party, making sure they were producing Party-applauded works, but also vigilantly monitoring implementation of communist guidelines. Logically, with the uniformity that was commanded, the limitations in writing and the immense pressure under which Albanian writers wrote, one can deduce that writing free literature in such circumstances of forced labour must have been a titanic task, indeed. Therefore, while the majority made the easier choice, Petro Marko presents an honourable exception or 'a man made of unusual fabric' as Aurel Plasari has described him [4].

### IF NOT FREEDOM, THEN FREE LITERATURE

*Hasta la Vista* (1958), his first novel was written after his release from prison. The novel is a recount of his personal experience in the Spanish Civil War, as part of the international Garibaldi Battalion, fighting for world freedom and communist ideals [5]. In *Interviewing Myself: Clouds and Stones*, Marko's invaluable memoir, written during the last years of his life, as a sincere testimony he wanted to leave onto future generations, he writes that its publication was difficult and many parts were removed, because they were considered naturalistic and unacceptable for socialist realism standards. His second novel *The Last City* went through the same difficulties. In *Interviewing myself: Clouds and Stones*, Marko recalls a dialogue with his former Spanish Civil War comrade and then Prime Minister of Albania, Mehmet Shehu, whom Marko would usually give his manuscripts to read, before sending them for publication, in view of the fact that Shehu was both a good friend of his and an important figure in the communist Party and government. He recalls that while complimenting him on the universal messages that *The Last City* conveyed, Shehu advised him to remove some 'pornographic' and rude words from the novel, to which Marko replied:

'...but that is the vocabulary of contrabanders and prostitutes... their vocabulary is not like the one you use here at government offices' [6].

Literary reviews were not just about literary or aesthetic standards, either, but an examination of the author's loyalty in following standard schematics, with respect to subjects, characters and messages, similar to that of byzantine iconography. Marko confesses that initial reviews at the state-owned publishing house were critical of the novel's striking naturalism. He was asked to remove naturalistic fragments, as a middle-way to proceed to publication, because they had nothing to do with socialist realism. He vehemently refused, defending his style and adding he would not degrade his pen by writing ridiculous literature, or to use his original words: 'quixotic' literature [6]. Quite abruptly we find a clear confirmation of Marko's views on the official socialist realism literature, along with the fact that he consciously and courageously chose to write a different kind of literature, one that was true to life, to his humanistic and idealistic worldview. This is why, even though *The Last City* was written in a stifling literary environment, dictated by the strictly imposed socialist realism theory and practice, the novel is the opposite of unnatural, forced, or schematic.

Unlike *Hasta la Vista*, *The Last City* was published complete, with the intervention of Mehmet Shehu, but the novel was banned soon after its publication. It tells the story of Ana Maria Monti, a young beautiful Italian girl, who once had dreams of love and a happy family, but the fates decided that her family move across the sea, following Albania's occupation by the Italian fascists in 1939. It is 1944 and the defeated Italians are waiting on the shores of an Albanian seaport city, to be transported back to Italy. Italians have lost the war, but Ana Maria Monti has lost everything. She has lost her brother, her honour, her hope and will to live. The novel also tells the story of Leka, a decent idealistic communist youth, who sees beyond the miserable unfortunate Italian prostitute, allowing himself to develop feelings for her, in spite of the fact that Party guidelines and communist morals tell him to stay away from her, the fallen woman of the West, the defeated enemy, the Italian prostitute. Advocating naturalistic and humanistic views, similar to those we observe in Thomas Hardy's *Tess of the d'Urbervilles* [7] the author depicts an idealist youth like Leka, who discovers in the tragedy of that innocent ill-used woman, a victim of human greed, lust, war and exploitation from her family members and her former lover, disregarding ideological considerations. Conceptually, Leka's love for the prostitute, the Italian fallen woman and the enemy, is the real blow to the typical socialist realism novel. A hero of the socialist realism novel could never cross this ideological line, committing such an

unforgivable error of stooping so low and betraying his ideals. He could only fall in love with a fellow communist, the strong, tough, morally astute communist woman, whom he does not love for her beauty, but for her commitment to the cause. Naturalistic messages are ingrained throughout the novel. It is the unrealistic aspirations of Ana Maria's brother and parents for material riches and social advancement, which determine Ana Maria's disgraceful fall, jostling her into the arms of exploitative males, eventual ruin and tragic end. Both Leka and Ana Maria depart from the socialist realism hero and heroine prototype. Instead of despising Ana Maria for being the prostitute and the aggressor, as the standard should have compelled, Leka falls in love with her. By socialist realism standards, Ana Maria should have been depicted as the abominable whore, the Italian enemy, the anti-heroine of the socialist realism novel. But for Marko, Ana Maria is the ill-used woman by male predators, greedy and ignorant family members, hostile societies and unfavourable natural forces. And in spite of all of this, she is capable of demonstrating such spiritual tenderness and emotional purity that no ideology can blur. For Marko, who clearly stands with the victims, Ana Maria is just a sacrificial exchange for her family's social and financial advancement, sold as merchandise in the vast market of human lust and greed, made worse by unjust wars.

*They will slay me,* - Ana Maria exclaims in the *Fifth Night* chapter, - *All of them will slay me!* [8]

To further accentuate *naturalistic* features of the novel we observe a sense of fatalistic inescapability, just like a hunted animal, of Ana Maria Monti from the war criminal Carlo Peroni, who personifies all the evil that has happened to her. On the *Third Night* Ana-Maria confesses to Leka:

*You are so good! But my fate has condemned me to always be the prey of evil people.*

And there again, Leka murmurs in his head:

*What sort of people this world contains! So sad to see that poor girls end up to such a state in this fogged confusion, where the wolves get ever more voracious.* [9]

To the end of Marko's novel, we observe a constancy of naturalistic inclinations, as fate seems to move its mechanisms every step of the way for Ana Maria towards her plunging into the depths of the sea, with society and environment joining in this fatalistic conspiracy. Ana-Maria commits suicide. Still, to the very last moment, she is driven by societal factors towards that inevitable end. Life represents nothing nice for her or worth living in Italy, where she is about to be transported, while Leka can not eventually step up to her redemption. An ill-used young soul, an early death, a crime greater than our heroine's faults, point the finger at the entire world, its unfair wars, its inequality and injustice, its false ethics and morality, upholding love and compassion for humans above our ordinary concern for appearances of conformity, or any kind of ideology and social conventionalism.

Besides naturalistic messages, the novel embodies obvious modernist traits, which differ from a typical socialist realism novel. The time setting, narration technique, frequent internal monologues, of which we are unsure whether they are fictional monologues or factual dialogues, are all modernist, reminding us of Virginia Woolf's *stream-of-consciousness* technique [10]. We are not told where the story is taking place, or when. Instead, the reader is invited to gradually realize both the time and geography: an Albanian seaport city on the Adriatic in 1944, which we assume it is Durrës. The story happens in 7 days and nights, with frequent contrasts and retrospection, highlighting a modernist tendency in Marko's style, as if he inadvertently lets us into his secret, that of his love for the free world, where literature is free, along with the individual and his right to love and write freely. Contrasting chapters are used to draw a line between two worlds, the communist characters and the vanquished Italian enemies, which resembles an effort to conform to socialist realism. This attempted contrast is, in fact, effaced because of the love that is born between the main protagonists in these two divided worlds. In spite of everything, the love between Leka and Ana Maria stands for the hopefulness of superseding human evil and exploitative greed, dimming the victory of one world over the other, with the author upholding that love, social justice and forgiveness is what really unities people and makes humans all the same.

## CONCLUSION

Petro Marko's literary contribution has won him the honour of being the founding father of Albanian Modernist literature, but also the deserved award of being a Man of superior moral fibre, who lived the moral values, he communicated in his novels. In spite of his status as a war veteran, an internationalist, a communist youth and survivor of fascist prisons, a remarkable writer, intellectual and journalist, the paranoia of the Albanian communist regime did not spare him. He patiently suffered all the consequences: tortures and imprisonment from 1947-1950, surveillance, persecution, his son's imprisonment, banning, censorship, and loss of publication rights from 1973-1982. Fully aware of communist Party expectations and strict socialist realism patterns, Marko chose to remain loyal to his literary and humanistic convictions, intentionally and courageously challenging socialist realism restrictions. Socialist realism literature in Albania was quite far from being realistic; it was a Party embellished and packaged literature, intended to impose a kind of utopic communist reality, which had little to do with truth or realism. Marko's second novel *The Last City*, written and published at the height of political repression in 1960, while attempted to pass as a socialist realism novel, manifests obvious tendencies towards literary naturalism and modernism. As observed hereinabove, the novel represents the first modernist Albanian novel, with clear *naturalistic* influences, conveying messages of universal love, humanism, social justice and redemption through love, as well obfuscating differences between cultures and ideologies, often used as excuses for divisions, crimes and wars among peoples. For Marko there is only one major division, that of Good versus Evil.

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PREVALENCE OF DIPYLIDIUM CANINUM IN PET CATS IN BELGRADE AREA IN  
PERIOD 2020-2023

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**ABSTRACT**

The parasite fauna of cats is much less studied in our environment than that of dogs. Maybe because of their characteristic that they are around us without us noticing them on the streets, unlike dogs that are noisy, aggressive, visibly pollute public areas and attack people. About endoparasites in cats from Belgrade area is very little data. From that reason in the period 2020-2023, we performed a parasitological examination of the 271 pet cats. All cats brought for examination from Veterinary clinics in the Belgrade. All animals had clinical symptoms that indicated parasitic infections (weight loss, stunted growth, notice the presence of proglottids crawling on its feces, feces with blood, etc.). During our examination presence of *Dypillidium caninum* was established in 31.55% animals. *Dipylidium caninum* occurs worldwide in cats, as well as in humans and is one of the most common tapeworm. The adult worm is 15-50 cm long and 2-4 mm wide. In development, this tapeworm has a intermediate host - the flea. A tapeworm egg must be ingested by a flea larva (an immature stage of the flea). Once inside the larval flea, the tapeworm egg continues to develop as the larval flea matures into an adult flea. During grooming, or in response to a flea bite, the cat inadvertently swallows the flea. As the flea is digested within the cat's intestine, the tapeworm egg is released, hatches, and then anchors itself to the intestinal completing the lifecycle. The most infections are asymptomatic and the infections that do result in symptoms are generally mildly so. Cat's behavior may reflect the presence of anal discomfort and itching, or pruritus. This could result in the 'butt-scooching' across the floor, grass or carpeting. It may be accompanied by slight gastrointestinal disturbances, as this is the region where the worms inhabit.

**Keywords:** pet cats, *Dipylidium caninum*, flea, epidemiology

ANALYSIS OF CYBERSECURITY IN HEALTHCARE INSTITUTIONS IN ALBANIA

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**ABSTRACT**

Nowadays, cyber security has become a key challenge for healthcare institutions around the world, including Albania. These institutions store a large amount of personal and sensitive data, making them an attractive target for cyberattacks. This study aims to analyze the current state of cyber security in healthcare institutions in Albania, identify the main challenges, and propose effective solutions to improve cyber protection. Through the analysis of data found during scans for vulnerabilities in open ports or services, this study provides a detailed analysis of the situation of cyber threats faced by public and private healthcare institutions in the Republic of Albania. The results show that regardless of the fact that knowledge about the importance of cyber security is increasing, there are elements that continue to prevent the implementation of high security measures, such as the lack of financial resources and the lack of expert staff for the implementation of these measures. This study aims to bring out the problems and then give the necessary recommendations for improving cyber security and increasing awareness of cyber security in the Albanian healthcare sector, including the development of correct security policies, the application and implementation of these policies in the systems that the institutions have, the continuous training of the staff, and the close cooperation between government agencies and international organisations for the sharing of knowledge and best practices for increasing cyber security.

**Keywords:** cyber security, healthcare institutions, security challenges, cyber security solutions.

**INTRODUCTION**

Nowadays, the use of information technology (IT) is mandatory for all healthcare institutions. Healthcare services can be obtained from these institutions using technologies that serve to increase the quality of this care and to provide fast and innovative services to their patients or clients[1]. However, despite the fact that there is a significant increase in the use of technology and the improvement of the quality of services, there are also challenges that come mainly from the field of cyber security. Hospitals generally receive various cyberattacks due to the sensitive patient data they hold, including personal and medical information.

In Albania, as in many other countries, information technology has a wide use in public and private healthcare institutions, to the extent that such institutions are already facing the potential risk of attacks that can be carried out against the systems and computers that they have in their possession. Also, with the increase in the use of technology, they have to face the growing need to keep computer systems and infrastructures safe from possible cyber attacks against them. Violations of cyber security can lead to serious consequences such as data loss, publication of sensitive data, loss of public and patient trust, financial loss, and complete endangerment of patients' lives. In this case, many healthcare

institutions must strengthen and implement comprehensive cyber security plans to protect the critical infrastructure they own and the data they hold.

This study analyzed cybersecurity for all healthcare institutions in the Republic of Albania that possess information technology systems. The analysis utilized data collected by scanning the ports, services, and vulnerabilities of these institutions. The focus was on healthcare facilities with an online presence, including websites and other internet-based services they offer.

This paper examines the scope and dimensions of cyber security in healthcare institutions in Albania. For this purpose, it will evaluate the main difficulties of the institutions affected by different vulnerabilities and give recommendations on how measures should be taken to increase security and mitigate the risk that appears from these vulnerabilities. This study will also offer suggestions for security best practices.

**MATERIALS AND METHODS**

In this study, we have assessed the cyber situation of all healthcare institutions that have a presence on the web. According to the Healthcare and Social Care Quality Assurance Agency[12], 4 university hospitals, 11 regional hospitals, 19 municipal hospitals, and a large number of healthcare centers are currently accredited in Albania. It is noted that despite the number of municipal hospitals and healthcare centers, they do not have a presence on the web.

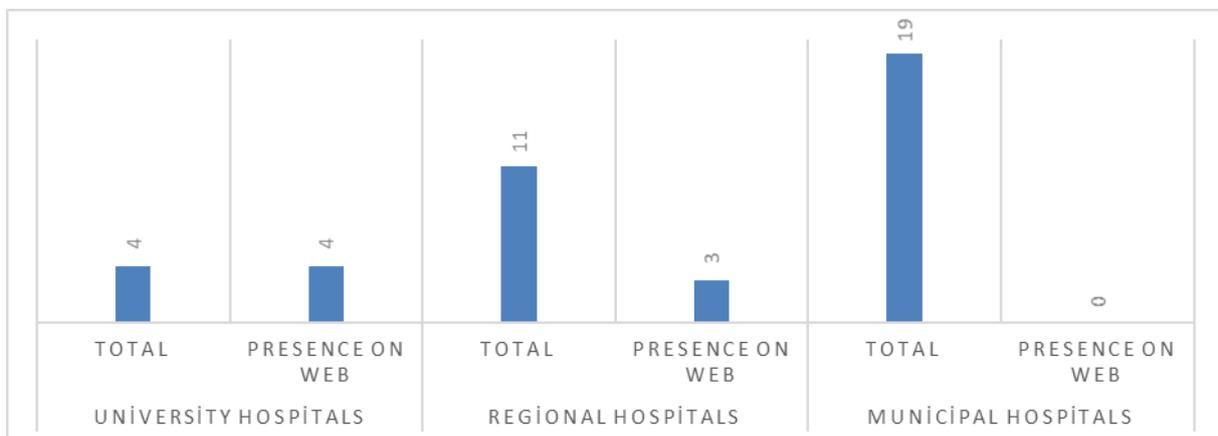


Figure 1: Distribution of Hospital Types (University, Regional, and Municipal) and Their Web Presence

Referring to Figure 1, we notice that a small percentage of public healthcare institutions have a presence on the web, of which 4 are university hospitals and 3 are regional hospitals. Regarding the number of private healthcare institutions, 11 of them that have a presence on the web were taken into consideration. Referring to the figures above, a total of 18 public and private healthcare institutions were taken into consideration for our study. This number is also the total number of healthcare institutions that have a web presence.

For the preparation of this study, two datasets obtained from the extraction of the results from the scanning of the websites of healthcare institutions through software such as Nmap and Tenable Nessus . From the scan and analysis through nmap, we have benefited from the results stored in the dataset nmap\_scan.csv, which contains the fields port, protocol, state, service, and version. This dataset contains stored data from scans that were performed through nmap and that contain open, closed, or filtered ports. By identifying the open ports and the services to which they are "listening," we can get clear information on how exposed our networks are to cyberattacks, and through this information, we can certainly prioritize the areas that require added security. [17]

Also, achieving results for In the second dataset, we performed scans and analyses of the websites of healthcare institutions using Tenable Nessus, which automates vulnerability assessments to help quickly identify and fix vulnerabilities, including software flaws, missing patches, malware, etc., and misconfigurations, across a variety of operating systems, devices, and applications across your modern

attack surface. [16] From the obtained results, we have created the dataset vulnerabilities.csv, which contains fields such as Port, Name, Synopsis, Description, Solution, Plugin Output, Stig Severity, Cvss V3.0 Base Score, Cvss V2.0 Temporal Score, Cvss V3.0 Temporal Score, Vpr Score, Risk Factor, Bid, Xref, Mskb, Plugin Publication Date, Plugin Modification Date, Metasploit, Core Impact, Canvas Referring to this dataset, we performed a broad analysis of the distribution of vulnerabilities, categorization of risks, analysis of gateways and protocols.

**RESULTS AND DISCUSSIONS**

While scanning with Nmap for the number of open ports for IP, the following results were obtained, which are shown in Figure 2. For security reasons, the IP address is hidden so as not to be visible.

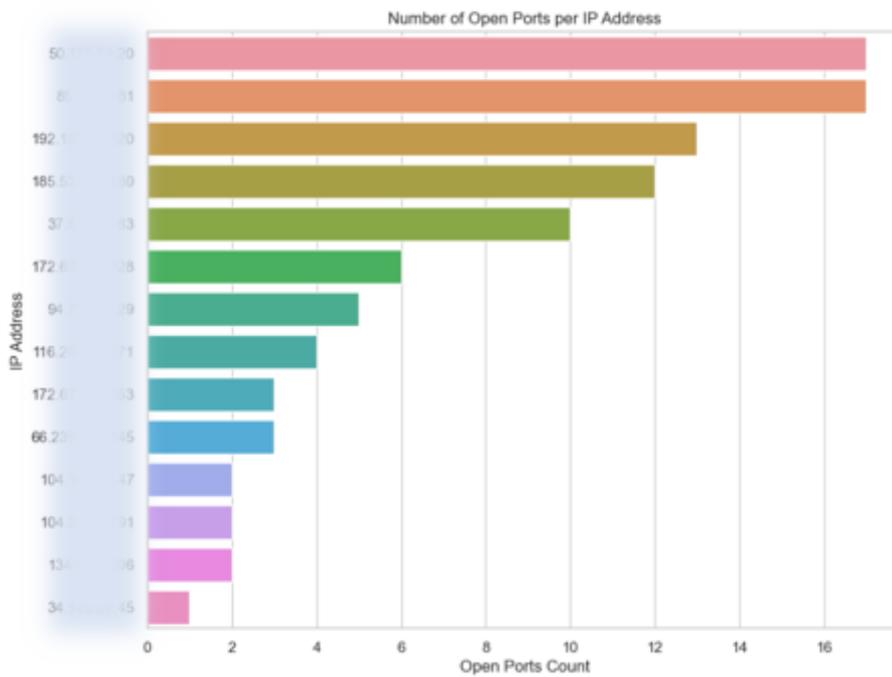


Figure 2: Number of Open Ports for Ip Address

During the analysis of the results, we see that there are addresses that have a high number of open ports, a number that goes up to 17, and there are also addresses that have a very low number of ports 1 or 2, and these ports mainly serve for web services.

Also in Figure 3, we will see a distribution of the ports that were found open and are the most used.

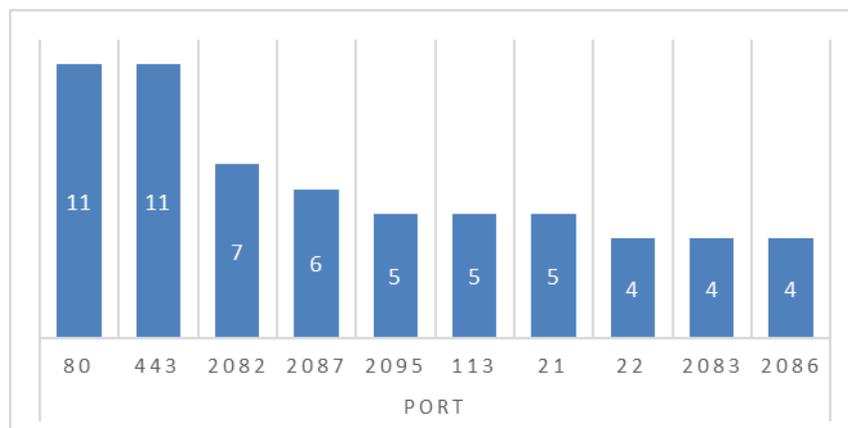


Figure 3: The most used ports

Referring to Figure 3, we see that the most used ports are Ports 80 and 443, which are used for Internet traffic, allowing us to access the web through HTTP and HTTPS, respectively. Their high use shows a great use of the web, where HTTPS shows us security in accessing the web.

As for ports 2082, 2083, 2086, and 2087, these ports are used for management in cPanel or Webmin, which enable us to manage web servers. Using their secure versions (SSL versions of cPanel) shows increased access security for server management. Ports 2095 and 2096 also connect to cPanel; they tell us about the use of email services that are enabled through this platform. Ports 21 and 22 are used for file transfer and remote access to servers, respectively, via FTP and SSH[30]. Gate 113, used by the service Auth, is a port used by some applications that require authentication.

During our analysis, we go further to see the number of open ports and their statuses, Open, Open|Filtered, and Closed, which are shown in the following figure.

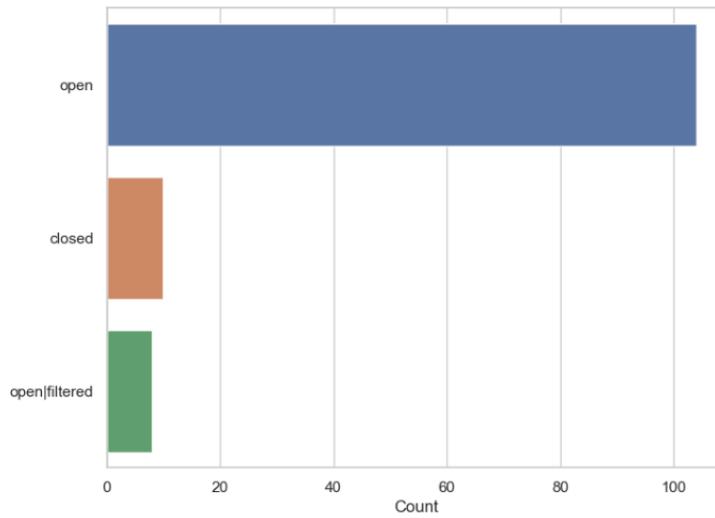


Figure 4: Distribution of Port States

According to the graph in Figure 4, we see that the number of ports in the closed or filtered state is very low, and the open ports are the ones that are found the most, which are shown in total in more than 100 cases. This shows that this problem should be looked at carefully and we should try to reduce their number as much as possible in order to increase the security of information.

Another important factor for our study is the analysis of which of the protocols is used the most for data transport in the identified cases of open ports. We see the results of this analysis in Figure 5 as follows:

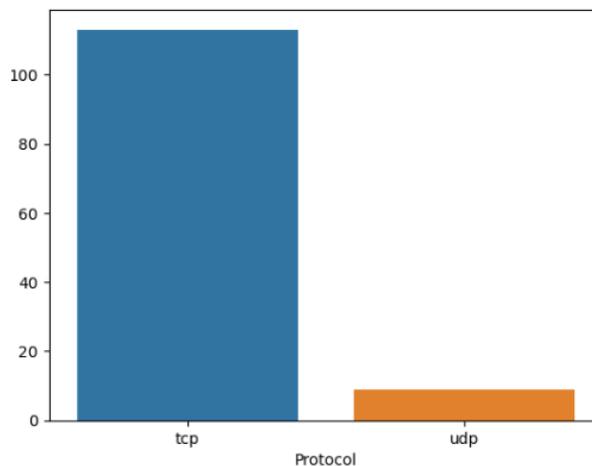


Figure 5: Protocol Usage

Referring to the picture, we see that the use of the TCP protocol is very high and that of UDP is very low. This shows that despite the fact that the ports are open, communication and data transport are carried out using the TCP protocol, which is a connection-oriented protocol.

Another element that was taken into our analysis is the types of operating systems that are found in the systems owned by healthcare institutions. In Figure 6, the corresponding graph is also designed.

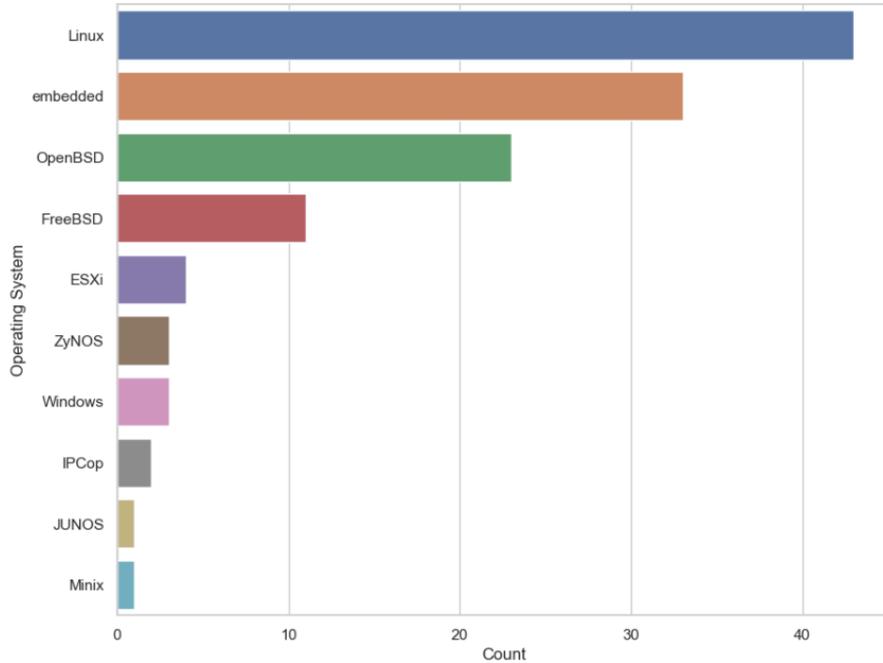


Figure 6: Operation Systema Distribution

What is noticed is the use of a high number of operating systems, such as Linux, OpenBSD, and FreeBSD, while the number of Windows systems is relatively low compared to the first systems.

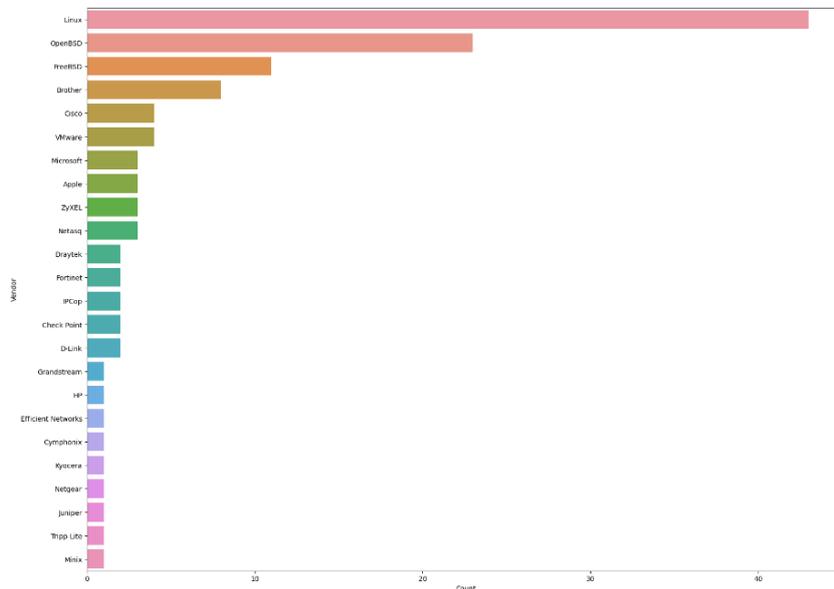


Figure 7: Vendor Distribution

The Linux operating system tops the list, reflecting the widespread use of Linux-based systems by web servers on network devices[18]. This may be due to the flexibility, high security, and relatively low cost of systems running on Linux. Also, the high use of OpenBSD and FreeBSD, which are two open source operating systems known for their high security and ranked after Linux, also highlights a tendency to use operating systems that offer strong security by design, especially in applications that require high levels of reliability and integrity. We also see the use of hardware products from

manufacturers such as Brother, Cisco, and VMware. The use of products from these prestigious companies also shows a tendency to use products that offer security and are already proven in the network or virtualization sector.

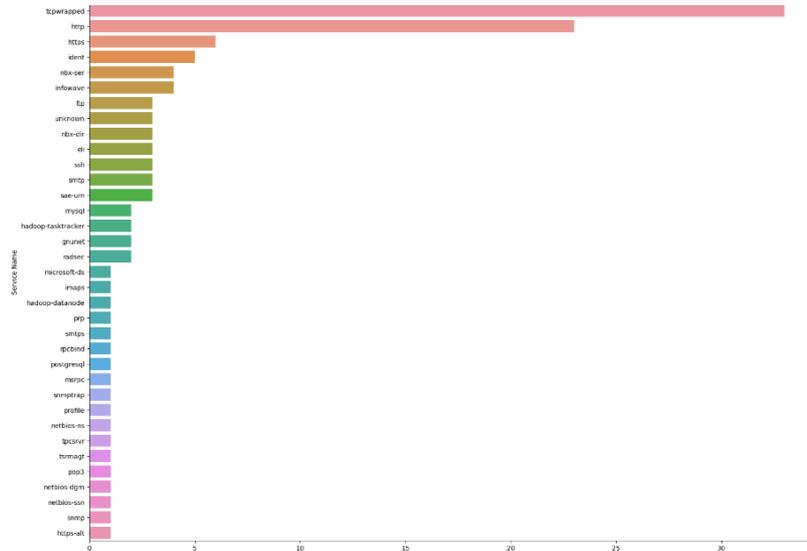


Figure 8: Distribution of Service Names on Ports

Referring to Figure 8, which shows the distribution of service names on ports, we see that the most common services are tcpwrapped, http, and https. This indicates a widespread use of standard network protocols for data transmission, especially for web purposes.

The presence of protocols like "http" and "https" indicates that a large part of the scanned ports are used for web services, which is completely normal. Also, the presence of services such as "ftp", "ssh", "smtp", and "mysql", although in smaller numbers, shows that we have a variety of activities, including file transfer, remote server administration, email delivery, and database management.

We also note a small number of instances for specific or lesser-known services such as "nbx-ser," "infowave," and "hadoop-tasktracker," suggesting the use of specialized technologies on some of the scanned hosts.

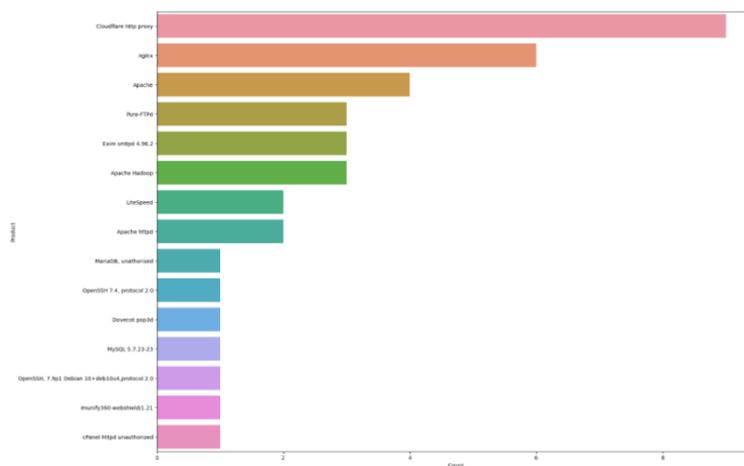


Figure 9: The most commonly found products for use on the web.

Referring to Figure 9 on the cases of the most found products for use on the web, we see that we have a dominance of Cloudflare and web servers: At the top of the list are Cloudflare HTTP proxy, NGINX, and Apache. This clearly shows the use of well-known and proven technologies for publishing content on the Internet. Cloudflare as a proxy offers performance and security advantages, reducing load time and protecting against distributed denial of service (DDoS)[32] attacks. On the other hand, Nginx and Apache are two of the most popular web servers, known for their flexibility and

configurability. We also see the presence of other servers and specialized software such as Pure-FTPd, Exim-Smtpd 4.96.2, and Apache Hadoop. This shows that the systems of healthcare institutions in Albania support a wide range of services that include file transfer (FTP), email service (SMTP), and big data processing (Hadoop). A problem that is noticed is the use of products such as MariaDB, unauthorized, immunify360-webshield/1.21, and cPanel httpd unauthorized. The presence of these unauthorized services, as in the case of "MariaDB" and "cPanel," may indicate weaknesses in the security configuration, but on the other hand, the use of "immunify360-webshield" indicates an attempt to protect web applications against attacks by various means, including SQL injection and cross-site scripting (XSS) attacks[31]. Another detail to keep in mind is the presence of specific software versions, such as OpenSSH 7.4, protocol 2.0, and MySQL 5.7.23-23, which require constant updating to protect against known vulnerabilities. that can be exploited by attackers.

**Analysis via Nessus**

In this study, in addition to scanning with NMap, we also performed a scan of all healthcare institutions using Nessus.

After obtaining the results, we will first analyze the risk distribution. The results are shown in Figure 10.

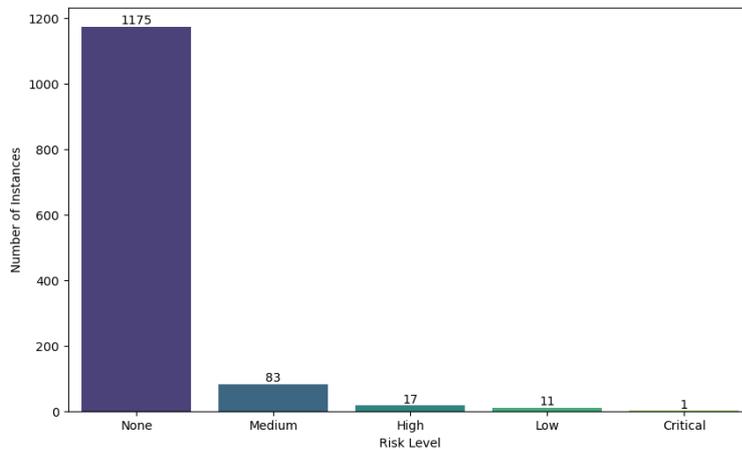


Figure 10: Risk Distribution

From the distribution data, we see that most cases, i.e., 1175 out of 1287 in total, or about 91%, are categorized as "none," which means that they do not present an immediate risk or are harmless. However, from the data analysis, we see a small number of cases that are categorized as "High" and one case as "Critical". This indicates that despite the actions taken, there are serious vulnerabilities that need immediate attention, and steps must be taken to resolve them or mitigate the risks they pose. The "Medium" and "Low" level risks are relatively minor, demonstrating effective management of less critical risks.

Referring to the total distribution, we note that in the general aspect we see a positive security situation, but with some special points that require attention for their solution to keep the level of risk to a minimum. It is essential to have a continuous assessment and improvement of security measures to address the risks that appear at any time. By means of nessus, we will also analyze the most exposed ports which appear in figure 11

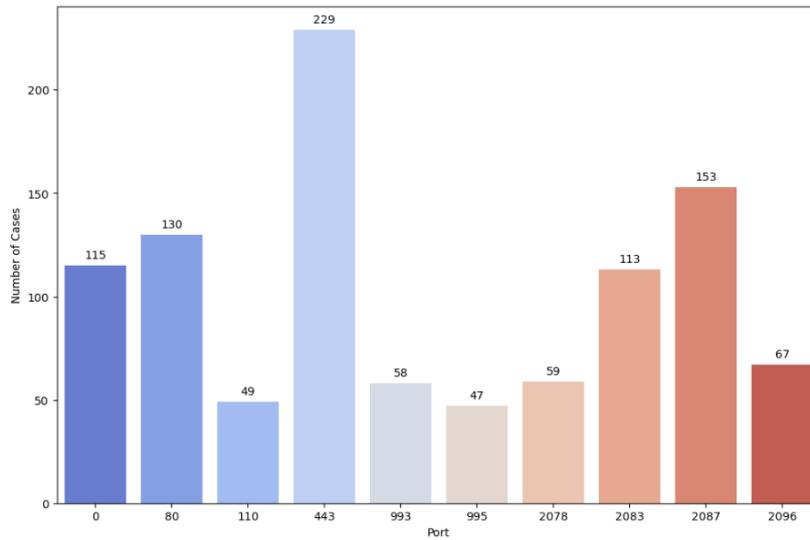


Figure 11: Top 10 most Exposed Ports

From the analysis of the most exposed ports, the most affected ports are those frequently used for secure communications and server management, such as port 443 for HTTPS and ports 2087 and 2083 for cPanel administration. This indicates that attackers target gateways that have high traffic and are critical to the operation of Internet services. Port 80, known for its use in non-secure communications (HTTP), also shows a high number of cases, which highlights the importance of switching to HTTPS to improve security. The case of port 0, which shows a significant number of cases, may indicate unusual or incorrect configurations. Other ports, such as 2096, 2078, 993, 110, and 995, are less exposed but still important to keep an eye on because of their use in various communications and as potential targets for cyber attacks.

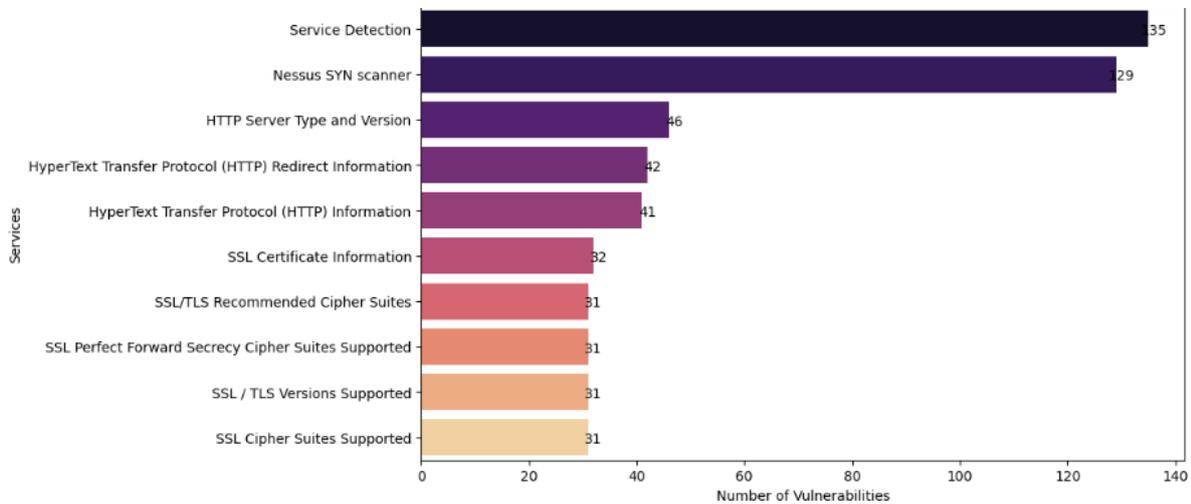


Figure 12: Services with most vulnerabilities

Referring to the results presented in Figure 12, we see that we have a high concentration of vulnerabilities in detection and scanning services such as "Service Detection" and "Nessus SYN scanner," which represent two of the most vulnerable areas in the network infrastructure. We also see a frequent occurrence of vulnerabilities in "HTTP Server Type and Version" and SSL/TLS elements such as "SSL Certificate Information," which show us that the systems that use these technologies are under constant risk from attacks that aim to compromise the transmitted data or undermine the integrity of the data exchange. These results show the importance of implementing security measures, continuously updating, and performing software configurations to prevent exposures and close any possible weak points.

We have also analyzed the most-used plug-ins,, which are shown in the figure below.

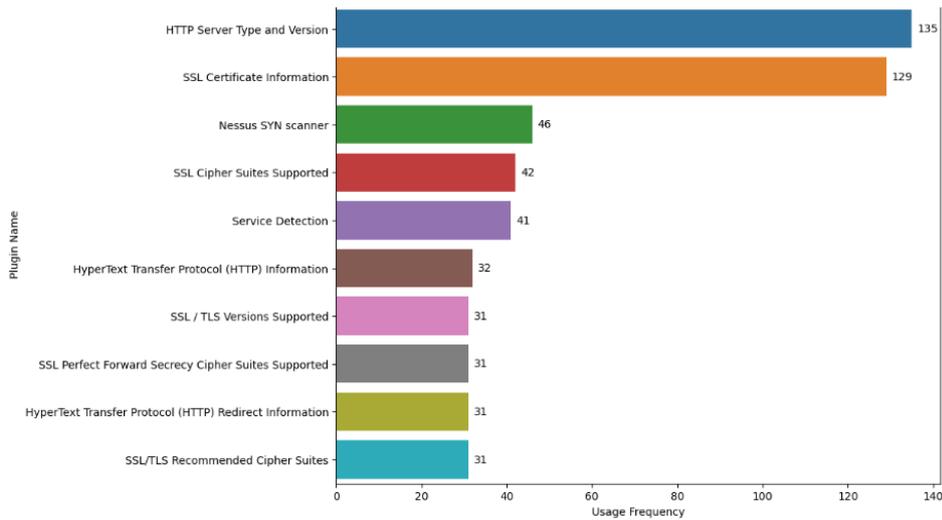


Figure 13: Most used Plugins

Referring to Figure 13, we see that the most commonly used plugins are Services Detection and Nessus SYN Scanner. These plugins are important to identify which services are active on the network and can constitute an entry point for attackers. We also see a distribution of plugin usage in HTTP and SSL/TLS plugins: Plugins that monitor HTTP and SSL/TLS are critical to detecting weak configurations and insecure versions of the protocols used to communicate on the network. Discovering weaknesses in these protocols helps prevent attacks that could expose sensitive data.

We will also perform an analysis of plugins that are at critical risk. In figure 14, we see the list of these plugins and their identification numbers.

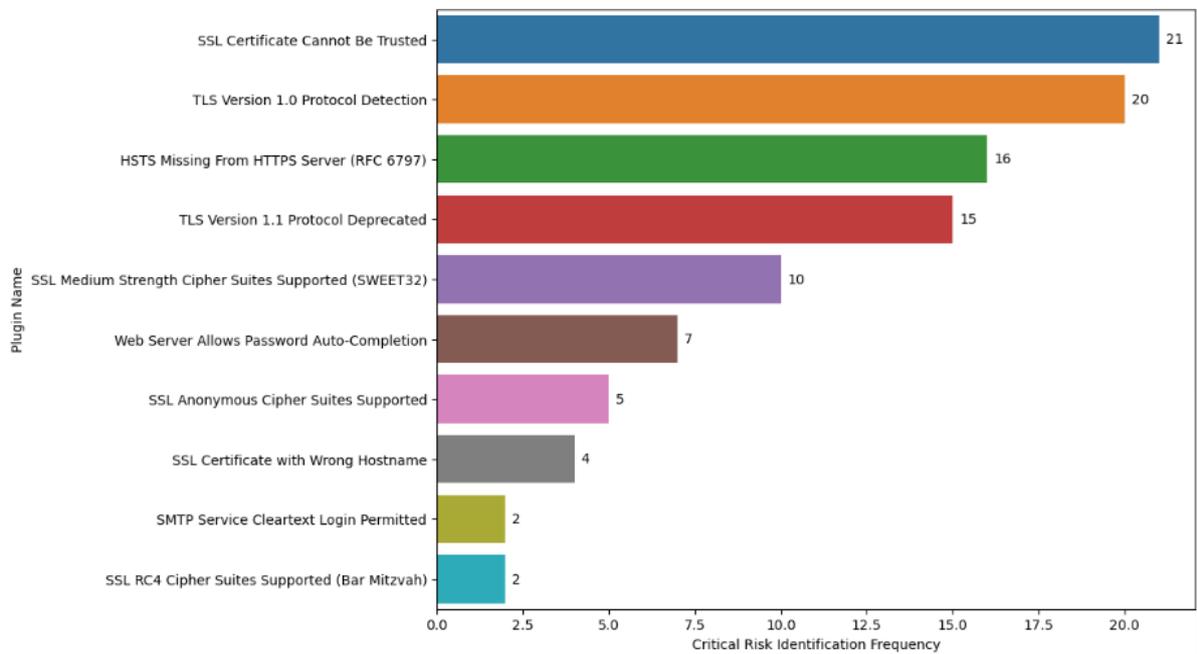


Figure 14: Plugins identifying critical risks

Referring to figure 14, we see the use of old protocols such as TLS (1.0 and 1.1). Their use poses a critical risk, as the use of outdated technologies can often allow attackers to exploit known vulnerabilities and intercept encrypted traffic. It is very important that organizations update to more secure versions of TLS to protect communications. We also note HSTS and SSL/TLS configuration

issues. It is now known that the lack of HSTS (HTTP Strict Transport Security)[3] and the use of cipher suites that do not provide sufficient protection indicate that networks are exposed to man-in-the-middle and decryption attacks. It is important that SSL/TLS configurations conform to security best practices.

Another thing to note are SSL certificate issues. Problems with SSL certificates indicate a mismatch between the hostnames and those specified in the certificates, as well as the use of certificates that cannot be trusted. These issues require immediate improvement to protect the authenticity and reliability of encrypted communication.

### DISCUSSIONS

In this work, an in-depth analysis of the data collected from scans using Nmap and Nessus, which are among the most powerful network and system scanning software for finding ports, services, or vulnerabilities, was carried out. Through this study, an accurate assessment and impact of the emerging weaknesses was carried out in order to reach the conclusions that give us the possibility of creating a complete idea and prioritizing solving risks in the computer systems of healthcare institutions in Albania. The analysis included a detailed process of obtaining data, processing it, and grouping it based on its level of risk. This approach enabled an efficient and accurate assessment of security risks to be addressed as a matter of priority. During this analysis, the presence of services, open ports, and insecure protocols was observed, which directly affected the way information security is managed. Our recommendations in this case are to perform software updates and appropriate configurations for closing or filtering ports that are not necessary to be in the open state. This will help a lot in increasing security and preventing cyberattacks.

Also, during the scan with Nessus, we noticed a general overview of the situation where, despite the fact that in general the cases of vulnerabilities with high criticality were low, there are issues that should be kept in mind for the increase of cyber security in the computer systems of healthcare institutions. It should be noted that it is very important to update the protocols and configurations. The analysis we conducted found that many of the highest risks come from using older security protocols such as TLS 1.0 and 1.1, as well as insecure SSL configurations. In these cases, we recommend carrying out continuous updating of protocols and reconfiguration of security settings to effectively protect against cyber attacks.

### CONCLUSION

Very significant results were obtained from this study that show the current state of cyber security in the healthcare system in the Republic of Albania. In general, the implementation of security measures was observed, but in some cases, we had vulnerable points with high criticality. For this reason, this study emphasizes the continuous importance of security assessments and updates to the computer systems that healthcare institutions have in their possession. Through a detailed analysis, organizations can identify and address critical vulnerabilities, implementing effective solutions that guarantee the integrity and availability of their systems and data. The implementation of the given recommendations will contribute to a strong and sustainable security strategy, which is essential for the protection of the resources and the data they possess from constant cyber threats.

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**THE EFFECT OF A POLISHING PROTOCOL IN 3D-PRINTING RESIN FOR DENTURE  
BASE ON SURFACE AND BIOLOGICAL PROPERTIES**

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**ABSTRACT**

The surface and biological properties of the 3D printing resins for denture base need evaluation for appropriate clinical application, once their use is increasing and can directly impact the adhesion of oral microorganisms with pathogenic potential. The aim of this in vitro study was to evaluate the effect of polishing in 3D printed resin on surface roughness and topography, adhesion and biofilm formation of *Candida albicans*. Samples measuring 14 mm in diameter and 1.2 mm in thickness were printed using Cosmos Denture® and divided into 2 groups: Polished (P): 3D printed samples which received polishing to standardize the average roughness to 0.2 µm and stored in distilled water for 48 hours; Not Polished (NP): 3D printed samples sanded to simulate the roughness of impression process and stored in distilled water for 48 hours. The surface roughness of the samples was measured using a profilometer (n=9) and topography surface was obtained by SEM analysis (n=1). Adhesion and biofilm formation of *C. albicans* on the samples in both groups were evaluated by cell proliferation analysis (colony-forming units count, n=9), cell metabolism analysis (AlamarBlue® assay, n=9) and the cell viability by confocal laser scanning microscopy (n=9). The obtained data were analyzed using BioEstat software version 5.3 to check the normality and homoscedasticity. Student's t test was used, considering p<0.05. The results showed statistical difference on the surface roughness between the groups similarly with the analysis observed with SEM. The values of adhesion and biofilm formation of *C. albicans* in log<sub>10</sub> CFU/mL did not show difference and the results obtained by fluorescence tests (AlamarBlue® and confocal analysis) demonstrated statistically significant reduction of biofilm in polished samples compared with control group. In conclusion, the polishing protocol was effective to reduce the roughness of 3D printed samples, and, although the microbiological results were conflicting, the robust assays showed the decrease of *C. albicans* viability in polished samples.

**Keywords:** Surface Roughness, *Candida albicans*, Denture Resins.

CRIMINAL POLICIES IN ALBANIA

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**ABSTRACT**

Criminal policies are an important topic in criminal justice discourse, especially in the context of Albania. This paper examines changes in Albania's Penal Code and their impact on the penal system and society. Starting with an analysis of the factors that have influenced changes in the Penal Code, including pressure from international institutions and societal needs, the paper explores the increased use of harsh sentences and arguments for and against this policy. Furthermore, it analyzes the effect of harsh criminal policies on the penal system, including issues of prison overcrowding. In conclusion, you will find suggestions for improving criminal policies in Albania, emphasizing the need for a balanced approach that combats crime while respecting the rights of convicted individuals.

**Key words:** Criminal policies, penal code, societal needs, penal system, crime.

**Introduction**

Tough penal policies are a debatable and significant topic in the context of Albania's penal system. In recent years, there has been a tendency towards implementing harsher punishments for criminal acts, as an effort to combat crime and ensure justice for crime victims. However, this policy has raised concerns and criticism regarding its effectiveness and impact on society. This paper will examine tough penal policies in Albania, analyzing recent changes in the Penal Code and their impact on the prison system and society as a whole. To better understand the context and impact of penal policies, it is important to examine the factors that have influenced changes in the Penal Code in Albania and why there has been an increase in the use of severe punishments. Furthermore, we will analyze the effects of these policies on the prison system and society, including arguments for and against their implementation. In conclusion, we will discuss suggestions for improving tough penal policies in Albania and finding a proper balance between fighting crime and respecting the human rights of convicted individuals.

**The Meaning and Importance of Studying Penal Policies**

Penal policies are the strategies and rules that a country adopts to manage its criminal justice system and address crime. These policies include laws and regulations that determine punishments for lawbreakers, as well as measures for crime prevention and rehabilitation.

Studying penal policies is important for understanding how a society responds to crime and how criminal justice operates in practice. Penal policies have a direct impact on justice and law because they set the rules of the game for legal authorities and individuals. The interaction between penal policies and society is profound, as penal policies affect the security and stability of society, as well as citizens' trust in the justice system.

Furthermore, penal policies have a direct impact on human rights and freedoms, as the punishment of an individual may infringe upon their fundamental liberties. At the same time, penal policies influence the level of crime and organized crime, determining how the state will combat these phenomena.

For these reasons, studying penal policies is essential for the development of a fair and effective legal system. It helps improve justice and ensures fairness for all citizens

### **The Importance of Penal Policies in Albania**

Penal policies have a direct impact on security and justice in society. Penal policies determine how criminal acts are sanctioned and how penal and justice systems are organized. In a country like Albania, where crime and corruption have been significant challenges, penal policies play a key role in preventing and combating these issues.

Additionally, penal policies have a direct impact on citizens' trust in justice and law enforcement. When penal policies are fair and effective, people feel safer and more confident in the order and law in society. Conversely, unjust or inadequate penal policies can lead to distrust and dissatisfaction in society, increasing division and social tensions.

Therefore, the importance of penal policies in Albania is closely linked to public safety, law enforcement, and citizens' trust in the justice system. To improve these aspects, it is important for penal policies to be fair, evidence-based, and meet international standards for fair and equal justice for all citizens.

Moreover, Albania is undergoing an important phase in its path towards integration into the European Union. Penal policy is one of the key areas in this process, as it involves profound changes in the criminal justice system that directly impact compliance with European standards and the strengthening of justice institutions.

For Albania, the European perspective is much more than a political or diplomatic goal. It is a major aim to transform society and institutions, adapting them to European values and standards. In this context, penal policy serves as a vital tool to strengthen law enforcement, promote the rule of law, and ensure respect for human rights.

Changes in the Penal Code are at the center of Albania's efforts to meet European integration requirements. Fulfilling these requirements is crucial for advancing the integration process, opening the way for accession negotiations, and creating a society and state that respects and promotes European values.

Through penal policies, Albania is striving to meet the high standards of criminal justice required by the European Union. This includes increasing the independence of judges and prosecutors, strengthening respect for human rights, and effectively and reliably combating corruption and organized crime.

In conclusion, penal policy in Albania has special importance for European integration, serving as a key instrument for meeting criminal justice standards and strengthening the rule of law. Through changes in the Penal Code and the implementation of tough penal policies, Albania is making progress towards fulfilling its aspirations to join the European family.

### **The Orientation of Albanian Penal Policy and Factors Influencing its Formation and Change**

The orientation of penal sentencing policy in Albania has significantly changed in recent years, marking a gradual shift from a more lenient and rehabilitative approach to a harsher and more punitive stance. Changes in sentencing policy are part of broader efforts to strengthen law enforcement and combat crime.

Several factors have contributed to this new orientation of sentencing policy in Albania. One of these factors is the growing public concern about the rise in crime and sensitivity to this issue in public opinion. Another factor is pressure from international partners to implement higher standards of criminal justice and law enforcement. In its transition to democracy and the rule of law, Albania has

faced significant challenges in the field of criminal justice. In this context, pressure from international institutions has played a key role in changing the country's Penal Code. Organizations such as the European Union, the Council of Europe, and the United Nations have served as catalysts for criminal justice reform in the country. The requirements to meet international standards in the field of criminal justice have been one of the key conditions for Albania's acceptance on the path to European integration and other international organizations.

In this context, Albanian authorities have taken steps to strengthen the law and increase the use of severe penalties for crimes. These steps include changes in penitentiary legislation and increased penalties for serious crimes such as corruption, human trafficking, and organized crime.

However, there are also criticisms of this new orientation of sentencing policy in Albania. Some concerns include concerns about human rights and the risk of overpopulation in the prison system. In this context, some critics have called for a more humane approach to sentencing and more focus on the rehabilitation of offenders.

By focusing solely on punishing criminals without providing alternatives for their reintegration into society, the policy of harsh penalties may contribute to a cycle of crime, leading to an increase in the rate of recidivism.

Illustrating some examples of how different factors have influenced the formation and change of penal policy in Albania:

➤ The Need for a Studied Strategy in Line with the Characteristics Presented by Various Age Groups or the Nature and Spread of Crime in a Given Country and Period.

Human trafficking as a social and criminal phenomenon in our country developed after the communist transition and turned into a major societal danger. Albania became a country of origin, transit, and destination for this type of trafficking. The U.S. Department's 2008 report stated that from Albania towards the West, 5,000 women (30% minors) were trafficked, all for sexual exploitation. The forms of trafficking and the most vulnerable social groups are: young women, children, young men, and the forms of exploitation include: prostitution, forced labor, organ donation, begging, etc.<sup>91</sup>

Human trafficking was initially foreseen in the Penal Code of 1995 as part of the criminal offense of "*Unlawful deprivation of liberty*"<sup>92</sup>.

In 2008, trafficking was envisaged as a criminal offense where the concept of trafficking was developed by linking it with profit and including qualifying circumstances such as mistreatment or serious consequences.

In 2004, article 110/a was amended, where the legislature developed and expanded the concept of trafficking and defined the elements and forms of committing the criminal offense of trafficking.

Trafficking in persons, women, and minors committed by subjects who exploit state function or public service is considered a qualifying circumstance. These offenses are foreseen in more severe circumstances when they are committed in collaboration, more than once, or accompanied by mistreatment and physical violence, or result in serious consequences for health, resulting in the death of the victim, or are committed through the exploitation of state function or public service. In these cases, they are considered qualified criminal offenses, and more severe measures are foreseen in sentencing. The latest amendment to this article was in 2013 with Law no. 144, dated 02.05.2013 "On some amendments and additions to the Penal Code" where the criminal offense of trafficking gained greater importance. It was envisaged that if committed against the female gender, it would be considered a qualifying circumstance, article 110/b envisaged the criminal offense of profiting from or using services offered by trafficked persons, and article 110/c the actions facilitating trafficking<sup>93</sup>. This provision has expanded the range of criminal offenses by increasing and guaranteeing more favorable punishment and protection for women and minors, increasing the sentencing range by raising the

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<sup>91</sup> The Report of the U.S. Department for the Year 2008

<sup>92</sup> The Penal Code of the year 1995

<sup>93</sup> The year 2013 with Law 144 dated 02.05.2013 "On some amendments and additions to the Penal Code"

minimum to eight years, whereas when committed against women and minors, the minimum is 10 years<sup>94</sup>.

### ➤ New Forms of Crime, Trends, and Adoption of International Acts.

The most significant legal change regarding article 28 comes with Law no. 7895, dated 16.09.2004. This amendment to the article reflects the ratification of the United Nations Convention against Transnational Organized Crime of 2000 and its 3 accompanying Protocols, ratified by the Albanian state with Law no. 8920, dated 11.07.2002. In the 2004 amendments to article 28, it is observed that a more structured division is made within the category of a specific form of organized crime. Thus, within the category of "particular forms of collaboration," as well as in 1995, "criminal organization" is considered the highest form of collaboration in committing a crime. The level of sophistication of this form of collaboration would be specified more clearly than in the 1995 law, this time explicitly defining two important criteria: 1) the number of participants (three or more persons), and 2) the purpose of the criminal activity of the organization, which should not have an ideological purpose but material and non-material gains. In the 2004 amendments, another form of criminal organization is added, "terrorist organization". The latter, unlike the criminal organization that commits crimes for material and non-material profit purposes, has a motive of terror, which, according to the version of article 28 of 2004, has political aims (overthrow of constitutional order, serious disruption of public order, instilling fear and insecurity on a large scale). The terrorist organization according to the version of article 28 of 2004 resembles more politically motivated terrorist organizations like the "Red Brigades" in Italy in the 1970s-80s<sup>95</sup> or the Greek Terrorist Organization "17 November"<sup>96</sup> destroyed in 2002.

### ➤ Public Opinion

Although Albanian criminal legislation has borrowed from the Italian Penal Code until the amendments of May 2017, it did not reflect the Italian approach to electoral crime by criminal groups regarding vote-buying during local and political elections in election campaigns, a troubling phenomenon in Albania. The toughening of the punishment for this category of crime has a significant sensitivity for our society. Thus, based on the agreement of the two political forces before the 2017 elections, it was agreed that the phenomenon of vote-buying should be punished more severely. This new penal policy was reflected in the changes to the Penal Code with Law 89/2017 "On some additions and changes to Law no. 7895, dated 27.1.1995, "The Penal Code of the Republic of

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<sup>94</sup> Article 110/a: "Recruitment, transportation, transfer, concealment, or reception of persons through threats or the use of force or other forms of coercion, abduction, deception, abuse of authority, or taking advantage of a person's social, physical, or psychological condition, or the provision or receipt of payments or benefits to obtain the consent of a person controlling another person, for the purpose of exploiting prostitution of others or other forms of sexual exploitation, forced labor or services, slavery or slavery-like practices, organ trafficking, as well as other forms of exploitation, both within and outside the territory of the Republic of Albania, shall be punishable by imprisonment from eight to fifteen years. When this act is committed against an adult female, it is punishable by imprisonment from ten to fifteen years. Organizing, directing, and financing human trafficking shall be punishable by imprisonment from seven to fifteen years. When this act is committed in cooperation, more than once, involves mistreatment and coercion with physical or psychological violence against the victim, to perform various acts, causing serious consequences for health, or endangering his life, shall be punishable by imprisonment of not less than fifteen years. When the act results in the death of the victim, it shall be punishable by imprisonment of not less than twenty years or life imprisonment. When the criminal act is committed through the exploitation of state or public service functions, the imprisonment shall be increased by ¼ of the given sentence.

<sup>95</sup> The Red Brigades (Italian: Brigate Rosse [bri'ga:te 'rosse], often abbreviated as BR) was an armed Marxist-Leninist terrorist organization that operated as a guerrilla and extremist left-wing terrorist group based in Italy. The most infamous crime of the Red Brigades was the kidnapping and murder of former Italian Prime Minister Aldo Moro in 1978. <https://www.cia.gov/readingroom/docs/CIA-RDP83B00231R000100240002-6.pdf>

<sup>96</sup> Formed in 1975 and led by Alexandros Giotopoulos, 17N conducted an extensive urban guerrilla campaign against the Greek state, banks, and businesses. The organization carried out 103 known armed robberies, assassinations, and bomb attacks, during which 23 people were killed.

Albania," as amended, approved on 22.05.2017. There is a noticeable toughening of the punishment with almost a two-year increase for each criminal offense under articles 325-332, and an addition of forms of criminal offenses (e.g., including voter Photography) and the Expansion of the Meaning of "Passive Corruption" and "Active Corruption" in Elections.

### ➤ Fear of Crime

For the first time, the punishment for domestic violence was included in the penal code on March 1, 2012, twelve years ago, by adding a new article, Article 130/a. So, until 2012, domestic violence was not considered a crime but rather a normal phenomenon. The first paragraph of Article 130/a provided that "beating, as well as any other act of violence, against a person who is a spouse, ex-spouse, cohabitant or former cohabitant, close relative or close relative by marriage to the perpetrator of the criminal offense, resulting in the impairment of his physical, psycho-social, and economic integrity, is punishable by imprisonment of up to two years." Serious injury or murder against individuals is punishable by imprisonment of up to three years, while intentional injury is punishable by up to five years. When this act was repeated, it was punishable by imprisonment ranging from one to five years.

The punishment measure has a serious deficiency as there is no minimum sentence prescribed, leaving room for abuse by prosecutors and judges to spare offenders from punishment. On May 2, 2013, the domestic violence article was amended for the first time. In the last paragraph, the element of punishment "in the presence of children" was added. With this change, repeat offenders and those who exercise violence, even for the first time, in the presence of children would be sentenced to one to five years in prison.

In April 2020, Article 130/a for domestic violence underwent several significant changes. Firstly, psychological violence was included. Secondly, the victims of violence were expanded to include not only spouses, ex-spouses, cohabitants, or former cohabitants but also individuals in intimate or former intimate relationships with the perpetrator of the criminal offense. Also included were brothers, sisters, in-laws, stepchildren, nephews, nieces, grandchildren, sons-in-law, daughters-in-law, aunts, uncles, cousins, and stepparents.

Thirdly, the punishment was increased. For physical and psychological violence, up to three years in prison. Serious injury or murder, up to four years in prison. Intentional injury, up to five years in prison. Repeat offenders and perpetrators of violence in the presence of children, from one to five years in prison. Since 2020, there have been several proposals to toughen punishment for violence against women and to establish a minimum sentence, but they have not been finalized in the Parliament.

### ➤ Freedom for Life Prisoners, based on Recommendation Rec (2003) 22

The Penal Code, with the changes made in 2017, creates the possibility for life prisoners to be released on parole. The law provides that any person sentenced to life imprisonment may be released on parole by the court if they have served at least thirty-five years of imprisonment and have demonstrated exemplary conduct during the period of serving the sentence, and the purpose of their re-education has been achieved. Based on Recommendation Rec (2003) 22, this change provides an opportunity to seek parole for all convicted prisoners, including "inclusion of Life Prisoners," the report states<sup>97</sup>. This change was specifically made to Article 65 of the current Penal Code, which prohibited the release of life-sentenced prisoners. The second paragraph of this article states that only in exceptional cases can a life-sentenced prisoner be released on parole.

### **Effect of Harsh Penal Policies on the Penitentiary System**

Harsh sentencing policies have been the subject of extensive debate in many countries due to the consequences they have on the prison system and society in general. These policies send a strong

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<sup>97</sup> Recommendation Rec (2003) 22

message against crime and may influence its reduction. Thus, these policies are often presented as a way to fight crime and ensure justice, but the challenges they bring can be significant.

One of the main consequences of harsh penal policies is the increase in the number of inmates in prisons. This happens due to two main factors. Firstly, harsher penalties for minor offenses lead to an increase in the number of individuals convicted for non-serious crimes. Secondly, harsh penal policies prolong the time individuals spend in prisons, thereby increasing the number of inmates staying in prisons for longer periods.

One of the most serious consequences of this situation is prison overcrowding. Overpopulated prisons can face numerous problems, including poor living conditions, weak health services, and a lack of necessary services for the rehabilitation of inmates. Additionally, prison overcrowding can cost significantly for the criminal justice system and public budgets.

To address this situation, there are several steps that societies can take. One option is to use alternative sentencing, such as house arrest or conditional sentences, for cases that are not serious. Additionally, it is important for penal policies to consider not only punishment but also the rehabilitation and reintegration of convicted individuals into society.

In Albania, amnesty has been one of the recurring measures taken to address the challenges of prison overcrowding. In the context of harsh penal policies in Albania, amnesty has been used as an alternative to reduce the number of inmates and improve conditions in the prison system. However, the implementation of amnesty must be done carefully and in accordance with the law, taking into account public safety and criminal justice.

Amnesty can bring various benefits to the prison system in Albania. It can help reduce prison overcrowding and increase capacities to offer healing and rehabilitation programs for inmates. Additionally, amnesty can contribute to improving the image of the prison system in the eyes of the public and international human rights organizations.

On the other hand, the implementation of amnesty may also have challenges and limitations. For example, there are discussions regarding the criteria for selecting individuals who will benefit from the amnesty and the risk of relapse into criminal activities for those released. Additionally, amnesty may affect the credibility of the legal system and respect for the law in the future, creating a precedent for the use of amnesty in other cases.

To use amnesty as an effective tool to address the challenges of the prison system in Albania, it is important that the amnesty process be transparent, based on clear criteria, and respect international standards of criminal justice and human rights. Furthermore, it is important that amnesty be accompanied by other measures, such as the reformulation of the prison system and investment in healing and rehabilitation programs, to ensure sustainable effectiveness in reducing the number of inmates and improving conditions in prisons.

### CONCLUSIONS AND RECOMMENDATIONS

To improve penal policies in Albania, it is important to use a balanced approach that fights crime while respecting the rights of convicted individuals. Some suggestions to achieve this goal are:

1. **Improving conditions in jails and correctional institutions:** It is important to ensure that convicted individuals have good conditions in jails and opportunities for rehabilitation and reintegration into society. This includes providing health services, education, and vocational training for convicted individuals, as well as strengthening programs for crime prevention and reintegration into society.
2. **Promoting alternatives to incarceration:** Instead of using harsh prison sentences for lesser crimes, alternatives to incarceration should be promoted, such as electronic monitoring and community work programs. This can not only reduce the burden on the penal system but also help in the reintegration of convicted individuals and preventing recidivism.

3. **Improving the justice system to ensure fair and equal justice:** It is important to improve the justice system to ensure that convicted individuals have a fair and equal trial before the law. This includes strengthening the independence of judges and prosecutors, ensuring defense for convicted individuals by lawyers, and providing opportunities for appeals and reviews of judicial decisions.

4. **Promoting alternative means of conflict resolution:** The use of mediation and other alternative means of conflict resolution can be an effective tool to prevent crime and reduce the burden on the penal system by offering peaceful conflict resolution opportunities, we can contribute to the return of peace and stability in society.

In conclusion, to improve penal policies in Albania and ensure a balanced approach that fights crime while respecting the rights of convicted individuals, a wide combination of means and strategies should be used. This includes, on one hand, improving conditions in jails and correctional institutions to provide a safe and dedicated environment for the rehabilitation and reintegration of convicted individuals into society. On the other hand, it is important to promote alternatives to incarceration and use alternative means of conflict resolution to prevent crime and reduce the burden on the penal system. Additionally, improving the justice system and ensuring fair and equal justice are fundamental to respecting human rights and increasing citizens' trust in the penal justice system. Through these combined and appropriate measures, Albania can progress towards a penal system that meets international standards and respects the fundamental values of justice and human rights.

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COMPARING PATIENT SATISFACTION IN PUBLIC AND PRIVATE HOSPITALS IN  
TUNISIA

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**ABSTRACT**

Patient satisfaction is a crucial indicator for evaluating the effectiveness and quality of healthcare services. In the context of a healthcare system, the quality of care varies between the public and private sectors. The main purpose of this study is to compare patient satisfaction in public and private hospitals in Sfax, Tunisia. The research was carried out among 198 patients hospitalized in public (N=101) and private (N=97) hospitals. We used the Patient Satisfaction with Nursing Care Quality Questionnaire (PSNCQQ-Ar). Data were collected between October and December 2023. The average age of patients hospitalized in the private sector was slightly higher (47.34 years) than that of patients hospitalized in the public sector (47.22 years). Additionally, a slight predominance of females was observed in both sectors. The average satisfaction of patients regarding the information provided was  $1.46 \pm 0.34$  in the public sector and  $3.006 \pm 0.9$  in the private sector ( $p < 0.01$ ). The average patient satisfaction with the care provided was  $1.48 \pm 0.33$  in the public sector and  $3.31 \pm 0.81$  in the private sector ( $p < 0.01$ ). The overall average satisfaction of patients with nursing care was significantly higher in the private sector ( $3.21 \pm 0.81$ ) compared to the public sector ( $1.47 \pm 0.3$ ). In general, patients in the private sector expressed significantly higher satisfaction with nursing care compared to those in the public sector. These results suggest a higher overall quality of nursing care in the private sector compared to the public sector. Hence, assessing patient satisfaction enables the description of care quality from the patient's viewpoint, the identification of potential issues, and the implementation of necessary solutions.

**Keywords:** inpatients; public sector; private sector

## INTRODUCTION

Healthcare systems are constantly evolving, in order to enhance the services provided to patients and ensure a better quality of life for them. Patient satisfaction, once neglected, is progressively gaining importance (1) (2). In fact, the rise of the Internet and social media platforms has provided people with the opportunity to learn more about the quality of care offered by healthcare systems (3). Several authors incorporate patient satisfaction as a healthcare service outcome, underscoring the critical need to assess the quality of care (4–6). Patient satisfaction is deeply individual and it's based on whether the patient's expectations regarding their care were fulfilled (7). Despite its subjective nature, satisfaction among patients has emerged as a crucial indicator for evaluating the effectiveness and quality of healthcare services and it stands as a cornerstone of a health system's success (3). By frequently evaluating its services, hospitals can offer a more precise determination of service quality, and the findings can be utilized to enhance patient satisfaction (8).

In the context of a healthcare system, the quality of care varies between the public and private sectors (9). Indeed, resource allocation, infrastructure, staffing levels, and reimbursement mechanisms can all influence the delivery of care and, consequently, patient satisfaction levels. This difference is particularly evident in low- and middle-income countries (10) (11). The main purpose of this study is to compare patient satisfaction in public and private hospitals in Sfax, Tunisia.

## MATERIALS AND METHODS

We carried out an observational cross-sectional study with a descriptive and etiological aim, among 198 patients hospitalized in public (N=101) and private (N=97) hospitals between October and December 2023. We used an anonymous self-administered questionnaire developed through an online interface hosted on Google Forms, including general and medical information in addition to satisfaction regarding the information and care provided. The latter was assessed by using the Arabic version of the Patient Satisfaction with Nursing Care Quality Questionnaire (PSNCQQ-Ar). It contains 17 items intended to evaluate satisfaction with the quality of nursing care on a 5-point Likert scale ranging from 'strongly disagree' to 'strongly agree,' along with items addressing the demographic characteristics of patients. This questionnaire measures the quality of nursing care during the patient's hospitalization based on two specific domains: satisfaction with information provided and satisfaction with care provided (12)(13).

Statistical analyses were performed using IBM SPSS Statistics version 23. Quantitative variables were described using means and standard deviations or medians, while qualitative variables were described using proportions or frequencies. The bivariate analysis was conducted using Student's t-test that compares two means between two independent samples. The study used a significance level of 5% ( $\alpha = 0.05$ ), and results were considered statistically significant when the p-value was less than 0.05.

## RESULTS AND DISCUSSION

The average age of patients hospitalized in the private sector was slightly higher (47.34 years) than that of patients hospitalized in the public sector (47.22 years) and a slight predominance of females was observed in both sectors. Almost half of the patient population was married in both the public and private sectors. The proportion of patients hospitalized twice was significantly higher in both sectors, public and private, representing 43.6% and 26.8% of cases, respectively. Previous health condition was poor in more than a quarter of the population (25.8%). A predominance of admissions through the emergency department was observed in both the public and private sectors, representing 38.6% and 46.4%, respectively.

In the private sector, 74.2% of patients were hospitalized alone in a room, while in the public sector, 74.3% of patients shared the room with more than one person (table I).

**Table I.** Descriptive patient data according to the sector

		<b>Public sector (N=101)</b>	<b>Private sector (N=97)</b>
<b>Age</b>		47.22 ±17.9 years [19-88]	47.34±18.02 years [20-88]
<b>Gender</b>	Female	56.4%	55.7%
	Male	43.6%	44.3%
<b>Marital status</b>	Single	12.9%	17.5%
	Married	54.5%	50.5%
	Divorced	17.8%	23.7%
	Widower	14.9%	8.2%
<b>Number of hospitalizations during the last two years</b>	1	16.8%	30.9%
	2	43.6%	26.8%
	3	17.8%	33%
	4	6.9%	2%
<b>Health condition before this hospital stays</b>	Excellent	5.9%	11.3%
	Good	9.9%	15.5%
	Acceptable	40.6%	53.6%
	Poor	32.7%	18.6%
	Very poor	10.9%	1%
<b>Admission through the emergency department</b>		38.6%	46.4%
<b>The number of individuals hospitalized in the same room</b>	0	4%	74.2%
	1	21.8%	21.6%
	>=1	74.3%	4.1%

The average satisfaction of patients regarding the information provided was  $1.46 \pm 0.34$  in the public sector and  $3.006 \pm 0.9$  in the private sector ( $p < 0.01$ ). Patient satisfaction is one of the essential dimensions to consider when evaluating hospital performance (14). Although it is not yet a regulatory measure in Tunisia, patient satisfaction assessment should become an integral part of management in order to improve the quality of care and patient satisfaction (15). Information is an important factor that influences patient satisfaction. Nurses and other healthcare professionals play an important role in providing support and information (6,16,17). Factors influencing patient satisfaction, according to a study conducted between 2015 and 2016 in Sousse (Tunisia), were linked to the quality of access and reception, the conditions of accommodation, technical care, information providing, and the respect for patient privacy (18).

A study conducted in Saudi Arabia in 2022 aimed to assess patient satisfaction with the quality of nursing care during hospitalization. Patient satisfaction regarding the information provided was high, with an average of  $4.45 \pm 0.8$  (19). Another study conducted in 2022, focusing on the satisfaction of COVID-19 patients in Saudi Arabia, evaluated patient satisfaction with the information provided, with an average of  $4.19 \pm 0.945$  (20). In a similar context, a study conducted in 2019 in Turkey revealed that among the satisfaction levels, the item "The information provided to you: clarity and comprehensiveness of nurses' explications about tests, treatments, and what to expect" scored  $1.74 \pm 0.86$ , which was almost similar to our findings (21).

The average patient satisfaction with the care provided was  $1.48 \pm 0.33$  in the public sector and  $3.31 \pm 0.81$  in the private sector ( $p < 0.01$ ). Within this framework, a study conducted in Saudi Arabia revealed that patients expressed a high level of satisfaction with the care provided, with an average of  $4.43 \pm 0.78$  (19).

The overall average satisfaction of patients with nursing care was significantly higher in the private sector ( $3.21 \pm 0.81$ ) compared to the public sector ( $1.47 \pm 0.3$ ). These results were almost similar to a study conducted in Sousse where overall patient satisfaction was moderate, with an average score of 1.53 and a satisfaction percentage of 51% (23). In Saudi Arabia, a study aimed to assess patient satisfaction with the quality of nursing care during hospitalization. The results showed that the overall patient satisfaction with nursing care has an average of  $4.43 \pm 0.76$  (19). A study focused on evaluating patient satisfaction with nursing care provided in some sectors of tertiary care hospitals in India in 2014, showed that patient satisfaction with nursing care was good among 23% of patients hospitalized in gynecology- obstetrics, 19% in medicine, and 24% in surgery (22).

In general, patients in the private sector expressed significantly higher satisfaction with nursing care compared to those in the public sector (table II).

In the other hand, we found that patients in the private sector expressed significantly higher satisfaction regarding the information provided compared to those in the public sector. This disparity may be attributed to more effective communication practices in the private sector (24). Moreover, patients in the private sector exhibited significantly higher satisfaction with the care provided compared to those in the public sector. This suggests a better assessment of care-related aspects, due to greater availability of material and human resources in the private sector (1). Indeed, private sector healthcare delivery in low- and middle-income countries has been considered to possess greater efficiency, accountability, and sustainability (10). A study conducted in Sub-Saharan Africa, has shown that private sector participation is positively and significantly associated with better health system performance (11).

Overall, patients in our study expressed significantly higher satisfaction with nursing care in the private sector compared to those in the public sector. These findings can be justified by the higher quality of nursing care in the private sector compared to the public sector.

**Tableau II.** Distribution of patients according to satisfaction and sector (PSNCQQ)

The items	Public sector		Private sector		P-value
	M	SD	M	SD	
1. The information provided to you: clarity and comprehensiveness regarding tests, treatments, and what you can expect	1.47	0.62	2.98	0.98	0.00
2. The instructions: the quality of nurses' explanations regarding preparation for exams and surgeries.	1.57	0.57	3.16	1.09	0.00
3. The ease of obtaining information: the willingness of nurses to answer your questions.	1.46	0.6	2.96	1.07	0.00
4. The information provided by nurses: the quality of nurses' communication with patients, families, and doctors.	1.52	0.64	2.94	1.15	0.00
5. Informing family or friends: the quality of nurses' communication with them to keep them informed about your condition and needs.	1.31	0.50	2.99	1.18	0.00
6. Involving family or friends in your care: the degree of permission for them to assist you in your care.	1.46	0.62	3.01	1.06	0.00
7. Nurses' attention and care: the politeness and respect you received; the kindness and friendliness.	1.56	0.68	3.24	1.008	0.00

8. Nurses' interest in your condition: the frequency of nurses' check-ins and the quality of their monitoring of your condition's progress.	1.56	0.68	3.48	1.147	0.00
9. Recognition of your opinions: to what extent nurses ask you what you think is important and offer you choices.	1.39	0.7	2.94	1.24	0.00
10. Taking your needs into account: the flexibility of nurses to respond to your needs.	1.42	0.55	3.04	1.13	0.00
11. Nurses' daily schedule: their ability to adjust their schedules according to your needs.	1.37	0.68	3.08	1.14	0.00
12. Assistance: nurses' ability to make you feel comfortable and reassured.	1.46	0.62	3.27	1.12	0.00
13. The responsiveness of the nursing team to your call: how quickly they provide assistance.	1.44	0.59	3.4	1.23	0.00
14. Nurses' competence and efficiency: the quality of task execution, such as administering medications or intravenous injections.	1.81	0.99	3.64	1.06	0.00
15. Care coordination: the collaboration between nurses and other members of the medical team taking care of you.	1.41	0.58	3.86	1.21	0.00
16. The calm atmosphere provided by the nurses: the degree of serenity and tranquility.	1.51	0.77	3.44	1.08	0.00
17. Confidentiality: the provision of means to ensure your privacy by the nurses.	1.35	0.607	3.26	1.1	0.00
<b>Patient satisfaction with the information provided (items from 1 to 5)</b>	1.46	0.34	3.006	0.9	0.00
<b>Patient satisfaction with the care provided (items from 6 to 17)</b>	1.48	0.33	3.31	0.81	0.00
<b>Patient satisfaction with the overall quality of nursing care (Items 1 to 17)</b>	1.47	0.3	3.21	0.81	0.00

M: mean

SD: standard deviation

## CONCLUSION

Patient satisfaction is a crucial indicator for evaluating the performance of medical and healthcare services. The findings of this study suggest that the overall quality of nursing care is higher in the private sector compared to the public sector. Assessing patient satisfaction allows for the description of care quality from the patient's perspective, the identification of potential issues, and the implementation of necessary solutions to improve the quality of healthcare services.

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**STUDY OF FEST METHODS FOR MICROPROCESSOR CENTRALIZATION OF  
ARROWS AND SIGNALS IN ORDER TO INCREASE TEST COVERAGE AND REDUCE  
THE RESOURCE INTENSITY OF BENCH TESTS**

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**ABSTRACT**

Annotation. The issue of reliability of combined testing methods based on the synthesis of simulation and physical modeling of the lower level of microprocessor centralization is considered. The possibility of their correct use with a minimum amount of equipment connected to the stand under conditions of limited statistical data on the functioning of centralization systems has been confirmed. One of the main activities to ensure and prove the safety of railway automation devices, incl. microprocessor centralization of arrows and signals (MPC), are bench tests of the experimental system. Their reliability is higher the closer the laboratory conditions approach real operational ones [1, 2]. The adequacy of the combined (physics-simulation) model underlying the methods is confirmed by testing. However, taking into account that from each equivalence class  $LL_i$ , into which the set of lower-level devices  $LL$  is divided, a very limited selection of elements  $\{ll_j\}$  is connected to the stand (in the limiting case, one system of representatives on the set  $LL$  is used, i.e.  $[\{ll_j\}] = 1$ ), the problem arises of the reliability of the distribution of test results to the entire system. This is due to the fact that due to the deviation of the parameters of an individual element  $ll_{br}$   $LL_i$  caused by a manufacturing defect, the set  $LL_i$  ceases to be an equivalence class, and  $LL_{ei} = LL_i / \{ll_{br}\}$  becomes such. To exclude elements  $ll_{br}$ , one of the necessary conditions for combined tests is a preliminary examination of lower-level devices, based on the results of which elements  $\{ll_{br}\}$  are eliminated or repaired. However, no matter how well it is organized, there are always many unaccounted factors, the impact of which leads to random errors, as a result of which a set of  $LL_{oshi} = \{ll_{osh}\}$  arises with undetected deviations of parameters, the connection of whose elements to the stand leads to erroneous test results. Thus, the reliability assessment consists of determining the probability  $P(E)$  of belonging of an arbitrarily selected element  $ll$   $LL_i$  to the equivalence class  $LL_{ei}$ :  $P(E) = P(ll \in LL_{ei})$  [6].

The correct organization of final product control allows us to eliminate systematic errors, therefore, when calculating the probability  $P(E)$ , we can limit ourselves to considering only random errors. The latter can be considered as a result of the influence of a great variety of different causes, each of which introduces a very small error, and none of them is dominant [6, 7].

According to Lyapunov's theorem, we can assume that random errors are distributed according to a normal law. Then the values that reproduce them will also be normally distributed:  $\omega = \omega_{ih} = (N_{osh} / N_{tot}) \times 100\%$ , where  $N_{osh}$  and  $N_{tot}$  are, respectively, the number of defective products of a certain type identified during trial operation and their total number). Event  $E$  can be considered the intersection of two events: not exceeding the percentage of defects  $\omega$  of a certain value  $\omega_{max}$  ( $\omega \leq \omega_{max}$ ) and selecting a product from a set of  $N_{tot} - N_{osh}$  ( $\omega_{max}$ ) of serviceable devices. The second event is dependent on the first, from where, according to the rule for finding conditional probability, the value of  $P(E)$  is determined as follows [6]:

$$P(E) = P(\omega \leq \omega_{max}) \times P_{\omega \leq \omega_{max}}(ll \in LL_i^e).$$

Considering that out of all Ntotal selection outcomes, Ntotal - Nosh corresponds to a serviceable element, according to the classical definition, the probability of the second event is equal to [6]:

$$P_{\omega \leq \omega_{max}}(ll \in LL_{ij}^e) = \frac{N_{o\delta u} - N_{ou}^{max}}{N_{o\delta u}} = 1 - \frac{N_{ou}^{max}}{N_{o\delta u}} = 1 - \frac{\omega_{max}}{100\%}$$

where is the absolute number of defective elements corresponding to the percentage ωmax. Then formula (1) takes the following form:

$$P(E) = P(\omega \leq \omega_{max}) \times \left(1 - \frac{\omega_{max}}{100\%}\right) = \frac{P(\omega \leq \omega_{max}) \times (100\% - \omega_{max})}{100\%}.$$

Thus, as can be seen from expression (3), the probability P(E) is a function of the parameter ω max, the determination of which is reduced to the task of confirming reliability. Based on the fact that the defect rate cannot be negative, the following identical transformations can be performed over the interval ω < ωmax: (ω ≤ ωmax) ≡ (0 ≤ ω ≤ ωmax) ≡ (ωo - Δω = 0 ≤ ω ≤ ωo + Δω = ωmax) ≡ (-Δω ≤ ω - ωo ≤ +Δω). (4) The values of ωo and Δω are found from the following system of equations:

$$\begin{cases} \omega_o - \Delta\omega = 0, \\ \omega_o + \Delta\omega = \omega_{max}; \end{cases} \rightarrow \begin{cases} \omega_o = \Delta\omega, \\ 2\Delta\omega = \omega_{max}; \end{cases} \rightarrow \omega_o = \Delta\omega = \frac{\omega_{max}}{2}.$$

According to formula (4), the following equality takes place:

$$P(\omega \leq \omega_{max}) = P(-\Delta\omega \leq \omega - \omega_o \leq +\Delta\omega),$$

which provides the basis for using methods for determining confidence probabilities and intervals to determine the value of ωmax. Taking into account the result (5), the probability P(ω ≤ ωmax) is determined through the probability and Laplace integrals as follows [6]:

$$P(\omega \leq \omega_{max}) = \frac{1}{\sigma\sqrt{2\pi}} \int_{-\frac{\omega_{max}}{2}}^{+\frac{\omega_{max}}{2}} e^{-\frac{\left(\omega - \frac{\omega_{max}}{2}\right)^2}{2\sigma^2}} d\left(\omega - \frac{\omega_{max}}{2}\right) = \sqrt{\frac{2}{\pi}} \int_0^{\chi} e^{-\frac{\chi^2}{2}} d\chi = 2\Phi(\chi),$$

where σ is the standard deviation (RMS) of the random variable ω;

$$\chi = \frac{\omega - \frac{\omega_{max}}{2}}{\sigma} = \frac{2\omega - \omega_{max}}{2\sigma}$$

converter of probability integral to Laplace integral;

Φ(χ) – Laplace function (integral).

With a known standard deviation, the probability P(ω ≤ ωmax) can be determined for a given value of ωmax, or vice versa - the value of ωmax for a given permissible (confidence) probability P(ω ≤ ωmax)

from reference data that determine the values of the function  $\Phi(\chi)$  at any point  $\chi$ . However, in many cases, the value of  $\sigma$  is unknown, and its calculation is impossible due to the lack of data on the specific values of the distribution function of the random variable  $\omega$ . To solve this problem, according to the classical error theory [6], you can use the maximum likelihood method and the Bessel formula, according to which the standard deviation is replaced by the average value of the sample standard  $s_{av} \approx \sigma$ :

$$\sigma \rightarrow s_{cp} = \sqrt{\frac{1}{\rho(\rho-1)} \sum_{h=1}^{\rho} (\omega_{ih} - \omega_{cp})^2}, \quad \omega_{cp} = \frac{1}{\rho} \sum_{h=1}^{\rho} \omega_{ih},$$

where  $\omega_{av}$  is the average value of the parameter  $\omega_{ih}$  for all objects of statistical data collection (railway stations where the MPC is operated) is its point estimate;  $\rho$  – number of observations of the value  $\omega_{ih}$  (railway stations).

Thus, with a sufficient amount of statistical data on the operation of the MPC, determined by the value of  $\rho$ , the reliability of the use of combined test methods (CTM) can be determined on the basis of formulas (3), (6) and (7).

A particular problem in determining the probability P(E) may be the case when the number of objects of implementation of a certain type of MPC is small ( $2 \leq \rho < 20$ ), which is typical for many domestically developed systems [8]. Its solution can be achieved using the Student method, based on the distribution of the same name, widely used in statistics of small samples (microstatistics). Based on the formulas of this distribution set out in works [6, 7], taking into account formulas (5) – (7) and the assumptions made above (including  $\sigma \rightarrow s_{cp}$ ), we can write an intermediate probability value:

$$\begin{aligned} P\left(-t_p \leq u = \frac{\omega_{cp} - \frac{\omega_{max}}{2}}{s_{cp}} \leq +t_p\right) &= P\left(-t_p s_{cp} \leq \omega_{cp} - \frac{\omega_{max}}{2} \leq +t_p s_{cp}\right) = \\ &= P\left(\omega_{cp} - t_p s_{cp} \leq \frac{\omega_{max}}{2} \leq \omega_{cp} + t_p s_{cp}\right) = P\left(2\omega_{cp} - 2t_p s_{cp} \leq \omega_{max} \leq 2\omega_{cp} + 2t_p s_{cp}\right) = \\ &= \int_{-t_p}^{+t_p} \left[ \frac{\Gamma\left(\frac{\kappa+1}{2}\right)}{\sqrt{\pi\kappa}\Gamma\left(\frac{\kappa}{2}\right)} \left(1 + \frac{u^2}{\kappa}\right) \right] du = 2 \int_0^{+t_p} \left[ \frac{\Gamma\left(\frac{\kappa+1}{2}\right)}{\sqrt{\pi\kappa}\Gamma\left(\frac{\kappa}{2}\right)} \left(1 + \frac{u^2}{\kappa}\right) \right] du = S(t_p, \kappa) \end{aligned}$$

where  $\Gamma$  – gamma function – Euler integral of the 2nd kind ( $x = \text{Re } z > 0$ );  $\kappa = \rho - 1$  – Student’s coefficient (the number of degrees of freedom of the Student’s distribution). The values of the function  $S(t_p, \kappa)$  are tabulated and determined for different values of the parameters  $t_p$  and  $\kappa$  using reference tables [6, 7]. It determines the probability that the deviation of the average value of the percentage of defects  $\omega_{cp}$  does not exceed the value  $\Delta p = t_p s_{cp}$ , and also, as can be seen from expression (8), the probability of finding the percentage of defects in a certain interval, individual elements of which, as will be shown below, can be negative. Considering that values  $\omega < 0$  are impossible,  $P(\omega_{max} < 0) = 0$ . Then, taking into account the possible loss of coverage of the values of the segment  $[0; 2\omega_{cp} - 2t_p s_{cp}]$ ,

which can only happen when  $2\omega_{cp} - 2t_{p_{cp}} \geq 0$ , provided that acceptable defects are accepted at the level  $\omega_{max} = 2\omega_{cp} + 2t_{p_{cp}}$ , we can assume that the probability  $S(t_p, \kappa) \leq P(\omega < \omega_{max})$ , which means : (9) where  $\Delta E$  is an event consisting in belonging to  $\omega [0; \omega_{min}]$ , incompatible with  $E'$ ;  $\omega_{min} = 2\omega_{av} - 2t_{p_{sp}}$  – conditional minimum calculated value of  $\omega$ .

According to inequality (9), instead of  $P(E)$ , you can use the probability  $P(E') \leq P(E)$ . The accepted value of  $P(E')$  enhances the result of the reliability assessment, and the possible loss of the value of  $P(\Delta E)$  is one of the costs of using microstatistics. Moreover, in the best case, when  $\omega_{min} < 0$ ,  $P(\Delta E) = P(\omega_{min} < 0) = 0$  is true, which implies the equality  $P(E')\Delta E = \{\omega_{min} < 0\} = P(E)$ . Then the accuracy of the assessment and the value of the reliability of the MCI increases. Thus, under the conditions of microstatistics of the operation of the MPC system, the reliability of the MCI is determined taking into account two parameters:  $t_p$  and  $\kappa$  according to formulas (3), (8) and (9).

Another problem in determining the reliability of the MCI is the possible inequalities of objects for implementing the MPC system. It is caused by various modifications of lower-level elements operated at different stations, differences in the technology of their operation, which lead to different manifestations of defects, etc. From the point of view of mathematical statistics and the theory of experimental planning, data collection during the operation of such objects is a special case of unequal observations [6, 7]. To solve it, you can use the weighing method proposed in [6]. Its essence lies in the fact that each station is assigned its own weight, expressed as an integer. The least reliable observations receive the least weight, and others are given more weight the higher their reliability. In this case, the weighting coefficient  $m_{ih}$  is considered as a multiplication of the observation, i.e. it is believed that an observation with a weight  $m_{ih}$  is equivalent to  $m_{ih}$  observations with a unit weight, which corresponds to a decrease in the average error by a factor. In this case, the expressions for  $\omega_{av}$  and  $s_{av}$  in formulas (6) and (8) are as follows [6]:

$$\omega_{cp} = \frac{1}{\sum_{h=1}^{\kappa+1} m_{ih}} \sum_{h=1}^{\kappa+1} [m_{ih}(\omega_{ih} - a)] + a, s_{cp} = \sqrt{\frac{1}{\kappa(\kappa+1)} \left\{ \sum_{h=1}^{\kappa+1} m_{ih}(\omega_{ih} - a)^2 - \frac{1}{\sum_{h=1}^{\kappa+1} m_{ih}} \left[ \sum_{h=1}^{\kappa+1} (\omega_{ih} - a) \right]^2 \right\}}$$

where  $a$  is an arbitrary number close to  $\omega_{avg}$ , determined by formula (7).

Combining formulas (3), (6) – (10), we can obtain the following expression for the probability  $P(E')$  in the conditions of microstatistics and the disparity of objects:

$$P(E') = 4 \left( \frac{\sum_{h=1}^{\kappa+1} m_{ih}(\omega_{ih} - a)}{\sum_{h=1}^{\kappa+1} m_{ih}} + \sqrt{\frac{1}{\kappa(\kappa+1)} \left\{ \sum_{h=1}^{\kappa+1} m_{ih}(\omega_{ih} - a)^2 - \frac{1}{\sum_{h=1}^{\kappa+1} m_{ih}} \left[ \sum_{h=1}^{\kappa+1} (\omega_{ih} - a) \right]^2 \right\}} + a \right) \times$$

$$\times \int_0^{+t_p} \frac{(t_p - \kappa) \Gamma\left(\frac{\kappa+1}{2}\right) \sqrt{\frac{1}{\kappa(\kappa+1)} \left\{ \sum_{h=1}^{\kappa+1} m_{ih}(\omega_{ih} - a)^2 - \frac{1}{\sum_{h=1}^{\kappa+1} m_{ih}} \left[ \sum_{h=1}^{\kappa+1} (\omega_{ih} - a) \right]^2 \right\}}}{\kappa \sqrt{\pi \kappa} \Gamma\left(\frac{\kappa}{2}\right)} dt_p$$

Considering that the parameters  $\kappa$ ,  $m_{ih}$ ,  $\omega_{ih}$  and  $a$  do not depend on  $t_p$ , we can take the corresponding constant component out of the sign of the integral in formula (11). Having calculated the integral:

$$\int_0^{+t_p} (t_p - \kappa) dt_p = \int_0^{+t_p} t_p dt_p - \kappa \int_0^{+t_p} dt_p = \frac{t_p^2}{2} - \kappa t_p = t_p \left( \frac{t_p}{2} - \kappa \right),$$

making a = ωavg, expression (11) taking into account (7) is written as follows:

$$P(E') = \frac{4\kappa^2 t_p \left( \frac{t_p}{2} - \kappa \right) \Gamma\left(\frac{\kappa+1}{2}\right)}{\sqrt{\pi(\kappa+1) \Gamma\left(\frac{\kappa}{2}\right)}} \sqrt{\frac{\left( \sum_{h=1}^{\kappa+1} m_{ih} \right)^2 \sum_{h=1}^{\kappa+1} m_{ih} \left( \omega_{ih} - \frac{\sum_{h=1}^{\kappa+1} m_{ih}}{\kappa+1} \right)^2 - \left[ \sum_{h=1}^{\kappa+1} \left( \omega_{ih} - \frac{\sum_{h=1}^{\kappa+1} m_{ih}}{\kappa+1} \right) \right]^2}{\sum_{h=1}^{\kappa+1} m_{ih}}} \times$$

$$\times \left( \frac{\sum_{h=1}^{\kappa+1} m_{ih} \left( \omega_{ih} - \frac{\sum_{h=1}^{\kappa+1} m_{ih}}{\kappa+1} \right)}{\sum_{h=1}^{\kappa+1} m_{ih}} + \sqrt{\frac{\left( \sum_{h=1}^{\kappa+1} m_{ih} \right)^2 \sum_{h=1}^{\kappa+1} m_{ih} \left( \omega_{ih} - \frac{\sum_{h=1}^{\kappa+1} m_{ih}}{\kappa+1} \right)^2 - \left[ \sum_{h=1}^{\kappa+1} \left( \omega_{ih} - \frac{\sum_{h=1}^{\kappa+1} m_{ih}}{\kappa+1} \right) \right]^2}{\kappa(\kappa+1) \sum_{h=1}^{\kappa+1} m_{ih}}} + \frac{\sum_{h=1}^{\kappa+1} m_{ih}}{\kappa+1} \right).$$

Direct calculation of P(E') using formula (12) is advisable only if the values of tp and κ are intermediate between the tabulated ones due to its cumbersomeness and the need to calculate gamma functions. It is preferable to find it indirectly on the basis of tabulated values of the function S(tp, κ), multiplied by the values according to formula (3), having previously calculated ωav and sav using formulas (7), (10).

In a number of cases, the calculated value of the probability P(E') may be insufficient to correctly generalize the results of applying the MCI to the entire system. The solution to this problem is to conduct several cycles of combined tests with different elements of the lower level of a certain group (type) according to a general methodology. To do this, each cycle selects its own system of representatives, equivalent to the others.

To disseminate test results, it is sufficient that at least one prototype of an element of the lower level of a certain group belongs to the equivalence class LLei, i.e. was not defective. Events that consist of simultaneous connection of several representatives to the stand are independent, and the choice of at least one element ll LLei is a union of these events. Then, according to the formula for finding the probability of combining a finite number of independent events, the total probability P(Etotal) of correct dissemination of test results is [6]:

$$P(E_{o\delta u}) = P\left(\bigcup_{k=1}^n E_k\right) = \sum_{k=1}^n P(E_k) - \sum_{1 \leq i < j \leq n} P(E_i \cap E_j) +$$

$$+ \sum_{1 \leq i < j < k \leq n} P(E_i \cap E_j \cap E_k) - \dots + (-1)^{n+1} P(E_1 \cap E_2 \cap E_3 \cap \dots \cap E_n)$$

where n is the number of test cycles and corresponding representative systems;

E1, E2, ..., En – events consisting in the choice of a system of representatives without marriage.

According to the properties of independent events and previous provisions regarding the arbitrary choice of elements of the lower level, events E1, E2, ..., En are equally probable [6]:

$$P(E1) = P(E2) = P(E3) = \dots = P(En) = P(E), \quad (14)$$

whence follows the following form of formula (13) for this case:

$$P(E_{o\delta u}) = C_n^1 P^1(E) - C_n^2 P^2(E) + C_n^3 P^3(E) - \dots + (-1)^{n+1} C_n^n P^n = \sum_{k=1}^n (-1)^{k+1} C_n^k P^k(E).$$

When deriving formula (15), the rule for finding the probability of intersection of independent events was taken into account: [6].

In addition to the probabilities  $P(E_{tot}) = P_i(E_{tot}) = P(E_{itot})$  for individual i-th groups of elements, the probability  $P(D_{tot})$ , which consists in the absence of defects in the entire selected system of representatives, is also important. Events that consist in the selection of representatives from different groups are independent, because , where m is the number of groups of elements. Thus, the probability  $P(D_{total})$  in the general case depends on each value of  $P_i(E_{total})$ , the number of groups m and test cycles n and, according to formula (15), is determined as follows [6]:

$$P(D_{o\delta u}) = \prod_{i=1}^m \sum_{k=1}^n (-1)^{k+1} C_n^k P_i^k(E) = \sum_{k=1}^n \left[ (-1)^{k+1} C_n^k \prod_{i=1}^m P_i^k(E) \right] = \sum_{k=1}^n \left[ (-1)^{k+1} C_n^k P^k(D) \right]$$

where D is the absence of a single defective element in one test cycle.

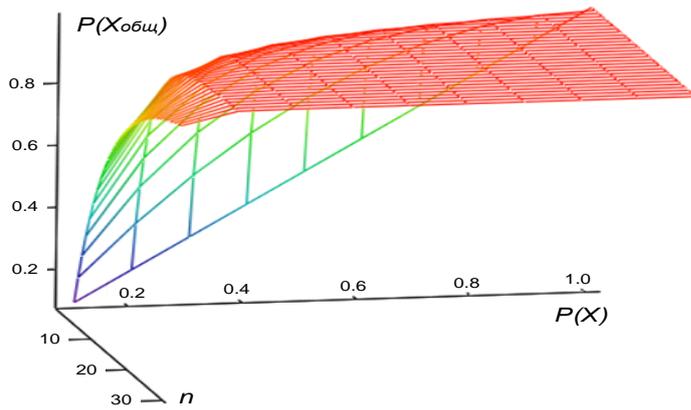
When comparing the last expressions in formulas (15) and (16), one observes their isomorphism with respect to operations on variables  $P(X)$ , where  $X = E, D$ . Moreover, equality (14) also implies the following equality:

$$P(D) = P(D_1) = P(D_2) = P(D_3) = \dots = P(D_n) = \sum_{k=1}^n \prod_{i=1}^m P_i(E_k),$$

where D1, D2, ..., Dn are events consisting in the selection of appropriate non-defective representative systems for different test cycles;

$P_i(E_k)$  – probability of selecting a non-defective element from the i-th group at the k-th test cycle.

Then the nature of the dependence of  $P(X_{total})$  on n and  $P(X) = P_i(X)$  is common for  $X = E$  and  $X = D$ , i.e. is the same for both individual elements and systems of representatives (Fig. 1).



Rice. 1. Surface graph of the dependence of  $P(X_{tot})$  on the values of  $P(X)$  and  $n$

The given graph determines the values of the parameters  $P(E_{tot})$  and  $P(D_{tot})$  regardless of how the initial parameters  $P(E)$  or  $P(D)$  were obtained, as well as the nature (law) of the distribution of the random variable  $\omega$ . From Fig. 1 shows that even with insignificant probabilities  $P(X)$ , but with a sufficient number of test cycles, the resulting probability  $P(X_{total})$  reaches high values (more than 90%). From this we can conclude that the MCIs proposed in [3 – 5] are universal for various MFC systems. It should be borne in mind that the number of lower-level elements in the bench composition is proportional to the number of test cycles, and, given the limited selection of elements in any case, this is true for both MCT and traditional bench tests (TST) described in [1 , 2]:

$$N_k(n_k) = k_k n_k, N_c(n_c) = k_s n_c,$$

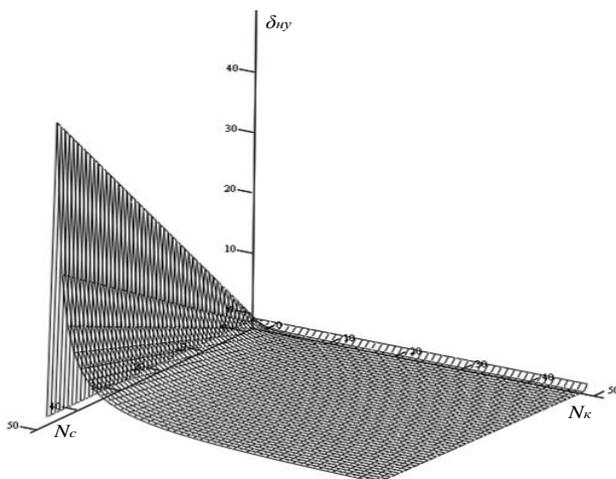
where  $N_k, N_c$  – number of elements of the lower level, respectively, for MCI and TSI;

$n_k, n_c$  – the required number of MKI and TSI cycles to achieve sufficient  $P(H_{total})$ ;

$k_k, k_s$  – coefficients taking into account the peculiarities of tests according to MKI or TSI.

Then the feasibility of choosing an MCI instead of a TSI from the standpoint of saving equipment connected to the stand while maintaining the overall test coverage can be determined based on the following relative indicator:  $\delta_{ny}$  (17) where is the minimum value of  $\delta_{ny}$  at which it is advisable to use MCI.

The nature of the change in the value of  $\delta_{ny}$  depending on the parameters  $N_k, N_c$  has, according to formula (17), a linear-hyperbolic character (Fig. 2).



Rice. 2. Surface graph of the dependence  $\delta_{ny}(N_k, N_c)$

The choice of the value of the reference parameter depends on the goals, conditions, test program and methodology, as well as the values of various parameters for optimizing the test process (time, test

coverage, number of testers, etc.). The development of methods for its determination requires a separate study.

Let's consider a special case of assessing the reliability of MCI results using the example of microprocessor centralization MPC-S produced by NPP SATEP LLC (Ukraine) [9].

For this system, which as of March 2013 is in operation at four railway stations, the results of collecting data on the number of defects among low-level microprocessor controllers (MPCs) of various types (switches - MKST, traffic lights - MKSV, rail sensors - MCRD, input modules - MK-IN32.01, output modules - MK-OUT16.01), identified during the trial period, are given in table.1.

Data on MPC defects identified during the trial operation of MPC-S

№ <i>i</i> groups	Type (group) MPC	Quantitative characteristics	Number h and station name			
			1	2	3	4
			Post South	Polugorki	Transfer- Donetsk	Transit
1.	ICSV	General quantity	58	23	54	18
		Number of defects	1	1	1	0
		Rejection rate	1,72%	4,35%	1,86%	0%
2.	MKST	General quantity	19	10	31	10
		Number of defects	0	0	1	0
		Rejection rate	0%	0%	3,23%	0%
3.	ICRD	General quantity	98	50	130	42
		Number of defects	2	1	3	1
		Rejection rate	1,04%	2,0%	2,31%	2,38%
4.	MK- IN32.01	General quantity	2	2	6	2
		Number of defects	0	0	0	0
		Rejection rate	0%	0%	0%	0%
5.	MK- OUT16.01	General quantity	2	2	6	2
		Number of defects	0	0	0	0
		Rejection rate	0%	0%	0%	0%

As can be seen from table. 1, no defects were observed for the I/O modules during operation, which can be explained by the small batches of their production and the associated minimization of inspection errors. By excluding these errors (i.e., assuming a 100% probability of detecting faulty modules), they will not be taken into account in the future. The examination errors of the remaining IPCs are assumed to be only random and normally distributed.

Since the operating data statistics are very small ( $p = 4$ ), maximum likelihood and Student's t methods are used. It is also necessary to take into account the various subtypes of the MPC-S system operated at stations, the technology of their operation, differentiation in modifications of the same type of MPC and their different numbers. Therefore, the objects of observation in this case are not equal, which determines the use of the weighing method (see paragraph 3). To determine the weight coefficients

$m_{ih}$  for each group  $i$  and station  $h$ , expert assessments were used by questioning specialists in the field of development, operation and testing of the MPC-S system. The values of the  $m_{ih}$  weights were assessed on a five-point scale, and their average values were rounded to the nearest whole number. The results of calculating the weights are presented in the following matrix, compiled according to table. 1:

$$\|m_{ih}\| = \begin{vmatrix} m_{11} = 3 & m_{12} = 1 & m_{13} = 4 & m_{14} = 2 \\ m_{21} = 2 & m_{22} = 1 & m_{23} = 3 & m_{24} = 1 \\ m_{31} = 4 & m_{32} = 2 & m_{33} = 4 & m_{34} = 2 \end{vmatrix}$$

The result is entirely natural, because Stations with a large number of operating MPCs (with a larger sample) received larger weights.

To calculate the probability  $P(E')$  of the reliability of the MCI of the MPC-S system, formulas (7), (8), (10) and (3) are successively applied. In this case, the values of the function  $S(t_p, \kappa)$  are determined from the table. 2 (selected values of parameters  $t_p$  and  $\kappa$  are highlighted in bold) [6].

$t_p$	Values of $S(t_p, \kappa)$ at values of $\kappa$					
	1	2	3	4	7	11
0,1	0,063	0,071	0,073	0,075	0,078	0,07966
0,2	0,126	0,140	0,146	0,149	0,155	0,15852
0,5	0,295	0,333	0,349	0,356	0,373	0,38292
1,0	0,500	0,577	0,609	0,626	0,661	0,68269
2,0	0,705	0,817	0,861	0,884	0,926	0,95450
<b>3,0</b>	0,795	0,905	<b>0,942</b>	0,960	0,988	0,99730
<b>5,0</b>	0,874	0,962	<b>0,985</b>	0,992	0,999	0,99999

Calculated in accordance with formulas (3), (7), (8), (10) and table. 1, 2 reliability indicators of MCI using the MathCAD\_15 application package are given in Table. 3.

Table 3

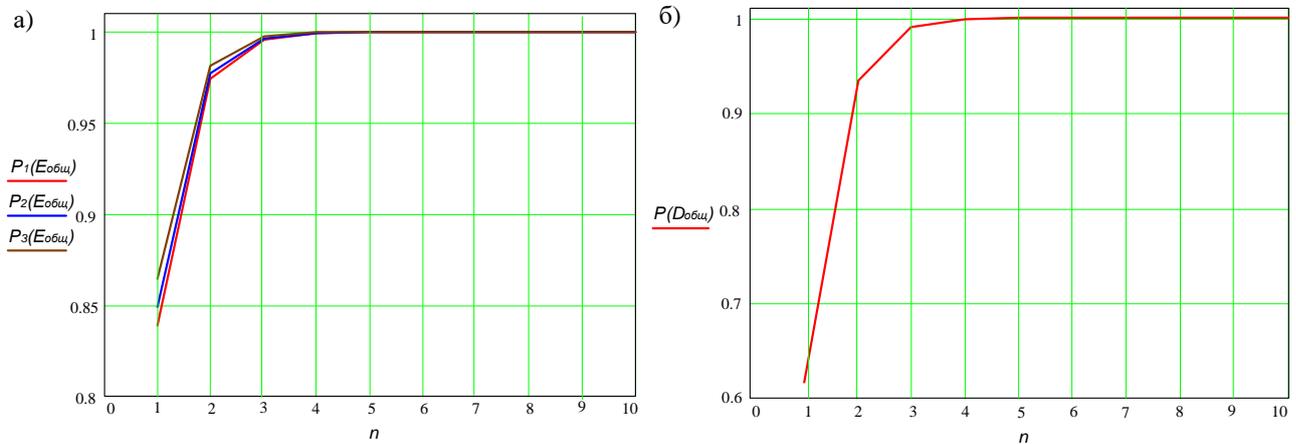
Calculation results of MCI reliability indicators for the MPC-S system

MPC type	Parameters characterizing the tests								
	$\omega_{cp}, \%$	$s_{cp}, \%$	$t_p$	$\omega_{max}, \%$	$\omega_{min}, \%$	$S(t_p, \kappa)$	$P(E')$	$P\%(E'), \%$	$P\%(D), \%$
ICSV	1,695	1,257	3	10,931	-4,151	0,942	0,839	83,903	61,575
MKST	1,384	1,183	3	9,866	-4,329	0,942	0,849	84,906	
ICRD	2,180	0,789	5	12,249	-3,529	0,985	0,864	86,435	

As can be seen from table. 3, the values of the parameter  $\omega_{min}$  are negative for all groups of IPC, therefore, according to formula (9), in this case  $P(E') = P(E)$ .

## INTRODUCTION

The above calculation was performed for a single system of representatives participating in one test cycle. However, the obtained values of  $P(E)$  and  $P(D)$  are not sufficient to extend the results to the MPC-S system, and therefore it is necessary to use additional test cycles. To determine their quantity, graphs of the dependences  $P_i(E_{total})$  and  $P(D_{total})$  on the number of cycles  $n$  were compiled (Fig. 3).



a – dependence of  $P_i(E_{total})$  on  $n$ ; b – dependence of  $P(D_{total})$  on  $n$

Rice. 3. Graphs of the dependences of  $P_i(E_{total})$  and  $P(D_{total})$  on the number of test cycles

Having set the acceptable conditions  $P_i(E_{total}) \geq 0.98$  and  $P(D_{total}) \geq 0.95$ , from the graphs in Fig. 3 it can be determined that, with the available operating statistics, for the correct application of the MCI of the MPC-S system, three cycles of tests are sufficient.

## CONCLUSION

The proposed approach to assessing reliability makes it possible to determine the admissibility and feasibility of using combined testing methods for an MPC system of a certain type, as well as to calculate the required number of test cycles. If the evaluation results are positive, these methods can significantly reduce the amount of material resources for testing and increase their test coverage.

**Key words:** combined tests, microprocessor centralization, reliability, microstatistics, maximum likelihood method, Student distribution, unequal observations.

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**LEVELS OF THERAPEUTIC COMPLIANCE AMONG TYPE 2 DIABETIC PATIENTS IN SOUTHERN TUNISIA**

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**ABSTRACT**

**Introduction:**

Diabetes represents a heavy burden and can lead to significant health complications. The impact of this pathology on health systems is very serious. Spectacular progress has been made in improving its treatment to ameliorate the management of diabetes. However, only good medication adherence can assure optimal therapeutic effectiveness.

This study aims to evaluate the level of therapeutic compliance adherence among type 2 diabetic patients and to identify factors associated with poor adherence.

**Methods**

It was a cross-sectional study concerning type 2 diabetic patients followed in primary care services in Sfax, Tunisia. Data collection was accomplished by using the Morisky Medication Adherence Scale-8 (MMAS-8). Therapeutic adherence was considered good for patients with a score of 8, average for those with a score between 8 and 6, and low for patients with a score less than 6.

**Results**

The study included 132 patients and the average age was 60.4 years  $\pm$  9.8. There were 69 (52.3%) females, with a with a sex ratio of 0.91. The mean glycated hemoglobin (HbA1c) was 8.7%  $\pm$  1.9. Forty-nine (37.1%) patients had diabetes-related complications, such as diabetic retinopathy in 40 cases (30.3%) and diabetic nephropathy in 16 patients (12.1 %)

Therapeutic compliance was good for 19 patients (14.4%), medium for 54 patients (40.9%), and poor for 59 patients (44.7%). Poor therapeutic compliance was significantly associated with a low educational level (66.4% vs 36.8%,  $p=0.014$ ) and a low economic income (36.3% vs 10.5%,  $p=0.027$ ). Moreover, the absence of self-monitoring blood sugar was significantly associated with non-therapeutic adherence (89.4% vs 68.4%,  $p=0.025$ ). Compliant patients presented a significantly higher rate of glycemic control (41.1% vs 32.8%,  $p=0.012$ ).

### **Conclusion**

This study showed that therapeutic non-compliance in type 2 diabetics was a frequent and multifactorial phenomenon. A specific focus is required on therapeutic compliance in order to guarantee better management of diabetes and its complications.

**Keywords:** therapeutic adherence, type 2 diabetes, compliance, Morisky Medical Adherence Scale

**INFLUENCE OF AGGREGATE GRADATION AND CEMENT CONTENT ON THE BEHAVIOR OF A TUFF AS A BASE MATERIAL FOR FLEXIBLE PAVEMENT**

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**ABSTRACT**

This study investigates the combined impact of particle size distribution and cement content on the mechanical properties of tuff as a cement-treated base layer material, uncovering significant variations in strength and stability. Specifically, it delves into how these factors affect the engineering properties of stabilized base materials, offering design optimization recommendations for flexible pavements. By examining the interaction between cement and aggregate gradation in cement-treated tuff, the study sheds light on their influence on material compression strength, shear resistance, and resilience. It also evaluates the effect of particle size distribution on the mechanical behavior of cement-treated mixtures, revealing favorable synergies and potential trade-offs in flexible pavement design. Key findings include a significant increase in maximum dry density with increasing mixture content up to 60%, and a notable increase in compressive strength with up to 7% cement content. Moreover, the addition of cement significantly enhances the soil's shear strength and parameters, leading to improved overall performance. These results suggest that the addition of 7% cement can increase the compressive strength of tuff by 8 times compared to untreated tuff, while a 40% mixture of quarry sand and gravel can double the compressive strength compared to untreated tuff. Overall, the study underscores the transformative impact of cement and mixture additions on tuff's mechanical properties, offering promising avenues for pavement material enhancement.

**Keywords:** Tuff, gravel, unconfined compressive strength, shear strength, cement treatment

LONG TERM IMPACTS OF GLOBAL WARMING ON COSTAL POLLUTION AND  
MARITIME CRIMINALITY; COASTAL ADAPTATION STRATEGIES

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**ABSTRACT**

Global warming impacts on coastal populations have socio-economic, environmental, and health implications, affecting maritime security and potentially leading to maritime criminality. Global Warming have change affects fisheries, increasing illegal fishing and disputes, demonstrating the interconnectedness between climate change, governance, and maritime crime. The ocean, as a global commons, is governed by maritime legal systems to manage conflicts related to national security, resources, and transportation routes. International cooperation is essential in addressing maritime threats, particularly terrorism, as no single nation can protect the maritime domain alone. The research has analyzed the data under subjective approach using the qualitative method of research. The research has adopted the descriptive method of research. Collaborative measures are necessary to prevent terrorist attacks at sea and maintain the safety and security of maritime activities worldwide. Global Warming is likely to have significant implications for maritime security, particularly so for the coastal and archipelagic states of South Asia and the Pacific where existing challenges will be exacerbated. This Research support for coastal climate action suggests that knowledge of societal perceptions and preferences of coastal adaptation strategies. The drivers behind them are essential for designing action that is in line with societal values and for informing communication and cooperation.

**Key Words:** *Global Warming, Costal pollution, Maritime Criminality, adaptation strategies*

**IN-SILICO STUDY OF ZINGIBER OFFICINALE PROVES THE MANAGEMENT OF ALCOHOLIC LIVER DISEASE**

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**ABSTRACT**

The liver receives numerous and varied biological insults daily. The induction of cytoprotective enzymes, including antioxidant and carcinogen-detoxification enzymes, is critical for maintaining hepatic homeostasis and preventing injury from absorbed endotoxin. Although, binge drinking arises the alcoholic steatohepatitis are stages leading to liver disease where hepatic stellate cells are activated, depositing collagen in the liver. There are three medications, namely acamprosate, disulfiram and naltrexone that have been authorised by FDA for the management of drinking disorder. However, these drugs have a number of drawbacks, including symptoms connected to the nervous system.

Ginger (*Zingiber officinale*) is one of the traditional kitchen condiment and it has been used as anti-inflammatory, anti-bacterial medicine. This molecular docking results emphasis that the bioactive constituents of *Zingiber officinale* can play a lead role in the treatment of alcohol induced liver diseases. Docking outcomes revealed that the bioactive compounds gingerol, shogaol,  $\beta$ -bisabolene,  $\beta$ -sesquiphellandrene, curcumene and o-cymene exhibit excellent binding with target LXR- $\alpha$ , LXR- $\beta$  protein. Meanwhile, these compound shows lesser binding affinity with HMG-CoA protein. The stability of the ligand-protein complex was influenced by hydrogen bonding and hydrophobic interactions. The drug likeness of the constituents were evaluated by Swiss ADME server. With the objective to reduce the burden on healthcare of liquor-induced disease and damage, this modelling results suggests that the ginger plant shows potential natural remedies in management of alcohol induced liver disease.

**Keywords:** Alcohol Induced, Docking, Drug likeness, Ginger, *Zingiber officinale*.

**THE IMPORTANCE OF BIOMECHANICAL ANALYSIS IN PERFORMANCE INDICATORS IN THE GAME OF BASKETBALL**

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**ABSTRACT**

Basketball is a sport of great importance in many countries of the world, and also it is a very popular sport in Albania. Basketball is a game in which coaches help the team by improving the individual skills of each athlete. It requires the integration of individual talents in the game, but also involving the rest of the team. The Albanian Basketball League is a competition consisting of the participation of professional men's and women's clubs in Albania and it is the most important event in this discipline. As in all sports, the development of basic motor skills in basketball is an important of training practices. It requires the execution of the basic skills, which, once learned, bring about a success in their performance. The development of basic motor skills is known to facilitate technical-tactical application and it is a prerequisite for sport success. The purpose of a biomechanical analysis in sport is to evaluate a movement and also the respective technique performed. Biomechanics in the field of sports is a method to improve athletic performance. With the greatest focus on young players, the basic elements of the technique were taken into consideration for the biomechanical analysis, which are: dribbling, passing, and shooting, which is used in the finalization of the attack action. In biomechanical analysis, positioning is closely related to stability. The horizontal localization of the center of gravity in relation to base of support affects all stability. Sport performance depends on a combination of physical, functional and behavioral characteristics. Achieving a high level of performance in sports results from a combination of many factors, which are skill-related components including physiological features and the athlete must perfect these features through exercise. Movement analysis, using a biomechanical approach is highly recommended to evaluate performance and the pathways leading to success.

**Keywords:** biomechanical analysis, performance indicators, dribbling, passing, shooting

**Introduction**

Many years ago still now, basketball had become a major college sport, paving the way for increased interest in professional basketball [1]. Today, basketball is a sport of great importance in many countries of the world. First, basketball is an extremely popular sport, especially on television. Basketball is a team game in which coaches help the team by improving the individual skills of each athlete. Basketball is a sport of great importance in many countries of the world, and also it is a very popular sport in Albania. Basketball is a game in which coaches help the team by improving the individual skills of each athlete. It requires the integration of individual talents in the game, but also involving the rest of the team. It requires also the execution of basic skills, which, once learned, bring about a success in their performance [2].

The Albanian Basketball League is a competition consisting of the participation of professional men's and women's clubs in Albania and it is the most important event in this discipline. The league consists of 12 professional teams in Albania and is one of the oldest leagues in the Balkans, founded in 1946. This sport grew rapidly in Albania and around the 70s almost every city had its own basketball hall or court. Today in Albania there are 12 professional teams as well as a large amount of amateur teams, ready to enter the professional leagues [3]. The Albanian Basketball Cup is a competition that consists of the participation of professional basketball clubs in Albania and is the second most important event after the Albanian Basketball League. It was founded in 1951 by FSHB [4]. This league aims to realize the early idea for the development of the competitive activities of the clubs of both countries. The competition calendar of this league will be developed alongside the national leagues [5].

As in all sports, the development of basic motor skills in basketball is an important part of training practices. The development of basic motor skills is a prerequisite for sports success [6, 7]. Furthermore, the development of basic motor skills is known to facilitate technical-tactical application [8]. The purpose of a biomechanical analysis in sport is to evaluate a movement and also the respective technique performed.

### **Methodology**

Biomechanics in the field of sports is a method to improve athletic performance. With the greatest focus on young players, the basic elements of the technique were taken into consideration for the biomechanical analysis, which are: dribbling, passing, and shooting, which is used in the finalization of the attack action.

The ball should be dribbled no higher than the waist, hitting the floor only in front and to the side of the back foot. The index finger of dribbling hand should point in the direction you are facing. The entire hand should stay on the top half of the ball at all times [9]. In basketball, there are basically three types of passes: air pass, bounce pass and chest pass [9]. It is a technical element which is used in the finalization of the attack action, related to shooting. Usually in basketball two types of shots are used. Jump shot, starting with bent knees and the ball in front of the forehead, with legs and elbows directed to the basket; if the player shoot with the right hand, he keeps the right hand under the ball and the left hand on the side of the ball; jump performed straight - up; at the maximum point of the jump, the wrist is detached from the ball and pushed with the extension of the arm. This will send the ball up into the basket and the jump ends in the same place [10]. Shooting from the seat is used when the player takes the ball up in a shooting position, with an extension of the body, simultaneously extending the lower arm and closing the wrist [11]. Layup or three steps, if the dribble is performed with the right hand, then the stance will be on the right side of the court; the dribble and the movement towards the basket are performed at the same time; when the player reaches the three-point line, two are made long steps and the dribble stops; once the player has reached there, he tries to score a basket by throwing the ball into the upper corner of the board [12].

### **Results and Discussion**

In biomechanical analysis, positioning is closely related to stability. The horizontal localization of the center of gravity in relation to base of support affects all stability. In basketball, the importance of body size and body proportions, particularly in relation to height, wingspan and leg length, is well documented. Physical performance markers can be important indicators of competitive success in young players, and anthropometric traits are essential for talent identification and selection. Furthermore, there are other variables such as growth differences, basketball experience, training, and weight that may affect the physical performance of young players [13]. During the growth process, the relationship between anthropometric variables and physical performance has a higher level of complexity [14] and numerous differences may occur in the morphological growth and physiological

development of players. Therefore, in preadolescent players, differences in growth and development rates may be a confounding factor affecting performance and success [15]. It is well known that adolescent growth and biological maturity strongly influence physical performance. Early maturing young players often surpass their peers in muscle strength and endurance.

Athletes' ability differences affect learning and performance of motor tasks, but most are not easily observed. To be effective, a trainer must understand that each of them is as important as the easily observed physical characteristics and motor movements [16]. Achieving a high level of performance in sports results from a combination of many factors [17; 18], which are skill-related components include speed, agility, strength, balance, coordination and reaction time [19]. In addition, to these physiological features, the athlete must perfect these features through exercise [20]. Change of direction and agility maneuvers are multidimensional skills that require athletes to control individual components, such as: body position, muscle activation and force production. These are especially important physical qualities in basketball, as aggressive directional changes occur during a game when guards compete for positional advantage. Analysis of performance times during change of direction and agility protocols between elite and novice athletes [21, 22] and genders [23, 25, 25] suggests that elite male athletes produce a faster COD performance than female and novice athletes, respectively. This difference in performance becomes more apparent when combining perception and action during an agility movement, as the task becomes more sport-specific [26, 27, 28]. Sport performance depends on a combination of physical, functional and behavioral characteristics. In addition, biomechanics in the field of sports is a method to improve athletic performance. This is consistent with studies conducted that state that biomechanics is necessary for the implementation of athlete selection and performance in training.

## Conclusions

Participation in basketball requires athletes to optimize all contributing physical qualities to ensure that their best athletic efforts will occur consistently over time. The optimal development of each physical quality depends on the most favorable development of the previous physical quality. In relation to basketball performance, the quality of strength is important for the development of both the soft tissues of the body and the bony structures of the body. Increased strength levels also result in improved levels of muscle and joint stiffness. Stronger soft tissue and stronger bones also aid in the athletes ability to slow down and change direction, as well as prevent injury during practice and competition. The importance of a biomechanical analysis in sport is closely related to the movement and also the respective technique performed. The movement analysis, using a biomechanical approach is highly recommended to evaluate performance and the pathways leading to success.

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**A COMPARATIVE ANALYSIS OF THE THERMAL-MECHANICAL BEHAVIOUR OF  
COMPOSITE SLABS MADE WITH NORMAL WEIGHT CONCRETE AND  
LIGHTWEIGHT CONCRETE**

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**ABSTRACT**

Composite slabs are horizontal elements made by casting concrete on top of profiled steel sheeting, which acts as a permanent formwork and provides a safe working platform. This system is widely used in steel and composite buildings and requires fire resistance. This study investigates the thermal-mechanical behaviour of composite slabs made with both trapezoidal and re-entrant steel decks section. The load bearing capacity and the slab deflection is calculated by a hybrid method, which combines the analytical equations presented in Eurocodes and the Finite element thermal results obtained by Ansys. The phenomenon of the debonding between the steel deck and the concrete is taken into consideration by modelling a constant gap layer between them. This combination allows to compute both the resisting moment and the deflection of the slabs step by step.

The thermal and mechanical results were validated against the experimental and numerical results provided in the literature. The parametric study includes the normal weight concrete “NWC” and the lightweight concrete “LWC” as fill materials, for both steel decks re-entrant and trapezoidal, however the other parameters of the slab such as the height “h”, the size of the reinforcing rebar and the anti-crack mesh are kept constant at 130 mm, 12 mm and 6 mm respectively. Most of the thermal properties of the materials such as thermal conductivity, specific heat, and material density and the mechanical properties such as the strain-stress and the thermal elongation were dependent on the temperature rises in the materials.

The results found show that the load bearing capacity of the composite slab decreases with the increase of the fire exposure time for both concretes. This loss is estimated around 67% and 54% for trapezoidal slabs for NWC and LWC respectively and about 54% and 44% in case of re-entrant slabs. The deflection of the composite slab increases with the increase of the fire exposure time, this increase is estimated to be around 6.73 mm and 8.31 for trapezoidal slabs made with NWC and LWC respectively. For the re-entrant slabs made with NWC and LWC, this increase is less and it is estimated to be 3.55 mm and 5.43 mm respectively.

**Keywords:** composite slabs; lightweight concrete; Eurocode 4; numerical simulation; load bearing capacity; deflection.

**TECHNOLOGICAL PERSPECTIVE IN LEADERSHIP STRATEGIES FOR GLOBAL  
HIGHER EDUCATIONAL SUSTAINABILITY**

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**ABSTRACT**

In our technology-driven global world, the rapidly evolving landscape of global higher education faces an imperative for sustainable leadership strategies, with a pressing demand for technological integration. Sustainability in higher education itself is paramount, as it ensures the long-term viability and relevance of educational systems in addressing the needs of current and future generations. The urgency of the research presented lies in its potential to inform and guide educational leaders, policymakers, technology developers, community members, researchers, and students in fostering sustainable educational systems globally. The findings are derived from a comprehensive investigation into leadership strategies for global higher educational sustainability. Over 100 policymakers, educational leaders and administrators, as well as, stakeholders from Georgia, Armenia, Albania; Romania, Poland, Turkey, India were surveyed to explore the complex relationship between sustainable leadership and technology utilization. Surveyed policymakers (11 respondents) intensely emphasize the crucial role of leadership strategies in fostering educational sustainability, with a resounding call for equitable access to technology. Educational leaders (50 respondents) and administrators (33 respondents) emphasize the critical nature of technology in streamlining policy implementation and enhancing data-driven decision-making, identifying learning management systems and educational data analytics as essential tools. Stakeholders (29 respondents) advocate for providing financial support for technology initiatives and emphasize the pivotal importance of technology access and equity. Challenges such as resistance to change and balancing technology use with educational goals are acknowledged, with suggestions for establishing partnerships with technology providers and promoting awareness of the benefits of technology. The study results aim to assist stakeholders in making informed decisions, formulating policies, and driving technological innovation to ensure the long-term sustainability of higher educational systems.

**Keywords:** educational leadership and management, technology integration, global sustainability, higher education.

**INTRODUCTION**

In an era characterized by rapid technological advancement and globalization, the landscape of higher education is undergoing profound transformations. Educational institutions worldwide are grappling with the call to adapt to evolving societal needs, technological innovations, and environmental

challenges while striving to maintain relevance and sustainability. At the heart of this dynamic environment lies the crucial role of leadership in guiding institutions toward sustainable practices and outcomes.

The integration of technology into educational leadership strategies has emerged as a pivotal factor in navigating the complexities of contemporary higher education. Technology offers unprecedented opportunities to enhance teaching and learning, facilitate administrative processes, and foster collaboration across diverse stakeholders. However, harnessing the full potential of technology in educational contexts requires visionary leadership, strategic planning, and a nuanced understanding of the interchange between technological innovations and educational goals.

Against the stated backdrop, the article aims to explore the intersection of technological perspectives and leadership strategies in the pursuit of global higher educational sustainability. By examining the multifaceted relationship between leadership practices, technology integration, and sustainable outcomes, this research seeks to provide insights that inform policy, practice, and future research directions in the field of educational leadership and management.

The urgency of this research is underscored by the pressing need to address the complex challenges facing higher education systems worldwide. From widening access to education to promoting inclusive learning environments and fostering innovation, the stakes are high for educational leaders, policymakers, and stakeholders invested in the future of higher education. By exploring the experiences, perceptions, and strategies of diverse stakeholders, the study endeavors to contribute to the development of evidence-based approaches to leadership and technology integration for sustainable educational outcomes.

### LITERATURE REVIEW

Numerous studies have delved into the role of leadership in promoting sustainability within educational systems. For instance, Leithwood and Day (2007) conducted a meta-analysis of over 27,000 schools and found that transformational leadership, characterized by visionary goals and supportive relationships, was positively associated with student achievement and school effectiveness. Similarly, Fullan (2014) emphasized the importance of distributed leadership, where decision-making is shared among stakeholders, in fostering organizational learning and innovation for sustainability.

The integration of technology has emerged as a key driver of educational sustainability, enabling institutions to enhance teaching and learning processes, streamline administrative tasks, and improve access to education. Research by Zhao et al. (2002) highlighted the transformative potential of technology in promoting student-centered learning environments and empowering learners to develop critical thinking and problem-solving skills. Additionally, studies by Hew and Brush (2007) and Kadagidze, L. (2024) underlined the importance of effective technology integration frameworks and professional development programs for educators to maximize the benefits of technology in education.

Several technologies have been employed to promote sustainability in educational systems, including learning management systems (LMS), educational data analytics (EDA), and virtual reality (VR) tools. Learning management systems, such as Moodle and Blackboard, facilitate the creation and delivery of online courses, enabling institutions to expand access to education and support personalized learning experiences (Czerkawski & Lyman, 2016). Educational data analytics tools allow educators to analyze student performance data and identify areas for intervention and improvement, thereby enhancing educational outcomes and efficiency (Siemens & Long, 2011). Virtual reality tools offer immersive learning experiences, enabling students to explore complex concepts and environments in a safe and interactive manner (Dalgarno & Lee, 2010).

The relationship between leadership, technology, and educational sustainability is complex and multifaceted, with various studies exploring different aspects of this dynamic interplay. For example, Avolio et al. (2009), Kadagidze, L. (2014; 2017) found that transformational leadership behaviors were positively associated with the use of technology for instructional purposes and student engagement. Similarly, Penuel et al. (2009) examined the role of distributed leadership in facilitating

technology integration initiatives in schools, highlighting the importance of collaborative decision-making and shared responsibility among stakeholders.

To sum up, the literature suggests that effective leadership strategies, informed by a deep understanding of technology integration frameworks and supported by robust professional development programs, are essential for promoting sustainability in educational systems. By supporting key technologies and fostering a culture of innovation and collaboration, educational leaders can drive meaningful change and create inclusive learning environments that prepare students for success in the digital age.

### **THEORETICAL FRAMEWORK**

In developing a theoretical framework that encompasses both sustainable leadership and the integration of technology in education, one prominent model that emerges is the Transformational Leadership Theory (TLT) augmented by the Technological Pedagogical Content Knowledge (TPACK) framework.

By integrating TLT and TPACK, the theoretical framework for this study bridges the gap between leadership theory and technology integration in education. TLT provides insights into the leadership behaviors and practices that promote sustainability and innovation within educational institutions, while TPACK offers a pedagogical framework for utilizing technology to support teaching and learning processes.

This integrated framework guides the exploration of leadership strategies in a technologically enhanced educational landscape by:

1. Examining how transformational leadership behaviors, such as visionary goal-setting and supportive relationships, influence the adoption and implementation of technology in higher educational settings.
2. Investigating how leaders can cultivate a culture of innovation and collaboration, exploiting technology to enhance pedagogical practices and support student-centered learning environments.
3. Exploring the role of educational leaders in providing strategic direction and resources for technology integration initiatives, ensuring alignment with institutional goals and educational objectives.
4. Identifying the knowledge, skills, and competencies required for educational leaders to effectively maximizing technology for sustainable educational outcomes, including digital literacy, data-driven decision-making, and technology management.

In summary, the theoretical framework integrates insights from transformational leadership theory and the TPACK framework to inform the exploration of leadership strategies in a technologically enhanced educational landscape, offering a holistic perspective on the intersection of leadership, technology, and educational sustainability.

### **RESEARCH METHODOLOGY**

The study employed a mixed-methods research design to comprehensively investigate leadership strategies for global higher educational sustainability, with a specific emphasis on the integration of technology. The rationale for employing a mixed-methods approach stemmed from the sophisticated relationship between leadership practices and technological integration, necessitating both qualitative insights and quantitative trends for a holistic understanding.

## **Qualitative Data Collection**

Qualitative data were collected through global semi-structured interviews involving educational leaders, policymakers, and stakeholders from diverse geographical regions. Purposive sampling was employed to ensure a comprehensive exploration of leadership strategies, with snowball sampling facilitating the inclusion of additional relevant stakeholders. Thematic analysis was applied to the qualitative data, enabling the identification of patterns and themes related to leadership practices and the integration of technology. Rigor was enhanced through member checking and inter-coder reliability.

## **Quantitative Data Collection**

Structured online surveys were distributed globally to a stratified sample of educational leaders and administrators to collect quantitative data. Stratified sampling categorized participants based on geographical regions, institutional types, and levels of technological integration, ensuring representation and facilitating subgroup analysis. Statistical analyses, including descriptive statistics, correlations, and regression analyses, were applied to the quantitative survey data to identify trends and relationships between leadership practices, technology use, and sustainable outcomes.

## **Data Analysis**

Qualitative data analysis involved thematic analysis, where patterns and themes related to leadership strategies and technology integration were identified from the semi-structured interviews. This process included coding of interview transcripts, identifying recurring themes, and analyzing relationships between different themes. Quantitative data analysis entailed descriptive statistics to summarize survey responses and inferential statistics to examine relationships between variables. Correlation analysis was used to explore associations between leadership practices, technology utilization, and educational sustainability, while regression analysis helped identify predictors of sustainable outcomes.

## **Ethical Considerations**

Ethical considerations were principal throughout the research process. Informed consent was obtained from interviewees and survey respondents, and measures were implemented to safeguard the confidentiality of participant identities and data. The research design emphasized transparency and ethical conduct.

## **Limitations**

The study acknowledges potential limitations, including biases in self-reported data and the inability to conduct on-site case studies. Despite these limitations, the mixed-methods approach, triangulation of data, and methodical sampling strategies aim to contribute valuable insights into the complex relationship between leadership, technology, and the sustainability of higher educational systems on a global scale.

## **RESULTS**

### **Interpretation of Findings**

The findings of the study offer subtle insights into the perceptions and experiences of participants across various categories, shedding light on their perspectives on leadership strategies and technology integration for educational sustainability.

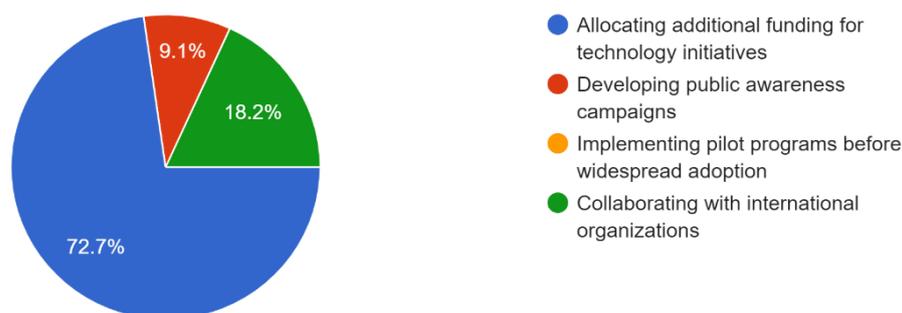
## Policymakers:

- **Participants:** 11 respondents.
- **Perceptions:** The majority of policymakers (63.6%) expressed a strongly positive perception of the influence of leadership strategies on the sustainable development of educational systems. A substantial portion (36.4%) held a somewhat positive view.
- **Integrating Technology:** Policymakers overwhelmingly supported policies for equitable access to technology (63.6%), while a notable minority (36.4%) encouraged technology integration in curriculum design.
- **Challenges and Solutions:** All policymakers identified limited financial resources as a significant challenge. The majority (72.7%) suggested allocating additional funding for technology initiatives, with a smaller percentage recommending collaboration with organizations (18.2%) and developing public awareness campaigns (9.1%) (See Figure 1).

**Figure 1.**

Can you suggest potential solutions or best practices to overcome these challenges?

11 responses



- **Impact of Technology:** Policymakers identified educational data analytics (54.5%) and virtual learning environments (45.5%) as technologies with a significant impact on educational sustainability.

## Stakeholders:

- **Participants:** 29 respondents.
- **Qualities of Educational Leaders:** The majority of stakeholders (62.1%) emphasized the importance of educational leaders possessing adaptability to technological changes and strong communication skills.

Figure 2.

What challenges do you anticipate in implementing sustainable leadership strategies with a focus on technology integration?

29 responses



- **Collaboration with Leaders:** Stakeholders primarily advocated for providing financial support for technology initiatives (62.1%) and promoting awareness of technology benefits (27.6%) to collaborate with leaders for sustainable educational outcomes.
- **Challenges and Solutions:** Stakeholders identified challenges such as limited financial resources (44.8%) and resistance to change from stakeholders (41.4%). They suggested solutions like establishing partnerships with technology providers (55.2%) and promoting awareness of technology benefits (44.8%) (See Figure 2).
- **Impact of Technology:** Stakeholders highlighted the significance of learning management systems (65.5%) and virtual learning environments (34.5%) in enhancing educational sustainability.

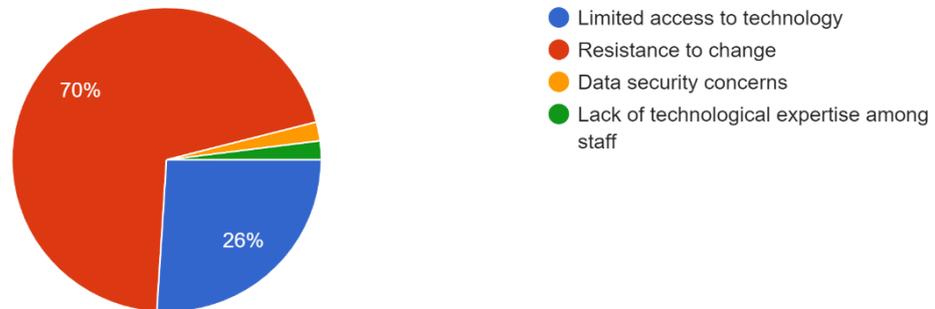
#### Educational Leaders:

- **Participants:** 50 respondents.
- **Leadership Style:** A majority of educational leaders described their leadership style as adaptive (60%), with a significant minority identifying as transformational (40%).
- **Role of Technology:** Educational leaders emphasized technology's role in facilitating communication and collaboration (80%), with a smaller percentage highlighting its role in enhancing data-driven decision-making (20%).
- **Challenges and Solutions:** The predominant challenges identified by educational leaders were resistance to change (70%) and limited access to technology (26%). Proposed solutions included establishing clear communication channels (40%), providing professional development for staff (40%), and implementing robust cybersecurity measures (20%) (See Figure 3 and Figure 4).
- **Impact of Technology:** Educational leaders recognized the significance of learning management systems (80%) and artificial intelligence applications (20%) in promoting educational sustainability.

**Figure 3.**

What challenges do you anticipate in implementing sustainable leadership strategies with a focus on technology integration?

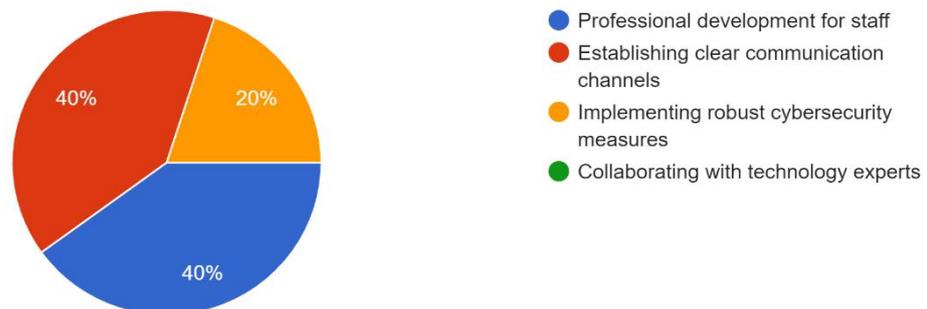
50 responses



**Figure 4.**

Can you suggest potential solutions or best practices to overcome these challenges?

50 responses



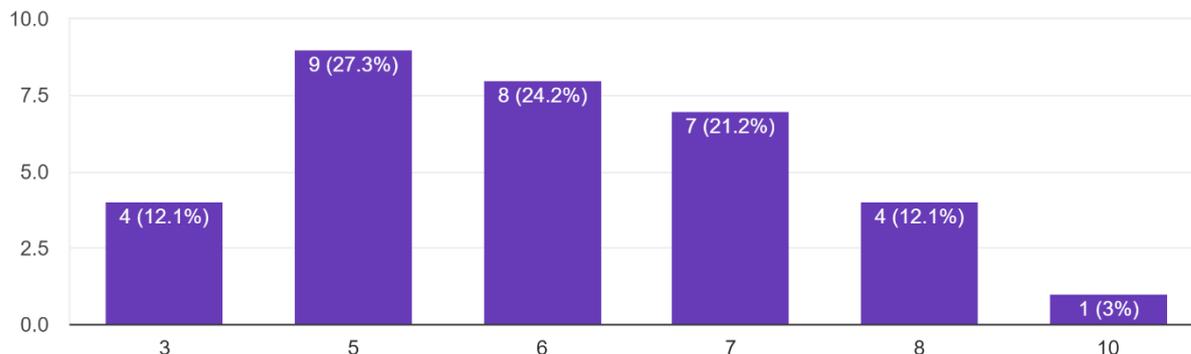
**Educational Administrators:**

- **Participants:** 33 respondents from Georgia, Armenia, Albania; Romania, Poland, Turkey, India.
- **Level of Technology Integration:** Participants rated the level of technology integration in their educational institutions, with varying percentages across different rating scales (See Figure 5).

**Figure 5**

On a scale of 1 to 10, how would you rate the level of technology integration in your educational institution?

33 responses



- Challenges and Solutions:** Participants identified limited financial resources as the primary obstacle to implementing sustainable practices. Proposed solutions included providing cost-effective sustainable solutions, facilitating communication and awareness campaigns, and offering affordable access to sustainable technologies.
- Integration of Technology:** Participants suggested measures such as creating incentives for technology adoption in leadership practices to improve the integration of technology into leadership strategies for educational sustainability See Figure 6 and Figure 7).

Figure 6.

How can technology help overcome these barriers?

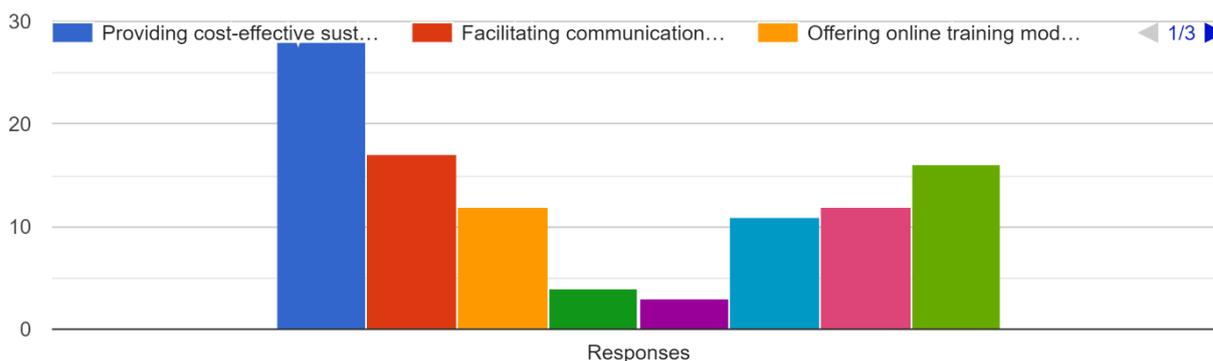
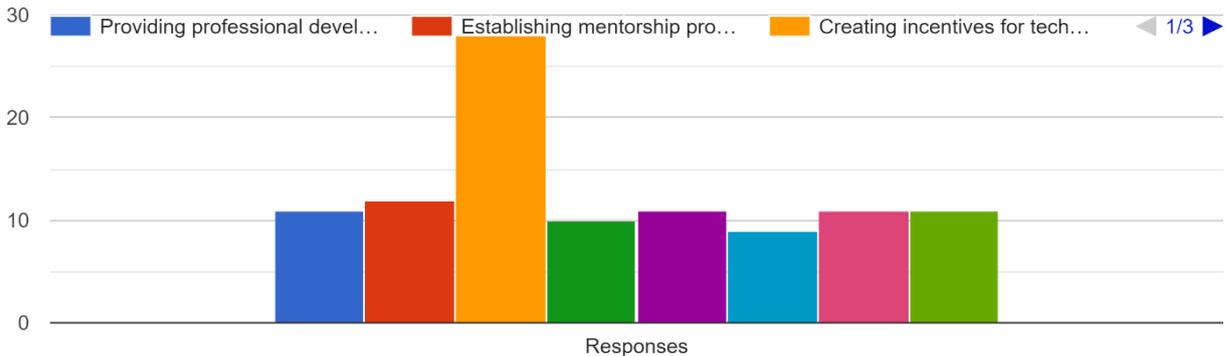


Figure 7.

In your opinion, what measures can be taken to improve the integration of technology into leadership strategies for educational sustainability?



### Results of Semi-structured Interviews

The semi-structured interviews conducted as part of the study provided rich qualitative data on participants' perspectives regarding leadership strategies and the integration of technology for educational sustainability. The key themes and insights derived from the interviews are as follows:

#### 1. Leadership Strategies:

- Participants emphasized the importance of adaptive leadership in handling the complexities of educational sustainability in a rapidly changing world.
- Transformative leadership approaches were also highlighted, particularly in driving innovation and fostering a culture of continuous improvement within educational institutions.

#### 2. Technology Integration:

- Technology was universally recognized as a critical enabler of educational sustainability, with participants highlighting its role in enhancing communication, collaboration, and decision-making processes.
- The integration of technology into curriculum design was seen as essential for preparing students for the digital age and fostering future-ready skills.

#### 3. Challenges and Solutions:

- Limited financial resources emerged as a prevalent challenge across interviews, hindering the implementation of sustainable leadership strategies and technology initiatives.
- Participants proposed various solutions, including seeking external funding, fostering partnerships with technology providers, and advocating for greater investment in education at the policymaker level.

#### 4. Impact of Technology:

- Educational leaders and stakeholders discussed the transformative impact of technologies such as learning management systems and data analytics on educational practices and outcomes.
- Virtual learning environments were identified as particularly beneficial for expanding access to education and supporting remote learning initiatives.

#### 5. Leadership Styles:

- Participants described a range of leadership styles, including participative, collaborative, and visionary approaches, each with its own strengths in promoting educational sustainability.
- The importance of leadership flexibility and adaptability in responding to emerging challenges and opportunities was consistently emphasized.

### 6. **Future Directions:**

- Interviewees expressed optimism about the potential of technology to drive positive change in education, but also highlighted the need for ongoing research, collaboration, and professional development to maximize its benefits.
- There was a consensus on the need for a strategic approach to technology integration, informed by evidence-based practices and guided by a shared vision of sustainable educational outcomes.

### **Summary**

The findings of the study provide valuable insights into the perceptions and experiences of policymakers, educational leaders, stakeholders, and respondents from universities in various countries regarding leadership strategies and technology integration for educational sustainability.

- **Policymakers:** Policymakers urgently underline the crucial role of leadership strategies in fostering educational sustainability, emphasizing equitable access to technology. They advocate for additional funding for technology initiatives and collaboration with organizations to overcome challenges such as limited financial resources.
- **Stakeholders:** Stakeholders highlight the importance of educational leaders possessing adaptability to technological changes and strong communication skills. They advocate for providing financial support for technology initiatives and promoting awareness of the benefits of technology to integrate it for sustainable educational outcomes.
- **Educational Leaders:** Educational leaders predominantly describe their leadership style as adaptive, highlighting the role of technology in facilitating communication and collaboration. They identify challenges such as resistance to change and suggest solutions like establishing clear communication channels and professional development for staff.
- **Educational Administrators:** University respondents rate the level of technology integration in their institutions and identify obstacles such as limited financial resources. They propose solutions such as providing cost-effective sustainable solutions and facilitating communication and awareness campaigns to overcome these barriers.

### **DISCUSSION**

The findings of the study align with existing literature on the importance of leadership in promoting educational sustainability. The intensely positive perceptions of policymakers, stakeholders, and educational leaders regarding the influence of leadership strategies underscore the pivotal role of effective leadership in driving sustainable development within educational systems. The emphasis on technology integration as a means to enhance educational sustainability resonates with previous research highlighting the transformative potential of technology in education.

**Implications for Educational Leadership and Policy:** The findings have several implications for educational leadership and policy. Firstly, the recognition of the critical role of leadership strategies in fostering educational sustainability emphasizes the need for investment in leadership development programs and initiatives. Educational leaders must possess the skills and competencies required to adapt to technological advancements and effectively exploit technology to support sustainable educational practices. Policymakers play a crucial role in shaping the educational landscape by formulating policies that support equitable access to technology and provide resources for technology

initiatives. Moreover, the emphasis on data-driven decision-making highlights the importance of investing in educational data analytics to inform policy formulation and implementation.

**Challenges and Considerations Related to Ethical Use of Technology:** While technology offers numerous opportunities for enhancing educational sustainability, it also presents challenges and considerations related to its ethical use. One of the primary challenges is ensuring equitable access to technology, particularly in economically challenged communities. Additionally, there is a need to address concerns regarding data privacy and security to ensure the ethical use of educational data analytics. Educational leaders must address these ethical considerations by implementing strong policies and practices that safeguard the privacy and security of student data while maximizing the benefits of technology for educational outcomes.

Finally, the findings of this study emphasize the importance of sustainable leadership practices and technology integration in shaping the future of education. By addressing these implications and challenges, educational stakeholders can work towards building resilient and future-ready educational systems that meet the needs of diverse learners in a rapidly evolving world.

### CONCLUSION

In conclusion, the study has provided valuable insights into the complex relationship between technology and sustainable leadership in the context of global higher education. The findings highlight the integrated technological fabric and leadership strategies, emphasizing the critical role of technology integration in fostering educational sustainability.

Key findings from the study reinforce the importance of effective leadership practices in driving sustainable development within educational systems. Policymakers, educational leaders, stakeholders, and respondents from universities expressed enormously positive perceptions of the influence of leadership strategies on educational sustainability. The emphasis on technology integration, data-driven decision-making, and equitable access to technology reflects the recognition of technology as a catalyst for sustainable educational outcomes.

It is evident that embracing technology in leadership strategies is essential for addressing the challenges and opportunities presented by the rapidly evolving landscape of global higher education. By capitalizing on technology effectively, educational leaders can streamline policy implementation, enhance communication and collaboration, and empower data-driven decision-making to support sustainable educational practices.

Looking ahead, future research at the intersection of technology and educational leadership for sustainability holds great promise. Further investigation into the specific mechanisms through which technology influences leadership practices and educational outcomes is authorized. Additionally, exploring innovative approaches to address challenges related to the ethical use of technology and promoting digital literacy among educational stakeholders will be crucial for advancing sustainable educational systems globally.

In summary, this study contributes to our understanding of the importance of technology in leadership strategies for global educational sustainability. By embracing technology and adopting evidence-based leadership practices, educational stakeholders can work towards building resilient, future-ready educational systems that meet the needs of diverse learners in the 21st century.

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## APPENDIX:

### Global Semi-Structured Interviews:

Participants:

#### 1. Educational Leaders:

How would you describe your leadership style in the context of promoting educational sustainability?

- a. Transformational
- b. Servant leadership
- c. Distributed leadership
- d. Adaptive leadership
- e. Other (please specify): \_\_\_\_\_

In your experience, what role does technology play in shaping leadership strategies for global educational sustainability?

- a. Facilitating communication and collaboration
- b. Enhancing data-driven decision-making
- c. Improving resource efficiency
- d. Fostering innovation in teaching and learning
- e. Other (please specify): \_\_\_\_\_

What challenges do you anticipate in implementing sustainable leadership strategies with a focus on technology integration?

- a. Limited access to technology
- b. Resistance to change
- c. Data security concerns
- d. Lack of technological expertise among staff
- e. Other (please specify): \_\_\_\_\_

Can you suggest potential solutions or best practices to overcome these challenges?

- a. Professional development for staff
- b. Establishing clear communication channels
- c. Implementing robust cybersecurity measures
- d. Collaborating with technology experts
- e. Other (please specify): \_\_\_\_\_

How has technology influenced your decision-making processes in educational leadership?

- a. Streamlining administrative tasks
- b. Providing data for evidence-based decision-making
- c. Enhancing communication with stakeholders
- d. Enabling quicker response to educational challenges
- e. Other (please specify): \_\_\_\_\_

Are there specific technologies you believe have a significant impact on educational sustainability?

- a. Learning Management Systems (LMS)
- b. Artificial Intelligence (AI) applications
- c. Online collaboration tools
- d. Renewable energy technologies
- e. Other (please specify): \_\_\_\_\_

2. **Policymakers:**

How do you perceive the influence of leadership strategies on the sustainable development of educational systems?

- a. Strongly positive
- b. Somewhat positive
- c. Neutral
- d. Somewhat negative
- e. Strongly negative

From a policy perspective, how can technology be leveraged to enhance educational sustainability globally?

- a. Implementing technology infrastructure projects
- b. Formulating policies for equitable access to technology
- c. Encouraging technology integration in curriculum design
- d. Establishing data privacy and security regulations
- e. Other (please specify): \_\_\_\_\_

What challenges do you anticipate in implementing sustainable leadership strategies with a focus on technology integration?

- a. Limited financial resources
- b. Resistance to policy changes
- c. Addressing disparities in technology access
- d. Balancing technology use with educational goals
- e. Other (please specify): \_\_\_\_\_

Can you suggest potential solutions or best practices to overcome these challenges?

- a. Allocating additional funding for technology initiatives
- b. Developing public awareness campaigns
- c. Implementing pilot programs before widespread adoption
- d. Collaborating with international organizations
- e. Other (please specify): \_\_\_\_\_

How has technology influenced your decision-making processes in educational leadership?

- a. Streamlining policy implementation
- b. Facilitating data-driven policymaking
- c. Enhancing communication with stakeholders
- d. Responding more efficiently to educational challenges
- e. Other (please specify): \_\_\_\_\_

Are there specific technologies you believe have a significant impact on educational sustainability?

- a. Educational data analytics
- b. Open educational resources (OER)
- c. Virtual learning environments
- d. Sustainable energy solutions for schools
- e. Other (please specify): \_\_\_\_\_

3. **Stakeholders:**

In your opinion, what qualities should educational leaders possess to effectively contribute to global educational sustainability?

- a. Visionary leadership
- b. Collaborative and inclusive decision-making
- c. Strong communication skills
- d. Adaptability to technological changes
- e. Other (please specify): \_\_\_\_\_

How can stakeholders collaborate with leaders to integrate technology for sustainable educational outcomes?

- a. Providing financial support for technology initiatives
- b. Participating in decision-making forums
- c. Advocating for technology access and equity
- d. Offering expertise in technology implementation
- e. Other (please specify): \_\_\_\_\_

What challenges do you anticipate in implementing sustainable leadership strategies with a focus on technology integration?

- a. Limited financial resources
- b. Resistance to change from stakeholders
- c. Addressing disparities in technology access
- d. Balancing technology use with educational goals
- e. Other (please specify): \_\_\_\_\_

Can you suggest potential solutions or best practices to overcome these challenges?

- a. Engaging stakeholders in technology planning
- b. Establishing partnerships with technology providers
- c. Conducting regular training for stakeholders
- d. Promoting awareness of the benefits of technology

e. Other (please specify): \_\_\_\_\_

How has technology influenced your decision-making processes in educational leadership?

a. Streamlining decision-making through technology tools

b. Enhancing communication with leaders

c. Improving stakeholder engagement in decision-making

d. Enabling quicker response to educational challenges

e. Other (please specify): \_\_\_\_\_

Are there specific technologies you believe have a significant impact on educational sustainability?

a. Learning Management Systems (LMS)

b. Open educational resources (OER)

c. Virtual learning environments

d. Sustainable energy solutions for schools

e. Other (please specify): \_\_\_\_\_

**Online Surveys:**

Demographic Questions:

1. **Geographical Information:**

- What region/country are you currently based in?
- What type of educational institution do you represent (e.g., school, university)?

2. **Technology Integration:**

- On a scale of 1 to 10, how would you rate the level of technology integration in your educational institution?
- Which specific technologies does your institution currently use to enhance educational sustainability?

Learning Management Systems (LMS)

Online collaborative tools (e.g., Google Workspace, Microsoft Teams)

Virtual Learning Environments (VLE)

Open Educational Resources (OER)

E-learning platforms and modules

Educational data analytics tools

Sustainable energy solutions for educational facilities

Mobile learning applications

Interactive whiteboards and smart classroom technologies

Video conferencing tools for remote learning

3D printing technologies for educational resources

Gamification and educational gaming platforms

Augmented Reality (AR) and Virtual Reality (VR) applications

Renewable energy sources (solar panels, wind turbines) for powering educational facilities

Online assessment and automated grading systems

Likert Scale Questions:

3. **Leadership Practices:**

- Please rate the effectiveness of leadership practices in your institution in promoting educational sustainability.
- To what extent do you believe sustainable leadership is crucial for the long-term success of educational institutions?

4. **Technology Utilization:**

- Rate the level of technology utilization for teaching and administrative purposes in your institution.
- How confident are you in the ability of technology to contribute to the sustainability of educational practices?

Open-ended Questions:

5. **Barriers to Sustainability:**

- What obstacles, if any, do you perceive in implementing sustainable practices in your educational institution?
- How can technology help overcome these barriers?

6. **Suggestions for Improvement:**

- In your opinion, what measures can be taken to improve the integration of technology into leadership strategies for educational sustainability?

**What obstacles, if any, do you perceive in implementing sustainable practices in your educational institution?**

1. Limited financial resources
2. Resistance to change from staff
3. Insufficient training for educators
4. Lack of awareness about sustainable practices
5. Inadequate support from stakeholders
6. Difficulty in measuring the impact of sustainability efforts
7. Absence of clear sustainability policies
8. Challenges in incorporating sustainability into the curriculum
9. Limited access to sustainable technologies
10. Other (please specify): \_\_\_\_\_

**How can technology help overcome these barriers?**

1. Providing cost-effective sustainable solutions
2. Facilitating communication and awareness campaigns
3. Offering online training modules for educators
4. Implementing data analytics for measuring sustainability impact

5. Enhancing stakeholder engagement through technology platforms
6. Supporting the development of clear sustainability policies
7. Integrating sustainability content into digital learning resources
8. Offering affordable access to sustainable technologies
9. Other (please specify): \_\_\_\_\_

**In your opinion, what measures can be taken to improve the integration of technology into leadership strategies for educational sustainability?**

1. Providing professional development for educational leaders
2. Establishing mentorship programs for technology integration
3. Creating incentives for technology adoption in leadership practices
4. Developing clear guidelines for technology use in leadership strategies
5. Fostering collaboration between educational leaders and technology experts
6. Conducting regular assessments of technology integration efforts
7. Incorporating technology considerations into leadership training programs
8. Recognizing and celebrating successful technology integration initiatives
9. Other (please specify): \_\_\_\_\_

**SHIFT WORK AND NURSES' HEALTH**

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**ABSTRACT**

Nursing can involve rotating shifts to ensure continuity of care. However, shift work and the resulting desynchronization of circadian rhythms may have adverse effects on nurses' health. The present study

aimed to describe the effects of shift work on nurse's health. A cross-sectional study was conducted on nurses working in two University Hospitals in Sfax- Tunisia. Validated self-reporting instruments were used: the Spiegel Scale to assess the quality of sleep, the Epworth Sleepiness Scale, and the General Health Questionnaire (GHQ 12). A total of 79 nurses responded to our survey. The mean age was  $36.5 \pm 6.8$  years. The sex ratio was 0.7. Rotating shift work was noted in 60.6 % of cases. The mean score of GHQ-12 was  $4.7 \pm 3.5$ . Psychological distress was noted among 28 % of respondents. Among the nurses studied, 25 respondents (31%) reported having one or more chronic diseases, 22% had a sleep disorder and 19% had a risk of sleepiness according to the Spiegel Scale and the Epworth scale. Statistical analysis has shown that shift work was associated with psychological distress ( $p=0.000$ ), sleep disorders ( $p = 0.003$ ), and diabetes ( $p = 0.001$ ). Shift work encompasses several risks for nursing staff, leading to psychological and physiological problems and decreased quality of work. Preventive and supportive measures for this professional group are needed.

**KEYWORDS:** Sleep quality, Mental health, Nurses, Shift work.

## **INTRODUCTION:**

Diversifying work hours has become one of the most effective tools for businesses to guarantee service availability. It concerns several sectors of activity such as transportation, security, and health care (1). Recent American and European surveys reported that between 15% and 30% of adult workers were working non-standard hours (2). Shift work and especially night shift work present health risks, as they interfere with the four spheres of human life: Basic biological functions, work performance, social relationships, and health (3). Numerous epidemiological studies have documented the various consequences of these atypical working hours on health (4–6), socio-family life, and quality of work (7).

Shift work is often associated with decreased sleep duration, leading to chronic sleep deficit (reduction of 1 to 2 hours of sleep per day). Daytime sleep tends to be of lower quality (shorter, disturbed by external factors) and therefore less restorative. Sleep disorders manifest as drowsiness and decreased vigilance (8).

The international classification established by the American Academy of Sleep Medicine defines sleep disorders caused by shift work as "Shift Work Sleep Disorder (SWSD)", which are resulting from the conflict between the circadian rhythm-driven sleep-wake cycle and the desired or required work schedule(9). On the other hand, the effects on mental health (depression, anxiety, irritability), cognitive performance, mood, and personality disorders are frequently reported by shift workers. These effects are caused by the circadian system disruption, sleep deprivation, and psychosocial risk factors associated with shift work organization(8).

Our study aimed to determine the effects of shift work on sleep, alertness, and mental health among nurses in two university hospitals in Sfax, Tunisia.

## **RELATED WORKS:**

In the literature, the topic of night shift work among nurses has consistently been addressed to detect its effects on both mental and physical health. A meta-analysis conducted in China by Chang and Col found that nurses working fixed night shifts experienced poorer sleep quality compared to those on fixed day shifts, regardless of age. The human body is naturally inclined to sleep at night, making chronic sleep deprivation particularly challenging for those consistently working during these hours. However, rotating shift workers have the advantage of transitioning to day or evening shifts, allowing them to catch up on sleep during the night. This flexibility reduces chronic sleep deprivation (10).

Another Chinese cohort study sheds light on the impact of night shift frequency and workload on both sleep disorders and metabolic risk among nurses. These findings underlined the importance of early intervention to prevent chronic metabolic diseases like cardiovascular disease, obesity, and diabetes. So they proposed to prioritize strategies aimed at ameliorating the sleep quality of nurses working night shifts, optimizing work schedules, and consistently monitoring metabolic risk factors (11).

According to DiMuzio and Col (12), medical errors rank as a leading cause of death; These errors are multifaceted, often involving factors such as sleepiness and impaired sustained attention. So, to reduce deaths from medical errors, a less disruptive shift-work schedule should be considered

A meta-analysis conducted by Torquati and Col (13) suggests a concerning association between shift work and negative mental health outcomes. Shift workers are more likely to experience a range of adverse mental health effects compared to individuals with traditional work schedules. A particular concern is the elevated risk of depressive symptoms among shift workers, which was found to be 33% higher than in those with regular work hours. This highlights the potential psychological distress of shift workers and emphasizes the importance of addressing mental health concerns in this population.

### **MATERIEL AND METHODS:**

This was a cross-sectional, comparative, and descriptive study.

#### **Population:**

The study included a sample of nurses from two hospitals in Sfax. The working hours were from 7:00 AM to 1:00 PM, 1:00 PM to 7:00 PM, and 7:00 PM to 7:00 AM for respectively morning, afternoon, and night shifts.

The exclusion criteria were as follows:

- Personal or family history of sleep disorders.
- Consumption of drugs known to interfere with sleep.
- Pregnant or lactating women.
- Having a second job.

#### **Ethical aspects of the survey:**

Before conducting the survey, it was essential to inform the personnel about the study's objectives and obtain their informed consent. Personal data will not be disclosed and questionnaire responses will be collected anonymously.

#### **Data collection:**

The data was collected through a questionnaire covering the following elements:

- Socio-professional data (age, gender, place of practice, professional seniority)
- Exploration of vigilance using the Epworth Sleepiness Scale (no risk of sleepiness if total score < 10, moderate risk of sleepiness if total score between 11 and 15, and high risk of sleepiness if total score > 15)
- Assessment of sleep quality using the Spiegel questionnaire with a score ranging from 0 to 30. The higher the score is, the better is the sleep quality. A score < 18 indicates sleep disturbances, and if it's < 15, it indicates severe alertness issues.
- Study of psychological distress factors and social dysfunction using the 12-item General Health Questionnaire <GHQ-12> (10). A score of 2 or higher indicates a psychiatric disorder.

The questionnaire was completed by the investigating physician to ensure the understanding of the questions and to guarantee a response to the entire questionnaire.

#### **Statistical Analysis**

Statistical analysis was conducted using SPSS version 20. Associations between variables were examined using hypothesis tests. Proportion comparisons were performed using the chi-square test. The significance level was set at 5%, allowing the elimination of non-statistically related descriptive variables from the dependent variables (chi-square test > 0.05). Results are presented as percentages or means  $\pm$  standard deviation.

## RESULTS

### Sociodemographic characteristics of the population:

A total of 79 nurses participated in the survey. The average age in our population was  $36.5 \pm 6.8$  years. A predominance of females was noted, with a sex ratio of 0.7.

The majority were assigned to medical services (38%). Personnel from surgical services and intensive care units represented 30.4% and 31.6% respectively. The majority of personnel had alternating shift work (60.7%) with an average of  $2 \pm 1$  shifts per week. Fixed daytime or nighttime work represented 12.7% and 26.6%, respectively (Table I).

**Table I:** Sociodemographic data of the study population

	Number (N)	Percentage (%)
<b>Gender</b>		
Female	47	59.5
Male	32	40.5
<b>Assignment department</b>		
Medical	30	38
Surgical	24	30.4
Intensive care	25	31.6
<b>Work schedule</b>		
Shift work	48	60.7
Fixed daytime	10	12.7
Fixed nighttime	21	26.6

### Health status and lifestyle of the population:

Most personnel (68.4%) had no prior medical history. The most commonly found medical histories were diabetes (10.12%) and cardiovascular diseases (8.8%).

Regarding lifestyle habits in our population, we observed alcohol and tobacco consumption (21.3%), as well as the abuse of certain stimulants (coffee, tea...) (23.1%) The practice of taking naps (43.1%) and engaging in physical activity (10%). The consumption of stimulants was higher among night shift workers ( $P = 0.00$ )

Statistical analysis has shown that shift work was associated with diabetes ( $p=0.001$ ).

### Alertness and sleep disorders:

The average sleep duration was  $6.8 \pm 3.2$  hours. The overall score of the sleep quality index (Spigel score) was satisfactory for the majority of the personnel (77.2%). However, 15.2% of the personnel had a sleep disorder, while 7.6% had severe alertness issues (Table II).

The multivariate analysis concluded that sleep quality impairment was more frequent in shift work (0.003)

For the Epworth Sleepiness Scale, 15 nurses (19%) had a risk of daytime sleepiness (score above 10), with a risk of excessive daytime sleepiness in 5% of the personnel (Table II).

**Mental health assessment:**

The average GHQ-12 score was  $4.7 \pm 3.5$ . twenty-two nurses (28%) had psychological distress and social dysfunction factors (Table II).

Statistical analysis has shown that shift work was associated with psychological distress ( $p=0.000$ ).

**Table II:** Sleep quality, Daytime Sleepiness, and psychological distress in Our Population

	N	%
<b>Spiegel scale</b>		
Good sleep quality	61	77.2
Sleep disturbance	12	15.2
Severe alertness issue	6	17.6
<b>Epworth scale</b>		
No risk of sleepiness	64	81
Moderate risk of sleepiness	11	14
High risk of sleepiness	4	5
<b>General health questionnaire:</b>		
<b>Psychological distress</b>		
Absent	57	72
Present	22	28

**DISCUSSION**

In the present study, we noted that shift work was associated with psychological distress and sleep disorders. These results were consistent with those of Matheson et al., in which shift work had multiple implications for the physical and psychological health as well as the sleep quality of healthcare personnel (14).

**Irregular working hours and sleep disorders**

A person sleeps better at night and functions better during the day (15). Nevertheless, during work on irregular schedules, workers often complain about a reduction in the quality and duration of sleep. Indeed, the night or shift worker’s sleep was on average shortened by 1 to 4 hours compared to the sleep of day workers (16).

Night work and rotating shifts are chronic situations of conflict between the internal clock and environmental and social synchronizers known as shift work intolerance or "shift work sleep disorder (SWSD)" (17). The diagnostic criteria for SWSD, as defined by the American Academy of Sleep Medicine (AASM) in the International Classification of Sleep Disorders-2 (ICSD-2) include:

- Complaints of insomnia or excessive daytime sleepiness temporally associated with recurrent work schedules interfering with habitual sleep times,
- Symptoms are associated with shift work for at least one month,
- Sleep diary or actigraphy for at least 7 days shows the mismatch between sleep timing and circadian periodicity,

- Sleep problems are not better explained by another sleep disorder or another mental disorder and are not related to the direct physiological effects of a substance or a general medical condition (9).

In Drake's study, 32.1% of night workers and 26% of shift workers exhibited symptoms corresponding to the diagnostic criteria of SWSD, but these percentages must be considered with the prevalence of these symptoms in the general population, which is estimated at 18% (18). However, studies using the formal criteria of SWSD symptoms remain infrequent (19).

Thus, several studies have highlighted the importance of interindividual variations in circadian dysrhythmia related to shift work (20). Consequently, the capacity to adapt to imposed schedules varies greatly from one individual to another. Numerous studies have demonstrated the existence of key determinants in the phenomenon of tolerance to shift work, such as gene-environment interactions (extraordinary adaptation abilities are largely genetically determined), chronotype (evening person/morning person), and the light-dark cycle (21–23). On the other hand, circadian misalignment between the wake/sleep cycle and the endogenous circadian pacemaker, observed in some shift workers, leads to multiple hormonal and metabolic disruptions that could modulate vulnerability to acute or chronic diseases (24).

As a result, shift work has been associated with several pathologies such as cardiovascular diseases, strokes, metabolic syndrome, diabetes, and cancer (24–26)

Regarding preventive measures, several non-pharmacological interventions have been suggested, such as light therapy, napping, and regular endurance physical activity. However, it is difficult to determine the effectiveness of these strategies, and sometimes they need to be used in synergy (27). Additionally, Costa G postulated that clockwise rotations (morning/afternoon/night), short rotations (less than 4 days), and the implementation of compensatory measures (Taking breaks, maintaining a balanced diet...) could be more beneficial (28).

### **Irregular working hours and mental health**

The World Health Organization (WHO) defines mental health as " a state of mental well-being that enables people to cope with the stresses of life, realize their abilities, learn well and work well, and contribute to their community" (29). In this positive sense, mental health is the foundation of an individual's well-being and the proper functioning of a community. So, mental health is a social issue and results from the adaptation of the individual to their environment.

In our study, shift work was a factor in psychological distress and poor mental health. These results were consistent with those of Barton et al. (30), who noted that rotating work could be one of the reasons for poor health, and those of Garde et al. (31), who found a higher state of lack of energy and enthusiasm experienced by healthcare personnel in the case of shift work. Indeed, shift work represented a factor of chronic stress and discomfort predisposing to the development of psychological disorders (32,33). Additionally, balancing family life with professional life greatly amplified mental and physical demands and was commonly acknowledged as a source of chronic stress among women in healthcare settings (34).

Additionally, rotating shift work significantly increased the negative effects of age and family problems, making it one of the main factors with detrimental effects on the physical and mental health of hospital staff (14). Furthermore, recent studies increasingly supported an association between circadian rhythm disorders and certain psychiatric illnesses, particularly the strong reciprocal relationship between insomnia, depression, and anxiety (35–38). In this regard, Boivin et al. postulated that subjective mood was influenced by complex and non-additive interactions with the circadian rhythm and duration of prior wakefulness; thus, even moderate changes in the wake-sleep cycle could profoundly affect mood (39). Consequently, all these phenomena could contribute to higher scores of psychological tensions (fatigue, anxiety, depression, anger-hostility, fatigue, etc.) reported by healthcare personnel during rotating shift work (40).

## CONCLUSION

Irregular working hours are characterized by their impacts on sleep, vigilance, psychological and emotional balance (psychological distress/social dysfunction), and healthcare personnel's work capacities (reduced vigilance). The balance of these factors is the best guarantee of quality care. Ensuring this balance is also a conduct that must be studied to harmonize medical practices in health and safety at work through preventive measures for risks associated with irregular working hours, based on work reorganization and raising awareness among nurses.

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OPTIMAL PARAMETER SELECTION WITH PROBABILISTIC METHODS

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**ABSTRACT**

This work aims to conduct an analysis of investment portfolio optimization, utilizing stochastic methods and techniques. Our focus will be on some of the most advanced optimization methods, including Bayesian Optimization (BO) and Monte Carlo simulation. Bayesian Optimization in portfolio optimization involves using a probabilistic approach to search efficiently for the optimal portfolio allocation. This method is particularly useful for handling uncertainty in the objective function, requiring fewer evaluations compared to traditional methods. Monte Carlo simulation helps investors to make more informed decisions in portfolio optimization by simulating a wide range of possible outcomes, enabling them to better understand their portfolios and manage risks effectively. This analysis will concentrate on applying these methods to enhance the parameters of investment portfolios, taking into account the performance of different companies. For this purpose, we will analyze historical data from the financial market and utilize Monte Carlo simulation techniques to assess the potential performance of the portfolio across various scenarios. Additionally, we will employ Bayesian Optimization to identify the optimal portfolio weights that maximize the Sharpe ratio. Finally, we will compare the results of different optimization methods and identify the one that offers the most effective way to improve the investment portfolio under varying market conditions. Through this study, we aim to contribute to further knowledge in the field of finance and provide practical guidelines for investment portfolio management.

**Keywords:** Portfolio, Bayesian Optimization, Monte Carlo simulation.

**INTRODUCTION**

Portfolio selection is one of the most important problems in practical investment management. Notably, Markowitz's mean-variance model [1], revolutionized portfolio construction by spotlighting diversification's critical role in balancing risk and return. Through strategic asset allocation, investors can enhance their risk-return profiles compared to individual investments. The model evaluates assets' expected returns, volatilities, and correlations to construct efficient frontiers, presenting portfolios with optimal risk-return trade-offs. Investors select portfolios from this frontier based on their risk tolerance and return objectives, achieving a desired balance between risk and return. In the dynamic landscape of investment strategies, achieving optimal parameters in portfolio optimization is pivotal for success amidst market fluctuations. Sophisticated optimization methodologies, as evidenced by [2, 3, 4, 5], have reshaped investor approaches to parameter selection, offering avenues to maximize returns while minimizing risks.

In finance, Bayesian methods have emerged as a potent tool across diverse domains, adeptly navigating complex optimization landscapes [6]. Its proficiency makes it particularly effective for addressing challenges where traditional methods falter. Bayesian Optimization is a powerful technique that can be applied to portfolio optimization to efficiently search for the optimal allocation of assets [7, 8, 9]. Through iterative exploration guided by probabilistic models, Bayesian optimization facilitates the discovery of portfolios with optimal risk-return profiles, enhancing investment strategies.

Conversely, Monte Carlo simulation serves as a robust technique extensively utilized in finance, encompassing tasks such as risk assessment, option pricing, and portfolio optimization [10, 11, 12]. By executing multiple random trials based on probabilistic models, Monte Carlo simulation evaluates a spectrum of potential outcomes and their associated probabilities. This method provides valuable insights for decision-making, particularly in complex financial scenarios.

We will employ Bayesian Optimization and Monte Carlo simulation methods to optimize returns and mitigate risks in portfolio management. These methodologies, drawing inspiration from diverse domains, represent a paradigm shift in optimizing investment strategies for adaptability, resilience, and performance. This investigation aims to explore their transformative capabilities in enhancing parameter selection across various asset classes and market scenarios.

### PORTFOLIO OPTIMIZATION MODEL

Portfolio Optimization is a core challenge in finance, revolving around and determining the best way to distribute investments across various assets to achieve financial objectives. Modern Portfolio Theory (MPT), formulated by Harry Markowitz, also known as mean-variance analysis, is a mathematical process that allows the user to maximize returns for a given level of risk.

The three formulations of the mean-variance optimization (MVO) problem, [1] involve minimizing portfolio variance while ensuring a target expected return, maximizing expected return while limiting portfolio variance, and maximizing risk-adjusted expected return, all of which are equivalent formulations. Our focus will be in maximizing expected return while limiting portfolio variance.

Consider assets  $1, \dots, N$  (securities, stocks, bonds, etc) with random returns. Let  $\mu_i$  and  $\sigma_i$  denote the expected return and the standard deviation of the return of asset  $i$ . For  $i \neq j, \rho_{ij}$  denotes the correlation coefficient of the returns of assets  $i$  and  $j$ . Let  $\mu = [\mu_1, \dots, \mu_N]^T$  and  $\Sigma = (\sigma_{ij})$  be the  $n \times n$  symmetric covariance matrix with  $\sigma_{ii} = \sigma_i^2$  and  $\sigma_{ij} = \rho_{ij}\sigma_i\sigma_j$  for  $i \neq j$ . Denoting by  $x_i$  the proportion of the total funds invested in asset  $i$ , one can represent the expected return and the variance of the resulting portfolio  $x = (x_1, \dots, x_N)$  as follows:

$$E[x] = x_1\mu_1 + \dots + x_N\mu_N = \mu^T x,$$

and

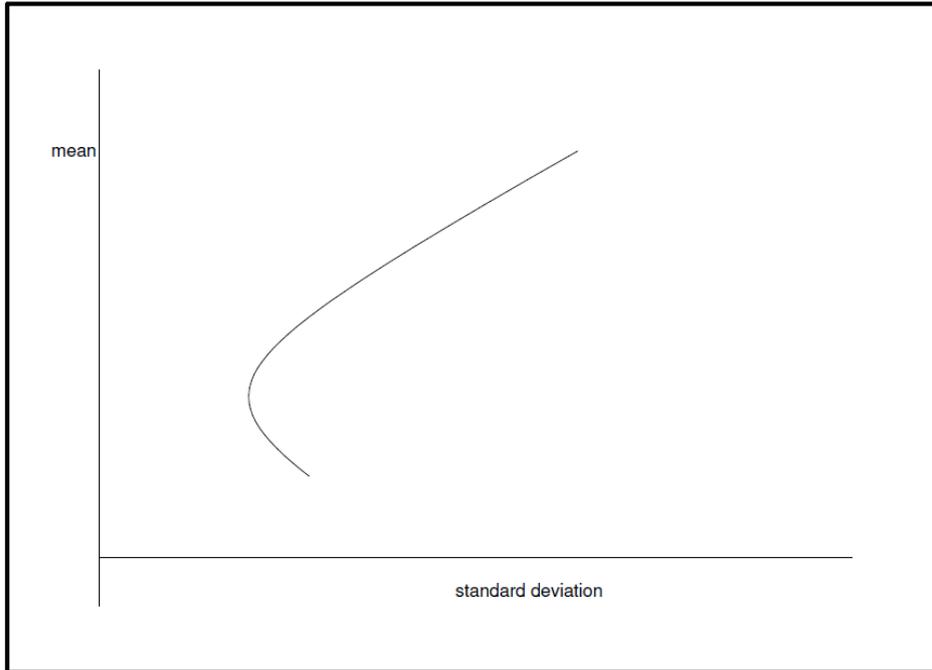
$$Var[x] = \sum_{i,j} \rho_{ij}\sigma_i\sigma_j x_i x_j = x^T \Sigma x,$$

where  $\rho_{ii} \equiv 1$ .

Assume that  $\Sigma$  is positive definite also we assume that the set of admissible portfolios is a nonempty polyhedral set and represent it as  $\chi = \{x: Ax = b, Cx \geq d\}$ , where  $A$  is an  $m \times n$  matrix,  $b$  is an  $m$  –dimensional vector,  $C$  is a  $p \times n$  matrix and  $d$  is a  $p$  –dimensional vector. In particular, one of the constraints in the set  $\chi$  is

$$\sum_i^N x_i = 1.$$

A feasible portfolio  $x$  is called efficient if it has the maximal expected return among all portfolios [13]. The collection of efficient portfolios forms the efficient frontier of the portfolio universe. Therefore, the efficient frontier is the curve that shows all efficient portfolios in a risk-return framework, Figure 1. An efficient portfolio is defined as the portfolio that maximizes the expected return for a given amount of risk (standard deviation), or the portfolio that minimizes the risk subject to a given expected return.



**Figure 1: The efficient frontier.**

#### Maximizing the Sharpe ratio

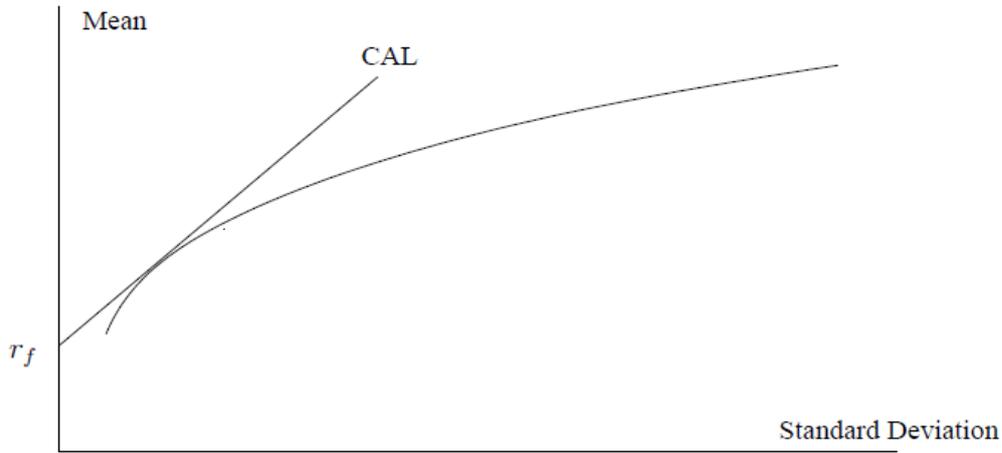
Let's denote  $R_{min}$  and  $R_{max}$  the minimum and the maximum expected returns for efficient portfolios, respectively. Now, let's define the function

$$\sigma(R): [R_{min}, R_{max}] \rightarrow \mathbb{R}, \sigma(R) = (x_R^T \Sigma x_R)^{1/2}$$

where  $x_R$  denotes the unique solution of the minimum variance portfolio problem for assets  $\mathbf{1}$  to  $\mathbf{N}$  as referenced in [13] QP problem. The function  $\sigma(R)$  is convex in its domain. The efficient frontier is the graph

$$E = \{(R, \sigma(R)); R \in [R_{min}, R_{max}]\}.$$

Let's consider a riskless asset whose return is  $r_f \geq 0$  with probability 1.  $r_f$  is the available rate of return of a risk-free security. Return/risk profiles of different combinations of a risky portfolio with the riskless asset can be represented as a straight line a capital allocation line (CAL) on the standard deviation versus mean graph, see Figure 2. The point where the optimal CAL touches the efficient frontier corresponds to the optimal risky portfolio [14, 16].



**Figure 2: Capital Allocation Line**

Mathematically, this can be expressed as the portfolio that maximizes the Sharpe ratio [15] by solving the problem:

$$\max_x \frac{\mu^T x - r_f}{(x^T \Sigma x)^{1/2}}$$

$$Ax = b \tag{1}$$

$$Cx \geq d$$

This is not a convex optimization problem due to the nature of the objective function.

**METHODS**

This paragraph explains the basic principles of the two methods used to solve the portfolio optimization problem. In this brief overview, we will explore Bayesian Optimization, leveraging Gaussian processes, alongside Monte Carlo simulation for generating portfolio optimization strategies.

**Bayesian Optimization (BO)**

Bayesian Optimization stands out as a powerful approach employed for solving global optimization problems [17, 18]. BO constructs a probabilistic surrogate model of the objective function, typically using Gaussian processes. This surrogate model captures the uncertainty in the function evaluations and guides the search towards promising regions of the search space. This method is known for its effectiveness in optimizing continuous domains with less than 20 dimensions and also for its ability to deal with stochastic noise in function evaluations.

Consider the maximization of an unknown function  $f$  that is expensive to evaluate, which can be formulate as follows:

$$x^* = \operatorname{argmax}_{x \in \mathcal{X}} f(x) \tag{2}$$

where  $\mathcal{X}$  denotes the search space of interest and  $x^*$  the global maximum.

Bayesian Optimization (BO) is composed of two fundamental elements: a Bayesian statistical model, employed to model the objective function, and an acquisition function, tasked with selecting the most strategic location for the next sampling point.

*Gaussian Process.* In the Bayesian Optimization framework, the statistical model utilized for modeling the objective function is often a Gaussian Process (GP). Gaussian process provides a Bayesian posterior probability distribution that describes potential values for  $f(x)$  at the candidate

point  $\mathbf{x}$ . Each time we observe  $f$  at a new point, this posterior distribution is updated. Let's delve into GP regression, we focus on the value of function  $f$  at a finite set of points  $x_1, \dots, x_k \in \mathbb{R}^d$ . It is practical to collect the function's values at these points together into a vector  $[f(x_1), \dots, f(x_k)]$ . We construct the mean vector by evaluating a mean function  $\mu_0$  at each  $x_i$ . Next we construct the covariance matrix by evaluating a covariance function or kernel  $\Sigma_0$  at each pair of points  $x_i, x_j$ . The kernel is chosen so that points  $x_i, x_j$  that are closer in the input space have a large positive correlation (commonly used kernel is the power exponential or Gaussian kernel), encoding the belief that they should have more similar function values than points that are far apart. The kernel should also have the property that the resulting covariance matrix is positive semi-definite, regardless of the collection of points chosen. The prior distribution on  $[f(x_1), \dots, f(x_k)]$  is:

$$f(x_{1:k}) \sim \mathcal{N}(\mu_0(x_{1:k}), \Sigma_0(x_{1:k}, x_{1:k})) \tag{3}$$

Suppose we observe  $f(x_{1:n})$  without noise for some  $n$  and we wish to infer the value of  $f(x)$  at some new point  $x$ . To do so, we let  $k = n + 1$  and  $x_k = x$ , so that the prior over  $[f(x_{1:n}), f(x)]$  is given by Equation (3). We then compute the conditional distribution of  $f(x)$  given these observations using Bayes' rule, see [21],

$$f(x)|f(x_{1:n}) \sim \mathcal{N}(\mu_n(x), \sigma_n^2(x))$$

$$\mu_n(x) = \Sigma_0(x, x_{1:n}) * \Sigma_0(x_{1:n}, x_{1:n})^{-1} * (f(x_{1:n}) - \mu_0(x_{1:n})) + \mu_0(x) \tag{4}$$

$$\sigma_n^2(x) = \Sigma_0(x, x) - \Sigma_0(x, x_{1:n}) * \Sigma_0(x_{1:n}, x_{1:n})^{-1} * \Sigma_0(x_{1:n}, x)$$

This conditional distribution is called the posterior probability distribution in the terminology of Bayesian inference.

The mean function and kernel contain parameters. They are typically called the prior hyperparameters. For further details, see [19, 20].

*Acquisition Functions for Bayesian Optimization.* Acquisition functions are the utility functions that guide the search to reach the optimum of the objective function by identifying where to sample next, which is crucial in Bayesian optimization. Among the most commonly used acquisition functions in Bayesian Optimization are probability of improvement (PI), expected improvement (EI) and upper confidence bound (UCB). They are widely employed due to their effectiveness in balancing exploration and exploitation during the optimization process.

Let  $f^*$  denote the optimum obtained so far, and  $\Phi(\cdot)$  and  $\phi(\cdot)$  denote the normal cumulative distribution function, and probability density function of the standard normal random variable, respectively. The probability of improvement (PI) over the current best value  $f^*$ , is formulated as

$$PI(x) = P(f(x) \geq f^*) = \Phi\left(\frac{\mu(x) - f^*}{\sigma(x)}\right) \tag{5}$$

Alternatively, expected improvement (EI) calculates the expected improvement with respect to  $f^*$ ,

$$EI(x) = \begin{cases} (\mu(x) - f^*)\Phi\left(\frac{\mu(x) - f^*}{\sigma(x)}\right) + \sigma(x)\phi\left(\frac{\mu(x) - f^*}{\sigma(x)}\right), & \text{if } \sigma(x) > 0 \\ 0 & \text{if } \sigma(x) = 0 \end{cases} \tag{6}$$

A heuristic approach to Expected Improvement (EI) is presented in [22]. Introducing a positive (hyper)parameter  $\xi$  reduces the value of the acquisition function near the currently sampled points, thus enhancing exploration. In this case, the EI function can be expressed as:

$$EI(x) = \begin{cases} (\mu(x) - f^* - \xi)\Phi\left(\frac{\mu(x) - f^* - \xi}{\sigma(x)}\right) + \sigma(x)\phi\left(\frac{\mu(x) - f^* - \xi}{\sigma(x)}\right), & \text{if } \sigma(x) > 0 \\ 0 & \text{if } \sigma(x) = 0 \end{cases} \tag{7}$$

The upper confidence bound (UCB), for maximization problems, is calculated as

$$UCB(x) = \mu(x) + \beta\sigma(x) \tag{8}$$

where  $\beta > 0$  is a parameter to navigate the the exploitation-exploration trade-off.

Expected improvement (EI) is one of the most widely used acquisition, as referenced in [22, 23].

**Monte Carlo Simulation**

Monte Carlo Simulation (or methods), like many other numerical methods, predates the widespread use of modern computers. The history of Monte Carlo simulation dates back to the mid-20th century. It was named after the famous Monte Carlo Casino in Monaco because of its reliance on random chance, much like gambling. Later, in the 1940s and 1950s, researchers such as Stanislaw Ulam and John von Neumann further developed the method for solving complex mathematical problems. Their work laid the foundation for modern Monte Carlo simulation techniques.

Today, Monte Carlo Simulation remains a fundamental tool in various fields, including finance, see [10, 11, 24, 25], where it is commonly used for risk assessment, option pricing, portfolio optimization, and other financial analyses. Monte Carlo simulation uses random sampling and statistical modeling to estimate mathematical functions and mimic the operations of complex systems. The statistical distribution of the process to be modeled must be determined first before Monte Carlo simulation can be applied.

In our problem Monte Carlo simulation approach allows for the exploration of various portfolio allocations and helps in identifying portfolios that offer an optimal balance between risk and return. We are going to follow these steps for the approach:

- Sampling the data: Historical adjusted closing prices of randomly selected companies are obtained and used to calculate daily logarithmic returns. These returns are then analyzed through visualizations such as plots of daily log returns and a correlation heatmap.
- Simulating portfolios using random weights for asset allocation: The large number of simulations allows for a comprehensive assessment of portfolio performance under various scenarios.
- Repeat Simulations. Run the simulation multiple times (often thousands or even millions of times) to generate a large number of potential future scenarios.
- Analyzing the results: The portfolios with the highest Sharpe ratio and lowest volatility are identified. Metrics such as expected return, volatility and Sharpe ratio are computed to assess each portfolio's performance. Additionally, the efficient frontier is plotted to visualize the relationship between return and volatility for different portfolios.

**EXPERIMENTAL RESULTS**

To effectively optimize the Sharpe ratio, we will employ both Monte Carlo simulation and Bayesian Optimization within a Python framework. The process involves randomly assigning weights to each assets (security) within our portfolio and computing statistical metrics such as mean volatility, correlation, variance, standard deviation, and skewness of our sample. These metrics provide insights into the risk and performance characteristics of the portfolio constituents. Referring to the mathematical model represented by Equation (1), the portfolio that maximizes the Sharpe ratio is found by solving the following problem:

$$\max f(\mathbf{w}) = \frac{\sum_{i=1}^N w_i * r_i - r_f}{\sqrt{\sum_{i=1}^N \sum_{j=1}^N w_i * w_j * \sigma_{ij}}} \tag{9}$$

Subject to  $\sum_{i=1}^N w_i = 1, 0 \leq w_i \leq 1, i = 1, 2, \dots, N$

Where  $N$  represents the number of different assets,  $w_i$  denotes the weight of each stock in portfolio,  $r_i$  represents return of stock  $i$ ,  $r_f$  is the available rate of return of a risk-free security

and  $\sigma_{ij}$  denotes covariance between the returns of assets  $i$  and  $j$ . The formula for the Sharpe ratio that we need to maximize can be written as

$$S = \frac{R_p - r_f}{\sigma_p} \quad (10)$$

Where  $R_p$  is expected portfolio return,  $r_f$  is risk free return and  $\sigma_p$  is portfolio standard deviation. We will assume that  $r_f$  is zero and continue to find the best portfolio using the Monte Carlo simulation and Bayesian Optimization.

All the data in this study are from Yahoo Finance, and eight companies are chosen randomly. We chose companies randomly for portfolio optimization to ensure our analysis captures the diversity of the market and yields more robust results. The companies to invest in are Danaher Corporation (DHR), Duke Energy Corporation (DUK), Helmerich & Payne, Inc. (HP), Altria Group, Inc. (MO), The Kraft Heinz Company (KHC), Mastercard Incorporated (MA), Pinnacle West Capital Corporation (PNW) and Teradata Corporation (TDC).

In this paper, we are using the log returns instead of arithmetic returns. Let  $p_t$  denote the price of an asset at time  $t$ . Then the return of the asset is defined as

$$r_t = \frac{p_t - p_{t-1}}{p_{t-1}} \quad (11)$$

Equation (11) can be rewritten as

$$r_t = \frac{p_t}{p_{t-1}} - 1 \quad (12)$$

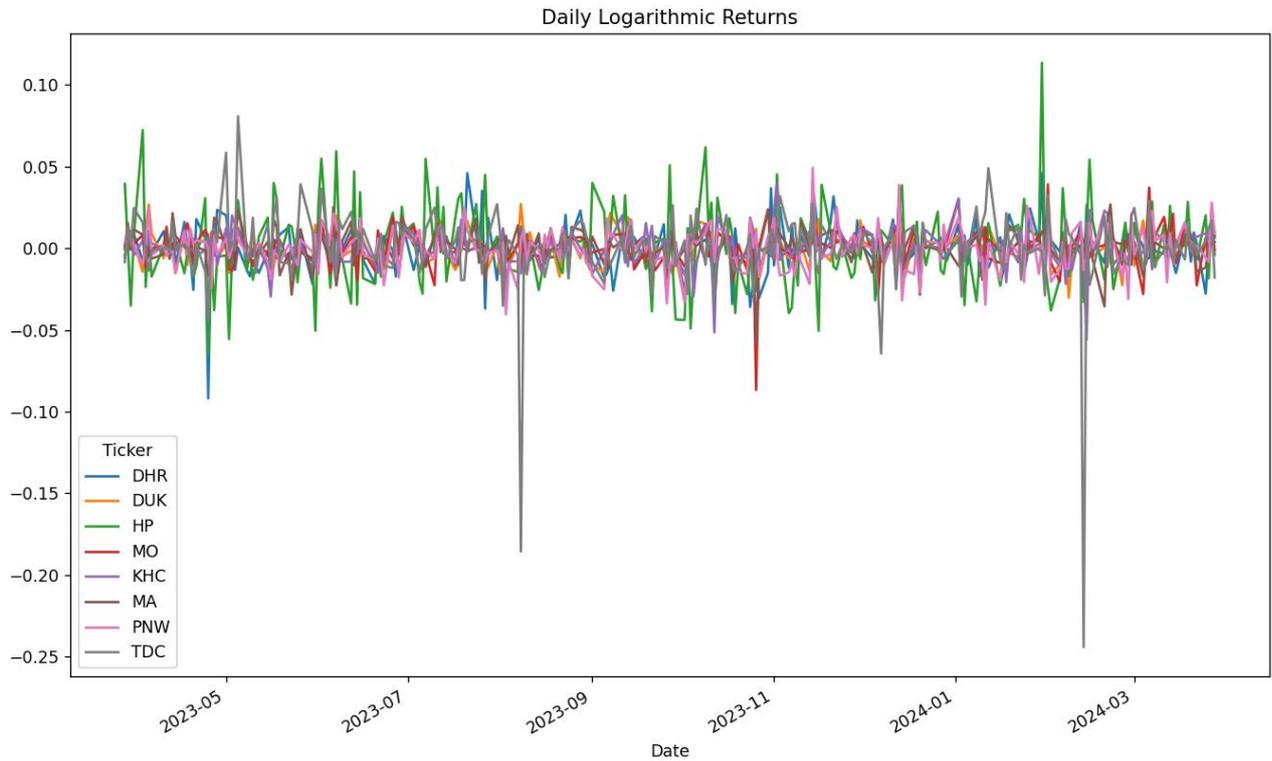
Logarithmic returns are defined as

$$z_t = \log(1 + r_t) \quad (13)$$

This can be expressed in terms of  $p_t$  and  $p_{t-1}$  as  $z_t = \log\left(\frac{p_t}{p_{t-1}}\right)$ .

Log returns are commonly used in finance and investment analysis for several reasons. The use of log returns is based on their mathematical properties, statistical stability, and interpretability, which make them well-suited for financial analysis and modeling. We will convert the log returns to annual returns by multiplying them by 252, assuming there are 252 working days in a year. Next, we will perform the same procedure for the mean and standard deviation. This annualization process helps standardize returns for comparison and analysis over different time periods.

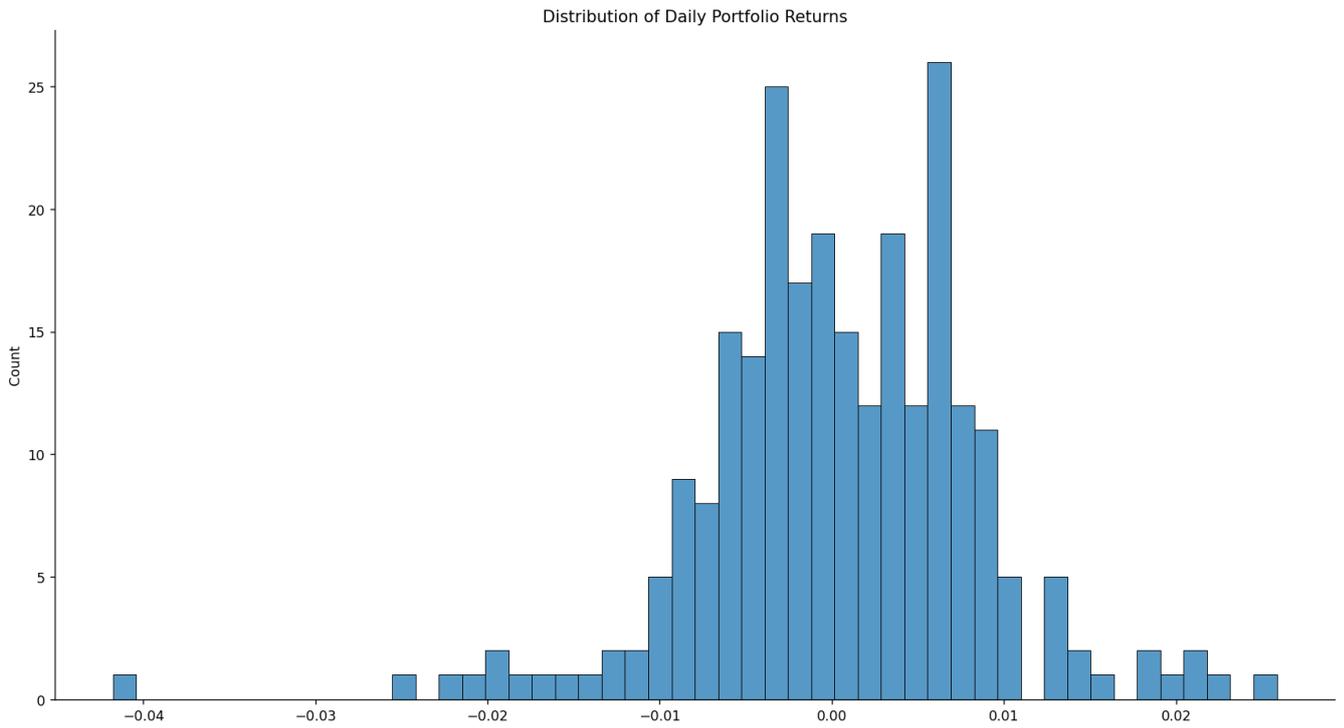
The distribution of eight companies is shown in Figure 3. for the period from March 27, 2023, to March 29, 2024.



**Figure 3. Distribution of Daily Logarithmic Returns.**

Incorporating annual distribution statistics for returns and volatility enhances portfolio optimization by providing valuable insights into long-term performance, risk management, and strategic decision making.

Let's examine the measure of asymmetry in the probability distribution by computing the skewness for a randomly chosen sample of eight companies [26], Figure 4.

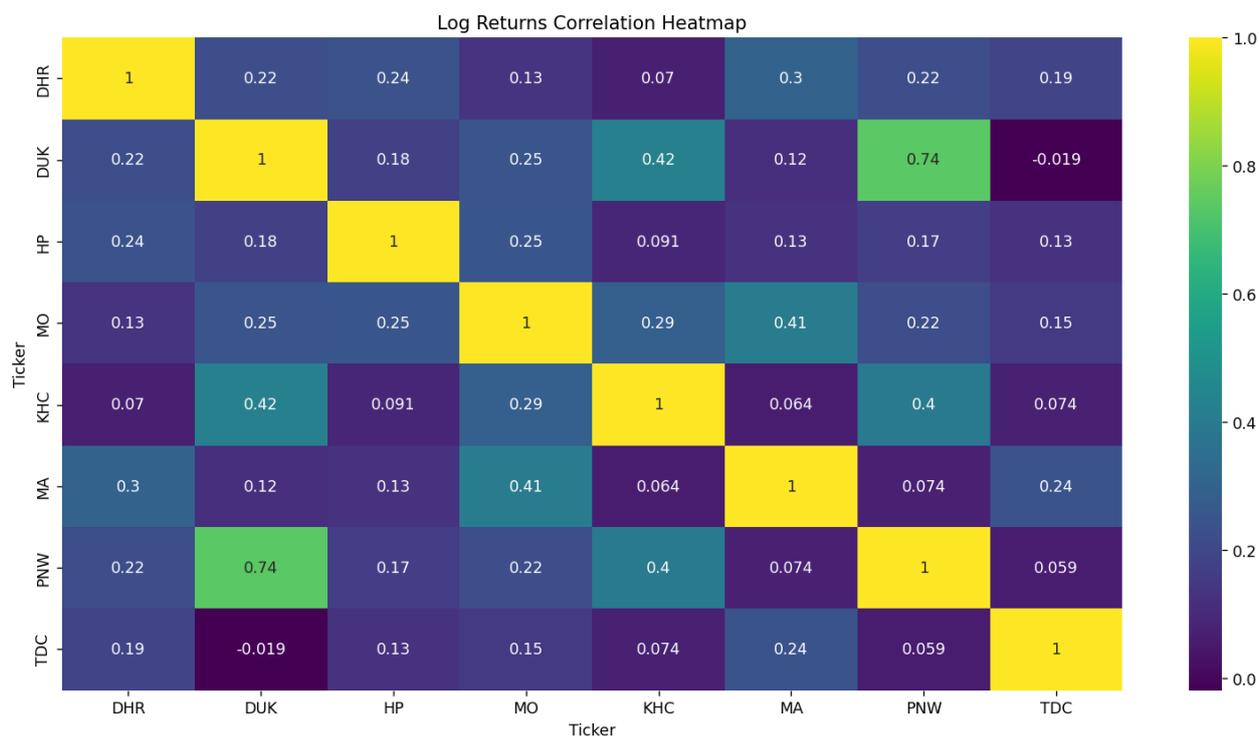


**Figure 4. Distribution of Daily Portfolio Returns**

The skewness is negative (left-skewed), indicating that the left tail of the distribution is longer than the right tail.

The correlation matrix, utilizing log returns is shown in Table 1.

**Table 1. Correlation Heatmap.**



Indeed, the correlation between each asset and itself is precisely 1. Notably, the highest correlation is observed between DUK and PNW, while the lowest correlation is found between DUK and TDC.

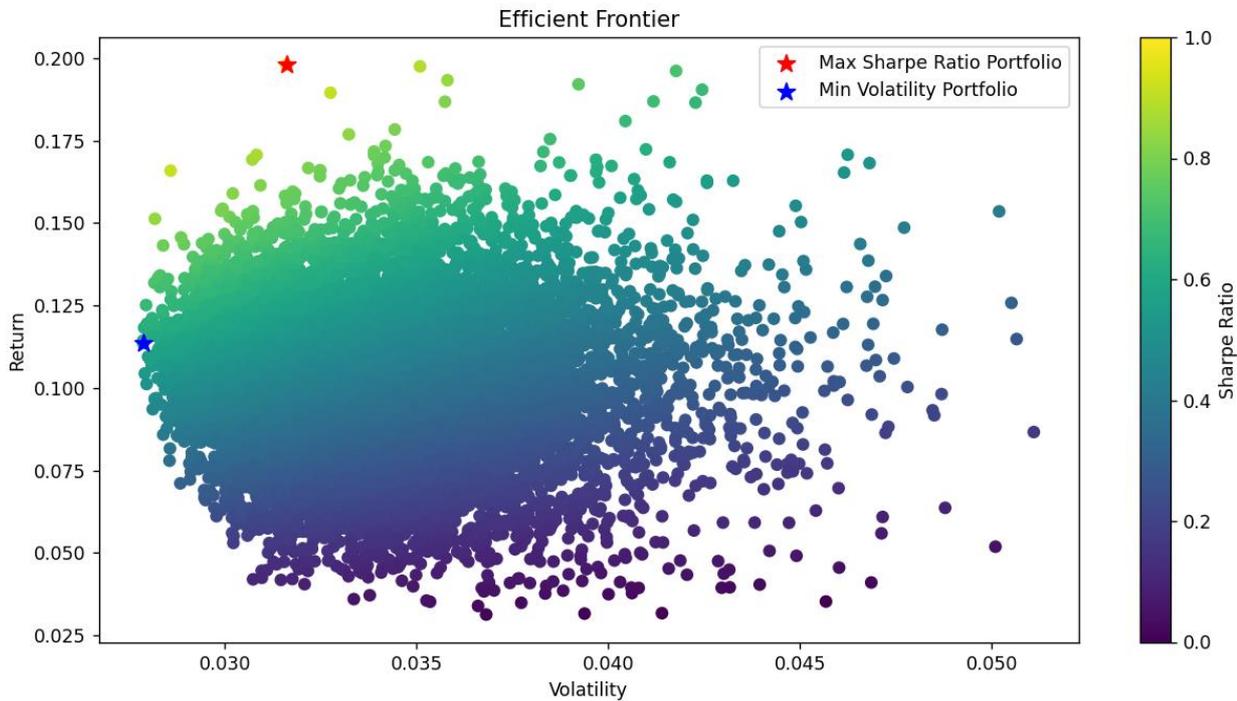
In Table 2 are displayed the expected return, volatility, skewness, and Sharpe ratio assuming equal weights of the assets.

**Table 2. Returns Distribution Statistics for Equal Weights**

Expected return of portfolio with equal weights	0.1009
Volatility	0.1285
Skewness	-0.5388
Sharpe ratio	0.7853

All the metrics are assumed to have equal weight, and it's important to remember that the sum of weights should always be 1.

We conduct Monte Carlo simulations to generate random weights for each portfolio, with a total number of 10,000 simulations. Subsequently, we compute the portfolio returns and volatility based on



these randomized weight distributions. The efficient frontier represents the relationship between risk and return. Each point on the curve is the best return that you can get for a given level of risk. Equivalently each point is the lowest risk that you can take for a particular expected return. Utilizing Monte Carlo simulation with 10,000 simulations allows us to derive the efficient frontier for the portfolios, as shown in Figure 5.

**Figure 5. The Efficient Frontier Enhanced by Monte Carlo simulation.**

In the efficient frontier we can see that there are a number of portfolios with different weights, returns and volatility. The red star represents the most efficient portfolio with maximum Sharpe ratio, while the blue star represents the most efficient portfolio with minimum volatility among all portfolios simulated using the Monte Carlo method.

Let's proceed with the methods: we simulate 1000 and 10000 portfolios using Monte Carlo, and then we execute Bayesian Optimization 1000 and 10000 times. For Bayesian Optimization (BO), we are going to utilize a Python framework with scikit-optimize package to find the optimal portfolio allocation solution, aiming to maximize the Sharpe ratio. So, Bayesian Optimization efficiently searches for the best combination of asset weights that maximize the Sharpe ratio, offering a systematic approach to portfolio optimization. Table 3 displays the results of both methods.

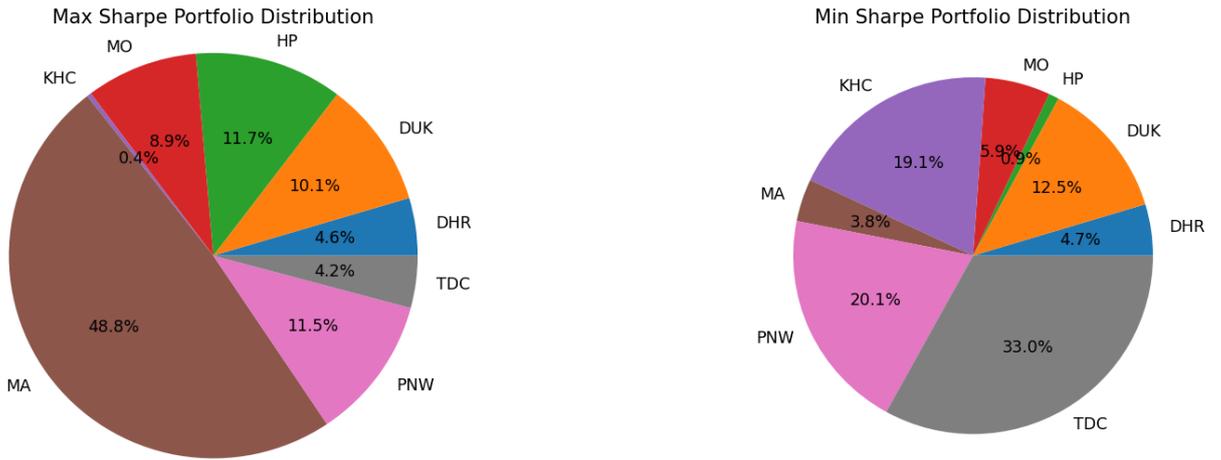
**Table 3. The optimal portfolios using Monte Carlo simulation and Bayesian Optimization methods.**

<b>Number of simulations 1000</b>	<b>Monte Carlo simulation</b>	<b>Number of iterations 1000</b>	<b>Bayesian Optimization EI, <math>\xi = 0.01</math></b>	<b>Bayesian Optimization EI, <math>\xi = 0</math></b>
Max Sharpe ratio	<b>5.2546</b>	Max Sharpe ratio	4.5414	4.387
Return	0.1627	Return	<b>0.4243</b>	0.3984
Volatility	<b>0.0309</b>	Volatility	0.0934	0.0908
<b>Number of simulations 10000</b>	<b>Monte Carlo simulation</b>	<b>Number of iterations 10000</b>	<b>Bayesian Optimization EI, <math>\xi = 0.01</math></b>	<b>Bayesian Optimization EI, <math>\xi = 0</math></b>
Max Sharpe ratio	5.7555	Max Sharpe ratio	7.6118	<b>7.7082</b>
Return	0.2031	Return	0.3108	<b>0.3184</b>
Volatility	<b>0.0352</b>	Volatility	0.0407	0.0413

From Table 3, we observe that Monte Carlo simulation with 1000 simulations outperforms BO with 1000 iterations. This is indicated by the higher Sharpe ratio and lower volatility, compared to Bayesian Optimization with acquisition function EI,  $\xi=0.01$  and  $\xi=0$ .

If we now look at the results for 10000 simulations with Monte Carlo and 10000 iterations of BO, we find that BO outperforms Monte Carlo simulation. Referring to the Sharpe ratio for  $\xi=0$ , BO achieves better performance, while Monte Carlo Simulation yields lower volatility than BO. For a larger number of iterations in Bayesian Optimization, it appears that setting the parameter  $\xi=0$  yields better results for the algorithm.

After simulating 10000 portfolios, we generated pie charts illustrating the distributions of the assets using Monte Carlo simulation for the eight companies, as shown in Figure 6.

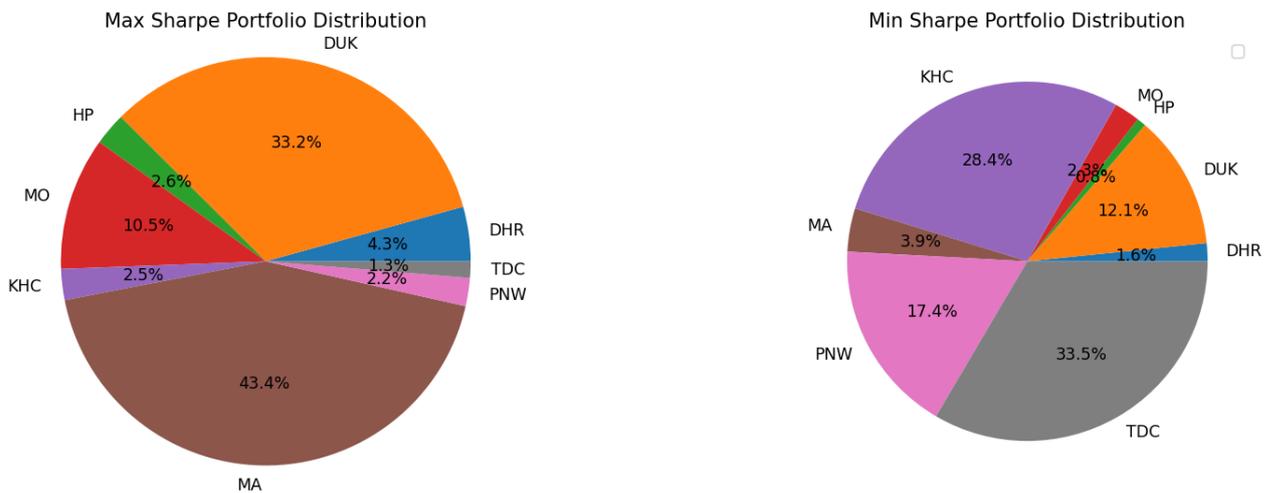


**Figure 6. The distributions of assets using Monte Carlo simulation.**

The left pie chart, generated through Monte Carlo simulation represents how assets are allocated within the portfolio that attains the highest Sharpe ratio. Each segment of the pie symbolizes a distinct asset in the portfolio, with its size indicative of the proportion of the portfolio's overall value invested in that asset.

On the other hand, the right pie chart, also produced via Monte Carlo simulation, displays the asset allocation for the portfolio characterized by the lowest Sharpe ratio. This portfolio likely prioritizes minimizing volatility, potentially at the expense of potential returns.

After 10000 iterations with BO, using the acquisition function EI with  $\xi = 0$  we have pie charts illustrating the distributions of the assets using Bayesian Optimization for the eight companies, as shown in Figure 7.



**Figure 7. The distributions of assets using Bayesian Optimization.**

The left pie chart shows asset distribution for the portfolio with highest Sharpe ratio. This portfolio is optimized to maximize the risk-adjusted return, aiming for the best trade-off between return and volatility.

On the other hand, the right pie chart shows asset distribution for the portfolio with the minimum Sharpe ratio. This portfolio likely prioritizes minimizing volatility, even if it means sacrificing potential returns.

## DISCUSSION

This study explores the optimization of investment portfolios using advanced stochastic methods, namely Bayesian Optimization (BO) and Monte Carlo simulation. The primary goal is to improve portfolio allocation parameters, considering the performance of various assets within the financial market. These methodologies aim to provide practical insights into portfolio management strategies, contributing to the advancement of financial knowledge.

Bayesian Optimization, guided by probabilistic models like Gaussian processes, offers an efficient approach in finding the most optimal portfolio allocations. By iteratively exploring the objective function landscape, BO facilitates the discovery of portfolios with optimal risk-return profiles. On the other hand, Monte Carlo simulation rooted in statistical modeling and random sampling, enables comprehensive assessments of portfolio performance under different scenarios.

Experimental results demonstrate the comparative performance of Monte Carlo simulation and Bayesian Optimization in optimizing portfolio parameters. The efficiency of each method varies depending on specific optimization objectives, market conditions, and the parameters chosen for the optimization process. For example, Monte Carlo simulation outperforms Bayesian Optimization with fewer iterations, while the latter exhibits superior performance with more iterations.

Visual representations, such as pie charts and efficient frontier plots, provide intuitive insights into the distribution of assets within optimized portfolios and the relationship between risk and return. These visualizations aid decision-making processes and offer clarity on portfolio composition and performance characteristics.

## CONCLUSION

In conclusion, this paper delves into the optimization of investment portfolios through the utilization of probabilistic methods, namely Bayesian Optimization (BO) and Monte Carlo simulation. By leveraging these advanced techniques, the study aims to enhance parameter selection in portfolio management, thereby maximizing returns while minimizing risks. Through the analysis of historical financial data and the application of these methods, the study contributes to the field of finance by providing practical insights into portfolio optimization under varying market conditions. The results showcase the effectiveness of both Monte Carlo simulation and Bayesian Optimization, with their respective strengths observed in different scenarios. Overall, this research offers valuable guidance for investors seeking to optimize their portfolios and navigate the complexities of the financial market.

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ENHANCING BREAST CANCER DETECTION WITH DEEP LEARNING: APPLYING  
TRANSFER LEARNING

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**Abstract**

Breast cancer is a prevalent malignancy among women worldwide, and early detection is essential for improved patient outcomes. Recent years have seen the development of deep learning as a promising method for automating the detection of breast cancer in mammography. Deep learning has the potential to improve the effectiveness and precision of breast cancer diagnosis through transfer learning, which is the process of fitting a previously trained model to a new job. In this study, pre-trained deep learning models are used to investigate the effectiveness of transfer learning techniques in the detection of breast cancer. We study various algorithms for transfer learning and evaluate their impact on detection performance parameters such ROC AUC, accuracy, precision, and recall using extensive mammography datasets. The findings of the study contribute to the advancement of automated breast cancer diagnosis and provide insight into the efficacy of transfer learning techniques in raising detection precision and reliability.

**Keywords:** Medical imaging, deep learning, breast cancer, and transfer learning.

**THE ROLE OF ARTIFICIAL INTELLIGENCE IN DIAGNOSING CUTANEOUS  
LEISHMANIASIS: A REVIEW OF PRESENT INNOVATIONS AND PROSPECTS FOR  
ADVANCEMENT**

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**ABSTRACT**

Cutaneous leishmaniasis (CL) is a critical global health concern, particularly because diagnosing it in resource-limited areas is complex. The integration of artificial intelligence (AI) into medical diagnostics has led to significant progress across various healthcare sectors, including dermatology. In this study, we aim to highlight the value of using AI for LC diagnosis, the AI-based algorithms that are employed in this process, and to identify gaps that need to be addressed. Our work highlights that only a limited number of studies are related to using AI algorithms for CL diagnosis. Among these studies, several gaps were identified for future research. Addressing these considerations will pave the way for the development of robust AI systems and encourage more research in CL detection by AI. This could contribute to leading to better diagnostic precision and improved health outcomes in affected regions.

**Keywords:** Cutaneous Leishmaniasis, Artificial Intelligence, Diagnosis

**ARTIFICIAL NEURAL NETWORKS MODEL FOR PREDICTING THE SIMPLE  
COMPRESSIVE STRENGTH OF LIME-STABILIZED SOILS**

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**ABSTRACT**

The laboratory tests are performed to determine the efficiency of mineral additions used in the soil stabilization, which costs time and expense. Hence, to avoid this problem, the use of the Neural Networks technique allows rapid and efficient prediction of the geotechnical properties of soils. In the present work, this technique was applied to develop a simple compressive strength prediction model of lime stabilized clay soils. However, a database collected from the experimental results of several previous research was used by considering the influencing parameters on the compressive strength. The training, testing and validation performance of the model showed a good correlation reaching 98% and a low MSE. On the other hand, the parametric study and the comparison of the predicted values with experimental results not included in the database proved the performance of the model. According to the found results, the ANNs model is reliable and could be used for the prediction of the simple compressive strength of lime stabilized clay soil.

**Keywords:** Clay soils, stabilization, lime, artificial neural network, prediction, simple compressive strength.

**STABILITY AND ANALYSIS OF HOPF BIFURCATIONS IN A DELAYED PREDATOR-PREY SYSTEM**

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**Abstract**

This paper presents a mathematical model that includes three populations with discrete time delays. The main goal is to examine the locally asymptotically stable of the system's equilibria by using characteristic equations. Additionally, we investigate the occurrence of Hopf bifurcations at the coexistence equilibrium. Subsequently, we analyze the direction of these bifurcations and the stability of the resulting periodic solutions using the normal form and center manifold theories. Numerical simulation examples are provided to support our theoretical findings. By utilizing the normal form theory and the center manifold theorem, we derive explicit formulas to determine the stability and direction of the bifurcating periodic solutions.

**Keywords:** Predator-prey, Hopf bifurcation, Locally asymptotically stable.

**1. Introduction**

The field of mathematical biology has made significant progress in developing population dynamics models, particularly those that focus on ecological changes within populations. Ecology, a branch of biology, studies the interactions between species and their environment (Roy & Roy, 2015). Mathematical modeling in ecology gained momentum with the introduction of the Lotka-Volterra model by Lotka (1925) and Volterra (1931), also known as the predator-prey model. Later, Holling (1953) incorporated the Holling response function into this model, which quantifies the number of successfully simulated prey captured per predator based on prey density (Solomon, 1949). Previous studies have extensively explored predator patterns among three species (Abadi & Savitri, 2015; Savitri, Suryanto, Kusumawinahyu, & Abadi, 2019; Sarwardi, Mandal, & Ray, 2013). In this study, we assume that super predators not only prey on other species but also act as predators themselves. Additionally, this research aims to align with real-life conditions in nature, where frog populations function as super predators, spiders act as predators, and mosquitoes serve as prey. The objective of this study is to analyze the robustness of the prey-predator-super predator model using different response functions, specifically Holling's Type I response function and Holling's Type II response function.

**2. Mathematical Model**

In this article, a model is presented that builds on previous scholarly research [4, 5, 6]. The model consists of three distinct species: a prey species, a predator species, and a super predator species. The main assumption of the model is that the growth rate of the predator species is affected by the density of the prey population, represented as  $x(t)$ . The predation rate of the predator on the prey is determined using Holling's type I response function, while the predation rate of the super predator on the predators

is determined using Holling's type II response function. In summary, the model includes three key components: the density of the prey species ( $x(t)$ ), the density of the predator species ( $y(t)$ ), and the density of the super predator species ( $z(t)$ ).

$$\begin{aligned} \frac{dx}{dt} &= rx \left(1 - \frac{x}{K}\right) - \alpha xy \\ \frac{dy}{dt} &= sy \left(1 - \frac{y}{x}\right) - \frac{\beta yz}{1+ny} \\ \frac{dz}{dt} &= \frac{\gamma yz}{1+ny} - \omega z \end{aligned} \tag{1}$$

The parameters in model (1) are

**Table 1. Parameters used**

Symbol	Information	Condition
r	prey growth rate	$r \geq 0$
s	predator growth rate	$s \geq 0$
K	carrying capacity of prey species	$K \geq 0$
$\alpha$	predator predation rate on prey	$\alpha \geq 0$
$\beta$	predation rate super predator against predator	$\beta \geq 0$
$\omega$	the natural death rate of super species	$\omega \geq 0$
$\gamma$	the growth conversion rate of predators into super predators	$\gamma \geq 0$
n	the time it takes the super predator to deal predators	$n \geq 0$
x(0)	Initial condition	$x(0) > 0$
y(0)	Initial condition	$y(0) > 0$
z(0)	Initial condition	$z(0) > 0$

**3. Results and discussions**

**3.1 Determination of equilibrium point**

To find the equilibrium point in the system of equations (1), we set the right side of each equation equal to zero.

$$\begin{aligned} \left[ r \left( 1 - \frac{x}{K} \right) - \alpha y \right] x &= 0 \\ \left[ s \left( 1 - \frac{y}{x} \right) - \frac{\beta z}{1 + ny} \right] y &= 0 \\ \left[ \frac{\gamma y}{1 + ny} - \omega \right] z &= 0 \end{aligned}$$

- The point  $E_1 = (k, 0, 0)$ . The point  $E_1$  represents the state when there are no predators and super-predators.
- The point  $E_2 = \left( \frac{rK}{\alpha K + r}, \frac{rK}{\alpha K + r}, 0 \right)$ . The point  $E_2$  states the extinction of super predators.
- The point  $E_3 = (x^*, y^*, z^*)$ . Point  $E_3$  is the point of existence of all populations where

$$\begin{aligned} x^* &= \frac{K(r - \alpha y^*)}{r}, \\ y^* &= \frac{\omega}{\gamma - \omega n}, \\ z^* &= \left( 1 - \frac{y^*}{x^*} \right) \frac{(1 + ny^*)s}{\beta} \end{aligned}$$

Points  $E_1, E_2$  are biologically determined because  $E_{1,2} \in R^{++}$  while point  $E_3$  must satisfy

$$\gamma > \omega n + \frac{(K\alpha + r)\omega}{Kr}.$$

**4. Stability Analysis**

The prey-predator-super predator model in the system of equations (1) is a system of nonlinear differential equations. Therefore, a linearization process is required to determine the stability of the system. The linearization process is performed using the Jacobian matrix as follows:

$$J = \begin{pmatrix} r \left( 1 - \frac{2x}{K} \right) - \alpha y & -\alpha x & 0 \\ -s \frac{y^2}{x^2} & s \left( 1 - \frac{2y}{x} \right) - \frac{\beta z}{1 + ny} + \frac{n\beta yz}{(1 + ny)^2} & -\frac{\beta y}{1 + ny} \\ 0 & \frac{\gamma z}{1 + ny} - \frac{n\gamma yz}{(1 + ny)^2} & \frac{\gamma y}{1 + ny} - \omega \end{pmatrix}$$

To analytically determine the dynamic behaviour of the system of equations (1), we can perform a local stability analysis by using the eigenvalues generated from each equilibrium point. These eigenvalues are then substituted into the Jacobian matrix.

**Teoreme 1.** The equilibrium point  $E_1 = (k, 0, 0)$  is the saddle point.

Proof. The Jacobian matrix of system (1) at  $E_1 = (k, 0, 0)$  is:

$$J(E_1) = \begin{pmatrix} -r & -K\alpha & 0 \\ 0 & s & 0 \\ 0 & 0 & -\omega \end{pmatrix}$$

The characteristic equation of  $J(E_1)$  is:

$$\det[J(E_1) - \lambda I] = 0$$

$$(-r - \lambda)(s - \lambda)(-\omega - \lambda) = 0$$

$$\lambda_1 = -r < 0, \lambda_2 = s > 0 \text{ and } \lambda_3 = -\omega < 0$$

The equilibrium point  $E_1$  is the saddle point.

**Teoreme 2.** The equilibrium point  $E_2 = (\frac{rK}{\alpha K+r}, \frac{rK}{\alpha K+r}, 0)$  is locally asymptotically stable if

$$\gamma < \omega n + \frac{(K\alpha+r)\omega}{Kr}.$$

Proof. The Jacobian matrix of system (1) at  $E_2 = (\frac{rK}{\alpha K+r}, \frac{rK}{\alpha K+r}, 0)$  is:

$$J(E_2) = \begin{pmatrix} -\frac{r^2}{\alpha K+r} & -\frac{\alpha r K}{\alpha K+r} & 0 \\ s & -s & -\frac{\beta r K}{nrK + \alpha K+r} \\ 0 & 0 & \frac{\gamma r K}{nrK + \alpha K+r} - \omega \end{pmatrix}$$

The characteristic equation of  $J(E_2)$  is:

$$\det[J(E_2) - \lambda I] = 0$$

$$\left(\frac{\gamma r K}{nrK + \alpha K+r} - \omega - \lambda\right) \left[\lambda^2 + \left(\frac{r^2}{\alpha K+r} + s\right)\lambda + rs\right] = 0$$

Therefore, we obtain the eigenvalues.

$$\lambda_1 = \frac{\gamma r K}{nrK + \alpha K+r} - \omega, \lambda_{2,3} = -\frac{1}{2}\left(\frac{r^2}{\alpha K+r} + s\right) \pm \frac{1}{2}\sqrt{\left(\frac{r^2}{\alpha K+r} + s\right)^2 - 4rs}$$

It is clear that  $\lambda_1 < 0$  if  $\gamma < \omega n + \frac{(K\alpha+r)\omega}{Kr}$ . From the fact that  $\frac{r^2}{\alpha K+r} + s > 0, rs > 0$  and

$$\left(\frac{r^2}{\alpha K+r} + s\right)rs > 0.$$

$\text{Re}(\lambda_{2,3}) < 0$  for  $\left(\frac{r^2}{\alpha K+r} + s\right)^2 < 4rs$  or  $\left(\frac{r^2}{\alpha K+r} + s\right)^2 \geq 4rs$ . Therefore, it can be concluded that

$E_2$  is locally asymptotically stable.

**Teoreme 3.** The equilibrium point  $E_3 = (x^*, y^*, z^*)$  is locally asymptotically stable if

$$\gamma > \frac{\omega}{y^*} \sqrt{\frac{\beta n x^* z^*}{r}}$$

Proof. The Jacobian matrix of system (1) at  $E_3 = (x^*, y^*, z^*)$  is:

$$J(E_3) = \begin{pmatrix} -\frac{rx^*}{K} & -\alpha x^* & 0 \\ s \left(\frac{y^*}{x^*}\right)^2 & \frac{\beta n \omega^2 z^*}{\gamma^2 y^*} - \frac{ry^*}{x^*} & -\frac{\beta \omega z^*}{\gamma} \\ 0 & \frac{(\gamma - \omega n) \omega z^*}{\gamma y^*} & 0 \end{pmatrix}$$

The characteristic equation of  $J(E_3)$  is:

$$\det[J(E_3) - \lambda I] = 0$$

$$\left(\frac{rx^*}{K} + \lambda\right) \left[\lambda^2 + \left(\frac{ry^*}{x^*} - \frac{\beta n \omega^2 z^*}{\gamma^2 y^*}\right) \lambda + \frac{(\gamma - \omega n) \beta \omega^2 (z^*)^2}{\gamma^2 y^*}\right] = 0$$

Therefore, we obtain the eigenvalues:

$$\lambda_1 = -\frac{rx^*}{K}, \lambda_{2,3} = \left(\frac{\beta n \omega^2 z^*}{2\gamma^2 y^*} - \frac{ry^*}{2x^*}\right) \pm \sqrt{\left(\frac{\beta n \omega^2 z^*}{2\gamma^2 y^*} - \frac{ry^*}{2x^*}\right)^2 - \frac{(\gamma - \omega n) \beta \omega^2 (z^*)^2}{\gamma^2 y^*}}$$

It is clear that  $\lambda_1 < 0$ . We also note that from the existence condition that  $E_3$  we get  $\gamma > \omega n$  so that

$$\frac{(\gamma - \omega n) \beta \omega^2 (z^*)^2}{\gamma^2 y^*} > 0. \text{ From the fact that } \frac{ry^*}{x^*} - \frac{\beta n \omega^2 z^*}{\gamma^2 y^*} > 0 \text{ we have that } \gamma > \frac{\omega}{y^*} \sqrt{\frac{\beta n x^* z^*}{r}}. \text{ Therefore}$$

$\text{Re}(\lambda_{2,3}) < 0$ . Therefore, it can be concluded that  $E_3$  is locally asymptotically stable.

According to the analysis results, modifying the value of  $\gamma$  will affect the presence and stability of  $E_2$  and  $E_3$ . More specifically, adjustments in  $\gamma$  can impact the stability of  $E_2$ , which is connected to the appearance of a critical point  $E_3$ . Additionally, changing  $\gamma$  causes the loss of stability in  $E_3$ . This condition also indicates the occurrence of a Hopf bifurcation.

#### 4. Numerical Simulation

To understand the interactions between prey, predators, and super-predators, we can analyze the changes in the phase field and solution fields. These fields provide information about the populations of prey and predators over time. The dynamics of the system solution (1) are illustrated in figures 1, 2, and 3 of the phase portrait. Before conducting these calculations, it is necessary to assign initial values to every variable and parameter. In this simulation, we utilized integral Runge-Kutta and Maple 18 software for the computational process.

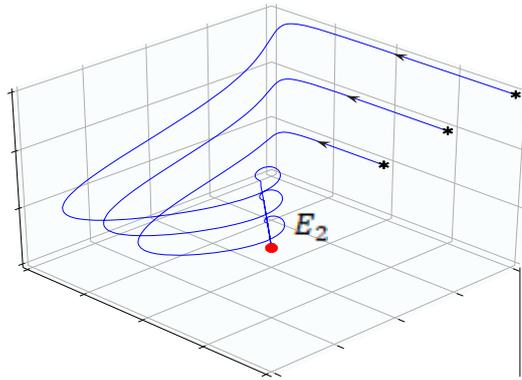


Figure 1. Phase portrait of the solution of model (1) around the equilibrium point  $E_2$ .  $\gamma=0,1$

The equilibrium point  $E_2$  is locally asymptotically stable at  $\gamma \approx 0.11$ , but loses its stability beyond this value. This condition is also linked to changes in the stability of  $E_3$  as  $\gamma$  exceeds 0.11. Solutions around  $E_2$  will converge to  $E_2$ , resulting in the extinction of the super predators. Numerically, this condition signifies the occurrence of the Transcritical bifurcation. See Figure 1.

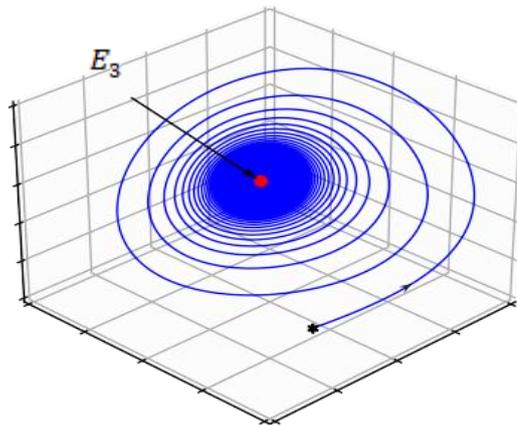


Figure 2. Phase portrait of the solution of model (1) around the equilibrium point  $E_3$ .  $\gamma=0,163$

The equilibrium point  $E_3$  is a locally asymptotically stable spiral, which means that all solutions eventually converge to a point within its interior. This property ensures the persistence of the entire population. However, at time  $\gamma=0,163$ , the equilibrium point  $E_3$  loses its stability due to the Hopf bifurcation. See Figure 2.

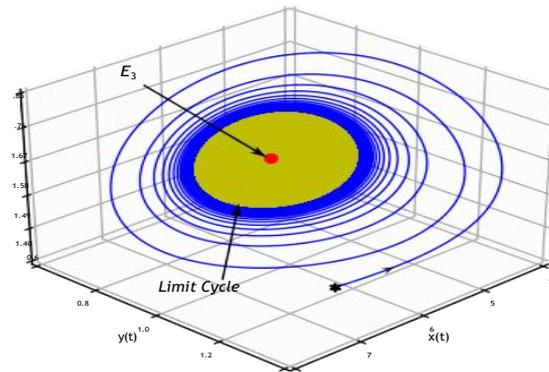


Figure 3. Phase portrait of the solution of model (1) around the equilibrium point  $E_3$ .  $\gamma=0,165$

For  $\gamma=0,165$ , the equilibrium point  $E_3$  is a locally asymptotically stable spiral. This means that all solutions will eventually converge to a limit cycle. From a biological perspective, even though  $E_3$  is unstable, the three populations will still be sustained, with their densities changing periodically over time. See Figure 3.

## 5. Conclusion

The findings of this study suggest that in order to comprehend the dynamics of the model solution and prevent the extinction of predator species, it is equilibrium to take into account the growth conversion rate parameter of predator species into super predators. Both the conditions for existence and numerical simulations support the asymptotic stability of equilibrium points  $E_2$  and  $E_3$ . Moreover, the observed numeric continuity in the prey-predator-super predator model indicates that the growth rate of predator species into a super predator has an impact on stability, indicating the occurrence of a Hopf bifurcation phenomenon.

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POWER OF RELATIONAL ALGEBRA IN SQL SERVER

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**ABSTRACT:**

Relational algebra serves as the foundation of the Structured Query Language (SQL) and underpins the relational database model that powers modern data management systems. In this article, we delve into the intricacies of relational algebra within the context of SQL Server, one of the most widely used relational database management systems.

We begin by providing a comprehensive overview of relational algebra, covering fundamental concepts such as set theory, relational operators, and query optimization techniques. We explore how SQL Server implements these concepts through its query processing engine, examining the execution plans generated for various SQL queries.

We showcase how to use relational operators such as selection, projection, join, and aggregation to perform complex data manipulation tasks efficiently. Additionally, we discuss advanced topics such as subqueries, set operations, and recursive queries, highlighting their importance in database development and optimization.

Throughout the article, we emphasize best practices and performance considerations for leveraging relational algebra in SQL Server. We discuss indexing strategies, query tuning techniques, and the importance of understanding relational algebra concepts to write efficient SQL code.

This article serves as a comprehensive guide for anyone seeking to deepen their understanding of relational algebra and its practical application in SQL Server.

**Keywords:** Relational algebra, SQL-Server, queries, practical application.

**INTRODUCTION**

In the realm of database management, the Structured Query Language (SQL) stands as the lingua franca, providing a standardized means of interacting with relational databases. At the core of SQL lies relational algebra, a mathematical framework that forms the backbone of database query operations. Understanding relational algebra is essential for harnessing the full power of SQL Server, one of the most prevalent relational database management systems in use today.

Relational algebra provides a formal foundation for manipulating data stored in relational databases. It enables users to perform a wide array of operations, ranging from simple data selection and projection to complex joins, aggregations, and set operations. In SQL Server, these relational algebraic operations are translated into SQL queries, which are then executed by the database engine to retrieve, manipulate, and analyze data. [7]

This article explores the power of relational algebra within the context of SQL Server. We delve into the fundamental principles of relational algebra, examining how they are implemented and optimized in SQL Server's query processing engine. [7] Through practical examples and real-world scenarios, we illustrate how relational algebra empowers developers and database administrators to perform sophisticated data manipulation tasks efficiently.

By gaining a deep understanding of relational algebra in SQL Server, readers will be equipped with the knowledge and skills to write efficient SQL queries, optimize database performance, and leverage the full capabilities of SQL Server for their data management needs. Whether you're a seasoned database professional or a novice SQL user, this article will serve as a valuable resource for mastering relational algebra and unleashing the true potential of SQL Server. [7]

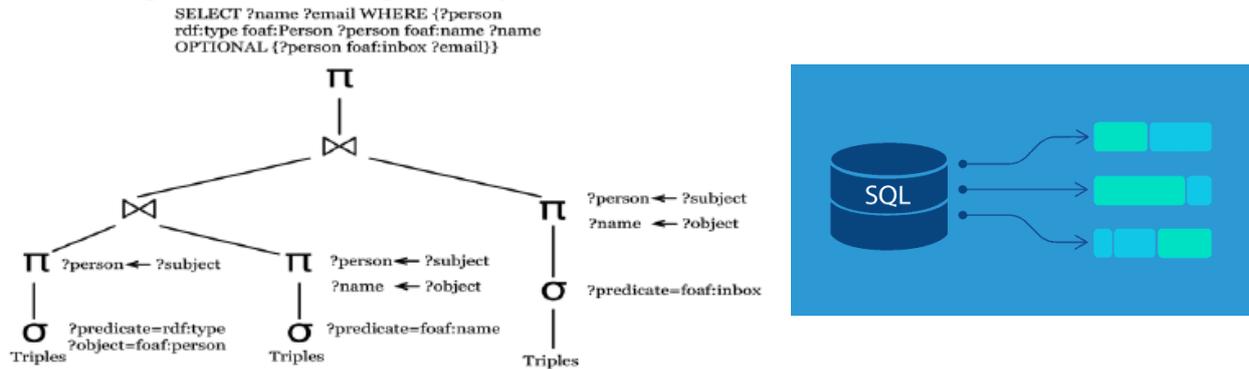


Figure 1. Algebra Relationale in SQL (Structured Quers Language)

## RELATED WORKS

"Foundations of SQL Server Query Optimization" this book by Kalen Delaney provides an in-depth exploration of query optimization techniques in SQL Server, including the role of relational algebra in query planning and execution.[1]

"SQL Performance Explained" Markus Winand's book offers practical insights into optimizing SQL performance across various database management systems, with a focus on understanding relational algebra concepts and their impact on query execution. [2]

"SQL Antipatterns: Avoiding the Pitfalls of Database Programming"

Bill Karwin's work identifies common SQL coding practices that can lead to inefficient queries and performance bottlenecks. It offers guidance on leveraging relational algebra effectively to write more efficient and maintainable SQL code in SQL Server and other databases. [3]

"Inside Microsoft SQL Server: Query Tuning and Optimization"

This book by Benjamin Nevarez provides comprehensive coverage of query tuning and optimization techniques specific to SQL Server. It discusses the role of relational algebra in query processing and offers practical tips for improving query performance.

"SQL Server Execution Plans". [4]

Grant Fritchey's book focuses on understanding and interpreting SQL Server execution plans, which are essential for optimizing query performance. It delves into how relational algebra concepts are translated into execution plans and provides insights into query optimization strategies. [5]

These related works offer valuable insights into the role of relational algebra in SQL Server query optimization and performance tuning, providing practical guidance for developers and database administrators.

## MATERIALS AND METHODS

**SQL Server Documentation:** Begin by referencing official documentation provided by Microsoft for SQL Server. This includes online resources, whitepapers, and technical documentation that detail the implementation of relational algebra concepts within SQL Server.

**Textbooks and Academic Papers:** Consult textbooks and academic papers on relational algebra and SQL Server. Look for publications authored by database experts and researchers that delve into the theoretical foundations and practical applications of relational algebra in SQL Server. [1], [2], [3], [4], [5]

**Online Tutorials and Courses:** Explore online tutorials, courses, and educational platforms that offer in-depth training on SQL Server and relational algebra. Websites like Microsoft Learn, Udemy, Coursera, and Khan Academy may provide valuable resources for understanding the concepts and techniques involved.

**SQL Server Management Studio (SSMS):** Utilize SQL Server Management Studio (SSMS) as the primary tool for experimenting with relational algebra queries. SSMS provides a user-friendly interface for writing and executing SQL queries, analyzing query execution plans, and optimizing query performance.

**Sample Databases:** Acquire sample databases that contain diverse datasets for practicing relational algebra queries. Microsoft provides several sample databases such as AdventureWorks and WideWorldImporters, which can be downloaded and used for experimentation and learning purposes.

**SQL Server Profiler:** Employ SQL Server Profiler to capture and analyze query execution events in real-time. This tool allows you to trace SQL statements, monitor query performance metrics, and identify areas for optimization when working with relational algebra queries.

**Query Optimization Techniques:** Study query optimization techniques specific to SQL Server, including index usage, query hints, and statistics management. Experiment with different optimization strategies to improve the performance of relational algebra queries in SQL Server.

**Peer Collaboration and Forums:** Engage with the SQL Server community through forums, discussion boards, and online communities such as Stack Overflow and SQLServerCentral. Collaborate with peers, ask questions, and share insights and experiences related to relational algebra in SQL Server.

By leveraging these materials and methods, you can gain a comprehensive understanding of relational algebra in SQL Server and develop proficiency in writing efficient and optimized SQL queries for various data manipulation tasks.

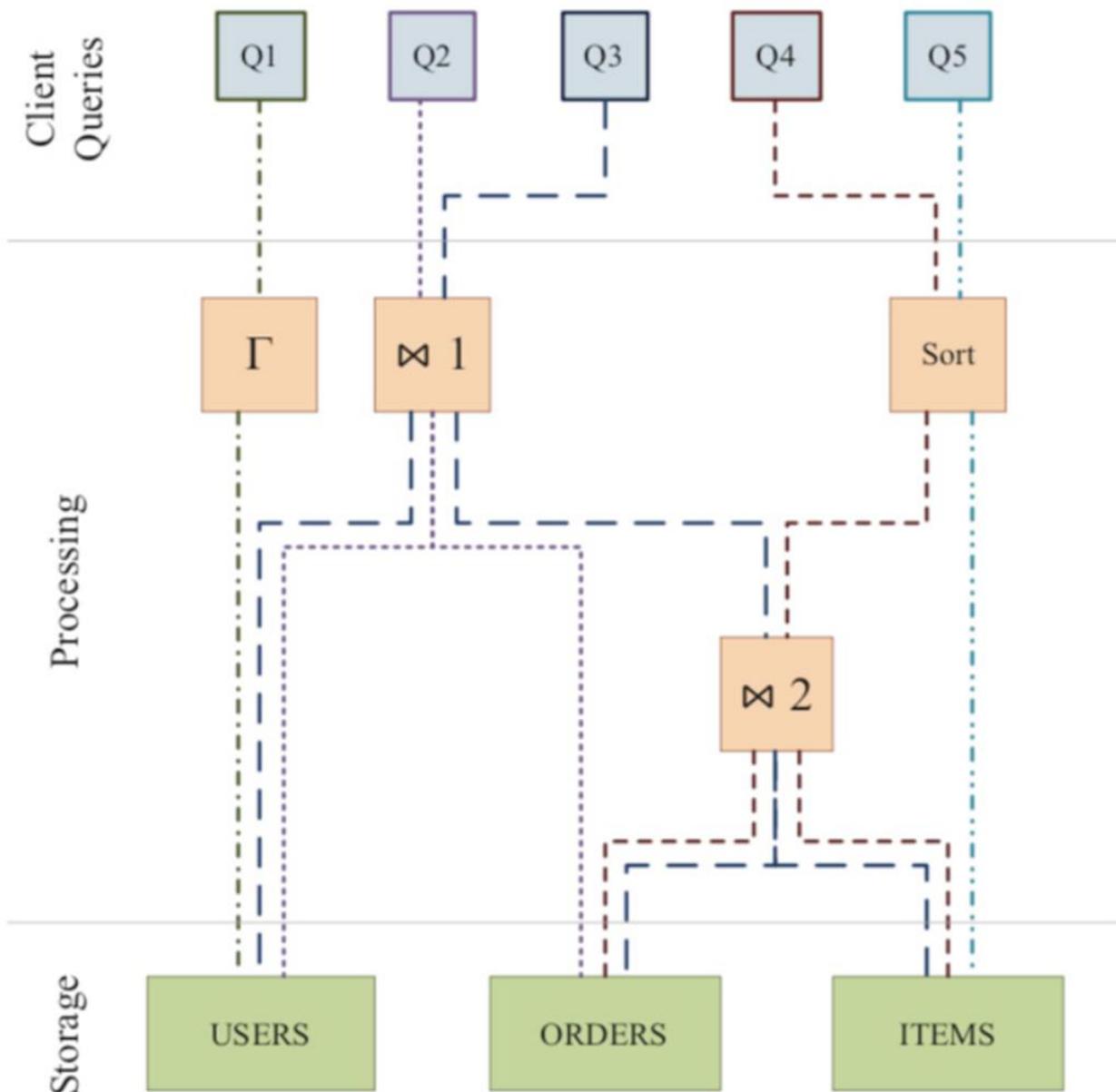


Figure 2. A plan for executing five queries together as shown in the SharedDB paper [7]

## THE POWER OF RELATIONAL ALGEBRA IN SQL SERVER: AN EXPERIMENTAL STUDY

Relational algebra forms the backbone of SQL (Structured Query Language) and is instrumental in database query processing. In this experimental study, we explore the efficacy and performance of relational algebra operations within the SQL Server environment.

We begin by outlining the foundational principles of relational algebra and its relevance in SQL Server's query execution model. [10] Through a series of experiments, we investigate the execution times and resource utilization of various relational algebra operations, including selection, projection, join, and aggregation, across different database configurations and query complexities.

Our study encompasses a diverse range of scenarios, from simple single-table queries to complex multi-table joins and aggregate functions. We analyze the impact of factors such as indexing strategies, query optimization techniques, and data distribution on the performance of relational algebra operations in SQL Server. [17] Relational algebra is a procedural query language, which takes instances of relations as input and yields instances of relations as output. It uses operators to perform queries. [9]

Furthermore, we compare the performance of relational algebra operations with alternative approaches, such as procedural programming using stored procedures or application-level data manipulation. We discuss the trade-offs between these approaches in terms of development complexity, query flexibility, and performance optimization.

Through our experimental findings, we provide insights into best practices for leveraging relational algebra in SQL Server to optimize query performance and enhance overall database efficiency. Our study serves as a valuable resource for database developers, administrators, and researchers seeking to harness the power of relational algebra in SQL Server for improved data management and query processing. [13]

Álgebra	SQL
(Pacientes)	Select * From Pacientes
$\sigma_{idade > 18}$ (Pacientes)	Select * From Pacientes Where idade > 18
$\pi_{CPF, nome}$ (Pacientes)	Select CPF, nome From Pacientes
$\pi_{CPF, nome} (\sigma_{idade > 18} (\text{Pacientes}))$	Select CPF, nome From Pacientes Where idade > 18

Figure 3. Sets and Operators to convert in SELECT QINCIDENCE AND PREDICTIVE

**FACTORS OF CATHETER-RELATED INFECTIONS IN PERITONEAL DIALYSIS: A CHALLENGE TO OVERCOME**

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**Introduction:**

The advantages of peritoneal dialysis include cost-effectiveness, good hemodynamic tolerance, and the ability to perform dialysis at home. However, infectious complications are quite common and could jeopardize patients' prognosis. In this context, this study aimed to determine the incidence and predictive factors of catheter-related infections in peritoneal dialysis.

**Materials and Methods:**

We conducted a prospective cohort study over 10 months between April and January 2024, involving 33 patients with chronic kidney disease at the peritoneal dialysis stage in outpatient care, with daily monitoring in a peritoneal dialysis unit of a university hospital center.

**Results:**

The median age of the patients was 42 years (Interquartile Range [IQR]= [31.5-57.5]). The sex ratio was 2.3. Twenty subjects were hypertensive (60.6%), and 9 patients were diabetic (27.3%). The etiologies of chronic kidney disease were interstitial nephropathy in 7 cases (21.2%) and diabetic nephropathy in 6 cases (18.1%). The median duration of chronic kidney disease was 8 years (IQR= [4-10]). Twenty-five patients had preserved diuresis (75.8%). Twenty-four patients were on continuous ambulatory peritoneal dialysis (72.7%). We noted 26 infections in 12 patients (infection-to-infected ratio = 2.16), with a cumulative incidence of infection of 78.8/100 catheters and an incidence of

infected patients of 36.4%. The median time to infection occurrence was 5 months (IQR= [2.41-14.8]). The most frequent infectious sites were catheter-related infections (11 infections; 42.3%), followed by peritonitis (7 infections; 26.9%) and exit site infections (5 infections; 19.2%). The most incriminated pathogen was Staphylococcus aureus in 9 cases of infections (34.5%). The most revealing symptoms of these infections were abdominal pain (8 cases, 24.2%), local redness, pus discharge, and serous discharge in 2 cases each (6.1%).

The study of predictive factors for infection revealed that a history of diabetes (45.3% versus 20.5%;  $p=0.02$ ) and duration of chronic kidney disease (5 years [IQR= [4-8]] versus 3 years [IQR= [2-5]];  $p=0.001$ ) were significantly associated with infection occurrence. Furthermore, poor personal hygiene of the patient (52.3% versus 30.1%;  $p= 0.015$ ) and failure to adhere to strict aseptic rules during catheter insertion (70.4% versus 55.6%;  $p=0.041$ ) were predictive factors for infection.

## Conclusion:

The incidence of infections in patients undergoing peritoneal dialysis has reached a worrying threshold, with manually transmitted pathogens being the most incriminated. Therefore, raising awareness among healthcare professionals and patients about the strict application of contact prevention measures is strongly recommended.

## queries

Sure, here's a simple example of using relational algebra as a query language to retrieve data from a hypothetical database:

Let's say we have a database with two tables:

1. Students (with attributes: StudentID, Name, Age, GPA)
2. Courses (with attributes: CourseID, CourseName, Credits)

Now, let's write a relational algebra query to find the names of students who are enrolled in a course named "Mathematics" and are older than 20 years old.

We can express this query using relational algebra operations:

relational algebra

$\pi_{\text{Name}}(\sigma_{\text{CourseName}=\text{'Mathematics'} \wedge \text{Age} > 20}(\text{Students} \bowtie \text{Enrollments}))$

In this query:

- $\sigma$  denotes the selection operation, which filters rows based on a condition.
- $\pi$  denotes the projection operation, which selects specific columns from the result.
- $\bowtie$  denotes the natural join operation, which combines rows from two relations where they have equal values in their common attributes.

So, in this query:

- $\sigma_{\text{CourseName}=\text{'Mathematics'}}$  selects rows from the Enrollments relation where the CourseName is "Mathematics".
- $\text{Age} > 20$  selects rows from the Students relation where the Age is greater than 20.
- The natural join ( $\bowtie$ ) combines the resulting rows from both relations.
- Finally,  $\pi_{\text{Name}}$  selects only the Name column from the resulting relation.

This query would return the names of students who are enrolled in the Mathematics course and are older than 20 years old.

## RESULTS AND DISCUSSIONS

Relational algebra provides the theoretical foundation for relational databases, including SQL Server. SQL Server, like other relational database management systems (RDBMS), implements and extends the concepts of relational algebra to enable efficient data storage, retrieval, and manipulation. Here are some key aspects of the power of relational algebra in SQL Server:

1. SQL Server's query language, Transact-SQL (T-SQL), is based on relational algebra principles. It provides a rich set of operators and functions that allow users to express complex queries in a concise and intuitive manner. By leveraging relational algebra concepts, developers can write SQL queries that efficiently retrieve and manipulate data from the database.
2. Relational algebra operations such as selection ( $\sigma$ ), projection ( $\pi$ ), join ( $\bowtie$ ), union ( $\cup$ ), and intersection ( $\cap$ ) are fundamental to SQL queries in SQL Server. These operations allow users to filter, combine, and transform data from multiple tables to obtain the desired results. For example, users can join tables using common attributes, apply conditions to filter rows, and select specific columns for output.
3. SQL Server's query optimizer uses relational algebra principles to optimize the execution of SQL queries. The optimizer analyzes the query's structure and generates an efficient execution plan that minimizes the overall cost of accessing and processing data. This may involve choosing the most appropriate join algorithm, selecting optimal indexes, or rearranging operations to reduce intermediate result sizes.
4. Relational algebra operations are not limited to query retrieval; they also support data manipulation operations such as insertion, deletion, and updating of records in SQL Server. SQL statements like INSERT, DELETE, and UPDATE allow users to modify the contents of tables based on specified conditions, maintaining the integrity and consistency of the database.
5. Relational algebra principles emphasize data integrity through constraints such as primary keys, foreign keys, and check constraints. SQL Server supports these constraints to enforce data integrity rules and ensure that data remains consistent and accurate across tables. For example, primary key constraints prevent duplicate entries in key columns, while foreign key constraints maintain referential integrity between related tables.
6. Relational algebra treats relations as sets of tuples, allowing users to perform set operations such as union, intersection, and difference. SQL Server supports these set operations through keywords like UNION, INTERSECT, and EXCEPT, enabling users to combine or compare the results of multiple queries.

In summary, relational algebra serves as a powerful framework for data manipulation and query processing in SQL Server. By understanding and leveraging relational algebra principles, developers can write efficient SQL queries, optimize query performance, and ensure data integrity within the database.

## CONCLUSION

The power of relational algebra in SQL Server manifests in its ability to provide a solid theoretical foundation for relational databases, support efficient query processing and optimization, enforce data integrity constraints, and facilitate expressive and intuitive data manipulation through SQL queries. This underpinning enables SQL Server to effectively manage and leverage relational data to meet the needs of various applications and users.

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CONCRETE STRENGTH ASSESSEMENT: USING ANN FOR PREDICTIVE MDELING

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**ABSTRACT**

Slag is commonly included in cement as alternative to enhance its physical and mechanical properties. Consequently, the utilization of artificial neural network (ANN) technology has become increasingly beneficial and essential for predicting compressive strength (CS) of concrete. To achieve this, a prediction model was constructed using a dataset compiled from various research experiments. Assessing the factors affecting the studied mechanical properties, the developed model demonstrated strong performance in learning, testing, and validation, exhibiting a commendable correlation of 96% and a mean squared error of 0.022. A parametric analysis and comparison of predicted values with experimental findings from other researchers further validated the efficiency of the model, suggesting its reliability for CS prediction of slag concrete.

**Keywords:** Slag concrete, Artificial neural networks, Compressive strength, predictive modeling.

**PREVALENCE AND FACTORS ASSOCIATED WITH PHYSICAL ACTIVITY IN TYPE 2  
DIABETIC PATIENTS**

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## **Introduction**

The benefits of regular physical activity have been widely demonstrated in patients with type 2 diabetes mellitus (T2DM), particularly in improving glycemic control. The aim of this study was to assess the level of physical activity practiced by patients with T2DM and to identify its associated factors.

## **Methods**

A cross-sectional study was conducted during the period between 01 October 2023 and 17 March 2024 among a representative sample of T2DM in the Governorate of Sfax, Southern Tunisia. Patients with Oral Hypoglycemic Medications were recruited from basic health-centers and those treated with Insulin were selected from endocrinology department of Hedi Chaker University Hospital. The International Physical Activity Questionnaire (IPAQ) was used to assess physical activity practice.

## **Results**

A total of 168 patients participated in the study. The sex ratio (Male/Female) was 0.85. The median age was 62 years (interquartile range (IQR) = [55-68]). One hundred and five patients were hypertensive (62.9%), 75 had dyslipidemia (44.9%) and 28 patients were active smokers. We noted that 99 patients had a poor glycemic control ( $HbA1c \geq 7\%$ ) (59.3%). Eighty-three patients (49.7%) had diabetes-related complications.

We noted that 136 patients practiced physical activity, among whom, 68 patients practiced daily walking (50%), 61 patients practiced moderate physical activity such as carrying light weights and cycling (44.9%) and 7 patients practiced intense physical activity like carrying heavy loads (5.1%).

For physical activity levels, we noted that 98 patients had low activity level (58.7%) and 69 patients (41.3%) had intense and moderate activity levels in respectively 32 cases (19.2%) and 37 cases (22.2%).

Regular physical activity was significantly less frequent in T2DM patients with degenerative complications (32.5% vs 50.6% ;  $p=0.018$ ), particularly among those with diabetic neuropathy (6.5% vs 33% ;  $p=0.004$ ) and those with other comorbidities (36% vs 64.5% ;  $p=0.004$ ). On the other hand, it was more frequently observed in cases of regular diabetes follow-up (46.2% vs 12.5% ;  $p=0.002$ ) and among diabetics whose disease had been evolving for less than 5 years (67.9% vs 36% ;  $p=0.002$ ).

### **Conclusion**

This study showed that regular physical activity was relatively low among T2DM patients. Promoting the value of physical activity and health education among this at-risk population would be of great benefit in the management of these patients.

**MEDIDAS ERGONÓMICAS Y PROTOCOLOS DE SEGURIDAD E HIGIENE EN EL ENTORNO LABORAL PARA LA PRODUCTIVIDAD**

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**RESUMEN**

La clave del éxito empresarial radica en la optimización de la productividad, pero esta búsqueda de eficiencia no debe comprometer la salud y seguridad de los trabajadores. La deficiencia en la productividad puede atribuirse a las condiciones laborales deficientes, destacando la importancia de medidas ergonómicas y protocolos de seguridad e higiene para mejorar el desempeño laboral y prevenir accidentes y enfermedades. Esta investigación es de enfoque cualitativo y se utilizaron las técnicas de investigación: revisión documental y revisión del estado del arte sobre el tema de ergonómicas y protocolos de seguridad e higiene en el entorno laboral para la productividad. Recopilando información de diferentes artículos científicos y libros. De acuerdo con los expertos se recomienda la efectiva ejecución de las medidas ergonómicas en las empresas para evitar riesgos laborales en diferentes áreas de trabajo. La implementación de medidas ergonómicas y protocolos de seguridad e higiene en el entorno laboral es esencial para garantizar la salud y el bienestar de los trabajadores, lo que a su vez contribuye a una mayor productividad. Al priorizar la seguridad y el confort de los empleados, las empresas pueden reducir los accidentes laborales, mejorar la moral, así como la satisfacción laboral, a su vez aumentar la eficiencia en general.

**Palabras clave:** Productividad, Ergonómicas, Implementación, Seguridad e Higiene

FACTORS INFLUENCING THE EMIGRATION OF TUNISIAN YOUNG DOCTORS

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**Introduction:** The emigration of young qualified professionals, including doctors, is a notable worldwide phenomenon with far-reaching effects. This brain drain affects both the source countries losing skilled professionals and destination countries benefiting from their expertise. For instance, Tunisia lost important human capital in recent decades crucial for economic growth and advancement of sectors, particularly healthcare.

**Aim:** This study aimed to determine the factors influencing the emigration of Tunisian young doctors.

**Methods:** This was a cross-sectional descriptive study conducted among a sample of young doctors working at the two university hospitals of Sfax. Data collection was carried out from January to August 2023 through an anonymous self-administered questionnaire. We defined “young doctors” as students of the first to the third cycle of medical studies including interns and residents. The minimum necessary sample size was 103 based on data from university-of-Sfax. We conducted multivariable logistic regression and calculated the adjusted-Odds-Ratio (aOR) with the confidence interval (CI) to identify predictive factors of emigration among young Tunisian doctors.

**Results:** A total of 325 young doctors completed the questionnaire. Their mean age was  $22.54 \pm 3.24$  years. The factors independently associated with the Tunisian young doctor's desire to emigrate were the instability in the familial situation in Tunisia ( $p=0.028$ ,  $aOR=3.029$ ,  $95\%CI=[1.129-8.128]$ ), failing at least once in a medical exam during medical curriculum ( $p=0.010$ ,  $aOR=2.285$ ,  $95\%CI [1.217-4.290]$ ) and seeking better economic-status ( $p<10^{-3}$ ,  $aOR=3.812$ ,  $95\%CI=[2.002-7.256]$ ). The factor independently associated with the desire to work as a physician in Tunisia was having a medical history of depression ( $p=0.013$ ,  $aOR =0.381$ ,  $95\% CI= [0.177-0.818]$ ).

**Conclusion:** The factors shown by this study influencing Tunisian young doctor's desire to emigrate require a nuanced understanding of the instability in their life and medical curriculum in Tunisia, but also their concerted motivation to create a better economic status abroad. This brain drain needs more national decisions and efforts to maintain environments conducive to retaining and attracting young doctors to work in their homeland.

**Key words:** Emigration, doctors, Tunisia

**MEDICINES ISOLATED FROM PLANTS: MORE IMPORTANT THAN THEY SEEM AT FIRST SIGHT**

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**ABSTRACT**

Nature has been a fantastic reservoir of substances with therapeutic properties for millennia. There is a misconception among the general public that pharmaceutical drugs are exclusively synthetic products while plant-based remedies, considered natural, are an integral part of herbal medicine. However, today, over 100 active ingredients are derived from plants used as well-known drugs. Many modern medicines are isolated from natural sources such as plants, animals, and microbes. This paper aims to explore ten well-known drugs with critical therapeutic properties that were isolated from nature:

- **Digoxin**, a medication used to treat several heart conditions, was first isolated in 1930 from the foxglove plant *Digitalis lanata*;
- **Caffeine**, a central nervous system stimulant, isolated from leaves, nuts seeds, and fruits of a several plant native's to South America;
- **Codeine** is an opiate that occurs naturally and makes up about 2% of opium;
- **Ephedrine**, a central nervous system stimulant obtained from the plant *Ephedra sinica*;
- **Vinblastine**, chemotherapy medication, isolated from the *Madagascar periwinkle*;
- **Atropine**, a tropane alkaloid and anticholinergic medication isolated from plant *Atropa belladonna*;
- **Benzyl benzoate**, a low-cost topical treatment for human scabies, occurs in a component of Balsam of Peru.
- **Quinine**, a medication used to treat malaria, is isolated from the *Cinchona calisaya* plant.

All the drugs are discussed from the perspectives of sources, medical use, mechanism of action, contraindications, and adverse effects. When appropriate, synthesis methods are also presented. It was emphasized that all the discussed plant-based medicines are on the World Health Organization's List of Essential Medicines.

**Keywords:** plant-based drugs, atropine, caffeine, vinblastine

TRANS FATS: SOURCES CONSUMPTION, HEALTH EFFECTS AND REGULATION

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**ABSTRACT**

The problem of fat intake, from the perspective of type, quantity, and therapeutic effects, is always a hot topic for nutritionists and the general public. Consumption of saturated fats and their increased coronary heart disease and mortality, the link between high blood levels of omega-3 fatty acids and prostate cancer, and pro-inflammatory properties of omega-6 fatty acids are just some of the controversial topics in the field of nutritional sciences. Beyond all this, one thing seems clear: trans fats are the worst type of dietary fat and must be eliminated.

The present paper focuses on the latest advances regarding trans fats, the hidden enemy found in many delicious foods.

The study tries to answer some essential questions about trans fats:

- *What are the primary sources of trans fats?* Thus, industrial processes such as hydrogenation of vegetable oil and conventional cooking methods, along with natural sources such as meat and dairy foods from ruminant animals (e.g., cows, sheep, and goats), are analyzed in detail.
- *Which foods contain trans fats?* A list of the most common food products on the market that contain trans are presented.
- *Why are trans fats so dangerous?* Raising Low-density lipoprotein (LDL) cholesterol and lowering High-density lipoprotein (HDL) cholesterol are the double troubles generated by consuming even limited quantities of trans fats.

The paper also emphasizes the most important actions initiated by the FDA to reduce artificial *trans* fat in the food supply.

**Keywords:** trans fat, low-density lipoprotein, hydrogenation

**A REVIEW OF ANTHROPOMETRIC CHANGES AND MOTOR SKILLS IN 7-11 YEAR OLD CHILDREN**

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**Abstract**

The period between 7 and 11 years of age marks a crucial phase of motor skill development in children, characterized by optimal learning abilities and sensitivity to skill acquisition. This review aims to summarize recent literature focusing on anthropometric changes, obesity, coordination, and motor skills in children within this age range. A systematic search was conducted on PubMed, JabRef, and ResearchGate, resulting in the inclusion of many studies meeting the predefined criteria. The review highlights the need for more longitudinal and randomized studies to periodically assess anthropometric changes, body mass index (BMI) levels, coordination, and motor skills in this age group. Additionally, physical activity (PA) programs should prioritize the improvement of these parameters to promote healthy development in children. The review highlights the need for more longitudinal and randomized studies to periodically assess anthropometric changes, body mass index (BMI) levels, coordination, and motor skills in this age group. Additionally, physical activity (PA) programs should prioritize the improvement of these parameters to promote healthy development in children. Furthermore, the review underscores the importance of considering socio-economic and environmental factors that may influence anthropometric changes and motor skill development during this critical period. Future research should explore innovative intervention strategies aimed at enhancing motor skills and reducing the prevalence of childhood obesity, ultimately fostering a healthier generation.

Keywords: Obesity, anthropometric, coordination, motor abilities, children

**Introduction**

Childhood obesity has been on the rise globally, posing significant health concerns, including impaired motor skill development. The period preceding puberty, particularly between 7 and 11 years of age, is characterized by optimal motor learning abilities, making it a crucial phase for skill acquisition. However, the prevalence of obesity and its impact on coordination and motor skills in children within this age range necessitates attention. This review aims to synthesize existing literature to understand the relationship between anthropometric changes, obesity, coordination, and motor skills in 7-11-year-old children. This review aims to explore recent literature focusing on: Anthropometric changes, Obesity, Coordination and Motor skills in children aged 7-11 years.

**Methodology**

A systematic search was conducted on databases including PubMed, JabRef, and ResearchGate using predefined keywords. Studies meeting inclusion criteria were selected for review. Information regarding study design, sample size, interventions, and outcomes were extracted from each study.

## **Anthropometric Changes, Obesity, Coordination, and Motor Skills**

The review identified several studies addressing anthropometric changes, obesity, coordination, and motor skills in 7-11-year-old children (Table 1).

Childhood overweight and obesity represent significant public health challenges globally, with prevalence rates steadily increasing over the past few decades (Ogden et al., 2002; Rolland-Cachera et al., 2002). This trend is particularly alarming given the numerous adverse health outcomes associated with excess weight during childhood and later in life. The consequences of childhood obesity extend beyond physical health, impacting psychological well-being, social interactions, and academic performance.

The pre-pubertal phase is recognized as a critical period for motor skill development, characterized by rapid growth and neural plasticity (Meinel, 1960). During this stage, children exhibit heightened learning abilities, making it an opportune time for interventions aimed at enhancing motor skills. Research has consistently shown that proficiency in motor skills not only facilitates physical activity engagement but also contributes to overall well-being and social integration (Rose et al., 1997; Weiss & Duncan, 1992).

However, children who experience difficulties in acquiring motor skills may face social challenges, including peer rejection, ridicule, and exclusion (Fitzpatrick & Watkinson, 2003; Mandich et al., 2003). These negative experiences can further exacerbate sedentary behaviors and contribute to the development of obesity, creating a vicious cycle that perpetuates poor health outcomes.

In recent years, there has been growing interest in understanding the relationship between childhood obesity and motor skill development. Studies have explored various aspects of this relationship, including the impact of obesity on specific motor skills, the role of physical activity interventions in improving motor performance, and the underlying mechanisms linking obesity and motor skill deficits.

Graf et al. (2005) examined the effects of intervention on BMI and motor abilities, shedding light on the differential motor performance of overweight and obese children compared to their normal-weight peers. Similarly, D'Hondt et al. (2008) provided insights into the challenges faced by obese children in fine motor control tasks, highlighting the need for targeted interventions to address these deficits.

De Toia et al. (2009) and D'Hondt et al. (2009, 2010) further elucidated the association between weight status and gross motor coordination, revealing significant differences between healthy-weight and overweight/obese children. These findings underscore the importance of early intervention strategies to promote motor skill development and mitigate the negative consequences of obesity.

Research by Castetbon and Andreyeva (2012) explored the nuanced relationship between obesity and motor skills, considering individual, social, and economic factors. Their findings underscored the multifaceted nature of this relationship, emphasizing the need for comprehensive interventions that address underlying determinants of motor skill proficiency.

Table 1: Literature Review: Anthropometric Changes, Obesity, Coordination, and Motor Skills studies

Author's Name	Year of publ	Type of study	Number of subjects	Type of intervention
1.Graf Ch et al.	2005	Children's Health Interventional Trial	651	The anthropometric data were assessed, BMI was calculated. Coordination was determined by lateral jumping and endurance performance by a 6-minute run.
2.D'Hondt E et al.	2008	Non specified	540	Participants had to perform a peg placing task under different postural constraints. The peg placing task for 9- and 10-year olds from the Movement Assessment Battery for Children (MABC)
3.De Toia D et al.	2009	Randomized control trial	27 kindergarden (Total 1300 children's)	The modified Karlsruher Motor Ability Screening. Test was carried out to determine the motor abilities of speed strength, muscular endurance, coordination, flexibility, and speed.
4.D'Hondt E et al.	2009	Randomized control trial	117 children between the age of 5 and 10 years	Motor skill was assessed by means of the Movement Assessment Battery for Children (MABC)
5.D'Hondt E et al.	2010	cross-sectional design	954	Body Coordination Test for Children (Körper coordination's test f ü r Kinder [KTK]) to assess gross motor coordination
6.Castetbon K. and Andreyeva T.	2012	Repeated cross-sectional assessments of the national sample from EChLS Birth Cohort	5-6-year-old kindergarteners (n = 4700).	Multivariate logistic and linear models estimated the association between obesity and gross and fine motor skills in very young children adjusting for individual, social, and economic characteristics and parental involvement.
7.Khalaj & Amri S..	2013	Randomized control trial	40 (4-6 years)	The test of Gross motor development-second edition was used to evaluate gross motor development
8.Roebbers C. M et al.,	2013	Randomized control trial	169 (4-6 years old)	Fine motor skills were assessed by the manual dexterity scale (3 tasks at each assessment) from the Movement Assessment Battery for Children 2
9.Gallotta M Ch.	2014	Randomized control trial	230 (8-11 years old)	5 months PA interventions PA interventions started with 15 min of warm-up, followed by 30 min of continuous moderate-to vigorous physical activities (MVPA) and ended with 5 min of cool-down and stretching.
10.Burrows E.J et al.	2014	Research project employed a quasi-experimental design	135 (6-10 years)	a skeleton schedule of programming to undertake each week, with a one hour time period for structured activity.

### Conclusions & Recommendations

Based on the review findings, preventive interventions in primary schools offer an effective means to improve motor skills and combat the cycle of physical inactivity and motor deficits in childhood. Early intervention strategies targeting obesity and promoting physical activity are crucial for promoting healthy development in children. In summary, the literature reviewed highlights the complex interplay

between childhood obesity, motor skills, and physical activity. While obesity is associated with deficits in motor skills, the relationship is influenced by various factors, including age, type of skill, and environmental influences. Targeted interventions that address both obesity and motor skill development are essential for promoting healthy outcomes in children and reducing the long-term burden of obesity-related health complications.

Findings suggest a significant association between obesity and motor skill deficits, particularly in coordination and endurance tasks. Overweight and obese children demonstrated lower scores in motor skill assessments compared to their normal-weight peers. Furthermore, BMI-related differences in gross motor coordination were more pronounced in older age groups, emphasizing the importance of early intervention to promote physical activity and motor skill development. However, interventions such as physical activity programs have shown promising results in improving motor performance among overweight and obese children. The review highlights the need for more longitudinal and randomized studies to periodically assess anthropometric changes, body mass index (BMI) levels, coordination, and motor skills in this age group. Additionally, physical activity (PA) programs should prioritize the improvement of these parameters to promote healthy development in children. Furthermore, the review underscores the importance of considering socio-economic and environmental factors that may influence anthropometric changes and motor skill development during this critical period.

Future research should explore innovative intervention strategies aimed at enhancing motor skills and reducing the prevalence of childhood obesity, ultimately fostering a healthier generation. Future research should focus on longitudinal studies to further understand the long-term effects of obesity on motor skill development and identify effective intervention strategies to mitigate these effects.

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**USO DEL COMERCIO ELECTRÓNICO EN EMPRESAS TEXTILES:UNA REVISIÓN DE LA LITERATURA**

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La llegada del internet ha transformado el comercio, impulsando el crecimiento del comercio electrónico como una herramienta fundamental para las empresas modernas. El comercio electrónico ofrece oportunidades significativas, pero requiere una comprensión profunda y una adaptación ágil por parte de las empresas. El objetivo es ayudar a las empresas textiles a llegar a mas clientes e implementar el comercio electrónico basado en la estrategia.

Esta investigación se enfoca en comercios electrónicos y tendencias en compra en línea y se utilizaron artículos de investigación sobre el tema comercio electrónico recopilando información de mas de 10 fuentes dentro de las cuales se destacan artículos y páginas web.

A partir de esta revisión de la literatura se concluye que existen nuevas tendencias del mercado electrónico en el contexto del tratado entre México y Estados Unidos, sin embargo, solo encontramos conocimiento teórico no dirigido hacia las empresas textiles si no hacia el puro comercio electrónico lo que nos deja un camino por recorrer inexplorado y con preguntas que responder.

**Palabras Claves:** Comercio eléctrico, Empresas textiles, Tendencias en compra en línea, Herramientas

**DETERMINATION OF RISK FACTORS FOR MUSCULOSKELETAL DISORDERS IN THE AGRI-FOOD SECTOR**

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**ABSTRACT**

Musculoskeletal disorders, a major occupational health concern, are common in manufacturing companies. Although of multifactorial origin, work-related stresses play a major role in their occurrence. Identifying risk factors is essential for developing preventive measures.

The aim of our study was to identify musculoskeletal disorders in employees of a pastry-making company and to investigate their occupational and non-occupational risk factors.

We conducted an exhaustive cross-sectional study of workers in a pastry company located in the city of Sfax. Data were collected using forms containing socio-demographic and occupational characteristics. Screening for musculoskeletal disorders was carried out using the Nordic style questionnaire. Risk factors for musculoskeletal disorders were identified using bivariate association analysis in SPSS. A multivariate explanatory model using logistic regression was established using R software.

Our population consisted of 221 employees, the majority of whom were women (90.5%) with an average age of  $34.2 \pm 8.5$  years. The average length of service was  $10.2 \pm 6.9$  years. Various occupational constraints were identified, essentially poor spinal hygiene (94.1%), repetitive movements (69.7%) and prolonged sitting posture (51.1%). Musculoskeletal disorders were found in 47.5% of individuals, mainly affecting the neck, shoulder and lumbar spine.

The bivariate analytical study concluded that the presence of MSDs over the last 12 months was associated with higher age ( $p=0.000$ ), female gender ( $p=0.000$ ; OR=4.9 [2-11]) and increased length of service ( $p=0.000$ ). In addition, MSDs were associated with working in a prolonged sitting posture ( $p=0.000$ ; OR= 2.5 [1.5-4.3]).

In multivariate analysis, the presence of MSDs was significantly associated with age, job tenure and prolonged sitting posture.

The prevalence of musculoskeletal disorders was high among workers in the pastry company. Recognition of individual and occupational risk factors will help to establish appropriate preventive measures.

**Keywords:** musculoskeletal disorders, occupational health, manufacturing, risk factors

**THE RELATIONSHIP BETWEEN SHAME AND GUILT AS SELF-CONSCIOUS EMOTIONS AND DEPRESSION, IN EMERGING ADULTHOOD**

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**ABSTRACT**

Shame and guilt are self-conscious emotions closely intertwined and linked together due to their negative impact on self-evaluation, interfering with mental health and playing an important role in interpersonal and intrapersonal relationships. The emotion of shame is based on the belief that the self as a whole 'is' bad, while guilt is based on the belief that one 'did' something bad (Gilbert, 2001). Frequent feelings of shame and guilt can eventually form into a trait, involving negative feelings that are very painful and often crippling, such as feelings of inferiority, despair, helplessness, and the eagerness to hide personal flaws (Andrews et al., 2002). Researchers examining the role of shame and guilt, have found that guilt, shame, depression and negative self-esteem are strongly linked, as they share similar attributes (Hedman et al., 2013).

The purpose of the present study is to research the relationship between self-conscious affects, shame and guilt, gender and depressive symptoms. A total of 193 albanian students (age 18 to 27 years old) completed The Test of Self-Conscious Affect, TOSCA-3 (Tangney, 1990, Tangney et al., 1989), a standardized questionnaire for the albanian population (Haka, 2016), assessing shame, guilt and the Beck Depression Inventory (BDI; Beck & Steer, 1993) assessing depression.

The key findings were as follows: Shame and depression, has resulted in a statistically significant positive correlation, revealing that the higher the depressive symptoms, the higher levels of shame in individuals. Also, guilt and depression were moderately positively correlated. However, the correlation between guilt and depression was not as strong as that detected between shame and depression. Also, gender differences were observed in experiencing shame and guilt. Results show, a significant difference between females and males in the experience of shame, aligned with the present literature.

**Keywords:** self-conscious emotions, guilt, shame, depression, gender, emerging adulthood.

**INTRODUCTION**

The phenomenon of shame and guilt has garnered significant attention in recent years within the realms of social research, clinical psychology, and developmental psychology, due to its emotionally charged and compelling findings. A prominent theme in contemporary studies within this domain posits a robust association between this conscious emotion and social interaction (Tangney, 2002). Shame is based on the belief that the self 'is' bad, while guilt is based on the belief that one 'did' something bad (Gilbert, 2001). Gilliland et al. (2011) propose that individuals who shield themselves from distressing experiences of shame tend to withdraw from social interactions and engage in negative, self-critical thought processes, resulting in depressive symptoms. One potential factor for maintaining depression symptoms is negative self-evaluation, which is at the core of shame proneness experiences. Negative self-evaluation is a complex collection of processes with strong theoretical ties to depression (Beck, 1963). Main components of such evaluation are shame-proneness, self-criticism, and self-esteem. Examined separately, each has empirical support as a correlate and predictor of depressive symptoms (Auerbach, Ho, & Kim, 2014; Dunkley, Sanislow, Grilo, & McGlashan, 2009; Ehret, Joorman, & Berking, 2015; Kim, Thibodeau, & Jorgensen, 2011; Mills et al., 2015; Orth, Berking, & Burkhardt, 2006; Rice, Fallon, & Bambling, 2011; Sowislo & Orth, 2013). Many researchers have undertaken empirical studies to explore the role of shame and guilt in the development of psychological maladjustment (Tangney, 1996). Most studies showed that shame is

related to a variety of psychopathologies, such as depression (Andrews, 1995; Grabe, Hyde & Lindberg, 2007; Harper & Arias, 2004; Luby, Belden, Sullivan, Hayen, McCadney & Spitznagel, 2009; Stuewig & McCloskey, 2005; Thompson & Berenbaum, 2006), anger (Harper & Arias, 2004), social phobia (Helsel, 2005), borderline personality disorder (Rüsch, Lieb, Göttinger, Hermann, Schramm, Richter, Jacob, Corrigan & Bohus, 2007), and posttraumatic stress disorder following sexual abuse (Feiring & Taska, 2005). Some other studies comparing shame with guilt demonstrated that shame is one of the crucial factors in the development of anger arousal, resentment, irritability, a tendency to blame others, somatization, obsessive compulsive disorder, interpersonal sensitivity, low other-oriented empathetic responsiveness, self-oriented personal distress, anxiety, hostility, depression, and psychoticism (Rüsch, et al., 1997; Tangney et al., 1992a, Tangney, Wagner & Fletcher & Gramzow, 1992b, Tangney, 1991; Tangney & Dearing, 2002a, Tangney, Stuewig & Mashek, 2007; Wright, O'Leary & Balkin, 1989).

These comparisons indicate that shame can cause more pain than guilt. Shame is characterized not only criticism by the entire self, but also by sensitivity to being exposed to surroundings. The latter characteristic is noted by Benedict's (1967) definition of shame as an external sanction, and Inoue's (1977) definition of "public shame," which is experienced as a result of judgment by the membership group. It appears that people prone to shame cannot bear self-criticism because of extremely low self-esteem (Tangney & Dearing, 2002b, Rüsch et al., 2007), and as a result they project their criticizing self on their surroundings and feel as though they are being criticized by others. This theoretical framework posits a substantial link between functioning and shame, providing a deeper understanding of the profound impact of these shameful experiences in critical life domains essential for self-development, such as socialization.

Shame is crucial for social identity (Kaufman, 1996) and is closely tied to self-esteem, given that the essence of shame lies in individual self-evaluation and fixation on how others perceive the individual (Gilbert, 2001). Shame is a complex psychological phenomenon, and according to Ayers (2003), it is common for individuals to experience shame as a result of feeling embarrassed about an aspect of themselves or their interactions with others.

Shame, as a self-conscious emotion, has also been defined as an unappealing, undesirable, devalued, inferior, or flawed self-experience, associated with possessing defects, failures, and exposing deficiencies (Kaufman, 1989; Lewis, 1992; Gilbert, 1998, 2002; Tangney & Dearing, 2002; Tangney & Fisher, 1995). However, shame is a fundamental emotion in someone's social existence and self-identity (Gilbert, 2007b; Lewis, 1992; Tangney & Dearing, 2002; Tracy & Robins, 2004). Shame is made up of a complex mix of emotions, and is widely known for its negative self-defeating thoughts, emotional avoidance, and high levels of denial (Tangney et al., 1996). The inward nature of this emotional experience often results in isolation and hiding (Rüsch et al., 2007). The isolation tendencies of this emotional chaos (Brown, 2006) keep people caught in a chronic cycle, driving them deeper into shame, despite their efforts to overcome it. Shame self-objectifies events and interprets experiences as if the self is at fault, flawed or unworthy, at a generalized and global level. (Tangney, 1991; Tangney et al., 1996; Tangney et al., 2007). Those who experience shame show high levels of self-defeating thoughts and internal attribution (self-blame) when confronted with negative life events (Pineles et al., 2006; Tangney, 2001; Tangney & Tracy, 2011).

Thus, the first prediction states: There is a statistically significant relationship between experiencing shame and depression (Hypothesis 1).

Shame is classified as an avoidance emotion: the motivation generated by shame compels the individual to hide. Shame tends to be experienced in a relationship between an individual and a group. On the other hand, guilt is an emotion that urges the individual to approach others. This emotion motivates the individual to repair or find ways to deny responsibilities (Burnett and Lunsford, 1995). Consequently, guilt may be perceived as a more beneficial emotion for motivating actions. Guilt is associated with self-punishment for not adhering to certain norms.

Feelings of guilt often arise as a consequence of an incident in which the individual perceives their behavior as a violation of a behavioral pattern or social norm judged by themselves as important (Gausel & Leech, 2011). Contemporary literature consists of debates regarding the idea that guilt usually produces more favorable outcomes than shame (Tangney & Dearing, 2002). On the other

hand, studies have showed a connection between guilt and depression. These findings may come as a result of the possibility that problematic guilt experiences are actually feelings of guilt fused with feelings of shame. It seems likely that when a person begins with a guilt experience ("Oh, look at what a horrible thing I have done") but then magnifies and generalizes the event to him- or herself ("... and aren't I a horrible person"), many of the advantages of guilt are lost. Not only is the person faced with tension and remorse over a specific behaviour that needs to be fixed, but he or she is also saddled with feelings of contempt and disgust for being a bad, defective person. In addition, generalized guilt divorced from specific contexts and guilt derived from beliefs and fears about harming others have been shown to be positively associated with depressive symptoms (Batson et al., 1987; Tracy and Robins, 2004). The second prediction states: There is a statistically significant relationship between experiencing guilt and depression. (Hypothesis 2).

Self-esteem is a psychological trait that is very well known and very well studied and explained by Branden (1994) as a person's belief in their worthiness to be rejoicing and able to cope with and handle everyday life issues. Self-esteem is determined by one's positive or negative self-assessment in comparison to others (Reilly, Rochlen, & Awad, 2014). Low self-esteem is often described as a key vulnerability characteristic that influences the onset and maintenance of depression through a variety of mechanisms (Orth & Robins, 2013). According to Branden (1994), self-esteem is a basic human need that is important for the continuation of positive, productive functions of life, such as interpersonal relationships, workplaces, and education. Rosenberg, 1965, describes self-esteem as a self-related concept that refers to self-worth, feasibility, and adequacy (as cited in Gilbert & Procter, 2006). Gilbert and Procter (2006) find that low self-esteem increases an individual's vulnerability to negative mood conditions such as shame. Likewise, Wells, Glickauf-Hughes, and Jones (1999) postulate that high levels of shame are correlated with low self-esteem due to flaws and defects arising from experiences of shame that reflect low self-esteem. This correlation is very important because low self-esteem has been associated with negative mental conditions, such as depression (Johnson & O'Brien, 2013).

Shame-prone individuals, like individuals low in self-esteem, engage in problematic interpersonal behaviors, which could elevate their risk for depression. Shame responses to interpersonal conflict predict poorer relationship satisfaction and depression (Black, Curran, & Dyer, 2013; Rice et al., 2011), even after controlling for rumination and affect regulation (Rice et al., 2011). Shame and guilt are interconnected emotions and, therefore, are often paired together, evoking similar self-evaluation, influencing mental health, aiding in the moral cultivation of values and behaviors, and playing a significant role in both interpersonal and intrapersonal relationships. (Tangney, 2002).

The concept of shame in recent years has been characterized by a multitude of studies and theories as an emotion that ranks negative effects regarding self-judgment. Shame is described by Brown as "a painful feeling or experience of believing that (the self as a whole) is defective and therefore unworthy of love and belonging." Shame is an individual experience; however, it is often mediated by the presence of someone else (Tangney, 2002). To understand this concept, it's crucial to note that the word "shame" originates from the Indo-European word "skam" meaning "to hide" (Gilbert, 2001). Similarly, guilt is understood as a potent emotion based on an individual's negative judgment of their behavior or actions (Gilbert, 2001). However, if shame is seen as a multi-dimensional concept, guilt is more of a one-dimensional concept, defined as self-blame or the conviction that builds in experiencing remorse over a specific action or event (Dryden, 2009). Furthermore, guilt is defined by Ausubel (1955) as a "wounded moral sense". Shame is experienced as a response to the perception that the individual is devalued by others (Tangney & Dearing, 2002). Hence, the third prediction states: There is a statistically significant relationship between experiencing shame and guilt (Hypothesis 3).

Regarding stress levels, shame is described as more painful than guilt. Specifically, experiencing shame makes individuals perceive themselves as worthless and powerless, whereas experiencing guilt makes them feel tense and remorseful about the "wrong" things they have done. Another key distinction is that people who feel shame are concerned with the evaluation of others, while those experiencing guilt are worried about the impact of their actions on others. Lastly, a desire to hide and escape is a typical trait of shame, whereas, regarding guilt, individuals want to seek forgiveness and confess (Lewis, 1971; Tangney & Dearing, 2002).

Furthermore, the distinction between the emotions of shame and guilt can also be seen regarding gender. Studies by Else-Quest, Higgins, Allison, & Morton (2012) have examined gender differences in individual experiences of shame and guilt, showing that it is widely accepted that females are stereotypically more emotional than males. However, recent studies have shown that the difference varies according to the specific emotion experienced (Else-Quest et al., 2012). For example, it has been found that shame, guilt, and embarrassment are more common in females than in males, while males exhibit higher levels of self-confidence and pride than females (Else-Quest et al., 2012). According to Kim et al. (2011), females are socially more oriented than males; for this reason, studies have shown that females are often more ashamed than males. Consequently, the difference between males and females in terms of experiencing shame and guilt is statistically significant (Hypothesis 4).

Kim et al. (2011) examined the validity of these stereotypes and found evidence supporting the theory that females score higher than males on emotions we are conscious of, such as shame, guilt, and embarrassment. Conversely, studies on gender differences in shame and guilt experiences have made interesting findings. The study revealed that chronic shame is more common among males than females (Benetti-McQuoid & Bursik, 2005).

Researchers Benetti-McQuoid and Bursik (2005) argue that one reason for the fluctuating results between genders is that the scales used to measure shame and guilt are usually different and can lead to different outcomes. It has also been proposed that a possible explanation for females scoring higher than males on emotions such as shame and guilt is due to gender roles. According to Benetti-McQuoid and Bursik (2005), society sets higher expectations for males, which may come as a perception of physical and emotional strength, hence males report higher levels of these emotions based on these social and gender norms. Due to social norms, it is widely recognized that males are less likely to acknowledge their shame than females (Shepard & Rabinowitz, 2013). Most findings parallel social norms and stereotypes portraying females as more emotionally oriented than males. However, further studies are needed in this field to understand these emotions at deeper levels.

### **METHODS**

Regarding the orientation of the phenomena studied and the methods used for data analysis, this study qualifies as quantitative research. It is a descriptive, correlational research as it undertakes to study the incidence, distribution, and relationships between variables.

The participants in this study were 193 Albanian students ranging in age from 18 to 27 years old. All participants were Albanian students from public universities. The study employed a convenience sampling method to select the study participants.

The first step followed was the selection of the respective faculties based on the feasibility of access. After securing permission from each faculty, the auditors were chosen to administer the questionnaires. All faculties and halls where the instruments were administered were selected based on convenience. The next step involved the selection of students in each auditorium. For their selection, a probabilistic method of sample selection based on the number of students in the auditorium was employed. Subsequently, the questionnaires were distributed anonymously only to the selected students. Information and monitoring was provide, until the final submission of the questionnaires.

### **MEASURES**

To collect data for this study, two instruments were utilized: the Test of Self-Conscious Affect-3 (Tangney, Dearing, Wagner, & Gramzow, 2000; Haka, 2016) and the Rosenberg Self-Esteem Scale (Rosenberg, M. 1965).

The Test of Self-Conscious Affect-3 (TOSCA-3) is an instrument that measures proneness towards guilt and shame. The instrument consists of four scales that assess the tendencies toward guilt, shame, externalization (blaming others), and detachment, which are considered primary reactions that individuals have in typical shame and guilt-inducing situations (Tangney, 1995). TOSCA-3 is scenario-based and includes 16 situations derived from a variety of shame and guilt-inducing scenarios

in everyday life (Tangney, 1990; Tangney et al., 1989). This instrument involves responding to 16 Likert scale statements ranging from 1 (not likely) to 5 (very likely). The scoring assumes the use of six subscales: Guilt Proneness: Measures an individual's inclination towards guilt in relation to the negative evaluation they make of their own behavior. Shame Proneness: Measures the inclination to experience shame when an individual makes a negative evaluation of themselves in a global, overall sense. Externalization: Measures the inclination to blame others or circumstances for the consequences of one's actions (tendency towards an external locus of control). Detachment: Measures the degree of emotional involvement (or lack thereof) in the situation and its consequences. Pride Alpha: Measures the inclination for positive self-evaluation (pride). Pride Beta: Measures the inclination to be proud in a specific current situation.

Advantages of TOSCA-3 include: (a) affect assessment is done for specific situations within a defined context; (b) respondents do not need to distinguish between abstract notions of shame and guilt; (c) such an approach does not provoke defensive reactions. Additionally, the greatest advantage of this instrument lies in the fact that it is validated and standardized for our culture (Haka, 2016). Since TOSCA-3 is standardized in our culture (Haka, 2016), the internal consistency reliability in this study is very high with  $\alpha = .91$ . Similarly, the coefficients of internal reliability in this sample for all scales were acceptable, with values ranging from  $\alpha = .82$  for (1) guilt proneness,  $\alpha = .84$  for (2) shame proneness,  $\alpha = .74$  for (3) externalization, and  $\alpha = .71$  for (4) detachment.

The Beck Depression Inventory (BDI; Beck et al., 1996) is a 21-item self-report measure of depressive symptoms based on DSM-IV criteria. Each item is rated on a 0–3 scale and total scores range from 0 to 63. Beck, Ward, Mendelson, Mock, and Arbaugh developed the inventory first in 1961 (Beck et al., 1979). The BDI has demonstrated excellent reliability and validity in samples of adolescent inpatients (Osman et al., 2004). Internal consistency was excellent for the current study ( $\alpha = 0.84$ ).

The Beck Depression Inventory (BDI; Beck & Steer, 1993, Beck et al., 1996) advantages include: It is administered quickly, demonstrating high reliability, validity and it provides a comprehensive view of depression levels.

**RESULTS AND DISCUSSION**

The response rate for the distributed surveys in this study is 97%. In the sampled population for the study, the average age is 21 years.  $SD=1.9$ , indicating that the variability in age is relatively small, with an age range from 19 to 21 years. In total, the sample consists of 117 females, accounting for 60.7%, and 76 males, representing 39.3%.

**Table 1.** Demographic data of the study sample.

		Gender	Age
N	Valid	193	193
	Missing	0	0
	Mean	.39	20.7450
	Median	.00	20.0000
	Mode	0	20.00
	Std. Deviation	.489	1.90153
	Skewness	.442	.718
	Std. Error of Skewness	.131	.131
	Kurtosis	-1.815	.324
	Std. Error of Kurtosis	.260	.260
	Minimum	0	18.00
	Maximum	1	27.00
	Sum	137	7240.00

There is an approximate average observed between the levels of experiencing guilt and shame in the sampled study population. Shame is reported to be experienced by respondents to the extent of 57%, while guilt is at 54%. In addition another element worth investigating is the homogeneity of respondents answers (Table 2.) We observe that the Standard Deviation (SD) is relatively consistent

across all variables, implying agreement among respondents. This makes the database highly homogeneous and compact, allowing for a better generalization of the results.

**Table 2. Descriptive statistics for the study variables.**

		Mean_shame	Mean_guilt
N	Valid	193	193
	Missing	0	0
	Mean	57.2264	54.0229
	Median	56.0000	53.0000
	Std. Deviation	12.01593	13.08788
	Skewness	.214	.432
	Std. Error of Skewness	.131	.131
	Kurtosis	-.294	.020
	Std. Error of Kurtosis	.260	.260

Consistent with Hypothesis 1, the experience of shame has a statistically significant positive correlation with depression (Table 3). Based on current findings and the reviewed literature in terms of stress levels, shame is described as more distressing than guilt. Specifically, the experience of shame leads individuals to perceive themselves as worthless and powerless. The experience of shame is seen to be linked to how an individual perceives themselves and the thoughts about how they are perceived by others (as inferior, inadequate, worthless, bad) (Kim et al., 2011). In these conditions, the internalization of these ongoing experiences may influence the development of negative self-schemas, low levels of self-esteem and increased depression levels (Hedman et al., 2013).

Consistent with Hypothesis 2, the experience of guilt has a statistically significant positive correlation with depression (Table 3). When individuals experience guilt, they feel tense and remorseful about the "wrong" things they have done. The experience of guilt is more closely related to the concern created by the individual "wrong" behavior and the negative consequences of their actions on others or oneself (Gausel & Leech, 2011). However, the experience of the emotion of guilt motivates the individual to take responsibility for the wrongdoing, positively influencing them. Nevertheless, the experience of guilt is closely tied to shame, self-anger, and self-punishment, affecting depressive vulnerability (Tangney & Dearing, 2002).

Consistent with Hypothesis 3, there is a statistically significant relationship between the experience of guilt and the experience of shame. Shame and guilt are considered emotions of which we are conscious; their experience is closely tied to self-reflection and self-evaluation (Dryden, 2009). These emotions stem from the perception of violating societal or moral norms, imposed externally (by society) or internally (by the individual). A high experience of shame and guilt is closely related to moral situations that individuals perceive as quite challenging and complex. The link between the experience of shame and the experience of guilt may vary based on cultural norms, personality traits, and education.

**Table 3. Correlations for the study variables.**

		Mean_ depression	Mean_shame	Mean_guilt
Mean_depression	Pearson Correlation	1	-.536**	-.488**
	Sig. (2-tailed)		.007	.001
	N	193	193	193
Mean_shame	Pearson Correlation	-.536**	1	.315**
	Sig. (2-tailed)	.007		.005
	N	193	193	193
Mean_guilt	Pearson Correlation	-.488**	.315**	1
	Sig. (2-tailed)	.001	.005	
	N	193	193	193

Consistent with Hypothesis 4, The first and most crucial indicator (Table 4.) is the level of statistical significance for shame. It is observed that the p-value is 0.242 (greater than the threshold level,  $p > 0.05$ ). This means that gender is not a determining factor for in experiencing the emotion of guilt; in other words, there is no significant difference between males and females related to guilt experience (Table 4).

Meanwhile, the regression data for the shame variable, shows that the significance is less than 0.05 ( $p < 0.05$ ), indicating a significant difference between females and males in the experience of shame.

**Table 4. Regression Analysis: The Influence of Gender on the Experience of Shame**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.734	.189		3.893	.000
Mes_turpi	-.006	.002	-.144	-2.625	.009
Mes_faji	.002	.002	.064	1.172	.242

**CONCLUSION**

Shame and guilt are emotions with important implications for psychopathology research and practice. The existing studies support the potential role of these emotions in psychopathology development. The current study was intended to explore the differential nature of shame and guilt proneness in relation to psychological distress mainly depression and gender in emerging adulthood. The differential nature of shame, guilt proneness, depression and gender in Albanian students was supported in the present study. Shame showed a stronger correlation with depression experience than guilt experience in Albanian students. In terms of gender differences it appeared that no differences were seen for guilt experience, whereas shame appeared to be experienced more from female students.

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**THE RELATIONSHIP BETWEEN SHAME AND GUILT AS SELF-CONSCIOUS  
EMOTIONS AND DEPRESSION, IN EMERGING ADULTHOOD**

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**ABSTRACT**

Shame and guilt are self-conscious emotions closely intertwined and linked together due to their negative impact on self-evaluation, interfering with mental health and playing an important role in interpersonal and intrapersonal relationships. The emotion of shame is based on the belief that the self as a whole 'is' bad, while guilt is based on the belief that one 'did' something bad (Gilbert, 2001). Frequent feelings of shame and guilt can eventually form into a trait, involving negative feelings that are very painful and often crippling, such as feelings of inferiority, despair, helplessness, and the eagerness to hide personal flaws (Andrews et al., 2002). Researchers examining the role of shame and guilt, have found that guilt, shame, depression and negative self-esteem are strongly linked, as they share similar attributes (Hedman et al., 2013).

The purpose of the present study is to research the relationship between self-conscious affects, shame and guilt, gender and depressive symptoms. A total of 193 albanian students (age 18 to 27 years old) completed The Test of Self-Conscious Affect, TOSCA-3 (Tangney, 1990, Tangney et al., 1989), a standardized questionnaire for the albanian population (Haka, 2016), assessing shame, guilt and the Beck Depression Inventory (BDI; Beck & Steer, 1993) assessing depression.

The key findings were as follows: Shame and depression, has resulted in a statistically significant positive correlation, revealing that the higher the depressive symptoms, the higher levels of shame in individuals. Also, guilt and depression were moderately positively correlated. However, the correlation between guilt and depression was not as strong as that detected between shame and depression. Also, gender differences were observed in experiencing shame and guilt. Results show, a significant difference between females and males in the experience of shame, aligned with the present literature.

**Key terms:** self-conscious emotions, guilt, shame, depression, gender, emerging adulthood.

**VIDA COTIADIANA DENTRO DEL AREA DE TRABAJO: UNA UTOPIA LABORAL**

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El trabajo para la mayoría de las personas no parece ser una actividad atractiva sino solamente obligatoria. Una de las principales causas es definitivamente el ambiente o el entorno que rodea esa área de trabajo. Se puede seguir en un lugar en el cual no se quiere ir o estar, y encima de ello, llegar a un entorno aburrido que invita a todo menos a permanecer ahí.

Esta investigación es de enfoque cualitativo y se utilizaron las técnicas de investigación: revisión documental y revisión del estado del arte sobre el tema vida cotidiana dentro del área de trabajo: una utopía laboral, recopilando información de diversas fuentes dentro de las cuales destacan revistas y páginas web.

Es común decir que las personas se encuentran en una zona de confort dentro de su vida cotidiana, las acciones que se realizan y se complementan, aquellas que los hacen felices, desde hacer ejercicio de relajación, cocinar, jugar con sus mascotas, descansar, entre otras.

En conclusión, la calidad de vida en el trabajo es parte del enfoque de responsabilidad social empresarial, todo con el objetivo de asegurar el bienestar de sus trabajadores y preservar un ambiente de trabajo sano. Con ello la relación con el trabajo es tan importante que es la condición básica y fundamental de la vida humana, es la fuente de los bienes y servicios que satisfacen las necesidades básicas del ser humano.

**Palabras claves:** Vida cotidiana, Entorno laboral, Zona de confort

**THE IMPORTANCE OF IMPROVING AEROBIC ENDURANCE IN PRE-PUBESCENT CHILDREN**

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**ABSTRACT**

Endurance is one of the main components of physical fitness and a key physical factor for the well-being of people in general. Aerobic endurance has a great impact both in improving the functional capacity of the organism and in the resupplying the muscles with energy to continue the contraction processes in humans. Aerobic processes take place in the presence of sufficient O<sub>2</sub> and are characterized by an increase in hemoglobin, an increase in the respiratory exchange capacity and an increase in the work activity of the heart. The endurance is known as the organism's ability to withstand physical and mental fatigue during e moving activity, or competition, for a long time. It helps the athlete to perform actions in the longest possible time and as a physical ability is one of the basic factors in physical preparation.

The aim of this study is to conduct a literature review on the studies including the physiological responses to aerobic training loads, and how endurance can significantly affect performance results. The methodology started with the selection and the research of literature for the tests performed accompanied by respective protocols in fully accordance with the literature data, with our training practice in the field. A computerized search engines was performed based on main websites such as Web of Science, Scopus, PubMed, Journal Citation Reports, and others. The appropriate literature, researched and selected has helped us to correctly determine the factors that affect aerobic performance, related with aerobic power, the lactate threshold, type of muscles and economy of movements. These factors can be significantly improved by applying appropriate training method. The importance of this study is in creating a reliable database that will serve as a reference for future studies, to determine an accurate training methodology for improving aerobic endurance at pre-pubescent children.

**Keywords:** aerobic endurance, pre-pubescent children, physical fitness

**Introduction**

The subject of aerobic endurance in pre-pubescent kids it is an important topic, since prepubescence can be the beginning of long - lasting sports activity for many. It influences not only performance but also health in a significant way. Sadly the increase in inactivity and obesity that the world population is experiencing in the last two decades it is impacting a lot this performance and health parameter. Several studies point out the trend of low fitness level of the current population [1, 2, 3].

A lot of studies have been conducted over the topic of aerobic endurance at this given age. Even though pre puberty is the period in which heart, lungs and muscle are developing, and the effects of training are debatable [4], because there is no doubt that the adaptation happens. Different studies have had positive results using concurrent training, high-intensity interval training (HIIT) or a combination between them [5]. Still, more research needs to be conducted on the subject of improving the endurance of pre-pubescent kids.

The aim of this study is to review existing research projects on the importance of aerobic endurance in kids and identifying potential moderators of intervention effects. Another aim is also to examine possible strategies that can be implemented to asses and improve aerobic fitness in pre-pubescent kids.

## Methodology

In accordance with reviews published previously with in focus the aerobic endurance importance and trainability in prepubescent children, a literature search was conducted for randomized controlled trials studying the effects of different aerobic endurance methods used to improve cardiorespiratory fitness level in prepubescent.

An electronic database searching was performed, using platforms such as; PubMed, Web of Science, MEDLINE, SPORT Discus, Scopus and Google Scholar, up to December 2023. The following criteria were used to search the articles: Aerobic endurance, kid's endurance, physical fitness, prepubescent kids, kids VO<sub>2</sub> max improvement, interval training, circuit training etc. The articles searched were in the English, Italian and Albanian language. From 37 studies, 13 met the research criteria and were included in this study.

## Results and Discussion

From the aspect of sports performance, endurance is the ability to sustain physical activity for long periods of time and helps athletes in different sports to withstand the strain of training and competition [5]. Aerobic endurance it is not a single ability, like strength or speed, it needs to be understood as a system of organs working together. The level of endurance is strictly influenced by the effectiveness of the cardiorespiratory system and the main indicator is VO<sub>2</sub> Max, expressed in ml/kg/min. It is also related to the person's body weight and fat and muscle percentage. The lower the body weight, the higher aerobic endurance performance is. Even though VO<sub>2</sub> max increases for both genders, boys tend to benefit more due to their bigger muscle mass.

The health specialists and medical community often associate aerobic activities with health benefits, implying that people especially children should engage more in endurance activities [6]. It does not need to be performed in long duration and slow pace, instead games or endurance related sports can be played in order to have a positive result, when it comes to kids structured exercise must leave place for fun, games and intense activities. Endurance training has very concrete health benefits on a person's body, since individuals involved in endurance activities have stronger hearts and lower heart rates and blood pressure [7] training improves insulin sensibility, the profile of blood lipids, influences body composition and inflammation [1]. Studies conducted by [3] found out that decrease in cardiorespiratory fitness was related to the increase of 13% to 15% in mortality from cardiovascular disease and other causes. Another author reached to the conclusion that lower levels of cardiorespiratory fitness in adolescence were related to all the cases mortality in adult age [8]. Similar studies in the future should follow the recommendations of [9], which suggest the improvement of endurance levels through creating a database of updated endurance test following national and international trends.

It is scientifically accepted that children can cope well with different activities that dominate the ability of endurance [10], even though the type of activities they perform is made of short duration exercises with intensity change [11] evidences that pre-puberty is the age where the heart, lungs and muscles, adapt to prolong activities, the response of kids and adolescents to the aerobic training, is yet adaptable, and needs to be conducted in accordance with their developmental stages. However since the athletes of this age group consistently score better than non-athletes, demonstrate that the adaptation to the training does occur [5].

The challenge nowadays, is finding ways to improve children's aerobic level [12], while there is a disturbing global trend in physical fitness level decrease [13] and mortality trends [1], due to inactivity and obesity. From the findings the levels of kids VO<sub>2</sub> [7], below 42 ml/kg/min in boys and 35 ml/kg/min in girls should ring the alarm bell.

## Conclusions

Aerobic endurance, as one of the most important conditional indicators, affects not only the improvement of cardio-vascular system but has also an impact for improving overall brain function, creativity, cognitive processes and fighting depression. The concerning trends that show continuous decrease in the fitness level of the world population, will influence its future health, not in a positive way. As an important part of the fitness components, aerobic endurance training needs to be addressed

in the youngest age possible, meaning pre-puberty. The American College of Sports Medicine recommends aerobic endurance exercises 3-5 times a week for a total of 20 -60 min per session. School based physical activity programs should influence on the children's health, and it must be part of the national health objectives in every country. The basic concepts of a physically active life style must be included since in elementary school programs and should be followed during and outside the physical education classes. The applying of combined fitness tests (EUROFIT) can help to create a database for monitoring the changes in kid's fitness, and allows starting and planning effective training programs in school programs, in order to reach and keep the physical fitness standard levels.

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DETERMINATION OF UNMANNED AERIAL VEHICLE LANDING GEAR MATERIAL  
SELECTION WITH USING MULTI-CRITERIA DECISION MAKING METHOD

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**ABSTRACT**

Unmanned aerial vehicles have a deep-rooted history. The earliest uses of unmanned aerial vehicles date back to the early 20th century, primarily for military purposes. However, with advancements in technology, unmanned aerial vehicles have begun to be used in various fields. Worldwide, unmanned aerial vehicles are widely used for military purposes such as intelligence gathering, surveillance, reconnaissance, and target identification. Additionally, they are used in civil applications such as increasing agricultural efficiency, environmental monitoring and enforcement, disaster management, communication infrastructure, mapping, and geographical information systems.

Unmanned aerial vehicle design involves many critical elements, but one of the most critical is the landing gear. Landing gear systems are mechanical systems that allow the aircraft to land, take off, and taxi on the ground, as well as dampen the static and dynamic loads during the aircraft's landing. Landing gear is designed considering engineering sciences such as aerodynamics, hydraulics, electricity, and electronics. Proper design of the landing gear and selection of suitable materials are crucial for the unmanned aerial vehicle to take off and, more importantly, land safely. Additionally, the correct selection of materials for the landing gear of unmanned aerial vehicles will affect the performance, reliability, and cost of the aircraft.

This study aims to achieve an optimal selection among various material options using multi-criteria decision-making methods. Factors such as material yield-stress, breaking stress, hardness, corrosion resistance, and material availability are among the criteria examined. By using multi-criteria decision-making methods AHP and Topsis, it is aimed to evaluate the performance of each material option and determine the most appropriate material selection. This study provides valuable guidance to engineers and designers in the material selection process for the design and manufacturing of unmanned aerial vehicles.

**Keywords:** unmanned aerial vehicle, material, landing gear, multi-criteria decision making, AHP, Topsis

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This study aims to achieve an optimal selection among various material options using multi-criteria decision-making methods. Factors such as material yield-stress, breaking stress, hardness, corrosion resistance, and material availability are among the criteria examined. By using multi-criteria decision-making methods AHP and Topsis, it is aimed to evaluate the performance of each material option and determine the most appropriate material selection. This study provides valuable guidance to engineers and designers in the material selection process for the design and manufacturing of unmanned aerial vehicles.

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## 1. INTRODUCTION

Decision making is one of the indispensable component of human life. Because we need to make a decision at every stage of our lives and in any situation. However, the first condition for decision making involves multiple alternatives.

One of the most critical points in making a decision is determining the important criteria that influence decision making (Saaty, 1990). In this context, the decision-making process can be based on the individual's perceptions, predictions and also can explained via a mathematical model. Multiple criteria decision making is an analytical method used to rank, classify, or select alternatives according to the criteria specified when there are multiple criteria.

In this study, we will choose between three different material in order to select for an unmanned aerial vehicle landing gear. There are five different criteria for selecting material. The AHP method was first used in the weighting process of the for criteria. The AHP is one of the multiple decision-making methods that model decision-making processes mathematically and are used to solve complex problems (Saaty, 1980). Although the AHP using since 1980, decision-making processes were already known with comparative judgment and similar scaling techniques. In particular, it is possible to say that the law of comparative judgment was first put forward by Thurstone in 1927. Alternatives in comparative judgment; are compared in the form of larger, better, more negative, better-looking, and the alternatives are shown on a number line as a result of the analyzes (Details: Turgut & Baykul, 1992). In essence AHP is also based on comparative judgments. But, it seems that the scaling techniques and first order decision making techniques do not include the influence of the criteria that are effective in the decision making process. The AHP aims that solving the hierarchical model by including in the model the criteria that are effective in the decision making process by adding second or higher order layers to the scaling techniques.

Considering our criteria, whose weights were determined by subjective and objective methods in our study, the alternatives were ranked with TOPSIS method.

TOPSIS is a useful method in dealing with MCDM or MADM problems in the real world. It helps decision maker(s) organize the problems to be solved, and carry out analysis, comparisons and rankings of the alternatives. TOPSIS method was initially presented by Hwang and Yoon. It has been deemed one of the major decision making methods within the world. The basic idea of TOPSIS is rather simple. It originates from the concept of a displaced ideal point from which the compromise solution has the shortest distance. A relative advantage of TOPSIS is its ability to identify the best alternative quickly. TOPSIS basically considers the alternatives according to their proximity and distance from the ideal solution (Chakraborty, 2022).

**2. MATERIALS AND METHODS**

In this research, we calculated criteria weights with AHP method, respectively, and then perform alternative ranking with TOPSIS. Landing gear material alternatives are indicated in the tables as M1, M2 and M3. At the table 2.6 the criteria information of the landing gear material are shown. The unit of these values are; MPa for Yield Stress, MPa for Breaking Stress, HP for Hardness.

**2.1 Criteria Weighting by AHP**

The process steps of AHP are as follows;

First step, the problem is identified and the hierarchical structure is constructed. The most important and priority step in the AHP is constructing the hierarchical structure (Zahedi, 1986). Information about how to construct the hierarchy is given in Figure 1.

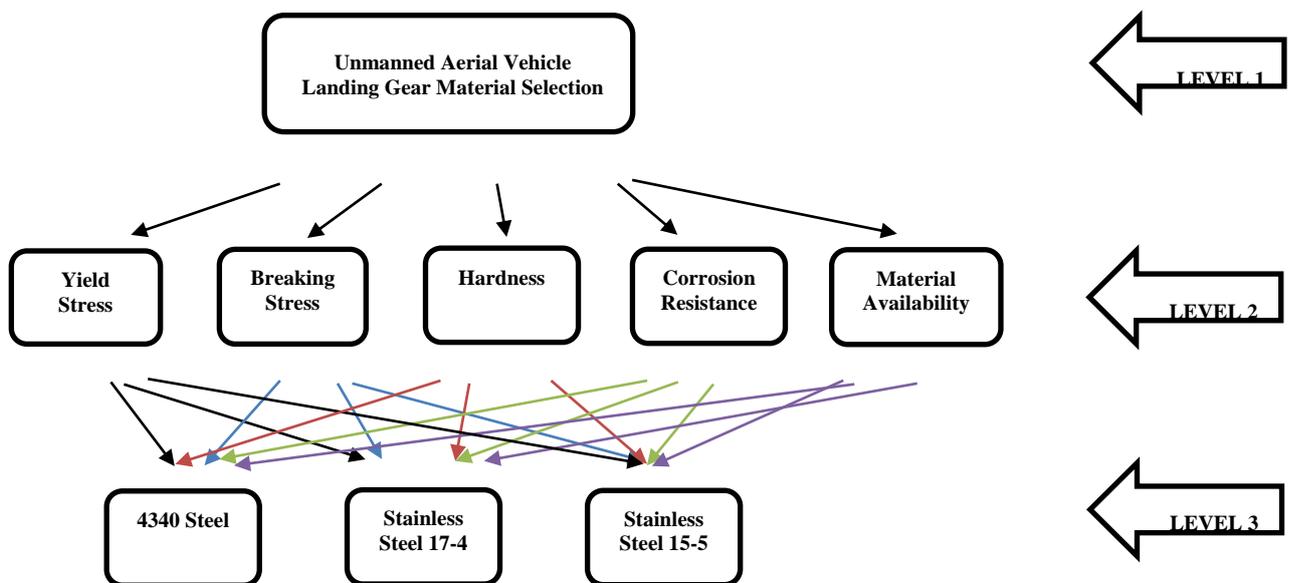


Figure 1: The Hierarchical Structure of AHP

As shown in Figure 1, there are several levels in the AHP process. At the top of the hierarchy is the purpose of the decision problem. In the second level, the criteria set for this purpose and in the third level, alternatives which will be determined the priority order according to these criteria.

The second step is to determination of the priorities. For this firstly, comparison matrices are created. For example, if there are 5 different criteria (Yield Stress, Breaking Stress, Hardness, Corrosion Resistance, Material Availability) in deciding which of the 3 different landing gear material (alternatives) will be taken, 5 \* 5 comparison matrix for the criteria, and a 3\*3 comparison matrix for the alternatives have been created. Then priority calculations are made based on these matrices. At the last step, consistency analysis is performed to obtain the validity of the results and then the results are reported. The comparison matrices for the criteria are given in Table 2.1.

**Table 2.1 :** Comparison matrix of criteria

	<b>Yield Stress</b>	<b>Breaking Stress</b>	<b>Hardness</b>	<b>Corrosion Resistance</b>	<b>Material Availability</b>
<b>Pair-wise matrix</b>	<b>M1</b>	<b>M2</b>	<b>M3</b>	<b>M4</b>	<b>M5</b>
<b>M1</b>	1	3,00	4,00	3,00	3,00
<b>M2</b>	0,33	1	3,00	3,00	3,00
<b>M3</b>	0,25	0,33	1	1,00	2,00
<b>M4</b>	0,33	0,33	1,00	1	1,00
<b>M5</b>	0,33	0,33	0,50	1,00	1
<b>Total</b>	2,25	5,00	9,50	9,00	10,00

The comparison matrix is a symmetric matrix. The diagonal values are "1". The comparison of the M1 criterion with M2 is "3" and the comparison of the M2 criterion with M1 is "0,33 (1/3)". After the criteria matrix, the alternative matrix is constructed which include comparative judgments of the alternatives based on each criterion.

In the third step, mathematical operations were performed on the comparison matrices and eigen values were determined. Then consistency analysis was performed. As a final step, priorities have been determined.

- First of all, normalized matrix is calculated.
- For this purpose, first the column values are sum and then the normalized matrix is calculated by dividing each element in the column by the column sum.
- The vector of priorities is calculated by taking the average of each line in this matrix. At this stage, all the priorities matrices have to be obtained.
- The priorities vector is multiplied by the comparison matrix given at the beginning and the matrix of all priorities is calculated.

**Table 2.2 :** Criterion weights

	<b>Yield Stress</b>	<b>Breaking Stress</b>	<b>Hardness</b>	<b>Corrosion Resistance</b>	<b>Material Availability</b>	
<b>Pair-wise matrix</b>	<b>M1</b>	<b>M2</b>	<b>M3</b>	<b>M4</b>	<b>M5</b>	<b>Criterion Weights</b>
<b>M1</b>	0,4444	0,6000	0,4211	0,3333	0,3000	0,4198
<b>M2</b>	0,1481	0,2000	0,3158	0,3333	0,3000	0,2595
<b>M3</b>	0,1111	0,0667	0,1053	0,1111	0,2000	0,1188
<b>M4</b>	0,1481	0,0667	0,1053	0,1111	0,1000	0,1062
<b>M5</b>	0,1481	0,0667	0,0526	0,1111	0,1000	0,0957

**Table 2.3 :** Normalized matrix, priority vector and all priorities matrix

	<b>Yield Stress</b>	<b>Breaking Stress</b>	<b>Hardness</b>	<b>Corrosion Resistance</b>	<b>Material Availability</b>	
<b>Pair-wise matrix</b>	<b>M1</b>	<b>M2</b>	<b>M3</b>	<b>M4</b>	<b>M5</b>	<b>Total</b>
<b>M1</b>	0,4198	0,7784	0,4753	0,3187	0,2871	2,2793
<b>M2</b>	0,1399	0,2595	0,3565	0,3187	0,2871	1,3617
<b>M3</b>	0,1049	0,0865	0,1188	0,1062	0,1914	0,6079
<b>M4</b>	0,1399	0,0865	0,1188	0,1062	0,0957	0,5472
<b>M5</b>	0,1399	0,0865	0,0594	0,1062	0,0957	0,4878

After the matrix calculations is completion, the consistency index is calculated. Equation 2.1 is used to calculate the consistency.

$$CR = \frac{CI}{RI} \text{ Equation 1}$$

CI: Consistency index

RI: Random Consistency Index (2.1)

Equation 2.2 is used for the consistency index calculation.

$$CI = \frac{(\lambda_{max} - n)}{n - 1} \text{ Equation 2} \quad (2.2)$$

$\lambda_{max}$  refers to maximum eigen value and n refers to number of criteria or alternatives. The random consistency index is given in Table 2.4 .

**Table 2.4 :** Random consistency index table (Saaaty, 1980)

<b>n</b>	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<b>Random Consistency Index</b>	0,00	0,58	0,90	1,12	1,24	1,32	1,41	1,45	1,49	1,51	1,48	1,56	1,57	1,59

Random consistency index is selected 1,12 according to the this table.

The consistency index, the random consistency index and the consistency ratio which is obtained according to these calculations.

**Table 2.5 :** Consistency index, Consistency ratio

<b>Total</b>	<b>Criterion Weights</b>	<b>t/c</b>	<b>Average</b>	<b>lamda max</b>
<b>2,27929825</b>	0,419766082	5,429925	5,208199519	5,208199519
<b>1,3617154</b>	0,259454191	5,248385		<b>consistency index</b>
<b>0,60791748</b>	0,118830409	5,115841		0,05204988
<b>0,54718648</b>	0,106237817	5,150581		0,046681507
<b>0,48777128</b>	0,095711501	5,096266		<0.10

The consistency ratio should be less than 0,1, otherwise an attempt should be made to increase consistency (Saaty, 1990). It can be said that the consistency rate which is obtained (0,046681507) is below the desired value and the consistency is acceptable.

## 2.2 Alternative Ranking with TOPSIS

The process steps of TOPSIS are as follows:

1. Constructing the decision matrix: We can see decision matrix below which consist of criteria values of all alternatives.

**Table 2.6 :** Decision Matrix

	<b>Yield Stress</b>	<b>Breaking Stress</b>	<b>Hardness</b>	<b>Corrosion Resistance</b>	<b>Material Availability</b>
<b>M1</b>	970	1220	285	2	2
<b>M2</b>	950	1090	360	3	2
<b>M3</b>	1000	1070	440	3	1

2. Normalization of decision matrix: We use Eq. (2.3). We divide the values in the cells by the square root of the sum of the squares of the values in the same column.

$$r_{ij} = x_{ij} / \sqrt{\sum_1^n x_{ij}^2} \tag{2.3}$$

**Table 2.7 :** Normalized decision matrix

<b>Step 1 : Normalized Matrix</b>					
	<b>Yield Stress</b>	<b>Breaking Stress</b>	<b>Hardness</b>	<b>Corrosion Resistance</b>	<b>Material Availability</b>
<b>M1</b>	0,57524487	0,62409195	0,448153	0,426401433	0,666666667
<b>M2</b>	0,56338415	0,557590349	0,566087	0,639602149	0,666666667
<b>M3</b>	0,59303595	0,547359334	0,691885	0,639602149	0,333333333

3. Calculating the weighted normalized decision matrix: From the step we should make calculation for AHP method weights separately.

$$v_{ij} = r_{ij} \cdot w_{ij} \tag{2.4}$$

**Table 2.8 :** Weight Normalized Matrix

<b>Step 2 : Weight Normalized Matrix</b>					
	<b>Yield Stress</b>	<b>Breaking Stress</b>	<b>Hardness</b>	<b>Corrosion Resistance</b>	<b>Material Availability</b>
<b>M1</b>	0,2416028 5	0,162263907	0,053778	0,046904158	0,066666667
<b>M2</b>	0,2366213 4	0,144973491	0,06793	0,070356236	0,066666667
<b>M3</b>	0,2490751	0,142313427	0,083026	0,070356236	0,033333333

4. Determining the positive and negative ideal solutions: After multiplying our normalized values by the weighting coefficients, we find the best and worst values in the columns. For negative impact criteria, the best value is the smallest and worst is the largest value.

$$A^+ = \{(\max v_{ij} | j \in J), (\min v_{ij} | j \in J')\} \tag{2.5}$$

$$A^- = \{(\min v_{ij} | j \in J), (\max v_{ij} | j \in J')\} \tag{2.6}$$

**Table 2.9 : Worst and Best**

<b>Step 3 : Worst and Best</b>					
	<b>Yield Stress</b>	<b>Breaking Stress</b>	<b>Hardness</b>	<b>Corrosion Resistance</b>	<b>Material Availability</b>
<b>A+</b>	0,2490751	0,162263907	0,083026	0,070356236	0,066666667
<b>A-</b>	0,23662134	0,142313427	0,053778	0,046904158	0,033333333

5. Calculating the separation measures: We apply Eq. (2.7) and (2.8).

$$S_i^+ = \sqrt{\sum_1^n (v_{ij} - v_j^+)^2} \quad (2.7)$$

$$S_i^- = \sqrt{\sum_1^n (v_{ij} - v_j^-)^2} \quad (2.8)$$

**Table 2.10 : Euclidean distance from the best and worst**

<b>Step 4 : Euclidean distance from the best and worst</b>		
	<b>Si+</b>	<b>Si-</b>
<b>M1</b>	0,03822658	0,03916565
<b>M2</b>	0,02611386	0,043225819
<b>M3</b>	0,03884756	1,000702472

6. Calculating relative closeness to ideal point: After finding separation measures, we apply Eq. (2.9) to find relative closeness values for per alternative.

$$C_i = S_i^- / (S_i^- + S_i^+) \quad (2.9)$$

**Table 2.11 : Relative closeness and rank**

<b>Step 5 : Calculate Performance Score</b>		
#	<b>Ci</b>	<b>rank</b>
<b>M1</b>	0,50606696	3
<b>M2</b>	0,62339227	2
<b>M3</b>	0,96263041	1

7. Ranking the preference order: We can rank the alternatives in accordance with relative closeness to ideal point values. Weight values which we found with AHP method. Our alternatives are respectively ranked from the best to worst as; M3, M2 and M1.

### 3. RESULTS

According to AHP method, we obtain criteria weights. In AHP method, criteria weights are; Yield Stress (0,419766081871345), Breaking Stress (0,259454191033138), Hardness (0,118830409356725), Corrosion Resistance (0,106237816764133) and Material Availability (0,0957115009746589). When we apply those weights at TOPSIS method, we can obtain ranks from the best to worst as M3, M2 and M1.

### 4. DISCUSSION and CONCLUSION

Unmanned aerial vehicle design involves many critical elements, but one of the most critical is the landing gear. Landing gear systems are mechanical systems that allow the aircraft to land, take off, and taxi on the ground, as well as dampen the static and dynamic loads during the aircraft's landing. Proper design of the landing gear and selection of suitable materials are crucial for the unmanned aerial vehicle to take off and, more importantly, land safely. Additionally, the correct selection of materials for the landing gear of unmanned aerial vehicles will affect the performance, reliability, and cost of the aircraft

The unmanned aerial vehicle landing gear material selection is very important in decision-making process in terms of the success of the defense area. There are a lot of criteria affecting decision process. All these criteria should be evaluated with various dimensions. Three material alternatives criteria were evaluated, and the model solution was established with multicriteria decision-making in this study. The objective of this paper is also to present an integrated MCDM approach for determination of the best unmanned aerial vehicle landing gear material. Therefore, AHP and TOPSIS methods are used together.

Within the context of the study, AHP that one of the most multi-criteria decision-making techniques, has been applied for find criteria weights. According to the AHP method, it was confirmed by looking at the consistency ratio whether the criterion weights in table 2.2 could actually be used. Consistency value was 0.046681507 and being less than 0.1 showed that realistic results would be obtained. The alternatives were ranked using the TOPSIS method with the data obtained by the AHP method. The TOPSIS method is an effective technique that is widely used to reduce complexity in the decision-making process and help make a clear decision.

First, the criteria were determined according to their importance in the decision-making process. Afterwards, the normalized decision matrix was created. This matrix contains in each cell a normalized value of the alternative's performance on a given criterion. Normalization ensures that the values are on the same scale. After this step, the Weighted normalization matrix was created. Weights were assigned for each criterion. These weights reflect the importance levels of the criteria. In the next step; Positive and negative ideal solutions were determined. The positive ideal solution is defined as an alternative with maximum performance in every criterion, while the negative ideal solution is defined as the alternative with minimum performance in every criterion. Then, the distances of each alternative to the positive and negative ideal solution were calculated. This was achieved using Euclidean. As the last step, performance scores were calculated and the alternatives were ranked according to the calculated performance scores. According to the Topsis method, the best unmanned aerial vehicle landing gear material is listed as Stainless Steel 15-5, Stainless Steel 17-4 and 4340 Steel.

This study will provides valuable guidance to engineers and designers in the material selection process for the design and manufacturing of unmanned aerial vehicles.

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# 1st International Canadian Scientific Research Congress

İlgili makama;

ULUSLARARASI KANADA BİLİMSEL ARAŞTIRMALAR KONGRESİ 1-3 Mayıs 2024 tarihleri arasında Toronto, Kanada'da 26 farklı ülkenin akademisyen/araştırmacılarının katılımıyla gerçekleşmiştir. Kongre kapsamında sunumu yapılan 153 bildirin 49 adeti Türkiye'den katılımcılar tarafından; 104 bildiri ise 14 ülkeden katılımcılar tarafından sunulmuştur. Kongre 16 Ocak 2020 Akademik Teşvik Ödeneği Yönetmeliğine getirilen *“Tebliğlerin sunulduğu yurt içinde veya yurt dışındaki etkinliğin uluslararası olarak nitelendirilebilmesi için Türkiye dışında en az beş farklı ülkeden sözlü tebliğ sunan konuşmacının katılım sağlaması ve tebliğlerin yarısından fazlasının Türkiye dışından katılımcılar tarafından sunulması esastır.”* değişikliğine uygun düzenlenmiştir.

Bilgilerinize arz edilir,

Saygılarımla,

**Dr. Firuz Fevzi**  
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22.04.2024

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Fakültemiz Hemşirelik Bölümü öğretim elemanlarından Dr.Öğr.Buket DAŞTAN'ın 1-3 Mayıs 2024 tarihleri arasında düzenlenecek olan "1ST INTERNATIONAL CANADIAN SCIENTIFIC RESEARCH CONGRESS" kongresinin ve 23-24 Mayıs 2024 tarihleri arasında düzenlenecek "ULUSLARARASI UYGULAMALI SAHA ARAŞTIRMALARI KONGRESİ'NİN" düzenleme komitesinde, akademisyen temsilcisi olarak görevlendirilmesi Dekanlığımızca uygun görülmüştür. Bilgilerinizi ve gereğini rica ederim.

Prof.Dr. Ali Savaş BÜLBÜL  
Dekan V.

Ek: Dilekçe (1 Sayfa)

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Bölümünüz öğretim üyelerinden Doç. Dr. Neslihan ÇELEBİ'nin İKSAD tarafından 1-3 Mayıs 2024 tarihleri arasında düzenlenecek olan '1st International Canadian Scientific Research Congress Toronto, Canada ' kongresinin düzenleme komitesinde ve bilim kurullarında akademisyen temsilcisi olarak yer alma isteği Müdürlüğümüzce uygun görülmüştür.

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