Journal of Contemporary Medicine

YEAR: 2025 VOLUME: 15 ISSUE: 3

JOURNAL OF CONTEMPORARY MEDICINE

e-ISSN 2667-7180

Formerly Çağdaş Tıp Dergisi

YEAR 2025 VOLUME 15 ISSUE 3

The Owner and Publishing Manager on behalf of the Journal of Contemporary Medicine

Prof. Dr. Resul YILMAZ

Address: Selçuk Üniversitesi, Tıp Fakültesi Çocuk Yoğun Bakım Bilim Dalı Alaeddin Keykubat Yerleşkesi Selçuklu/Konya 42075 Türkiye
Phone: +90 (332) 241 50 00-44513
Fax: +90 (332) 241 21 84
e-mail: cagdastipdergisi@gmail.com
web: http://www.jcontempmed.com

JOURNAL OF CONTEMPORARY MEDICINE

e-ISSN 2667-7180

Formerly Çağdaş Tıp Dergisi

JOURNAL OF CONTEMPORARY MEDICINE

e-ISSN 2667-7180

Formerly Çağdaş Tıp Dergisi

JOURNAL OF CONTEMPORARY MEDICINE

Formerly Çağdaş Tıp Dergisi

INSTRUCTIONS FOR AUTHORS

AIM AND SCOPE

The Journal will not consider manuscripts any that have been published elsewhere, or manuscripts that are being considered for another publication, or are in press. Studies previously announced in the congresses are accepted if this condition is stated. If any part of a manuscript by the same author(s) contains any information that was previously published, a reprint or a copy of the previous article should be submitted to the Editorial Office with an explanation by the authors

A technical review is performed to confirm that all of the required documentation has been submitted and to conduct a preliminary evaluation of the manuscript and supplementary files to assess suitability for the Journal. The manuscript will be returned to the Author in the event of any deficiency.

Journal of Contemporary Medicine operates a blind review process. Contributions deemed suitable are then typically sent to a minimum of two independent expert reviewers in the field of study to assess the scientific quality of the paper. (You can see at the picture below).

The Editor/Editors are responsible for the final decision regarding acceptance or rejection of articles. The Editor's decision is final. If necessary, author(s) may be invited to submit a revised version of the manuscript. This invitation does not imply that the manuscript will be accepted for publication. Revised manuscripts must be sent to the Editorial Office within 4 (four) weeks, otherwise they will be considered as a new application. The corresponding author will be notified of the decision to accept or reject the manuscript for publication.

Statements and suggestions published in manuscripts are the authors' responsibility and do not reflect the opinions of the Editor, Associate Editors and the Editorial Board members.

The manuscript will not be returned to the authors whether the article is accepted or not. Copyright fee is not paid for the articles published in the journal. A copy of the journal will be sent to the corresponding author.

Language of the Journal

The official languages of the Journal are Turkish and English. The manuscripts that are written in Turkish have abstracts in English, which makes the abstracts available to a broader audience.

Authorship Criteria

After accepted for publication, all the authors will be asked to sign "CoyrightTransfer Form" which states the following: " This work is not under active consideration for publication, has not been accepted for publication, nor has it been published, in full or in part (except in abstract form). I confirm that the study has been approved by the ethics committee. " All authors should agree to the conditions outlined in the form.

Journal of Contemporary Medicine has agreed to use the standards of the International Committee of Medical Journal Editors. The author(s) should meet the criteria for authorship according to the "Uniform Requirements for Manuscripts Submitted to Biomedical Journals: Writing and Editing for Biomedical Publication. It is available at www.icmje.org.

Ethical Responsibility

The protocol of clinical research articles must be approved by the Ethics Committee.

In all studies conducted on humans, the "Material and Method" section was approved by the relevant committee or the Helsinki Declaration of Principles (https://www.wma.net/what-we-do/medical-ethics/declaration-of-helsinki/).

It should be stated in the text that all persons included in the study signed the am Informed Consent Form ".

The articles submitted to the Journal of Contemporary Medicine will be deemed to have been conducted in accordance with the Helsinki Declaration of Principles, and have received ethical and legal permissions and will not be held responsible.

If the "Animal" item was used in the study, the authors stated that in the Material and Method section of the article, they protect the animal rights in their studies in accordance with the principles of Guide for the Care and Use of Laboratory Animals (www.nap.edu/catalog/5140.html) and that they have received approval from the ethics committees of their institutions. must specify.

In case reports, Informed Consent a should be obtained from patients regardless of the identity of the patient.

If the article includes the institution (directly or indirectly) providing financial support for the commercial connection or work, the authors; the commercial product used, the drug, the company has no commercial relationship with, or if there is any relationship (consultant, other agreements, etc.), the editor must inform the presentation page.

If Ethics Committee Approval is required in the article; the received document should be sent with the article.

JOURNAL OF CONTEMPORARY MEDICINE

Formerly Çağdaş Tıp Dergisi

The manuscript should be submitted to the Academic Plagiarism Prevention Program by the authors.

It is the authors' responsibility to ensure that the article complies with the ethical rules.

Policy of Screening for Plagiarism

The manuscripts are scanned by the Journal using the iThenticate program for determination of plagiarism and non-ethical situations. Journal of Contemporary Medicine will immediately reject manuscripts leading to plagiarism.

TYPES OF MANUSCRIPT

Manuscripts should be submitted online via www.jcontempmed.com

Original Articles should not exceed 3000 words and should be arranged under the headings of Abstract (not more than 250 words), Introduction, Materials and Methods, Results, Discussion, Conclusion and References.

Case Reports should not exceed 1000 words and 10 references, and should be arranged as follows: Abstract, Introduction, Case Report, Discussion and References. It may be accompanied by only one figure or table.

Letter to the Editor should not exceed 500 words. Short relevant comments on medical and scientific issues, particularly controversies, having no more than five references and one table or figure are encouraged. Where letters refer to an earlier published paper, authors will be offered right of reply.

Reviews are not accepted unless written on the invitation of the Editorial Board.

PREPARATION OF MANUSCRIPTS

All articles submitted to the Journal must comply with the following instructions:

a) Submissions should be doubled-spaced and typed in Arial 10 points.

b) All pages should be numbered consecutively in the top right-hand corner, beginning with the title page.

c) The title page should not include the names and institutions of the authors.

d) The manuscript should be presented in the following order: Title page, Abstract (English, Turkish), Keywords (English, Turkish), Introduction, Materials and Methods, Results, Discussion, Conclusion, Acknowledgements (if present), References, Figure Legends, Tables (each table, complete with title and foot-notes, on a separate page) and Appendices (if present) presented each on a separate page.

Title

The title should be short, easy to understand and must define the contents of the article.

Abstract

Abstract should be in both English and Turkish and should consist "Aim, Materials and Methods, Results and Conclusion". The purpose of the study, the setting for the study, the subjects, the treatment or intervention, principal outcomes measured, the type of statistical analysis and the outcome of the study should be stated in this section (up to 250 words). Abstract should not include reference. No abstract is required for the letters to the Editor.

Keywords

Not more than five keywords in order of importance for indexing purposes should be supplied below the abstract and should be selected from Index Medicus Medical Subject Headings (MeSH), available at www.nlm.nih.gov/meshhome.html.

Text

Authors should use subheadings to divide sections regarding the type of the manuscript as described above. Statistical methods used should be specified in the Materials and Methods section.

References

In the text, references should be cited using Arabic numerals in parenthesis in the order in which they appear. If cited only in tables or figure legends, they should be numbered according to the first identification of the table or figure in the text. Names of the journals should be abbreviated in the style used in Index Medicus. The names of all authors should be cited when there are six or fewer; when seven or more, the first three should be followed by et al. The issue and volume numbers of the referenced journal should be added.

References should be listed in the following form:

Journal article

Teke Z, Kabay B, Aytekin FO et al. Pyrrolidine dithiocarbamate prevents 60 minutes of warm mesenteric ischemia/reperfusion injury in rats. Am J Surg 2007;194(6):255-62.

Supplement

Solca M. Acute pain management: Unmet needs and new advances in pain management. Eur J Anaesthesiol 2002; 19(Suppl 25): 3-10.

JOURNAL OF CONTEMPORARY MEDICINE

Formerly Çağdaş Tıp Dergisi

Online article not yet published in an issue

Butterly SJ, Pillans P, Horn B, Miles R, Sturtevant J. Off-label use of rituximab in a tertiary Queensland hospital. Intern Med J doi: 10.1111/j.1445-5994.2009.01988.x

Book

Sample1: Murray PR, Rosenthal KS, Kobayashi GS, Pfaller MA. Medical microbiology. 4th ed. St. Louis: Mosby; 2002.

Sample 2: Sümbüloğlu K, Akdağ B. Regresyon Yöntemleri ve Korelasyon Analizi. Hatiboğlu Yayınevi: Ankara; 2007.

Chapter in a book

Meltzer PS, Kallioniemi A, Trent JM. Chromosome alterations in human solid tumors. I n: Vogelstein B, Kinzler KW, editors. The genetic basis of human cancer. New York: McGraw-Hill; 2002. p. 93113.

Journal article on the Internet

Abood S. Quality improvement initiative in nursing homes: The ANA acts in an advisory role. Am J Nurs [serial on the Internet] 2002 [cited 12 Aug 2002]; 102. Available from: www.nursingworld.org/AJN/2002/june/wawatch.htm

Website

Cancer-pain.org [homepage on the Internet]. New York: Association of Cancer Online Resources [updated 16 May 2002; cited 9 Jul 2002]. Available from: www.cancer-pain.org

An organization as an author

The Intensive Care Society of Australia and New Zealand. Mechanical ventilation strategy in ARDS: Guidelines. Int Care J Aust 1996;164:282-4.

Acknowledgements

The source of financial grants and the contribution of colleagues or institutions should be acknowledged.

Tables

Tables should be complementary, but not duplicate information contained in the text. Tables should be numbered consecutively in Arabic numbers, with a descriptive, self-explanatory title above the table. All abbreviations should be explained in a footnote. Footnotes should be designated by symbols in the following order: *,†, ‡, §, ¶.

Figures

All illustrations (including line drawings and photographs) are classified as figures. Figures must be added to the system as separate .jpg or .gif files (approximately 500x400 pixels, 8 cm in width and at least 300 dpi resolution). Figures should be numbered consecutively in Arabic numbers and should be cited in parenthesis in consecutive order in the text.

Figure Legends

Legends should be self-explanatory and positioned on a separate page. The legend should incorporate definitions of any symbols used and all abbreviations and units of measurements should be explained. A letter should be provided stating copyright authorization if figures have been reproduced from another source.

Measurements and Abbreviations

All measurements must be given in metric system (Système International d'Unités, SI). Example: mg/kg, µg/kg, mL, mL/kg, mL/kg/h, mL/kg/min, L/min, mmHg, etc. Statistics and measurements should always be given in numerals, except where the number begins a sentence. When a number does not refer to a unit of measurement, it is spelt out, except where the number is greater than nine.

Abbreviations that are used should be defined in parenthesis where the full word is first mentioned. Some common abbreviations can be used, such as iv, im, po, and sc.

Drugs should be referred to by their generic names, rather than brand names.

Editorial Correspondence

Prof. Dr. Resul YILMAZ
Selçuk Üniversitesi, Tıp Fakültesi
Çocuk Yoğun Bakım Bilim Dalı
Alaeddin Keykubat Yerleşkesi Selçuklu/Konya 42075 Türkiye
Phone: +90 (332) 241 50 00-44513
Faks: +90 (332) 241 21 84

Journal of Contemporary Medicine

(Çağdaş Tıp Dergisi)
http://www.jcontempmed.com
e-posta: cagdastipdergisi@gmail.com

Checklist for Manuscripts

Review guide for authors and instructions for submitting manuscripts through the electronic submission, website at

http://www.jcontempmed.com

JOURNAL OF CONTEMPORARY MEDICINE

Formerly Çağdaş Tıp Dergisi

CONTENTS

YEAR 2025 VOLUME 15 ISSUE 3 e-ISSN 2667-7180

ORIGINAL ARTICLES

CASE REPORT

LETTER TO THE EDITOR

JOURNAL OF
CONTEMPORARY MEDICINE

DOI:10.16899/jcm.1473266
J Contemp Med 2025;15(3):109-113

Original Article / Orijinal Araştırma

Knowlegde Level of Residents of A Tertiary Care Center in Somalia Regarding Adult Life Support

Somali'de Üçüncü Düzey Sağlık Kuruluşunda Çalışan Asistan Doktorların Temel Yaşam Desteği Hakkındaki Bİlgi Düzeyi

Şule Yakar[1], Ayşe Şule Akan[1], Necmi Baykan[1], Nasteho Mohamed Sheikh Omar[2], Emir Şahan[3], Funda İpekten[4]

[1]Department of Emergency, Kayseri City Hospital, Kayseri, Turkey
[2]Department of Emergency, Recep Tayyip Erdoğan Education and Research Hospital, Mogadishu, Somalia
[3]Department of Anesthesiology and Reanimation, Ataturk University Research Hospital, Erzurum, Turkey
[4]Department of Biostatistics, Faculty of Medicine, Adıyaman University, Adıyaman, Turkey

Abstract

Aim: This study aimed to assess the knowledge level of resident doctors in clinics at the Somalia Mogadishu Turkey Recep Tayyip Erdoğan Training and Research Hospital concerning basic life support (BLS) and advanced life support (ALS).

Material and Method: A total of 102 residents, actively engaged in the clinical practice, voluntarily participated in the study. Participants completed a questionnaire encompassing demographic data and 34 objective questions measuring knowledge levels about BLS and ALS. The questionnaire responses were analyzed, comparing the results across different clinics.

Results: Among the 102 participants, 84 were male and 18 were female resident doctors. Age distribution analysis revealed that 58 participants were aged between 26 and 30 years or older. Most of the resident doctors (n=10) were working in emergency medicine and gynecology (n=10). Regarding professional experience, the highest proportion (n=36) had less than one year of work experience. Statistical analyses revealed no significant differences in correct answers between female and male residents (p=0.58, p=0.34), between medical and surgical departments (p=0.31, p=0.34), or based on years of professional experience (p=0.69, p=0.65).

Conclusions: Periodic informative training on adult life support should be provided to all resident doctors. This approach will substantially enhance knowledge levels and service quality in applying adult life support.

Keywords: Advanced life support, basic life support, cardiac arrest

Öz

Amaç: Bu çalışmada Somali Mogadişu Türkiye Recep Tayyip Erdoğan Eğitim ve Araştırma Hastanesi kliniklerinde asistan hekimlerin temel yaşam desteği (BLS) ve ileri yaşam desteği (ALS) konusundaki bilgi düzeylerinin değerlendirilmesi amaçlandı.

Gereç ve Yöntem: Çalışmaya klinikte aktif olarak görev yapan toplam 102 asistan gönüllü olarak katılmıştır. Katılımcılar, BLS ve ALS ile ilgili bilgi düzeylerini ölçen, demografik verileri ve 34 objektif soruyu içeren anketi doldurdu. Anket yanıtları, farklı kliniklerdeki sonuçlar karşılaştırılarak analiz edildi.

Bulgular: 102 katılımcının 84'ü erkek, 18'i kadın asistan doktordu. Yaş dağılımı analizi, 58 katılımcının 26 ila 30 yaş veya üzerinde olduğunu ortaya çıkardı. Asistan doktorların çoğunluğunun (n=10) acil tıp ve jinekoloji (n=10) branşlarında görev yaptığı belirlendi. Mesleki deneyime bakıldığında en yüksek oranın (n=36) bir yıldan az iş tecrübesine sahip olduğu görülmektedir. İstatistiksel analizler, kadın ve erkek asistanlar arasında (p=0,58; p=0,34), tıbbi ve cerrahi departmanlar arasında (p=0,31; p=0,34) veya mesleki deneyim yıllarına göre doğru yanıtlar arasında anlamlı bir fark olmadığını ortaya çıkardı. (p=0,69; p=0,65).

Sonuç: Tüm asistan doktorlara yetişkin yaşam desteği konusunda periyodik bilgilendirme eğitimleri verilmelidir. Bu yaklaşım, yetişkin yaşam desteğinin uygulanmasında bilgi düzeyini ve hizmet kalitesini önemli ölçüde artıracaktır.

Anahtar Kelimeler: İleri yaşam desteği, temel yaşam desteği, kardiyak arrest

Corresponding *(İletişim)*: Emir Şahan, Ataturk University Research Hospital, Department of Anesthesiology and Reanimation, Erzurum, Turkey
E-mail *(E-posta)*: emirsahan94@gmail.com
Received *(Geliş Tarihi)*: 24.04.2024 **Accepted *(Kabul Tarihi)*:** 27.01.2025

INTRODUCTION

Sudden cardiac arrest stands as the foremost cause of global mortality. Prompt diagnosis and proficient cardiopulmonary resuscitation (CPR) are pivotal for patient survival. The American Heart Association (AHA) and the European Society of Cardiology (ESC) periodically release updated guidelines to optimize CPR effectiveness. All physicians, regardless of specialty, are expected to possess sufficient knowledge and skills in CPR. Demonstrated standardized approaches have proven effective in diminishing morbidity and mortality associated with sudden cardiac arrest.[1]

Effective CPR ensures adequate cerebral and coronary perfusion and enhances neurological survival in patients. Despite the introduction of novel techniques and technological advancements, the importance of effective CPR in patient survival persists.[2]

For patients in cardiac arrest, a series of interventions is imperative, including recognizing the arrest, ensuring the readiness of the emergency response team, administering early CPR, prompt defibrillation, and effectively applying advanced life support (ALS) alongside subsequent intensive care support. Basic life support (BLS) represents a globally standardized intervention that relies solely on human resources without requiring technological support. The correct application of essential techniques and maneuvers is crucial. Timely and effective BLS was shown to increase survival rates two to fourfold.[3]

In contrast to BLS, ALS involves interventional procedures such as intravenous fluids, drug administration, and intubation. The ALS is practiced by physicians and healthcare professionals, incorporating most BLS techniques. Technical applications related to both BLS and ALS vary across countries due to differences in geographical location, cultural considerations, and economic factors.[4]

The European Resuscitation Council (ERC) emphasizes the propensity for technical skills related to CPR, BLS, and ALS to wane between three and six months, underscoring the need for ongoing training. The CPR performance is particularly expected to improve post-training.[5]

The American Heart Association first published ALS guidelines in 1974, subsequently updating them at intervals to enhance practitioner knowledge and skills. The treatment approaches outlined in these guidelines for cardiac arrest and other life-threatening emergencies serve as the gold standard. The most recent ALS guidelines from the AHA, updated based on decisions from the 2010 International Liaison Committee (ILCOR) Consensus on Science and Treatment Recommendations (CoSTR) include a section on education and practice to enhance resuscitation quality and subsequent patient care.[6] International resuscitation committees recommend ALS training every two years.[7]

In light of this, our study aims to assess the knowledge levels of resident doctors regarding BLS and ALS.

MATERIAL AND METHOD

The study was carried out with the permission of Recep Tayyip Erdogan Training and Research Hospital Ethics Committee in Mogadishu, Somalia (Date: 07.02.2022, Decision No: 473).

The study was conducted at Recep Tayyip Erdogan Training and Research Hospital in Mogadishu, Somalia. They were included in the study after obtaining an informed consent form from the participants. The prepared survey form was sent to all assistant physicians actively working in the hospital where the study was conducted via e-mail and mobile phone. The assistants' e-mail and mobile phone information were obtained from the institution, and assistants with incomplete or incorrect information were not included in the study. Again, assistants who did not want to participate were excluded from the study. Finally, a total of 102 residents, actively engaged in the clinical practice, voluntarily participated in the study. Participants completed a questionnaire encompassing demographic data and 34 objective questions measuring knowledge levels about BLS and ALS. The questionnaire was based on the 2021 guidelines of the European Resuscitation Council, and demographic data were also examined.

Statistical Analysis

Survey results were compiled, and the normality of data distribution was assessed by histograms, q-q plots, and the Shapiro-Wilk test. Variance homogeneity was tested using the Levene test. Continuous variables were compared for group differences using an independent sample t-test. On the other hand, a one-way variance analysis (ANOVA) was employed to compare group differences involving two or more groups. For repeated binary measurement comparisons of quantitative variables, a paired t-test was utilized. The analysis was performed using R 4.3.2 (www.r-project.org) software, and a p-value less than 5% was considered statistically significant.

RESULTS

In this observational study, encompassing 102 residents, we analyzed questionnaire results to assess their knowledge and experience regarding BLS and ALS. Most participants fell within the 26-30 age range, constituting 56.9% (n=58) of the study population. Male residents accounted for 82.4% (n=84). In comparison, female residents comprised 17.6% (n=18) of the study participants. Predominant specialization areas included emergency medicine at 9.8% (n=10) and gynecology at 9.8% (n=10). Regarding professional experience, the highest proportion (35.3%; n=36) had less than one year of work experience. Approximately 54% (n=55) received ALS training during medical school. While 26.5% (n=27) had never read any guidelines on ALS, 24.5% (n=25) read the ERC 2021 guidelines, 28.4% (n=29) read the AHA 2020 guidelines, and 20.6% (n=21) consulted guidelines published before 2020. The highest frequency of performing ALS occurred once a month, with 29.4% (n=30) reporting such frequency. Answers to three critical questions from the questionnaire are detailed in **Table 1**, and demographic data and survey results are presented in **Table 2**.

Table 1. Answers Given to Three Critical Questions Included in the Questionnaire

Question	Yes	No
Do you think that all physicians should have knowledge and skills about adult life support?	67.6% (n=69)	32.4% (n=33)
If necessary can you effectively implement adult life support?	65.7% (n=67)	%34.3% (n=35)
Do you think repeating adult life support trainings would be beneficial for physicians?	95.1% (n=97)	4.9% (n=5)

Table 2. Demographic data of the study participants

	Frequency/ Percentage
Age ranges	
20-25	18 (17.6%)
25-30	58 (56.9%)
30-35	26 (25.5%)
Gender	
Male	84 (82.4%)
Female	18 (17.6%)
Duty unit	
Emergency Medicine	10
Obstetrics	10 (9.8%)
Anesthesiology	9 (8.8%)
General surgery	9 (8.8%)
Internal medicine	8 (7.8%)
Orthopedics	8 (7.8%)
Radiology	7 (6.9%)
Neurology	5 (4.9%)
Pulmonary disease	5 (4.9%)
Ophthalmology	5 (4.9%)
Neurosurgery	4 (3.9%)
Cardiovascular surgery	4 (3.9%)
Infectious diseases	4 (3.9%)
Urology	4 (3.9%)
Cardiology	3 (2.9%)
Thoracic surgery	2 (2%)
Otolaryngology	2 (2%)
Dermatology	2 (2%)
Psychiatry	1(1%)
Duty period	
<1 year	36 (25.3%)
1-3 years	19 (18.6%)
3-4 years	29 (28.4%)
>4 years	18 (17.6%)
Most recent Adult Life Support training	
Never	14 (13.7%)
At faculty	55 (53.9%)
After faculty	33 (32.4%)
Most recent Adult Life Support guideline reading	
Never	27 (26.5%)
ERC 2021	25 (24.5%)
AHA 2020	29 (28.4%)
Published before 2020	21 (20.6%)
Frequency of ALS performance	
Never	18 (17.6%)
Daily	18 (17.6%)
Often (Every week)	13 (12.7%)
Not often (once a month)	30 (29.4%)
Once a year	23 (22.5%)

In the analysis of true/false survey questions related to BLS, correct response rates were high for crucial aspects such as ensuring safety (86.3%, n=88), activating Emergency Medical Services (EMS) when alone with an adult patient before starting CPR (81.4%, n=83), alternating between providing 30 compressions and 2 rescue breaths (93.2%, n=95), continuing CPR if no shock is advised by an automated external defibrillator (AED) or in the absence of AED (88.2%, n=90), and placing an unresponsive patient with an abnormal breathing pattern in the recovery position (71.6%, n=73). These results are summarized in **Table 3**.

Table 3. Responses given to true/false questions regarding BLS and ALS

Basic life support	Frequency/ Percentage	
	True	False
Make sure you, the victim and any bystanders are safe.	88 (86.3%)	14 (13.7%)
Open the airway; in trauma patients you can use head-tilt chin-lift maneura.	33 (32.4%)	69 (67.6%)
Look, listen and feel for breathing for no more than 5 seconds.	26 (25.5%)	76 (74.5%)
If alone with an adult patient, activate the EMS first and then start CPR.	83 (81.4%)	19 (18.6%)
If alone with an adult patient, leave the victim to get an AED if available.	79 (75.5%)	23 (22.5%)
Compress to a depth of at least 5 cm but not more than 6 cm.	68 (66.7%)	34 (33.3%)
Compress the chest at a rate of 120-130 min.	58 (56.9%)	44 (43.1%)
Alternate between providing 30 compressions and 2 rescue breaths.	95 (93.1%)	7 (6.9%)
The AED will advise a shock for all cardiac arrest patients.	59 (57.8%)	43 (42.2%)
If no shock advised by AED or, if no AED available continue CPR.	90 (88.2%)	12 (11.8%)
Don't interrupt resuscitation until, the victim is definitely waking up, moving, opening eyes and breathing normally.	60 (58.8%)	42 (41.2%)
If the patient unresponsive and breath anormally, place in the recovary position.	29 (28.4%)	73 (71.6%)
Advanced life support		
If patient unresponsive with absent or abnormal breathing, start CPR 30:2 and attach defibrillator.	78 (76.5%)	24 (23.5%)
Use a basic or advanced airway technique-onlr rescuers with a high success should use tracheal intubation.	81 (79.4%)	21 (20.6%)
Give the low-flow oxygen during CPR.	72 (70.6%)	30 (29.4%)
Immediately resume chest compressions at non-shockable rhtyms.	84 (82.4%)	18 (17.6%)
Use adrenalin early for non-shockable cardiac arrest.	87 (85.3%)	15 (14.7%)
During CPR give 1 mg IV adrenalin every 5-10 min.	41 (%40.2)	61 (%59.8)
pVT and PEA are shockable rhtyms.	43 (42.2%)	59 (57.8%)
For biphasic waveforms, deliver the first shock with an energy of at least 150 J.	72 (70.6%)	30 (29.4%)
Assess rhtym after giving shock, than start CPR.	31 (30.4%)	71 (69.6%)
Give 300 mg IV amiodarone after 2 shocks.	38 (37.3%)	64 (62.7%)
IO access if attempts at IV access are unsuccessful or IV access is not feasible	89 (87.3%)	13 (12.7%)
Stop CPR if the patient has not recovered after 15 minutes of resuscitation.	68 (66.7%)	34 (33.3%)

AED:Automated external defibrillator, ALS: Advanced life support, BLS: Basic life support, CPR: Cardiopulmoner resusitasyon, EMS: Emergency Medical, IO: Consider intraosseous, PEA: Pulseless electrical activity, pVT: Pulseless ventricular tachycardia

In the analysis of true/false survey questions related to ALS, correct response rates were observed for aspects such as immediately resuming chest compressions at non-shockable rhythms (82.4%, n=84), using adrenaline early for non-shockable cardiac arrest (85.3%, n=87), and considering intraosseous (IO) access if attempts at IV access are unsuccessful or IV access is not feasible (87.3%, n=89). However, 67.2% (n=64) incorrectly answered the question regarding administering 300 mg IV amiodarone after 2 shocks. It was thought that the incorrect answer rate was so high because participants did not have enough information about the use of amiodarone recommended in the guideline or they did not read and understood the question carefully enough. These results are also summarized in **Table 3**.

Statistical analyses revealed no significant differences in correct answers between female and male residents (p=0.58, p=0.34), between medical and surgical departments (p=0.31, p=0.48), or based on years of professional experience (p=0.69, p=0.37). Additionally, the frequency of reading and complying with Adult Life Support guidelines did not significantly impact correct answers related to BLS and ALS questions (p=0.38, p=0.99, p=0.60, p=0.93) (**Table 4**).

Table 4. Comparisons of gender, department, duration, reading and application frequency regarding BLS and ALS

		BLS			ALS	
Gender						
Female	Correct	8.22±1.48	P=0.58	Correct	7.33±1.75	P=0.34
	Incorrect	3.78±1.48		Incorrect	4.67±1.75	
Male	Correct	7.98±1.79		Correct	7.76±1.73	
	Incorrect	4.02±1.79		Incorrect	4.24±1.73	
Department						
Medical	Correct	7.82±1.70	P=0.31	Correct	7.82±1.71	P=0.48
	Incorrect	4.18±1.70		Incorrect	4.18±1.71	
Surgical	Correct	8.18±1.76		Correct	7.58±1.76	
	Incorrect	3.82±1.76		Incorrect	4.42±1.76	
Working period (Years)						
<1	Correct	7.83±1.52	P=0.69	Correct	7.78±1.61	P=0.37
	Incorrect	4.17±1.52		Incorrect	4.22±1.61	
1-3	Correct	8.42±1.80		Correct	8.11±1.56	
	Incorrect	3.58±1.80		Incorrect	3.89±1.56	
3-4	Correct	7.97±1.97		Correct	7.24±1.96	
	Incorrect	4.03±1.97		Incorrect	4.76±1.96	
>3	Correct	8.06±1.73		Correct	7.78±1.77	
	Incorrect	3.94±1.73		Incorrect	4.22±1.77	
ALS guideline						
Never	Correct	8.07±1.80	P=0.38	Correct	7.70±1.77	P=0.99
	Incorrect	3.93±1.80		Incorrect	4.30±1.77	
ERC2021	Correct	8.36±1.82		Correct	7.72±1.70	
	Incorrect	3.64±1.82		Incorrect	4.28±1.70	
AHA2020	Correct	8.07±1.73		Correct.	7.69±1.77	
	Incorrect	3.93±1.73		Incorrect	4.31±1.77	
Before2020	Correct	7.48±1.54		Correct.	7.62±1.80	
	Incorrect	4.52±1.54		Incorrect	4.38±1.80	
ALS performing						
Never	Correct	8.22±1.66	P=0.60	Correct	7.78±1.70	P=0.93
	Incorrect	3.78±1.66		Incorrect	4.22±1.70	
Daily	Correct	8.50±1.82		Correct	7.50±2.07	
	Incorrect	3.50±1.82		Incorrect	4.50±2.07	
Often	Correct	7.92±1.80		Correct	7.92±1.93	
	Incorrect	4.08±1.80		Incorrect	4.08±1.93	
Not often	Correct	7.93±1.70		Correct	7.53±1.63	
	Incorrect	4.07±1.70		Incorrect	4.47±1.63	
Once a year	Correct	7.65±1.77		Correct	7.83±1.61	
	Incorrect	4.35±1.77		Incorrect	4.17±1.61	

ALS: Advanced life support, BLS: Basic life support

DISCUSSION

Basic life support and ALS are integral practices that all physicians should be acquainted with during their primary medical education. Regular training intervals are essential to staying abreast of innovations and maintaining proficiency in these practices. This cross-sectional observational survey, conducted at a single center, aimed to measure residents' knowledge regarding adult life support. The study included 102 resident doctors, with a higher representation of male residents. The mean age and gender distribution were comparable to findings in other studies in the literature.[8]

While some studies reported that male healthcare workers exhibited more correct responses to questions measuring the knowledge of resident physicians about current guidelines regarding adult life support, we did not find a significant difference between genders in our study.[9] It is thought that due to the unbalanced ratio of male and female participants in our study, different results were obtained from the literature.

Do you think that all physicians should have knowledge and skills about adult life support? The majority answered yes to the question. In a study, they suggest that all doctors should be effectively informed about adult life support in order to save the patient.[10] If necessary can you effectively implement Adult Life Support? We received a majority yes answer to the question. A study has shown that doctors can effectively provide adult life support.[11] Do you think repeating Adult Life Support training would be beneficial for physicians? The majority said yes to the question. In a survey conducted on adult life support, it was observed that doctors who received repeated training were more successful.[12]

In a multicenter study assessing the knowledge level of CPR, BLS, and ALS among European healthcare workers, it was observed that Emergency Medicine Department and ICU workers had a better knowledge level than other departments. However, in our study, the knowledge level was similar between departments. Since the knowledge level comparison in our study was made between internal and surgical departments, it is thought that different results were obtained from the literature. Similarly, while other studies reported that the knowledge level increased with increasing professional experience, we did not find a significant difference in our study concerning years of work experience.[13,14] Again, the lack of difference in knowledge levels according to years of experience in our study may be related to the small number of participants and the fact that the groups did not include equal numbers of participants.

The practice of adult life support has a longstanding history, and current guidelines on the subject have been available for years. Some studies suggest a decline in the knowledge and skills of healthcare professionals six months after initial adult life support training, resulting in a lack of training frequency and manual reading.[9] In another study, it was observed that the knowledge and skills of healthcare professionals regarding adult life support decreased when they did not receive repeated training within 6 months to 1 year, and their knowledge levels remained good with repeated training throughout their working lives.[12] In contrast, contrary to existing literature, our study did not find a significant difference between the frequency of guideline reading and knowledge level in answering survey questions.

Although the frequency of reading guides of the assistant doctors who participated in our study was not sufficient, it is seen that their level of knowledge about adult life support is praiseworthy. When we look at other studies in the literature, it is clear the importance of continuous training and awareness initiatives to ensure that healthcare professionals maintain their competence in life support applications throughout their careers.

CONCLUSION

Our study indicates a commendable theoretical knowledge level among resident doctors regarding adult life support. Residents demonstrate robust theoretical knowledge even in departments where this practice is only occasionally performed. However, it is evident that our residents, particularly those in high patient-density departments with heavy workloads, need help keeping up with current guidelines due to time constraints.

The recommended periodic reading of current guidelines may need to be consistently followed. To address this issue, we propose the mandatory repetition of adult life support training at regular intervals, ideally integrated into the curriculum every two years during the residency training process. This approach is anticipated to elevate knowledge levels, facilitate adherence to current guidelines, and enhance the self-confidence of our residents in practical applications.

The most important limitations of our study are that it is a single-center study, the number of participants is small, and the participant groups are not homogeneous.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Recep Tayyip Erdogan Training and Research Hospital Ethics Committee in Mogadishu, Somalia (Date: 07.02.2022, Decision No: 473).

Informed Consent: All patients signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

REFERENCES

1. Ssewante N, Wekha G, Iradukunda A, et al. Basic life support, a necessary inclusion in the medical curriculum: a cross-sectional survey of knowledge and attitude in Uganda. BMC Med Educ. 2022;22(1):140.
2. Bhatnagar V, Tandon U, Jinjil K, Dwivedi D, Kiran S, Verma R. Cardiopulmonary Resuscitation: Evaluation of Knowledge, Efficacy, and Retention in Young Doctors Joining Postgraduation Program. Anesth Essays Res. 2017;11(4):842-6.
3. Chandran KV, Abraham SV. Basic Life Support: Need of the Hour-A Study on the Knowledge of Basic Life Support among Young Doctors in India. Indian J Crit Care Med. 2020;24(5):332-5.
4. Ryynänen OP, Iirola T, Reitala J, Pälve H, Malmivaara A. Is advanced life support better than basic life support in prehospital care? A systematic review. Scand J Trauma Resusc Emerg Med. 2010;18:62.
5. Krajina I, Kvolik S, Steiner R, Kovacevic K, Lovric I. Cardiopulmonary resuscitation, chest compression only and teamwork from the perspective of medical doctors, surgeons and anesthesiologists. Iran Red Crescent Med J. 2015;17(3):e18208.
6. Böttiger BW, Lockey A, Aickin R, et al. "All citizens of the world can save a life" - The World Restart a Heart (WRAH) initiative starts in 2018. Resuscitation. 2018;128:188-90.
7. Spooner BB, Fallaha JF, Kocierz L, Smith CM, Smith SC, Perkins GD. An evaluation of objective feedback in basic life support (BLS) training. Resuscitation. 2007;73(3):417-24.
8. Oktay V, Cirali IC, Baydar O, Sansoy V. Knowledge and experience of cardiopulmonary resuscitation among cardiologists in clinical practice: A multicenter cross-sectional study. Anatol J Cardiol. 2019;21(6):296-304.
9. Rajeswaran L, Cox M, Moeng S, Tsima BM. Assessment of nurses' cardiopulmonary resuscitation knowledge and skills within three district hospitals in Botswana. Afr J Prim Health Care Fam Med. 2018;10(1):1-6.
10. Brugger H, Durrer B, Elsensohn F, et al. Resuscitation of avalanche victims: Evidence-based guidelines of the international commission for mountain emergency medicine (ICAR MEDCOM): intended for physicians and other advanced life support personnel. Resuscitation. 2013;84(5):539-46.
11. Yang CW, Yen ZS, McGowan JE, et al. A systematic review of retention of adult advanced life support knowledge and skills in healthcare providers. Resuscitation. 2012;83(9):1055-60.
12. Passali C, Pantazopoulos I, Dontas I, et al. Evaluation of nurses' and doctors' knowledge of basic & advanced life support resuscitation guidelines. Nurse Educ Pract. 2011;11(6):365-9.
13. Kourek C, Greif R, Georgiopoulos G, et al. Healthcare professionals' knowledge on cardiopulmonary resuscitation correlated with return of spontaneous circulation rates after in-hospital cardiac arrests: A multicentric study between university hospitals in 12 European countries. Eur J Cardiovasc Nurs. 2020;19(5):401-10.
14. Munezero JBT, Atuhaire C, Groves S, Cumber SN. Assessment of nurses knowledge and skills following cardiopulmonary resuscitation training at Mbarara Regional Referral Hospital, Uganda. Pan Afr Med J. 2018;30:108.

JOURNAL OF
CONTEMPORARY MEDICINE

DOI:10.16899/jcm.1658408
J Contemp Med 2025;15(3):114-120

Original Article / Orijinal Araştırma

Evaluation of Marriage Integration and Psychological Resilience of Parents with Children with Down Syndrome and Cerebral Palsy

Down Sendromlu ve Serebral Palsili Çocuğu Olan Ebeveynlerin Evlilik Uyumu ve Psikolojik Dayanıklılıklarının Değerlendirilmesi

Davut Kormalı[1], Gülbeyaz BARAN DURMAZ[2]

[1]Pediatrics Master's Degree with Thesis, Dicle University, Diyarbakır, Turkiye
[2]Ataturk Faculty of Health Sciences, Dicle University, Diyarbakır, Turkiye

Abstract

Aim: This study was conducted to evaluate marital adjustment and psychological resilience of parents with children with Down Syndrome and Cerebral Palsy who are individuals with disabilities.

Material and Method: This descriptive study was conducted with the parents of children with Down syndrome and cerebral palsy who are being educated in Bingöl Special Education and Rehabilitation Center. Personal information form, Psychological Resilience Scale for Adults and Marital Adjustment Scale were used between February and May. The data were analyzed by transferring to SPSS 26 package program in computer environment. Chi-square, T test, Mann Whitney U and Kruskall-Wallis H were used. Pearson correlation analysis was used to analyze the relationships. P<.05 was preferred for statistical significance.

Results: A statistically significant (p<.001) positive correlation was found between the mean scores of Psychological Resilience Scale for Adults and Marital Adjustment of parents with Down Syndrome and Cerebral Palsy. As a result of the independent samples t-test, it was found that there was no statistically significant difference between the two groups (p>.05). As a result of the Kruskal Wallis H test between the educational level of the parents with a child with Down Syndrome, it was found that there was a statistically significant difference between the groups (p<.05).

Conclusion: It has been determined that demographic characteristics do not affect the marital adjustment and psychological resilience of parents of children with down syndrome and cerebral palsy. Marital adjustment and psychological resilience are compatible.

Keywords: Down syndrome, cerebral palsy, marital adjustment, pediatric nursing, psychological resilience

Öz

Amaç: Bu çalışma engelli bireyler olan Down sendromlu ve Serebral Palsili çocuğu olan ebeveynlerin evlilik uyumunu ve psikolojik dayanıklılığını değerlendirmek amacıyla yapılmıştır.

Gereç ve Yöntem: Tanımlayıcı tipte olan bu çalışma Bingöl özel eğitim ve rehabilitasyon merkezinde eğitim görmekte olan Down sendromlu ve Serebral palsili çocukların ebeveynleri ile yürütülmüştür. Araştırma Şubat-Mayıs tarihleri arasında; kişisel bilgi formu, Yetişkinler İçin Psikolojik Dayanıklılık Ölçeği, Evlilik Uyumu Ölçeği kullanılarak elde edilmiştir. Veriler bilgisayar ortamında SPSS 26 paket programına aktarılarak analiz edilmiştir. Ki Kare, T testi, Mann Whitney U ve Kruskall- Wallis H kullanılmıştır. İlişkilerin incelenmesinde pearson korelasyon analizi kullanılmıştır. İstatistiksel anlamlılık için p<.05 tercih edilmiştir.

Bulgular: Down sendromu ve Serebrali çocuğa sahip ebeveynlerin Evlilik Uyumu Ölçeği ve Yetişkinler İçin Psikolojik Dayanıklılık Ölçeği puan ortalamaları arasında pozitif yönde korelasyon istatistiksel açıdan anlamlı (p<.001) bulunmuştur. Down sendromu ve Serebrali çocuğa sahip ebeveynlerin Evlilik Uyumu Ölçeği ve Yetişkinler İçin Psikolojik Dayanıklılık Ölçeği puan ortalaması yapılan bağımsız örneklemler t testi sonucunda iki grup arasında istatistiksel açıdan anlamlı bir farklılık olmadığı (p>.05) bulunmuştur. DS hastası çocuğa sahip ebeveynler içerisinde eğitim düzeyi arasında yapılan Kruskal Wallis H testi sonucunda gruplar arasında istatistiksel açıdan anlamlı bir farklılık olduğu (p<.05) bulunmuştur.

Sonuç: Down sendromlu ve Serebral palsili çocuğu olan ebeveynlerin evlilik uyumu ve psikolojik dayanıklılıklarını demografik özelliklerin etkilemediği belirlenmiştir Evlilik uyumu ile psikolojik dayanıklılık ise uyumludur.

Anahtar Kelimeler: Down sendromu, serebral palsi, evlilik uyumu, pediatri hemşireliği, psikolojik dayanıklılık

Corresponding *(İletişim)*: Davut Kormalı, Pediatrics Master's Degree with Thesis, Dicle University, Diyarbakır, Turkiye
E-mail *(E-posta)*: davidkrml01@gmail.com
Received *(Geliş Tarihi)*: 15.03.2025 **Accepted *(Kabul Tarihi)*:** 02.05.2025

INTRODUCTION

Disability, which is expressed as the inability of the individual to fulfill the roles that he/she should fulfill due to age, gender, socio-cultural differences and which arises for different reasons, is examined under five main headings: orthopedic, hearing, vision, mental and speech.[1] It is known that 15% of the world population, i.e. more than 1000 million people, has a disability. According to this information, 1 out of 7 people is disabled. It has been found that more than 93 million of this population consists of children under the age of 15. In our country, it is estimated that there are more than 5.5-6 million disabled children.[2]

There are some disability groups in the world that define the concept of developmental disability. Down Syndrome (DS) is one of these disability groups. DS is a disease of genetic origin, seen in nations in different geographies and occurs due to the excess number of chromosomes in the cell.[3] Although the birth rate of babies with DS varies according to the sources, it is generally defined as 1 in 600 live births or 1 in 1000 live births. It has been reported that the number of individuals with DS in our country is around 70,000 in line with uncertain data.[4] Another disability group is cerebral palsy (CP). Cerebral means related to the brain. Palsy means weakness or problem in muscle use. CP is an abnormality that results from abnormal brain development or damage to the developing brain and affects a person's ability to control their brain.[5] Various population-based research reports worldwide estimate the prevalence of the disease to be approximately 1.5-4 per 1000 children.[6] In Turkiye, it has been concluded that the prevalence of CP is 4.4 per 1000 live births.[7]

One of the basic concepts addressed in marriage studies is marital adjustment.[8] Marital adjustment is a concept related to the level of meeting the needs of couples in the marriage process and how satisfied they are with the marriage. In addition to being much more important at the beginning of marriage, it is a process that needs to be protected and maintained throughout life.[9,10] While studies have focused on resilience in children and adolescents, the number of studies on resilience in adults and caregivers has increased recently. Psychological resilience is a characteristic or personal ability that enables individuals who can overcome the current difficulties despite the difficulties and develop more than expected to survive, the ability to adapt quickly in the face of stressful life experiences and the ability to overcome the traumas experienced.[11]

Each parent wants a healthy child to be born for the continuation of his/her generation and directs his/her life within the framework of these expectations.[12] However, when it is determined that the child has a disability, the discrepancy between the actual situation and expectations emerges.[13] Regardless of the degree of disability, having a disabled child affects the family emotionally, socially, physically and economically and may cause problems in marital adjustment.[14,15]

Parents of individuals with mental or physical disabilities often need psychological support. Nurses reduce the burden of the family with the interventions they plan to improve the well-being of children with disabilities. They partially meet the psychological support needed by the family and reduce the depression levels of parents.[16] Pediatric nurses should be able to provide all kinds of support and interventions to children and their families who have problems within the framework of their roles of supporting child and family health, advocacy, education and counseling.[17]

When the studies involving parents with children with disabilities are examined, it is seen that studies have been conducted on the difficulties experienced by parents, life satisfaction, psychological resilience, care burden, and marital adjustment. There are very few studies on the psychological well-being of families of children with Down syndrome and cerebral palsy. The aim of this study was to evaluate marital adjustment and psychological resilience of parents with children with DS and CP.

METHOD AND METHOD

Research Ethics and Institutional Consent

In order to conduct the research, approval was obtained from Dicle University Social and Human Sciences Ethics Committee on 22.12.2023. After the Ethics Committee approval was obtained, institutional permission was obtained from Bingöl Provincial Directorate of National Education (Number/Date: 97250045-21.02.2024) for the rehabilitation centers where the research would be conducted. Written and verbal permission was obtained from parents who met the criteria for inclusion in the research sample. The data were collected with the "Informed Consent Form", which included information about the purpose, duration, and implementation of the study, that participation in the study was voluntary, that the names of the participants would be kept confidential, and that they could leave the study at any time. Permission was obtained by e-mail from the authors who performed the validity and reliability of the scales to be used in the study.

Type of Research

In this study, a correlational model was used to test the marital adjustment and psychological resilience and sociodemographic characteristics of parents with children with DS and CP. This study is cross-sectional and correlational descriptive type.

Population and Sample of the Study

The population of the study consisted of the parents of students with DS and CP enrolled in the Private Dünyam Special Education and Rehabilitation Center and Private Mucize Special Education and Rehabilitation Center affiliated to Bingöl Directorate of National Education

between February 2024 and June 2024. The sample size was 140 parents of students. Of these parents, 70 were parents of children with DS and the other 70 were parents of children with CP.

Post hoc power analysis was performed to determine the adequate sample size and effect size for the study. Power analysis was performed with the G*Power 3.1.9.4 package program.[18] For the calculation of the effect size, Marital Adjustment Scale (MAS) and Psychological Resilience Scale for Adults (PRSA) were taken as reference. According to the calculation based on the relevant references, the effect size (ρ)= .23, Power (1- β) =.99 for the SP group, while the effect size (ρ)= .69, Power (1- β) = 1.0 for the DS group. The obtained values show that the sample size of the study and the effect sizes of the variables are sufficient.

Data Collection Tools

Personal Information Form: It is a form developed by the researcher in order to determine the characteristics of the sample group clearly and explicitly. The form included questions including sociodemographic characteristics and personal information such as age, gender, occupation and educational status of the parents, number of children in the family, and whether they wanted another child after the disabled child.[19,20] The personal information form is given in Appendix 10.1.

Marital Adjustment Scale (MAS): Developed by Locke and Wallace in 1959, the MAS was adapted into Turkish by Tutarel and Kışlak in 1999. The scale consists of 15 items. Each item receives a score between 0 and 6, which differs according to the number of options. Accordingly, item 1 is evaluated between 0-6 points, items 2-9 are evaluated between 0-5 points, items 10 and 14 are evaluated between 0-2 points, items 11 and 13 are evaluated between 0-3 points, item 12 is evaluated between 0 points if the option of staying at home for one of the spouses and doing something outside for the other is selected, 1 point if the option of doing something outside is selected for each of the spouses, 2 points if the option of staying at home is selected for each of the spouses, and item 15 is evaluated between 0-2 points. The total score obtained from the scale varies between 0-60. Scores above 43 points are considered harmonious in terms of marital relations, while scores below 43 points are considered incompatible. Scores go from incompatibility to compatibility. As a result of validity and reliability studies, the Cronbach alpha value of the scale was found to be 84.[21] According to the findings obtained, Cronbach's α reliability coefficients were calculated as .95 in the group with CP and .90 in the group with DS.

Psychological Resilience Scale for Adults (PRSA): It was developed by Friborg et al. in 2003 and adapted into Turkish by Basım and Çetin (2011). The scale initially consisted of six sub-dimensions: structural style, future perception, self-perception, social competence, social resources, and family harmony. The increase in the total score to be obtained from the scale consisting of a total of 33 items in 5-point Likert type indicates that the psychological resilience level of the individual is high. The internal consistency coefficients of the scale were calculated as .80 for 'Self Perception', .75 for 'Future Perception', .82 for 'Social Competence', .86 for 'Family Adjustment', .84 for 'Social Resources' and .76 for 'Structural Style'.[22] According to the findings obtained, Cronbach α reliability coefficients were calculated as .92 in the group with CP and .94 in the group with DS.

Evaluation of Data

The data obtained in the study were analyzed using SPSS (Statistical Package for Social Sciences) 26.0 program. Skewness and Kurtosis values, which are descriptive statistical measures, were taken into consideration to determine whether the data showed normal distribution.[23] If the Skewness and Kurtosis values are between +2.0 and -2.0, it can be said that the data are normally distributed.[24] Accordingly, when the scales used in this study were analyzed in terms of skewness and kurtosis values, it was determined that the data showed normal distribution. In the evaluation of the data, numbers, averages and percentages were used for descriptive analysis. Chi-square analysis was used to compare the demographic characteristics of parents with CP and DS and t-test was used to evaluate the differences between the MAS and PRSA variables in parents with CP and DS. For variables that did not show normal distribution, Mann-Whitney U and Kruskall-Wallis H tests were used to evaluate the differences in the mean scores of the MAS and PRSA of parents with CP and DS children according to demographic characteristics. Pearson correlation analysis was used to examine the relationships. For statistical significance, $p<.05$ was preferred.

Data Collection

The data were collected between February 2024 and May 2024. The research sample consisted of 140 disabled parents. The Personal Information Form, MAS and PRSA, which were created to determine the demographic characteristics of the parents who made up the research sample, were collected by face-to-face interview method through the researcher to the parents of children with CP and DS receiving education in Bingöl Private World Special Education and Rehabilitation Center and Bingöl Private Mucize Special Education and Rehabilitation Center. Written and verbal consent was obtained from the parents who participated in the study. These scales were administered by the researcher using the face-to-face method, which took an average of 10-15 minutes.

RESULTS

Of the parents, 67.1% were housewives, 71.4% were women, 31.4% were primary school graduates, and 31.4% had three children. The rate of those who have no other disabled children is 95.7%. The rate of those who do not plan to have another child is 63.6% (**Table 1**).

Table 1. Socio-Demographic Characteristics of Parents of Children with Cerebral Palsy and Down Syndrome

Variable	Category	N	%
Occupation			
	Housewife	94	67.1
	Self-employed	33	23.6
	Civil Servant	13	9.3
Gender			
	Female	100	71.4
	Male	40	28.6
Level of education			
	Illiterate	24	17.1
	Primary School	44	31.4
	Secondary School	23	16.4
	High School	33	23.6
	Bachelor's degree and above	16	11.4
Number of children			
	One	20	14.3
	Two	38	27.1
	Three	44	31.4
	Four or more	38	27.1
Do you have other children with disabilities?			
	Yes	6	4.3
	No	134	95.7
Do you plan to have children again?			
	Yes	51	36.4
	No	89	63.6

N: number of samples; %: percentage

As a result of the chi-square test on occupational distribution among parents of children with CP and parents of children with DS, it was found that there was no statistically significant difference between the two groups (X^2: 1.217; p>.05) (**Table 2**).

As a result of the chi-square test on the distribution between the genders of parents of children with CP and parents of children with DS, it was found that there was no statistically significant difference between the two groups (X^2: .560; p>.05) (**Table 2**).

As a result of the chi-square test on the distribution of educational status between the parents of children with CP and parents of children with DS, it was found that there was no statistically significant difference between the two groups (X^2: 9.216; p>.05) (**Table 2**).

As a result of the chi-square test on the distribution of the number of children between parents with CP and parents with DS, it was found that there was no statistically significant difference between the two groups (X^2: 1.838; p>.05) (**Table 2**).

As a result of the chi-square test on the distribution of parents of children with CP and parents of children with DS having other disabled children, it was found that there was no statistically significant difference between the two groups (X^2: .697; p>.05) (**Table 2**).

As a result of the chi-square test on the distribution of parents with a child with CP and parents with a child with DS considering having another child, it was found that there was no statistically significant difference between the two groups (X^2: 3.732; p>.05) (**Table 2**).

Table 2. Comparison of Demographic Characteristics of Parents of Children with Cerebral Palsy and Down Syndrome

Variable	Category	Cerebral Palsy		Down Syndrome		Significance
		N	%	N	%	
Occupation						
	Housewife	50	71.4	44	62.9	X^2: 1.217 p: .544
	Self-employed	14	20.0	19	27.1	
	Civil Servant	6	8.6	7	10.0	
Gender						
	Female	52	74.3	48	68.6	X^2: .560 p: .454
	Male	18	25.7	22	31.4	
Level of education						
	Illiterate	8	11.4	16	22.9	X^2: 9.216 p: .056
	Primary School	21	30.0	23	32.9	
	Secondary School	9	12.9	14	20.0	
	High School	23	32.9	10	14.3	
	Bachelor's degree and above	9	12.9	7	10.0	
Number of children						
	One	12	17.1	8	11.4	X^2: 1.838 p: .607
	Two	19	27.1	19	27.1	
	Three	23	32.9	21	30.0	
	Four or more	16	22.9	22	31.4	
Do you have other children with disabilities?						
	Yes	4	5.7	2	2.9	X^2: .697 p: .404
	No	66	94.3	68	97.1	
Do you plan to have children again?						
	Yes	31	44.3	20	28.6	X^2: 3.732 p: .053
	No	39	55.7	50	71.4	

X^2: Chi-square analysis; N: sample size; %: percentage

The mean score of MAS was 38.70±13.54 in the group with CP and 41.41±11.05 in the group with DS, and as a result of the independent samples t test, it was found that there was no statistically significant difference between the two groups (t:-1.300; p>.05) (**Table 3**). According to this finding, the level of marital adjustment of parents of children with CP and DS did not differ. The mean score of the PRSA was 118.11±24.93 in the group with CP and 119.94±26.67 in the group with DS, and as a result of the independent samples t test, it was found that there was no statistically significant difference between the two groups (t: .419; p>.05) (**Table 3**). According to this finding, the level of psychological resilience of parents of children with CP and DS does not differ.

Table 3. Distribution of MAS and PRSA Variables of Parents of Children with Cerebral Palsy and Down Syndrome

Variable	Cerebral Palsy		Down Syndrome		Significance	
	x̄	SS	x̄	SS		
MAS	38.70	13.54	41.41	11.05	t: -1.300	p: .196
PRSA	118.11	24.93	119.94	26.67	t: -.419	p: .676

x̄: mean; SD: Standard deviation; MAS: Marital adjustment scale; PRSA: Psychological resilience scale for adults; t: Independent samples t test

The mean score of the MAS scale used in the study was 38.7±13.5 in the group with CP and 41.4±11.1 in the group with DS, and the mean score of the PRSA scale was 118.1±24.9 in the group with CP and 119.9±26.7 in the group with DS. A statistically significant (r: .587; p<.001) positive correlation was found between the mean scores of the MAS and PRSA of parents with children with CP (**Table 4**). According to this finding, as the level of marital adjustment increases in parents with a child with CP, the level of psychological resilience also increases.

A statistically significant (r: .691; p<.001) positive correlation was found between the mean scores of MAS and PRSA of parents with children with DS (**Table 4**). According to this finding, as the level of marital adjustment increases in parents with a child with DS, the level of psychological resilience also increases.

Table 4. Mean, Correlation, Normality and Reliability Findings of MAS and PRSA in Parents with Children with Cerebral Palsy and Down Syndrome

Group	Variable	x̄	SS	r	Skw.	Krt.	α
Cerebral Palsy (n:70)	MAS	38.7	13.5	.587*	-1.032	.746	.95
	PRSA	118.1	24.9		-.383	.286	.92
Down Syndrome (n:70)	MAS	41.4	11.1	.691*	-.701	.031	.90
	PRSA	119.9	26.7		-.095	-.692	.94

*p< ,001; x̄: mean; SD: Standard deviation; r: Pearson correlation; Skw: Skewness; Krt: Kurtosis; MAS: Marital adjustment scale; PRSA: Psychological resilience scale for adults; α: Cronbach's α

DISCUSSION

In this study in which marital adjustment and psychological resilience of parents with children with DS and CP were evaluated, scale scores of parents of children with the disease were compared according to their sociodemographic characteristics. Through the data obtained from this study, it was examined whether the problems experienced by the parents in both disease groups differed according to the disease group. We think that this study comparing both disease groups will bring a different perspective to the academia.

It was determined that there was no significant difference in the answers given to the question of whether a child had been had or considered after a child with a disability in individuals with children in both disease groups. There is no literature study that exactly matches this study. However, in a previous study, it was found that 66.2% of disabled parents answered no and 33.8% answered yes to the question "Do you think of having another child after a disabled child and do you have another child?".[25] Müller et al. found that having a child with CP decreased the birth rate regardless of birth order and severity level.[26] In our study, it was found that 63.6% answered no to this question (**Table 1**). However, no significant difference was found between whether a child was considered after the disabled child (**Table 2**).

There are similar studies comparing different types of disabilities in terms of marital adjustment and psychological resilience. In our study, no significant relationship was found between marital adjustment and psychological resilience of parents with children with DS and CP in terms of demographic characteristics (**Table 3**). For example, Friedman found that parents with children with autism and intellectual disabilities did not experience a significant difference in terms of marital adjustment. This shows that parents have similar attitudes towards different disabilities of the child.[27,28] In addition, mothers with children with normal development, autism and DS were compared in terms of marital satisfaction and it was determined that mothers with children with autism had lower marital satisfaction scores.[29]

Pınar found that the psychological resilience of parents of children with borderline intellectual disabilities was lower than parents with moderate and mild intellectual disabilities and parents with children with DS.[30] Another study examined the relationship between parenting stress levels of mothers of children with different levels and characteristics of special needs and various psychological characteristics of mothers. Najimi et al. stated that psychological characteristics of the mother such as marital satisfaction, psychological problems and coping styles are important determinants of parenting stress.[31] Ören and Aydın examined the psychological characteristics of parents with mentally or physically disabled children.

According to the results obtained by Küçük Alemdar, parents of children with physical disabilities had higher life satisfaction than parents of children with intellectual disability.[32] Soliman et al. stated that families with children with CP face many difficulties and problems. They determined that affecting the anxiety levels of mothers as one of them.[33] It was determined that unhealthy family functioning was parallel to depressive disorders of parents. It is stated that unhealthy family organization points to unhealthy individuals and healthy family organization points to healthy individuals.[34] In contrast to these studies, there are studies indicating that the presence of a disabled child in the family has no effect on marital order.[35] The data we obtained in our study indicate that marital adjustment scores and psychological resilience scores of parents with children with DS and CP are directly proportional (**Table 4**). According to this result, marital adjustment and psychological resilience should be evaluated together and considered as a common denominator in solving problems.

CONCLUSIONS

This study evaluated marital adjustment and psychological resilience of parents with children with DS and CP. The results of the evaluation are as follows.

- In this study, the demographic characteristics of parents with children with CP and DS were similar.

- The level of marital adjustment and psychological resilience of parents with children with CP and DS did not vary according to demographic characteristics.
- The level of marital adjustment and psychological resilience of parents with children with CP do not vary according to occupation, educational status, number of children, and whether or not they plan to have children again. The level of marital adjustment of male parents with a child with CP is higher than that of female parents. On the other hand, the level of psychological resilience in parents with children with CP does not vary according to gender.
- Marital adjustment level and psychological resilience level of parents with children with DS do not vary according to occupation, gender, number of children, and whether or not they plan to have children again. However, it was found that education level made a significant difference in marital adjustment of parents with children with DS.
- As the level of marital adjustment increases in parents with children with CP and DS, the level of psychological resilience also increases.

Those that can be added to make the study more qualified:

- The spouses of married individuals should also be included in the study.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Dicle University Social and Human Sciences Ethics Committee (Date: 22.12.2023, Decision No: 299).

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

REFERENCES

1. Kalaycı Kırlıoğlu Hİ. Zihinsel engellilere yönelik durumun ve hizmetlerin uzman görüşleri perspektifinde değerlendirilmesi [Yüksek Lisans Tezi]. Konya: Selçuk Üniversitesi; 2015.
2. Ünal-Karagüven MH, Demirtaş F. Engelli çocuğu olan ailelerde öz saygı, yaşam doyumu ve sürekli kaygı. Academia Eğitim Araştırmaları Derg. 2022;7(1):92-110.
3. Çayhan S, Özdemir G, Özdemir H. 8-20 yaş down sendromlu kız bireylerin antropometrik bir yaklaşımla temel beden kalıplarının oluşturulması. Elektronik Sosyal Bilimler Derg. 2023;22(88):2014-32.
4. Korkmaz S. Down sendromlu ergen çocuk sahibi olan ailelerin cinsiyete bağlı olarak anksiyete, depresyon, baş etme yöntemleri ve yaşam kalitesi bakımından incelenmesi [Yüksek Lisans Tezi]. İstanbul: İstanbul Gelişim Üniversitesi; 2021.
5. Özdemir G. Serebral palsili çocuğu olan annelere yaşam modeli doğrultusunda verilen eğitimin annelerin bakım yükü ve çocuğun öz bakımına etkisi [Yüksek Lisans Tezi]. İstanbul: İstanbul Cerrahpaşa Üniversitesi; 2019.
6. Wang X, Teh SH, Wang XH. Knowledge mapping of spastic cerebral palsy. A bibliometric analysis of global research (2000–2022). Ital J Pediatr. 2024;50(1):9.
7. Sultanoğlu TE, Akyüz EU, Çevikol A, Sultanoğlu A. Serebral palsili ilaçların demografik ve klinik özellikleri. Ege Tip Derg. 2019;(58):265–73.
8. Soylu Y, Kağnıcı, DY. Evlilik uyumunun empatik eğilim, iletişim ve çatışma çözme stillerine göre yordanması. Turk Psychol Couns Guid J. 2015;5(43):44-54.
9. Güler M. Engelli çocuğu olan annelerin evlilik uyumlarının sosyo-demografik değişkenler açısından incelenmesi. Mehmet Akif Ersoy Üniversitesi Eğitim Fakültesi Derg. 2021;(58):1-18.
10. Diker M. Zihinsel yetersizliği olan çocuğa sahip annelerin evlilik uyumu, sosyal destek algısı ve çocuğunu kabul-ret düzeyleri arasındaki ilişkinin incelenmesi [Yüksek Lisans Tezi]. Konya: Necmettin Erbakan Üniversitesi; 2020.
11. Karaman E. Özel eğitime ihtiyacı olan çocuğa sahip anne babaların psikolojik dayanıklılıklarının yordayıcısı olarak sosyal destek algısı ve benlik saygısının incelenmesi [Yüksek Lisans Tezi]. Konya: Necmettin Erbakan Üniversitesi; 2018.
12. Hassamancıoğlu U, Akın A, Yoldaş C, Şahin S. Özel gereksinimli çocuğa sahip ailelerde, aile içi roller ve çocuğu tanıma becerilerinin aile yılmazlığına etkisinin incelenmesi. Toplum ve Sosyal Hizmet. 2020;31(3):1176-200.
13. Togay A, Güçray SS. Zihinsel yetersizliği olan bireylerin aileleri ve psikolojik danışma: bir derleme çalışması. HAYEF J Educ. 2018;15(1):43-62.
14. Aközlü Z, Ekim A. Engelli çocuklara sahip olan ailelerle yapılan hemşirelik lisansüstü tezlerinin incelenmesi: sistematik derleme. Tıp Fakültesi Klinikleri Derg. 2020;3(2):85-98.
15. Avcı N. Otizmli çocukların ebeveynlerinin evlilik uyumları sosyal destek algıları ve anksiyete düzeylerinin değerlendirilmesi [Tıpta Uzmanlık Tezi]. Diyarbakır: Dicle Üniversitesi; 2017.
16. Balcı S, Kızıl H, Savaşer S, Dur Ş, Mutlu B. Zihinsel engelli çocuğu olan ailelerin yaşadığı güçlüklerin ve aile yükünün belirlenmesi. Psikiyatri Hemşireliği Derg. 2019;10(2):124-30.
17. Berberoğlu BK, Çalışır H. Serebral palsili bir çocuğun orem öz-bakım eksikliği kuramı'na göre hemşirelik bakımı: olgu sunumu. Adnan Menderes Üniversitesi Sağlık Bilimleri Fakültesi Derg. 2020;4(2):154-67.
18. Faul F, Erdfelder E, Lang AG, Buchner A. G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. Behav Res Methods. 2007;39(2):175-91.
19. Yavuz S. Normal gelişim gösteren çocuğa sahip ebeveynler ile zihinsel engelli çocuğa sahip ebeveynlerin evlilik uyumu ve yaşam doyumu düzeylerinin incelenmesi [Yüksek Lisans Tezi]. İstanbul: İstanbul Haliç Üniversitesi; 2016.
20. Göktaş M. Engelli çocuğa sahip çiftlerin başa çıkma davranışlarının evlilik uyumları üzerindeki diyadik etkisinin incelenmesi [Yüksek Lisans Tezi]. Gaziantep: Hasan Kalyoncu Üniversitesi; 2020.
21. Tutarel- Kışlak Ş, Çabukça F. Empati ve demografik değişkenlerin evlilik uyumu ile ilişkisi. Aile ve Toplum Derg. 2002;(2)5:32-8.
22. Basım HN, Çetin F. Yetişkinler için psikolojik dayanıklılık ölçeği'nin güvenilirlik ve geçerlilik çalışması. Türk Psikiyatri Derg. 2011;22(2):101-14.
23. Kalaycı Ş. SPSS uygulamalı çok değişkenli istatistik teknikleri. Asil Yayın Dağıtım. Ankara. 2014, s:6-7.
24. George D, Mallery M. SPSS for Windows step by step: a simple guide and reference. 17.0 Update (10a ed.) Boston; 2010, Pearson
25. Tarsuslu Şimşek T, Taşçı M, Karabulut D. Kronik engelli çocuğu olan ailelerde başka çocuk yapma isteği ve anne-baba birlikteliğine etkisi. Türk Pediatri Arşivi. 2015;(50):163-9.
26. Müller V, Gerdtham U, Alriksson-Schmidt A, Jarl J. Parental decisions to divorce and have additional children among families with children with cerebral palsy:Evidence from Swedish longitudinal and administrative data. Health Econ. 2022;31(10):2170-86.

27. Friedman C. Family members of people with disabilities' explicit and implicit disability attitudes. Rehabil Psychol. 2019;64(2):203.
28. Çapan AS, Sarıyıldız D. Özel eğitime gereksinim duyan çocukların annelerinin evlilik uyumunun incelenmesi. Aydın Sağlık Derg. 2017;3(2):19-31.
29. Santamaria F, Cuzzocrea F, Gugliandolo MC, Larcan R. Marital satisfaction and attribution style in parents of children with autism spectrum disorder, Down syndrome and non-disabled children. Life Span Disabil. 2012;15(1):19-37.
30. Pınar E. Özel Eğitime gereksinimi olan zihinsel engelli çocukların annelerinin başa çıkma becerileri ile psikolojik dayanıklılığı arasındaki ilişkinin incelenmesi [Yüksek Lisans Tezi]. İstanbul: Haliç Üniversitesi; 2018.
31. Najmi B, Heidari Z, Feizi A, Hovsepian S, Momeni F, Azhar SMM. Do psychological characteristics of mothers predict parenting stress? A cross-sectional study among mothers of children with different disabilities. Arch Psychiatr Nurs. 2018;32(3):396-402.
32. Ören B, Aydın R. Engelli çocuğa sahip ebeveynlerde bakım veren yükü ve depresyon durumlarının incelenmesi. Celal Bayar Üniversitesi Sağlık Bilimleri Enstitüsü Derg. 2020;7(3):302-9.
33. Jameel HT, Rafiq SAIMA, Kalsoom UMMAY. A study on level of depression, anxiety and stress among parents of Down syndrome children versus parents of healthy children. Int J Biol Pharm Allied Sci. 2016;5(7):1553-60.
34. Uçar M. Serebral palsi tanısı almış çocuğa sahip annelerin ve tipik gelişim gösteren çocuğa sahip annelerin psikolojik dayanıklılık ve ebeveyn yeterlilik düzeylerinin karşılaştırılması [Yüksek Lisans Tezi]. İstanbul: Gelişim Üniversitesi; 2021.
35. Küçük EE, Küçük Alemdar D. Life satisfaction and psychological status of mothers with disabled children: A descriptive study. Community Ment Health J. 2018;54(1):102-6.

JOURNAL OF
CONTEMPORARY MEDICINE

DOI:10.16899/jcm.1688152
J Contemp Med 2025;15(3):121-125

Original Article / Orijinal Araştırma

Evaluation of Demographic, Clinical and Laboratory Parameters and Long-Term Renal Effects in Infants with Hypernatremic Dehydration

Hipernatremik Dehidratasyon Tanılı Bebeklerde Demografik, Klinik ve Laboratuvar Parametrelerinin Değerlendirilmesi ve Uzun Dönem Renal Etkiler

Saime Sündüs Uygun

Selcuk University, Konya, Turkiye

Abstract

Aim: Neonatal hypernatremic dehydration is a potentially life-threatening condition in infants, primarily caused by inadequate breast milk intake. This study aimed to evaluate the demographic characteristics, clinical and laboratory findings, and risk factors in term neonates diagnosed with neonatal hypernatremic dehydration, as well as to assess its long-term impact on renal function.

Material and Method: This retrospective study included 36 term neonates diagnosed with Neonatal hypernatremic dehydration and followed in our clinic between January 2014 and December 2019. Data on demographics, clinical presentation, dehydration severity, laboratory values at admission, and serum creatinine and urea levels at follow-up (1–5 years later) were recorded. Dehydration was classified based on percentage of weight loss. Statistical analyses included Spearman correlation and ROC analysis to evaluate the relationship between hypernatremia and renal function.

Results: Of the 36 patients, 52.7% were male and 72.2% were delivered vaginally. Feeding difficulties (58%) and jaundice were the most common presenting complaints. Sixteen infants had >10% weight loss and were classified as moderately or severely dehydrated. Serum creatinine levels at admission were ≥0.6 mg/dL in 83% and ≥1.0 mg/dL in 28% of cases, suggesting significant renal involvement. At follow-up, creatinine levels normalized in all patients. The lack of urine output data was a limitation.

Conclusion: Neonatal hypernatremic dehydration is a serious but preventable condition. Risk is higher in infants born to primiparous mothers or by cesarean section. Early breastfeeding support, maternal education, and post-discharge follow-up are critical for prevention and early detection of potential renal complications.

Keywords: Dehydration, breastfeeding difficulties, kidney injury

Öz

Amaç: Yenidoğan hipernatremik dehidratasyonu, genellikle yetersiz anne sütü alımına bağlı olarak ortaya çıkan ve bebeklerde yaşamı tehdit edebilen bir klinik tablodur. Bu çalışmanın amacı, yenidoğan hipernatremik dehidratasyonu tanısı alan term yenidoğanların demografik özelliklerini, klinik ve laboratuar bulgularını ve risk faktörlerini değerlendirmek ve hastalığın böbrek fonksiyonları üzerindeki uzun dönem etkilerini incelemektir.

Gereç ve Yöntem: Bu retrospektif çalışmada, Ocak 2014 ile Aralık 2019 tarihleri arasında kliniğimizde hipernatremik dehidratasyon tanısı almış 36 term hasta değerlendirildi. Hastaların demografik verileri, klinik başvuru bulguları, dehidratasyon şiddeti, başvuru anındaki laboratuar değerleri ile 1–5 yaşlarında yapılan takiplerde ölçülen serum kreatinin ve üre düzeyleri kaydedildi. Dehidratasyon, kilo kaybı yüzdesine göre sınıflandırıldı. Hipernatreminin böbrek fonksiyonlarıyla ilişkisini değerlendirmek için Spearman korelasyon ve ROC analizleri kullanıldı.

Bulgular: Hastaların %52,7'si erkekti. 26 hasta (%72,2) vajinal yolla doğmuştu. En sık başvuru şikâyetleri beslenme güçlüğü (%58) ve sarılık olarak belirlendi. On altı bebekte %10'dan fazla kilo kaybı tespit edildi ve bu bebekler orta/ağır dehidrate olarak sınıflandırıldı. Başvuru anında serum kreatinin düzeyleri 30 hastada (%83) ≥0.6 mg/dL ve 10 hastada (%28) ≥1.0 mg/dL olup anlamlı böbrek tutulumu düşündürdü. Takiplerde tüm hastalarda kreatinin düzeyleri yaşa uygun normal aralıklara döndü. İdrar çıkışı verilerinin eksikliği çalışmanın bir sınırlılığıdır.

Sonuç: Yenidoğan hipernatremik dehidratasyonu ciddi bir durumdur. Risk, özellikle primipar, sezeryan ile doğum yapan annelerin çocuklarında daha yüksektir. Erken emzirme desteği, annelere yönelik eğitim ve taburculuk sonrası yakın takip, hem bu tablonun önlenmesi hem de olası böbrek komplikasyonlarının erken tanısı ve uygun müdahale yapılması açısından kritik öneme sahiptir

Anahtar Kelimeler: Dehidratasyon, emzirme güçlükleri, renal hasar

Corresponding *(İletişim)*: Saime Sündüs Uygun, Selcuk University, Konya, Turkiye
E-mail *(E-posta)*: uygunsaime@hotmail.com
Received *(Geliş Tarihi)*: 30.04.2025 **Accepted *(Kabul Tarihi)*:** 30.05.2025

INTRODUCTION

In recent years, it has become increasingly common for term newborns to be discharged within 24 hours after spontaneous vaginal delivery and within 72 hours after cesarean section. Although early discharge offers benefits such as enhanced maternal-infant bonding and reduced hospital-related costs and infection risks, it also presents certain clinical challenges. Notably, early discharge may hinder the timely identification and management of feeding difficulties, potentially leading toinadequate nutritional intake during the critical early days of life. Consequently, there has been a noticeable increase in hospital readmissions for conditions such as hyperbilirubinemia and dehydration, particularly those associated with insufficient breastfeeding. These preventable complications emphasize the importance of structured discharge planning, early post-discharge follow-up, and effective breastfeeding support for new mothers.[1]

Neonatal hypernatremic dehydration (NHD) is a potentially life-threatening condition that endangers the brain and other vital organs in neonates. It is defined by a serum sodium level greater than 145 mEq/L.[2] It may develop due to reasons such as inadequate fluid intake, excessive insensible losses, diarrhea, vomiting, or inadequate breastfeeding. The most common cause of hypernatremic dehydration is generally considered to be insufficient breast milk intake.[3] In the early days of life, insufficient amounts of breast milk significantly contribute to the development of this condition. The main reasons for this include the lack of maternal knowledge and skills in breastfeeding, cesarean delivery, infrequent breastfeeding, mismatch between mother and baby during breastfeeding, low educational level of mothers, and mistakes in breastfeeding techniques. Additionally, although less common, nipple issues can also contribute to breastfeeding insufficiency.[4]

Hypernatremic dehydration is recognized as a significant contributor to neonatal morbidity and mortality. Among the various complications associated with this condition, renal dysfunction plays a particularly critical role. The kidneys, being highly sensitive to changes in fluid and electrolyte balance, are especially vulnerable during episodes of severe dehydration. Prerenal acute kidney injury, is frequently observed due to decreased renal perfusion, is frequently observed in affected neonates. If not promptly diagnosed and managed, such renal complications may lead to long-term impairment or even permanent renal damage.[5]

The aim of this study is to evaluate the demographic characteristics, associated complaints, and risk factors of infants diagnosed with hypernatremic dehydration; to stage the severity of dehydration and assess laboratory parameters. Additionally, the study aims to evaluate the long-term effects of hypernatremic dehydration on the renal function of these infants.

MATERIAL AND METHOD

The study was carried out with the permission of Selçuk University Ethics Committee (Date: 30.12.2020, Decision No: 2020/576). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Retrospective evaluation was performed on term neonates diagnosed with hypernatremic dehydration and followed in our clinic between January 2014 and December 2019. Among these patients, 36 who were readmitted to our hospital 1 to 5 years after the initial diagnosis and had renal function tests (urea/creatinine) were included in the study. The demographic characteristics, clinical and laboratory findings, follow-up data, observed complications, and urea and creatinine levels measured at the time of re-evaluation were recorded.

Data collected included the date and reason for admission, type and week of birth, birth weight, body weight and percentage of weight loss at admission, serum sodium, blood urea nitrogen, creatinine, total and indirect bilirubin levels, dehydration status, and length of hospitalization. During follow-up evaluations, patient age, serum urea and creatinine levels were recorded. Patients who lost 7–10% of their body weight were classified as mildly dehydrated, those with 10–15% loss as moderately dehydrated and >15% as severely dehydrated.

Statistical analyses of the study were performed using IBM SPSS Statistics version 20. Continuous variables were assessed for normal distribution; variables with normal distribution were presented as mean±standard deviation, while those without normal distribution were expressed as median (minimum–maximum). Categorical variables were reported as counts and percentages. For comparisons between groups, the Independent Samples t-test or the Mann–Whitney U test was used depending on the distribution of the data, and the Chi-square test was applied for categorical variables.

To evaluate the relationship between the severity of neonatal hypernatremia and later renal function parameters, Spearman correlation analysis was performed. In addition, receiver operating characteristic (ROC) curve analysis was used to assess the predictive value of hypernatremia levels for renal squeal. A p-value of <0.05 was considered statistically significant.

RESULTS

Of the 36 patients included in the study, 19 were male (52,7%). The majority of the patients were delivered via spontaneous vaginal delivery (26/72,2%). The demographic and laboratory data of the patients are summarized in **Table 1**. When evaluating the patients based on their presenting complaints, feeding problems were identified as the most common reason for admission. Distribution of cases based on presenting complaints and degree of dehydration on physical examination is presented in **Table 2**. Patients were categorized into three groups—mild, moderate, and severe dehydration—based on their clinical status at admission. The admission and follow-up characteristics of these groups are summarized in

Table 3. As expected, weight loss at the time of admission, both in grams and as a percentage, was significantly higher in the severely dehydrated group (P=0.001). Similarly, serum sodium, urea, and creatinine levels at admission were also found to be significantly elevated in this group compared to the others (P=0.003 and P=0.001, respectively). However, when comparing follow-up values, no statistically significant differences were observed among the three groups in terms of urea and creatinine levels (P=0.477 and P=0.547, respectively).

Table 1. Demographic and laboratory characteristics of the patients.

Sex (Male/Female)	19/17
Mode of Delivery (Vaginal/Cesarean)	26/10
Parity (Primiparous/Multiparous)	20/16
Birth Weight (g)	3121.61±382.37 (2245-3820)
Gestational Age (weeks)	38.58±1.22 (37-41)
Age at Admission (days)	4.72±2.32 (2-13)
Weight at Admission (g)	2789.72±330.11 (2060-3400)
Weight Loss (g)	331.94±129.87 (185-760)
Weight Loss (%)	10.52±3.43 (6.54-21.11)
Maternal Age (years)	27.92±6.26 (18-43)
Serum Sodium (mEq/L)	151.88±7.03 (145-177)
Blood Urea Nitrogen (mg/dL)	52.58±42.02 (14.60-240.50)
Serum Creatinine (mg/dL)	0.88±0.39 (0.40-2.39)
Total Bilirubin (mg/dL)	14.27±4.91 (2.3-22.5)
Indirect (Unconjugated) Bilirubin (mg/dL)	13.72±4.91 (1.4-22)

Table 2. Distribution of Cases Based on Presenting Complaints and Degree of Dehydration on Physical Examination

Clinical Findings and Physical Examination Characteristics	n	%
Feeding Difficulty	22	61.1
Jaundice	22	61.1
Restlessness	6	16.7
Fever	4	11.1
Mildly dehydrated	20	55.5
Moderately dehydrated	10	27.7
Severely dehydrated	6	16.6

Table 3. Demographic characteristics of the patients according to the degree of dehydration

	Mild	Moderate	Severe	p
Postnatal age at admission	4.35±1.84	3.9±0.88	7.33±3.67	0.077
Age at follow-up	2.8±1.74	2.8±1.62	3.5±1.97	0.710
Birth weight	3070±392.01	3139±368.77	3265±398.53	0.660
Gestational age at birth	38.6±1.19	38.4±1.35	38.83±1.33	0.737
Admission weight	2820±355.82	2777.5±316.68	2709.17±299.04	0.901
Weight loss (g)	250±44.57	361.5±56.18	555.83±126.82	0.001
Weight loss (%)	8.13±0.82	11.48±0.69	16.92±2.28	0.001
Maternal age	27.1±5.74	27.5±6.79	31.33±7.03	0.357
Serum sodium (na)	149.25±4.25	150.9±3.14	162.33±9.97	0.003
Serum urea at admission	37.67±14.83	39.23±15.01	124.58±60.45	0.001
Follow-up urea	23.23±9.74	21.38±5.05	17.5±8.55	0.477
Serum creatinine at admission	0.79± 0.31	0.74±0.15	1.43±0.51	0.001
Follow-up creatinine	0.35± 0.09	0.35± 0.10	0.32± 0.07	0.547
Length of hospital stay	3.35±1.39	3±0.82	4.02± 0.92	0.680

DISCUSSION

Fluid and electrolyte balance is very important in the newborn period. In patients with inadequate nutritional support, hypernatremic dehydration may develop, potentially leading to significant morbidity and even mortality. This clinical condition can be associated with serious complications such as acute kidney failure, disseminated intravascular coagulation (DIC), seizures, and multiple cerebrovascular events.[6]

Clinical manifestations of hypernatremic dehydration typically emerge within the first 10 days of life.[1] In our study, the mean age at admission was 4.7 days. To ensure successful breastfeeding, breast milk should be initiated as early as possible after birth.[7] In deliveries by cesarean section, the initiation of feeding is often delayed, which may lead to an increased incidence of hypernatremic dehydration in newborns.[8] Primiparous mothers may face greater challenges with breastfeeding due to limited experience and inadequate education, which can increase the risk of feeding difficulties in newborns. These challenges can be mitigated through structured education and support focused on neonatal feeding practices.[9] In our study, 28% of the infants were delivered via cesarean section, and 56% of the mothers were primiparous. Regardless of the mode of delivery, early initiation of breastfeeding is essential to ensure adequate milk intake, and mothers should be adequately supported in the immediate postnatal period.

Manganaro et al. demonstrated that a weight loss of ≥10% within the first days of life serves as a simple and effective indicator for the early detection of dehydration prior to the development of severe hypernatremia.[10] In our study, weight loss was also used as a criterion for evaluating dehydration severity. Sixteen infants who experienced more than 10% weight loss were classified as moderately or severely dehydrated.

The most common presenting complaints in neonates with hypernatremic dehydration typically include poor feeding, decreased urine output, brick-red or orange-colored staining of the diaper due to urate crystals, jaundice, and elevated body temperature.[3] These clinical signs often reflect underlying fluid and electrolyte imbalances and may be overlooked in the early postnatal period, particularly in infants who are discharged early. In our study, the most frequently reported symptoms at admission were feeding difficulties and jaundice, observed in 58% of cases. These findings are consistent with the early manifestations of inadequate breastfeeding and developing dehydration. In addition, restlessness and fever were noted as accompanying complaints, which may indicate systemic distress and worsening dehydration status. Recognizing these early clinical signs is crucial for timely intervention, as delays in diagnosis and treatment can lead to severe complications, including renal dysfunction and neurological impairment.

The major complications of HDH are disseminated intravascular coagulation, vascular complications, intracranial hemorrhage, convulsion and brain damage.[11] Acute kidney injury (AKI) is among the complications observed in these patients. While the literature extensively reports the causes of acute morbidity and mortality associated with this condition, studies investigating the long-term neurodevelopmental and physical morbidities of hypernatremia remain limited.

Although neonatal hypernatremia can often be corrected with timely and appropriate fluid resuscitation, more severe or treatment-resistant cases may require renal replacement therapies such as peritoneal dialysis or hemodialysis.[12] In instances of severe hypernatremic dehydration, there is a significant reduction in intravascular volume, which compromises renal perfusion. This reduction in renal blood flow leads to prerenal acute kidney injury, which is the most commonly observed form of AKI in neonates. Prerenal AKI accounts for approximately 85% of all neonatal AKI cases and, if left unrecognized or inadequately managed, may progress to intrinsic renal injury.[13] Early identification and intervention are therefore critical to prevent irreversible renal damage and long-term sequelae.

Acute kidney injury is defined as a sudden decline in renal function, leading to impaired regulation of fluid, electrolyte, and acid-base homeostasis, ineffective blood pressure control, and accumulation of nitrogenous metabolic waste products.[14] While it is generally accepted that the diagnosis of renal failure should be based on the degree of increase in serum creatinine rather than an absolute threshold, in term neonates without identifiable risk factors, a creatinine level exceeding 0.6 mg/dL should prompt consideration of acute kidney injury.[15] In neonates who develop acute kidney injury, the prognosis is influenced by the underlying etiology, gestational age, and birth weight.[16] Furthermore, chronic renal impairment may develop in approximately 10% to 16% of survivors. Factors influencing the spectrum of acute kidney injury to acute kidney disease and to chronic kidney disease transition include the type of kidney injury, pre-existing chronic conditions, and genetic factors.[17] Among our cases, 83% (n=30) had serum creatinine levels above 0.6 mg/dL, while 28% (n=10) had levels exceeding 1.0 mg/dL. Elevated creatinine levels are important as they indicate the severity of renal involvement. One of the limitations of our study is the absence of data on urine output volumes. However, in the follow-up assessments, creatinine levels in all of our cases were within the age-appropriate normal range. This may be attributed to the high rate of renal regeneration and strong renal plasticity during the neonatal period.[18] There are significant functional changes that continue to take place as the infant matures. Nephrogenesis is complete by 34th–36th week of gestation; however, the maturation of the kidney continues through the postnatal period.[19] In addition, the careful implementation of treatment approaches aimed at maintaining fluid-electrolyte balance, regulating blood pressure, and preserving acid-base homeostasis in infants admitted to our clinic with hypernatremic dehydration was considered an important factor in the improvement of renal function and the prevention of progression to chronic kidney disease.

CONCLUSION

Hypernatremic dehydration resulting from breastfeeding difficulties is a serious and potentially life-threatening clinical condition in the neonatal period. However, it is largely preventable through early recognition and timely intervention. Infants with inadequate feeding history and those born to mothers who were not sufficiently informed about neonatal care and breastfeeding during pregnancy—particularly primiparous mothers—should be closely monitored throughout their hospital stay. These mothers should be provided with confidence-building, comprehensive, and practical education on breastfeeding and feeding techniques. Additionally, early post-discharge follow-up appointments should be scheduled, and families should be thoroughly informed about potential complications that may arise due to insufficient nutrition. It is also of great importance to continue follow-up after the completion of treatment in order to monitor for potential long-term complications in these infants.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Selçuk University Ethics Committee (Date: 30.12.2020, Decision No: 2020/576).

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

REFERENCES

1. Kul M, Gürsel O, Kesik V, Duranoğlu L, Sarıcı SÜ, Alpay F. Hipernatremik dehidratasyon tanısı ï le takip edilen yenidoğan olgularımızın değerlendirilmesi. Gülhane Tıp Derg. 2006;48:162-5.
2. Çakır EP, Aliefendioğlu D, Tufan E, Altuğ Ü, Kırlı E. Hipernatremik dehidratasyon: yenidoğanlarda nadir olmayan bir sorun. Türkiye Çocuk Hast Derg. 2010;4:89-93.
3. Tayman C, Tonbul A, Aydemir S, Köşüş A, Tatlı MM. Anne sütüne bağlı hipernatremik dehidratasyonun klinik bulguları ve tedavi önerileri. Dicle Tıp Derg. 2010;37:254-62.
4. Güzoğlu N, Kızılelma A, Sarı FN, Uraş N, Dilmen U. Hipernatremik dehidratasyon tanılı yenidoğan olgularımızın değerlendirilmesi. Türkiye Çocuk Hast Derg/Turkish J Pediatr Dis. 2013;3:124-7.

5. Akgün A, Katar S, Taşkesen M, Özbek MN. Yenidoğan döneminde önemli bir sorun: hipernatremik dehidratasyon. Göztepe Tıp Derg 2010;25:126-31.
6. Ergin H, Şahin Ö, Özmert MD, Özdemir MA, Küçüktaşçı K, Hatipoğlu C. Anne sütüyle beslenen yenidoğanlarda hipernatremik dehidratasyon. Güncel Pediatri 2013;11:51-6.
7. Yılmaz E, Öcal FD, Yılmaz ZV, Ceyhan M, Kara OF, Küçüközkan T. Early initiation and exclusive breastfeeding: factors influencing the attitudes of mothers who gave birth in a baby-friendly hospital. Turk J Obstet Gynecol 2017;14:1-9.
8. Del Castillo-Hegyi C, Achilles J, Segrave-Daly BJ, Hafken L. Fatal hypernatremic dehydration in a term exclusively breastfed newborn. Children(Basel). 2022;9:1379.
9. Kehinde J, O'Donnell C, Grealish A. The effectiveness of prenatal breastfeeding education on breastfeeding uptake postpartum: a systematic review. Midwifery. 2023;118:103579.
10. Manganaro R, Mamì C, Marrone T, Marseglia L, Gemelli M. Incidence of dehydration and hypernatremia in exclusively breast-fed infants. J Pediatr. 2001;139:673-5.
11. Akdeniz O, Çelik M, Samancı S. Evaluation of term newborn patients with hypernatremic dehydration. Turk Arch Pediatr 2021;56:1-6.
12. Durrani NUR, Imam AA, Soni N. Hypernatremia in newborns: a practical approach to management. Biomed Hub. 2022;7:55-69.
13. Nada A, Bonachea EM, Askenazi DJ. Acute kidney injury in the fetus and neonate. Semin Fetal Neonatal Med. 2017;22:90-7.
14. Goyal A, Daneshpajouhnejad P, Hashmi MF, et al. Acute kidney injury. [Updated 2023 Nov 25]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK441896/
15. Perazzo S, Revenis M, Massaro A, Short BL, Ray PE. A new approach to recognize neonatal impaired kidney function. Kidney Int Rep. 2020;5:2301-12.
16. Coleman C, Tambay Perez A, Selewski DT, Steflik HJ. Neonatal acute kidney injury. Front Pediatr. 2022;10:842544.
17. Koh ES, Chung S. Recent update on acute kidney injury-to-chronic kidney disease transition. Yonsei Med J. 2024;65:247-56.
18. Chang-Panesso M, Humphreys BD. Cellular plasticity in kidney injury and repair. Nat Rev Nephrol. 2017;13:39-46.
19. Sulemanji M, Vakili K. Neonatal renal physiology. Semin Pediatr Surg. 2013;22:195-8.

JOURNAL OF
CONTEMPORARY MEDICINE

DOI:10.16899/jcm.1655414
J Contemp Med 2025;15(3):126-131

Original Article / Orijinal Araştırma

Relationship Between Blood Gas and NT-ProBNP in Patients Presenting with Dyspnea

Dispne ile Başvuran Hastalarda Kan Gazı ve NT-ProBNP İlişkisi

Semahat Karahisar Şirali[1], Muhammed Emir İnce[2]

[1]Division of Nephrology, Department of Internal Medicine, Faculty of Medicine, Ufuk University, Ankara, Turkey
[2]Department of Internal Medicine, Faculty of Medicine, Ufuk University, Ankara, Turkey

Abstract

Aim: Dyspnea can be caused by different systems, and the negative predictive value of N_terminal pro-brain natriuretic peptide (NT-proBNP) is indicative of heart failure. We aimed to evaluate the relationship between blood gases and NT-proBNP in patients presenting with dyspnea and to determine the guiding factors in the differential diagnosis.

Material and Method: Patients admitted to our hospital with dyspnea and who underwent NT-proBNP and venous blood gas tests at the same time were included in the study. Demographic data, comorbidities, and laboratory data were recorded. The relationship between NT-proBNP and venous blood gas parameters was evaluated. p<0.05 was considered significant.

Results: The mean age of the 523 patients was 74±12.83 years, with 50.3% of the patient population identified as male. In the total group, NT-proBNP demonstrated a positive correlation with age (p<0.001) and a negative correlation with current bicarbonate ($cHCO_3$) (p<0.001), standard bicarbonate (HCO_3) (p<0.001), pCO_2 (p=0.022), and BE (p<0.001). In patients with chronic kidney disease (CKD), NT-proBNP demonstrated a moderately negative correlation with $cHCO_3$ (p=0.008), HCO_3 (p=0.019), and BE (p=0.010). In patients with heart failure (HF), there was a moderate negative association between NT-proBNP and $cHCO_3$ (p=0.002), HCO_3 (p=0.001), and BE (p=0.001).

Conclusion: In the absence of definitive evidence of heart failure in a dyspneic patient, it is reasonable to consider the potential contribution of impaired renal function to the overall evaluation.

Keywords: NT-proBNP, venous blood gas, heart failure, chronic kidney disease

Öz

Amaç: Dispne farklı sistemlerden kaynaklanabilen bir bulgu olup N_terminal pro brain natriüretik peptid (NT-proBNP)'in negatif prediktif değeri kalp yetmezliği için yol göstericidir. Nefes darlığı şikayeti ile başvuran hastalarda kan gazı ve NT-proBNP arasındaki ilişkiyi değerlendirerek ayırıcı tanıda yol gösterici faktörleri belirlemeyi amaçladık.

Gereç ve Yöntem: Çalışmaya dispne ile hastanemize başvuran ve NT-proBNP ve venöz kan gazı tetkikleri aynı zamanda yapılan hastalar alındı. Demografik verileri, eşlik eden hastalıkları ve laboratuvar verileri kaydedildi. NT-proBNP ve venöz kan gazı parametreleri arasındaki ilişki değerlendirildi. p<.05 anlamlı kabul edildi.

Bulgular: Çalışmaya katılan 523 hastanın yaş ortalaması 74±12.83 yıl olup %50,3'ü erkekti. Total grupta NT-proBNP ile yaş (p<.001) arasında pozitif yönde, aktüel bikarbonat ($cHCO_3$) (p<,001), standart bikarbonat (HCO_3) (p<,001), pCO_2 (p=,022) ve BE (p<,001) ile negatif yönde anlamlı korelasyon bulundu. Kronik böbrek hastalığı (CKD) olanlarda NT-proBNP ile $cHCO_3$ (p=,008), HCO_3 (p=,019), BE (p=,010) orta düzeyde negatif yönde ilişki vardı. Kalb yetmezliği (HF) olanlarda NT-proBNP ile $cHCO_3$ (p=,002), HCO_3 (p=,001), BE (p=,001) arasında orta düzeyde negatif yönde ilişki vardı.

Sonuç: Dispneik hastanın NT-proBNP ve kan gazları değerleri kesin kalp yetmezliğine işaret etmiyorsa, böbrek fonksiyonlarındaki bozulmanın değerlendirme denklemine katılması uygun görünmektedir.

Anahtar Kelimeler: NT-proBNP, venous blood gas, heart failure, chronic kidney disease

Corresponding *(İletişim)*: Semahat Karahisar Şirali, Division of Nephrology, Department of Internal Medicine, Faculty of Medicine, Ufuk University, Ankara, Turkey
E-mail *(E-posta)*: drsemahat@hotmail.com
Received *(Geliş Tarihi)*: 11.03.2025 **Accepted *(Kabul Tarihi)*:** 20.04.2025

INTRODUCTION

Shortness of breath, defined as the sensation of difficulty in breathing in and out, constitutes an emergency. The condition has a cardiac and pulmonary origin. Given the similarity in the clinical picture, the use of guiding markers is of great importance in the process of differential diagnosis. A delay in diagnosis and treatment results in an increased risk of morbidity and mortality. N-terminal brain natriuretic peptide (NT-proBNP) is released from cardiac myocytes in response to myocardial strain, volume load, and increased end-diastolic pressure. It serves as a diagnostic and prognostic marker for heart failure.[1-3] An elevated NT-proBNP level may be observed in patients with end-stage renal disease, even in the absence of heart failure. An increase in volume load, left ventricular hypertrophy, and hypertension, as well as delayed renal elimination, are all involved.[4]

Venous blood gas analysis represents a rapid and straightforward method for estimating systemic carbon dioxide and pH levels, which can also be performed in emergency settings Venous blood pH may assist in differentiating between metabolic and respiratory causes of dyspnea symptoms. Venous blood pH is approximately 0.02 to 0.04 lower than arterial blood. The assessment of pH is conducted in conjunction with the partial pressure of carbondioxide (pCO_2) and bicarbonate (HCO_3). An elevated pCO_2 (impaired excretion of carbondioxide) indicates respiratory acidosis, whereas a reduced pCO_2 (hyperventilation) suggests respiratory alkalosis. An elevated bicarbonate level, indicative of augmented bicarbonate reabsorption, denotes metabolic alkalosis. Conversely, a diminished venous bicarbonate concentration, suggestive of bicarbonate loss and acid accumulation, signifies metabolic acidosis.[5,6] The normal pH range in arterial blood gas is 7.35-7.45; the bicarbonate level is 21-27 mEq/L, the carbondioxide level is 35-45 mmHg, the base excess (BE ±3), and the lactate level is less than 1.9 mmol/L. The BE value indicates the quantity of acid and base that should be added to attain a pH of 7.40 at 37 degrees Celsius and a partial oxygen pressure of 40 mmHg.[7,8] The BE is evaluated in conjunction with lactate in order to detect metabolic balance disorders. Lactate is a metabolite that is formed as a result of anaerobic metabolism in tissues and serves as an indicator of hypoxia or hypoperfusion.[9]

METHODS

Ethics statement

This retrospective study was conducted with the decision number 24.06.07.07.02/09 dated 07.06.2024 of the Ufuk University Non-Interventional Clinical Research Evaluation Ethics Committee. All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

The study included patients admitted to the hospital with dyspnea between January 1, 2018, and January 1, 2024, who underwent NT-proBNP and venous blood gas examinations at the same time. The demographic data of the patients, including age, gender, and known diseases, as well as the NT-proBNP, venous blood gas pH, pCO_2, pO_2, standard HCO_3 (bicarbonate that should be present in the blood under 40 mmHg pCO_2 at 37 degrees), current $cHCO_3$ (patient's current bicarbonate value), BE, lactate, and glucose levels, were recorded. Laboratory values, including albumin, blood urea nitrogen, glomerular filtration rate (calculated with Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) 2021), sodium, potassium, calcium, and C-reactive protein (CRP), were obtained retrospectively from the hospital record system. The relationship between NT-proBNP and venous blood gas parameters was evaluated, and a p-value of less than 0.05 was considered statistically significant.

Statistical analysis

Analyses were conducted using Statistical Package for Windows 22.0 version (IBM SPSS Statistic, Armonk, NY, IBM Corp. 2013). Categorical variables were presented as frequency (n) and percentage (%). The conformity of continuous variables to normal distribution (-3, +3) was tested with Skewness and Kurtosis and expressed as arithmetic mean standard deviation values. Quantitative data that were not normally distributed were presented as the median and interquartile range (IQR). A chi-square test was applied for categorical variables. Venous blood gas was applied considering the difficulty of obtaining arterial blood gas in emergency admission and the known differences determined by studies between venous and arterial blood gas. If venous blood gas is taken from the central vein, 0.03-0.05 is added to pH, if taken from the periphery, then 0.02-0.04 is added, and pCO_2 is subtracted by 4-5mmHg, 3-8mmHg, respectively, and base excess (BE) is evaluated as 0.15 higher, and lactate is evaluated as 0.12 higher. Patients with history, clinical and laboratory results pointing out pulmonary embolism, anemia, pneumothorax, bronchial asthma and carbon monoxide poisoning were not included in the study. The relationship between NT-proBNP and blood gas was evaluated using the Spearman correlation. $p<0.05$ was considered significant.

RESULTS

The mean age of the 523 patients was 74±12.83 years, with 50.3% of the participants being male. The distribution of demographic and laboratory data is presented in **Table 1**, and the prevalence of comorbid conditions is presented in **Table 2**. A statistically significant difference was observed between males and females with regard to the prevalence of chronic obstructive pulmonary disease (COPD) ($p=0.05$). The prevalence of hypertension was significantly higher in women than in men ($p<0.001$). There were no statistically significant differences between the sexes with regard to the prevalence of diabetes mellitus, chronic kidney disease, coronary artery disease, and cerebrovascular disease.

Table 1. Demographic and laboratory data of the study group

Variables	mean±sd, median(IQR)
Gender	
Male	50.3% (263)
Female	49.7% (260)
Age (year)	74±12.83
NT-proBNP (pg/mL)	2575 (6994)
$cHCO_3$ (mEq/L)	24.4±5.51
HCO_3 (mEq/L)	25.62±4.55
pH	7.4 (.08)
pCO_2 (mmHg)	43.73±9.62
pO_2 (mmHg)	47.44±19.61
BE (mmol/L)	1.7 (6.2)
EF (%)	41.25±25.06
Hemoglobin (g/L)	11.89±2.23
Glucose (mg/dL)	102 (43)
Albumin (g/L)	32.65±6.37
Creatinine (mg/dL)	1.27 (1.04)
GFR (ml/min/1.73 m^2)	51.21±28.09
Sodium (mmol/L)	138 (5)
Potasium (mmol/L)	4.17±.67
Calcium(mg/dL)	8.59±0.67
CRP (mg/L)	20.3 (62.5)

NT-proBNP: N-terminal brain natriuretic peptide HCO_3: standard bicarbonate, $cHCO_3$: Current bicarbonate, pCO_2: Partial pressure of carbondioxide, pO_2: Partial pressure of oxygen, BE: Base excess, EF: Ejection fraction

Table 2. Co-morbid Diseases

Diseases	Gender	(+) % (n)	(-) % (n)	X^2	p
Diabetes mellitus	Male	48.4 (123)	52 (140)	.685	.432
	Female	51.6 (131)	48(129)		
Hypertension	Male	46.1 (187	65 (76)	12.97	<.001
	Female	53.9 (219)	35 (41)		
Chronic kidney disease	Male	49.2 (65)	50.6 (198)	.077	.841
	Female	50.8 (67)	49.4 (193)		
Coroner artery disease	Male	54.3 (146)	46.1 (117)	3.52	.066
	Female	45.7 (123)	53.9 (137)		
Cerebrovascular disease	Male	41.8 (23)	51.3 (240)	1.76	.184
	Female	58.2 (32)	48.7 (228)		
Chronic obstructive pulmonary disease	Male	57.1 (84)	47.6 (179)	3.84	.050
	Female	42.9 (63)	52.4 (197)		

HF NT-proBNP≤300 negative, <50 age≥400 pg/mL,50-74 age≥900 pg/mL,>75age≥1800 pg/mL positive, T2DM NT-proBNP≤50 negative <50 age≥75 pg/mL,50-74 age≥150 pg/mL,>75 age ≥300 pg/mL positive, In CKD, NT-proBNP is added according to GFR. In obesity, it is subtracted according to BMI

NT-proBNP demonstrated a positive correlation with age (p<.001) and a negative correlation with $cHCO_3$ (p<0.001), HCO_3 (p<0.001), pCO_2 (p=0.022), and BE (p<0.001). a significant negative correlation with laboratory parameters, including albumin (p<0.001), GFR (p<0.001), calcium (p <0 .001), and hemoglobin (p<0.001), and a significant positive correlation with glucose (p=0.047), blood urea nitrogen (p<0.001), creatinine (p<0.001), and CRP (p<0.001) (**Table 3**).

Table 3. Spearman's correlation between NT-proBNP and blood gas and laboratory variables

Variables		NTproBNP
age	r	.233**
	p	<.001
$cHCO_3$	r	-.172**
	p	<.001
HCO_3	r	-.166**
	p	<.001
pH	r	-.085
	p	.052
pCO_2	r	-.100*
	p	.022
pO_2	r	.085
	p	.052
BE	r	-.178**
	p	<.001
Lactate	r	.050
	p	.250
Glucose	r	.087*
	p	.047
Albumin	r	-.261**
	p	<.001
BUN	r	.407**
	p	<.001
Creatinine	r	.434**
	p	<.001
Sodium	r	-.071
	p	.103
GFR	r	-.458**
	p	<.001
Potassium	r	.002
	p	.968
Calcium	r	-.312**
	p	<.001
CRP	r	.252**
	p	<.001
Hb	r	-.300**
	p	<.001

*Correlation is significant at the 0.05 level, ** Correlation is significant at the 0.01 level, NT-proBNP:N-terminal brain natriuretic peptide HCO_3: standard bicarbonate, $cHCO_3$:current bicarbonate, pCO_2: Partial pressure of carbondioxide, pO_2: Partial pressure of oxygen, BE:Base excess

The relationship between NT-proBNP and venous blood gases in co-morbid conditions was evaluated, and a weakly significant negative correlation was observed between NT-proBNP and $cHCO_3$ (p=0.002), HCO_3 (p=0.002), pCO_2 (p=0.028), and BE (p=0.004) in patients with diabetes mellitus (DM). In patients with hypertension (HT), a weak negative correlation with age (p=0.001), $cHCO_3$ (p=0.001), HCO_3 (p=0.002), pCO_2 (p=0.017), and BE (p=0.001). In patients with heart failure (HF), a moderate negative correlation was observed $cHCO_3$ (p=0.002), HCO_3 (p=0.001), and BE (p=0.001). In patients with chronic kidney disease (CKD) (GFR<59 Stage III,IV,V), a moderate negative association was observed $cHCO_3$ (p=0.008), HCO_3 (p=0.019), and BE (p=0.010).

In patients with coronary artery disease (CAD), a moderately negative correlation with $cHCO_3$ (p=0.001), HCO_3 (p=0.001), pH (p=0.023), and BE (p=0.001). In patients with COPD, a significant and moderate negative correlation with $cHCO_3$ (p=0.012), HCO_3 (p=0.014), pH (p=0.014), and BE (p=0.035) (**Table 4**). When the chest radiographs of the cases were examined, the cardiothoracic ratio was at the upper limit of normal in 31%, increased in 65%, and pleural effusion was present in 4%.

DISCUSSION

Dyspnea is a prevalent condition among patients admitted to the emergency department. Cardiac and pulmonary causes are the most common causes, and it is also important to evaluate the contribution of chronic kidney disease. NT-proBNP is a valuable diagnostic marker for heart failure, with a high negative predictive value (1.4). A venous blood gas test is a valuable diagnostic tool that can be used to assess acid-base status and certain metabolic alterations. There is an indirect correlation between pH and NT-proBNP. This relationship manifests as a reduction in pH and elevated lactate levels, which result from inadequate delivery of oxygen and nutrients to tissues, particularly in patients with heart failure. In the event of acidosis, there is a reduction in the contractility of the cardiac muscle, which in turn results in an increase in NT-proBNP. A low pH and high NT-proBNP level is typically indicative of an unfavorable prognosis.[5,8,9] In this study, we conducted a comparative analysis of NT-proBNP and blood gas analysis values in patients admitted to our hospital with dyspnea. By comparing the laboratory values, we sought to identify the parameters that should be considered when developing a diagnosis and treatment plan. Our findings indicated that renal function should be taken into account when interpreting NT-proBNP values.

The weak negative correlation between NT-proBNP and $cHCO_3^-$, HCO_3^-, pCO_2^-, and BE in patients with DM and HT suggests that there is a partial shift in the acidotic direction in blood gas, which indirectly affects the heart. Venous blood gas analysis is a diagnostic and monitoring tool used in the evaluation of cardiac and pulmonary diseases. It is also employed in the follow-up of diabetic ketoacidosis and euglycemic ketoacidosis.[10,11] It is postulated that increased acidity causes a weak increase in NT-proBNP, which in turn exerts a negative effect on the heart muscle. A literature search yielded no studies that simultaneously compared NT-proBNP and venous blood gas analysis in patients presenting to the emergency room with dyspnea. Consequently, the available data on the identified patients were evaluated. A weak negative correlation between NT-proBNP and venous blood gas parameters was observed in patients with DM and HT who also had coronary artery disease or chronic obstructive pulmonary disease. In the meta-analysis conducted by Su et al.[12] it was demonstrated that NT-proBNP exhibited significant differences across distinct COPD stages and disease progression, as evaluated based on data from 29 studies comprising 8,534 participants. The negative correlation between NT-proBNP and bicarbonate and BE observed in our study is consistent with the results of the meta-analysis.[13] reported in a prospective study including 8062 patients with different glucose levels that NT-proBNP levels measured at baseline and in the development of cardiovascular death and myocardial infarction showed a relationship in patients with prediabetes and diabetes that was not seen in normoglycemic patients. It was observed that NT-proBNP may serve as a predictor of unfavorable outcomes in dysglycemic patients with coronary syndrome and normal left ventricular systolic function. The negative correlation between venous blood gas parameters and NT-proBNP observed in patients with coronary artery disease, as in COPD patients, was consistent with the results of this study.

Table 4. Relationship Between NT-proBNP and Venous Blood Gas Parameters in Co-morbid Conditions

NTproBNP		DM+ n=254	DM- n=269	HT+ n=406	HT- n=117	HF+ n=254	HF- n=269	CKD+ n=132	CKD- n=391	CAD+ n=269	CAD- n=254	CVA+ n=55	CVA- n=468	COPD+ n=147	COPD- n=376
age		,055	,370**	,161**	,374**	,108	,312**	,109	,258**	,053	,413**	,115	,242**	,109	,167**
	p	.385	.000	.001	.000	.087	.000	.211	.000	.383	.000	.401	.000	.187	.001
$cHCO_3$		-,192**	-,154*	-,170**	-,260**	-,192**	-,237**	-,232**	-,107*	-,204**	-,135*	-,062	-,180**	-,207*	-,107*
	p	.002	.011	.001	.005	.002	.000	.008	.034	.001	.031	.654	.000	.012	.039
HCO_3		-,193**	-,138*	-,152**	-,232*	-,202**	-,212**	-,204*	-,088	-,204**	-,114	-,170	-,161**	-,202*	-,100
	p	.002	.023	.002	.012	.001	.000	.019	.083	.001	.069	.216	.000	.014	.052
pH		-,072	-,085	-,060	-,071	-,105	-,099	-,107	-,025	-,138*	-,015	-,112	-,076	-,138	-,047
	p	.251	.165	.225	.445	.096	.106	.222	.627	.023	.814	.416	.101	.096	.363
pCO_2		-,138*	-,086	-,119*	-,163	-,095	-,172**	-,165	-,071	-,106	-,095	,029	-,113*	-,082	-,090
	p	.028	.158	.017	.080	.132	.005	.059	.162	.084	.129	.832	.014	.323	.081
BE		-,182**	-,174**	-,157**	-,291**	-,211**	-,231**	-,222*	-,108*	-,199**	-,147*	-,135	-,180**	-,174*	-,120*
	p	.004	.004	.001	.001	.001	.000	.010	.034	.001	.019	.326	.000	.035	.020
Lactate		,043	,055	,033	,109	,044	,068	,007	,085	,095	,026	-,079	,062	,029	,048
	p	.498	.370	.510	.243	.490	.267	.933	.093	.120	.681	.565	.181	.725	.350

NT-proBNP: N-terminal brain natriuretic peptide HCO_3: Standard bicarbonate, $cHCO_3$: Current bicarbonate, pCO_2: Partial pressure of carbondioxide, pO_2: Partial pressure of oxygen, BE: Base excess.

In patients under the age of 50 with acute symptoms, an NT-proBNP value below 300 pg/mL is indicative of a negative diagnosis of heart failure. The range of 300 to 450 pg/mL is considered to be within the range of values that may warrant further investigation. In non-acute cases, values below 125 pg/mL are indicative of the absence of heart failure, while a range of 125-500 pg/mL is considered to be within the suspicious range.[14] It was suggested that if GFR is <30 ml/min/1.73 m², 35% should be added to NT-proBNP levels, if it is between 30-45, 25%, if it is between 45-60, 15% should be added to NT-proBNP levels in the grey zone, and if BMI is 30-35 kg/m², 25% should be subtracted, if it is between 35-40, 30% should be subtracted, and if it is over 40, then 40% should be subtracted from NT-proBNP levels.[15] It has been reported that estimated GFR and atrial fibrillation correlate better with NT-proBNP.[16] The low volume overload of 4% in the study group requires attention in the grey zone.

The moderate negative correlation observed between NT-proBNP and HCO_3, $cHCO_3$, and BE in patients with heart failure was also observed in patients with chronic kidney disease. It is established that circulatory failure in heart failure may have a deleterious impact on renal function and that impaired renal function may similarly affect cardiac function. In both instances, an acidotic picture is observed in the venous blood gas. In light of the moderately negative relationship between NT-proBNP and blood gas parameters observed in both heart failure and chronic kidney disease, it seems appropriate to include renal function in the evaluation of NT-proBNP in heart failure within the suspicious zone values, both diagnostically and therapeutically. NT-proBNP testing increases diagnostic accuracy and therefore should be a standard procedure of the evaluation of patients presenting to the emergency department with dyspnea.[17] Renal dysfunction in the gray zones should not be ignored, and the strong relationship between heart and kidney disease should be taken into account. Because the kidney plays a role in both excretion and metabolism of NT-proBNP.

Limitation

The findings obtained in this study reveal the comparison of blood gas and NT-proBNP results of patients admitted to our hospital with dyspnea at hospital admission. However, the limitations of the study should be considered. Monocentric, the limited sample size, the short-term coverage of the data results, and the fact that long-term results were not evaluated prevent the generalizability of these results. Since it is indirectly possible that diseases affecting blood gas parameters also affect NT-proBNP values, the study requires a more detailed evaluation of the effects of renal function on these laboratory data with larger patient groups.

CONCLUSION

It is of the utmost importance that patients presenting to the emergency department with dyspnea be evaluated rapidly and that the diagnosis and treatment be initiated without delay. NT-proBNP is a valuable marker for excluding the diagnosis of heart failure, and venous blood gas analysis is an easily performed method in emergency departments. In the absence of definitive evidence of heart failure in a dyspneic patient, it is reasonable to consider the possibility of impaired renal function as a contributing factor in the evaluation process.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Ufuk University Non-interventional Clinical Research Ethics Committee (Date: 07.06.2024, Decision No: 24.06.07.07.02/09).

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

REFERENCES

1. Su Q, Liu H, Zhang X, et al. Diagnostic values of NT-proBNP in acute dyspnea among elderly patients. Int J Clin Exp Pathol 2015;8(10):13471-6.
2. Palazzuoli A, Gallotta M, Quatrini I, Nuti R. Natriuretic peptides (BNP and NT-proBNP): measurement and relevance in heart failure. Vasc Health Risk Manag 2010;6:411-8.
3. Karakiliç E, Kepez A, Abali G, Coşkun F, Kunt M, Tokgözoğlu L. The relationship between Btype natriuretic peptide levels and echocardiographic parameters in patients with heart failure admitted to the emergency department. Anadolu Kardiyol Derg 2010;10:143-9.
4. Wang S, Li M, Wang X, et al. The Ratio of NT-proBNP to CysC1.53 Predicts heart failure in patients with chronic kidney disease. Front Cardiovasc Med. 2021;8
5. Byrne AL, Bennett M, Chatterji R, et al. Peripheral venous and arterial blood gas analysis in adults: are the comparable? A systematic review and meta-analysis. Respirol 2014;19:168.
6. Kelly AM, Klim S, Rees SE. Agreemet between mathematically arterialised venous versus arterial blood gas values in patients undergoing non-invasive ventilation: a cohort study. Emerg Med J 2014;31:e46.
7. Saberian L, Sharif M, Aarabi M, et al. Arterial versus venous blood gas analysis comparisons, appropriateness and alternatives in different acid/base clinical settings: a systematic review. Cureus 2023;15(7)e41707.
8. Prasad H, Vempalli N, Agrawal N, et al. Correlation and agrement arterial and venous blood gas analysis in patients with hypotension an emergency deparment based cross-sectional study. Int J Emerg Med 2023;16(1):18.
9. Galic K, Pravdie D, Prskalo Z, et al. Prognostic value of lactates in relation to gas analysis and acid-base status in patients with pulmonary embolism. Croatian Med J 2018;59(4):149-55
10. Patel MP, Ahmed A, Gunapalan T, Hesselbacher. Use of sodium bicarbonate and blood gas monitoring in diabetic ketoasidosis: A review. World J Diabetes 2018;9(11):199-205.
11. Long B, Lentz S, Koyfman A, Gottlieb M. Euglycemic diabetic ketoasidosis: Etiologies, evaluation and management. Am J Emerg Med 2021; 44:157-60.

12. Su X, Lei T, Yu H, et al. NT-proBNP in Different Patient Groups of COPD: A systematic review and meta-analysis. IntJ Chron Obstruct Pulmon Dis 2023; 18:811-25.
13. Liu HH, Cao YX, Jin JL, et al. Prognostic value of NT_proBNP in patients with chronic coronary syndrom and normal left ventricular systolic function according to glucose status: a prospective cohort study. Cardiovasc Diabetol 2021;20(1):84.
14. Mueller C, McDonald K, Boer RA, et al. Heart Failure Association of the European Society of Cardiology practical guidance on the use of natriuretic peptide concentrations. Eur J Heart Fail 2019; 21:715–31.
15. Bayes-Genis A, Docherty KF, Petrie MC, et al. Practical algorithms for early diagnosis of heart failure and heart stress using NT-proBNP: A clinical consensus statement from the Heart Failure Association of the ESC. Eur J Heart Fail. 2023;25(11):1891-8.
16. Sarzani R, Spannella F, Giulietti F, et al. NT-proBNP and Its Correlation with In-Hospital Mortality in the Very Elderly without an Admission Diagnosis of Heart Failure. PLoS One 2016;14:11(4):e0153759.
17. Januzzi Jr JL , Chen-Tournoux AA, Christenson RH, et al. N-Terminal Pro-B-Type Natriuretic Peptide in the Emergency Department: The ICON-RELOADED Study. J Am Coll Cardiol 2018;71(11):1191-200.

JOURNAL OF
CONTEMPORARY MEDICINE

DOI:10.16899/jcm.1648812
J Contemp Med 2025;15(3):132-138

Original Article / Orijinal Araştırma

Taste Alteration in Children with Cancer Before and During Chemotherapy

Kanserli Çocuklarda Kemoterapi Öncesi ve Kemoterapi Sırasında Tat Alma Değişikliği

Sabiha Uvalı[1], Elif Bilsin Kocamaz[2]

[1]Gaziantep Provincial Health Directorate Cengiz Gökçek Gynecology and Pediatrics Hospital, Gaziantep, Turkiye
[2]Department of Child Health and Diseases Nursing, Dicle University Atatürk Health Science Faculty, Diyarbakır, Turkiye

Abstract

Aim: This study was conducted to investigate the taste alteration before and during chemotherapy in children with cancer.

Material and Method: It is a descriptive and cross-sectional study. The population of the study consisted of children aged 8-18 years who were followed up and received chemotherapy in the pediatric hematology and oncology clinic of a University Medical Faculty Oncology Hospital. A Child Description Form, the Taste Alteration Scale for Children Receiving Chemotherapy (TAS-CRC) and the Scale of Subjective Total Taste Acuity (SSTTA) were used to collect the data.

Results: It was determined that 13.3% of the children before chemotherapy, 53.3% in the 3rd week of chemotherapy and 66.7% in the 6th week of chemotherapy experienced taste changes. It was determined that there was a statistically significant difference between the mean scores of the TAS-CRC administered before chemotherapy and at the 3rd and 6th week of chemotherapy. In addition, taste acuity was found to be higher in the 3rd and 6th week of chemotherapy compared to before chemotherapy.

Conclusion: It was determined that both taste alteration and taste acuity in children were higher in the 3rd and 6th week of chemotherapy compared to pre-chemotherapy. Since taste alteration and increased taste acuity in children undergoing chemotherapy can adversely affect their nutrition, children should be regularly monitored in terms of height, weight, and Body Mass Index (BMI).

Keywords: Chemotherapy, nursing, taste alteration

Öz

Amaç: Bu çalışma kanserli çocuklarda kemoterapi öncesi ve kemoterapi sırasında tat alma değişikliğini incelemek amacıyla yapılmıştır.

Gereç ve Yöntem: Tanımlayıcı ve kesitsel tipte bir araştırmadır. Araştırmanın evrenini bir Üniversitenin Tıp Fakültesi Onkoloji Hastanesi pediatri hematoloji ve onkoloji kliniğinde izlenen ve kemoterapi alan 8-18 yaş arasındaki çocuklar oluşturmuştur. Verilerin toplanmasında Çocuk Tanıtım Formu, Kemoterapi Alan Çocuklar İçin Tat Alma Değişikliği Ölçeği (KAÇ-TADÖ) ve Subjektif Total Tat Keskinliği Ölçeği (STTKÖ) kullanılmıştır.

Bulgular: Çocukların kemoterapi öncesinde %13.3'nün, kemoterapinin 3. haftasında %53.3'ünün ve kemoterapinin 6. haftasında %66.7'sinin tat alma değişikliği yaşadığı belirlenmiştir. Kemoterapi öncesi, kemoterapinin 3. ve 6. haftasında uygulanan KAÇ-TADÖ puan ortalamaları arasında istatistiksel olarak anlamlı fark olduğu belirlenmiştir. Ayrıca kemoterapi öncesine göre kemoterapinin 3. ve 6. haftasında tat keskinliği kaybının daha fazla olduğu saptanmıştır.

Sonuç: Çocuklarda hem tat alma değişikliğinin hem de tat keskinliğinin kemoterapi öncesine göre kemoterapinin 3. ve 6. haftasında daha fazla olduğu belirlenmiştir. Kemoterapi alan çocuklarda tat alma değişikliği ve tat keskinliği beslenmelerini olumsuz yönde etkileyebileceğinden, çocukların boy, kilo ve Beden Kitle İndeksi (BKİ) açısından düzenli olarak izlenmesi gerekir.

Anahtar Kelimeler: Hemşirelik, kemoterapi, tat alma değişikliği

Corresponding *(İletişim)*: Elif Bilsin Kocamaz, Department of Child Health and Diseases Nursing, Dicle University Atatürk Health Science Faculty, Sur, Diyarbakır, Turkiye
E-mail *(E-posta)*: elifbilsin-86@hotmail.com
Received *(Geliş Tarihi)*: 28.02.2025 **Accepted *(Kabul Tarihi)*:** 20.04.2025

INTRODUCTION

Chemotherapy and radiotherapy used in the treatment of cancer cause a number of side-effects, such as decreased appetite, gustatory and olfactory changes, nausea, vomiting, mucositis, diarrhea, pain, and fatigue.[1] Taste alteration is another frequent and overlooked side-effect of chemotherapy.[2] Studies of pediatric cancer patients have reported that 36-77% experience taste alteration during chemotherapy.[1,3] This treatment leads to a decrease in flavor perception and appetite,[3,5] weight loss, alteration in social activities associated with decreased nutrient and energy intake, emotional problems, and alterations in daily life and quality of life.[4]

The sense of taste is a system that plays a critical role in human nutrition and life.[3] However, taste disorders are generally difficult to diagnose and treat, since they are usually missed at routine examination.[4]

The adverse effect of taste alteration is more important in children, because their eating behaviors and food preferences are still developing and are more affected by chemical stimuli.[5] However, adequate and balanced nutrition during the treatment of cancer is regarded as an inseparable factor in survival rates, treatment tolerance, and quality of life.[6] Increasing energy requirements for growth and development during infancy and adolescence raise the risk of malnutrition among children with cancer in these age groups.[2,7] Inadequate nutrition in children with cancer increases disease-related complication and recurrence rates, while lowering survival rates.[1] In addition, taste perception alterations can also reduce quality of life by adversely impacting on children's physiological, psychological, and social function.[3,8] Early identification and intervention are therefore important in pediatric cancer patients.[3]

Studies examining taste alteration in pediatric cancer patients before and during chemotherapy are insufficient.[1,3,5] The present study is important since it evaluated taste alterations in children with cancer three times, once before chemotherapy and twice during it, and investigated how chemotherapy affects the child's sense of taste. The research also examined the relationship between taste alteration and the treatment received during two periods of chemotherapy. It will also serve as a reference for other research and for oncologists and nurses.

MATERIAL AND METHOD

The study was carried out with the permission of Dicle University Non-invasive Clinical Research Ethics Committee (Date: 02.2021, Decision No: 2020/296). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Objectives

The purpose of this research was to determine taste alterations before and during chemotherapy in pediatric cancer patients.

Study Design

A descriptive, cohort, and cross-sectional study.

Research Hypotheses

H1: Taste alteration in children with cancer is greater at the third and sixth weeks of treatment compared to before chemotherapy.

H2: Loss of taste acuity in children with cancer is greater at the third and sixth weeks of treatment compared to before chemotherapy.

Study Setting and Sampling

The study was carried out at a University Oncology Hospital pediatric hematology and oncology clinics, between February 2021 and September 2022.

The research population consisted of children aged 8-18 under follow-up at the University Oncology Hospital pediatric hematology and oncology clinics and receiving chemotherapy between February 2021 and September 2022. Power analysis software was applied to calculate the size of the research sample. Following the power analysis, the minimum number required for the expectation of an effect size of f=0.35 between the taste scale scores at different times to be statistically significant was determined at 15 (α=.05; 1-ß=.80).

Inclusion Criteria

- Voluntary participation on the part of the child and the family,
- The child being aged 8-18,
- The child being diagnosed with cancer, and
- The child being capable of oral nutrition.

Data Collection Tools

A Child Description Form, the Taste Alteration Scale for Children Receiving Chemotherapy (TAS-CRC), and the Subjective Total Taste Acuity (STTA) scale were applied for data collection.

Child Description Form

This form was developed by the researcher based on a scan of the literature.[1,9-12] It consisted of two sections, containing three questions concerning the child's sociodemographic characteristics and 20 regarding the disease.

Taste Alteration Scale for Children Receiving Chemotherapy (TAS-CRC)

This scale allows the child to express his sense of taste in a subjective manner. It was developed by Bilsin and Bal Yılmaz for the purpose of evaluating changes in taste perception in children receiving chemotherapy aged 8-18.[9] It consists of nine items. Items 1, 4, 5, 6, and 7 refer to dysgeusia, item 2 to cacogeusia, item 3 to phantogeusia, item 8 to parosmia, and item 9 to cacosmia. Each item is scored on a 0-4 Likert-type scale (0=None, 1=Mild, 2=Moderate, 3=Severe, 4=Very severe). A total scale score is obtained by summing the

scores for the individual items. The lowest possible score is 0 and the highest possible score 36. Higher scores indicate a greater severity of taste alteration. The scale's reported Cronbach α reliability coefficient is 0.88.[9] In the present study, the Cronbach α reliability coefficient values were 0.834 on the third week of chemotherapy and 0.818 on the sixth week.

Subjective Total Taste Acuity (STTA) Scale

This scoring tool is employed to evaluate taste acuity.[13] The Late Effects Normal Tissue Task Force (LENT) adapted from the Subjective, Objective, Management, Analytic (SOMA) scoring system was established in 1995 by a specialist working group (the European Organization for Cancer Research and Treatment and Radiation Therapy Oncology Group) to grade radiotherapy-related side effects.[14] It contains five statements permitting the evaluation of taste acuity (0: Pre-treatment taste acuity, Grade 1: Mild loss of taste acuity, but not troublesome in daily life, Grade 2: Moderate loss of taste acuity, sometimes causing inconvenience in daily life, Grade 3: Severe loss of taste acuity generally troublesome in daily life, and Grade 4: Complete or almost complete loss of taste acuity). These items indicate a decrease in taste acuity from 0 to 4. Each item on the scale is evaluated in yes/no form.[13] The Turkish-language and content validity were investigated by Sülger Bicici and Bilsin Kocamaz. The items' Content Validity Ratio (CVI) was 0.80-1.00, and the Content Validity Ratio (CVR) was 0.96. Since CVI≥CVR, the content validity of the scale was regarded as statistically significant.[15]

Data Collection

The study was carried out at a University Oncology Hospital pediatric hematology and oncology clinics, between February 2021 and September 2022. The child description form, TAS-CRC, and STTA were applied to children diagnosed with cancer and who had not yet started chemotherapy by the author at face-to-face interviews. The same author subsequently administered the section of the child description form related to the patient's disease, the TAS-CRC and the STTA on the third and sixth weeks of chemotherapy. The children were weighed and measured in the clinic. Height, weight, and body mass index (BMI) Z scores were calculated using the appropriate tool on the Diabetes Association web site.[16] A pre-questionnaire was applied to 10 children as a pilot study, after which the requisite amendments were made, and it thus assumed its final form.

Data Analysis

Data analyses were performed on SPSS version 20.0 (Statistical Packages for the Social Sciences) software. Non-parametric tests were applied since the data were not normally distributed according to the Shapiro Wilk normality test. The normality test, mean, number and percentage distributions, Cronbach alpha coefficient, and the Friedman and Wilcoxon tests were used in the data analysis.

RESULTS

The children's mean age was 10.73±2.60 years, 60.0% were boys, and 46.6% were attending elementary school.

ALL was determined in 46.7% of the children, and 88.2% received chemotherapy via the intravenous route. In terms of types of chemotherapy, 100.0% used antitumor antibiotics, 66.7% antimetabolites, 60.0% vinca alkaloids, 53.3% alkylating agents, 13.3% hormones, and 7.7% enzymes.

Examination of pre-chemotherapy nutrition and gastrointestinal symptoms showed that children's weight Z scores were between -2 and +2 in 86.7% of cases and ≥+2 in 13.3%. Height Z scores were between -2 and +2 in 93.3% of the children and ≤-2 in 6.7%, while BMI Z scores were between -2 and +2 in 93.3% and ≥+2 in 6.7%. Weight loss was present in 26.7% of the children, dry mouth in 20%, swallowing difficulty in 33.3%, no sensitivity to any hot or cold foods or beverages was found in any patients, lack of appetite in 40.0%, abdominal pain in 20.0%, and taste alteration in 13.3%. All the children performed oral hygiene care, with 46.7% using mycostatin, 100.0% sodium bicarbonate, and 100.0% chlorhexidine. In addition, 46.7% of the children adopted measures to overcome taste alteration, with 33.3% consuming favorite foods, 33.3% not eating, and 20.0% adding spices to food (**Table 1**).

Examination of nutritional and gastrointestinal symptoms on the third week of chemotherapy showed that weight Z scores were between -2 and +2 in 93.3% of children and ≥+2 in 6.7%, while height Z scores were between -2 and +2 in 93.3% and ≤-2 in 6.7%, and BMI Z scores were between -2 and +2 in 86.7% and ≤-2 in 13.3%. Analysis showed that 86.7% of children experienced weight loss, 53.3% difficulty in swallowing and dry mouth, 33.3% sensitivity to hot food or beverages, 20.0% sensitivity to cold food or beverages, 73.3% lack of appetite, 46.7% abdominal pain, and 53.3% taste alteration (**Table 1**).

Examination of nutritional and gastrointestinal symptoms on sixth week of chemotherapy revealed that weight Z scores were between -2 and +2 in 86.7% of children and ≤-2 in 6.7%. Height Z scores were between -2 and +2 in 86.7% and ≤-2 in 6.7%, and BMI Z scores were between -2 and +2 in 86.7% and ≤-2 in 13.3%. Weight loss was experienced by 66.7% of children, dry mouth by 33.3%, difficulty in swallowing by 26.7%, sensitivity to hot food or beverages by 26.7%, sensitivity to cold food or beverages by 13.3%, lack of appetite by 60.0%, abdominal pain by 40.0%, and taste alteration by 66.7% (**Table 1**).

Examination of the distribution of foods that children regarded as pleasant or unpleasant after the development of taste alteration showed that 20.0% of the children liked home-made foods and 6.7% fruit, pizza/toasted sandwiches, pasta, and potatoes, while 33.3% disliked hospital food, 20.0% fruit and desserts, 13.3% eggs, and 6.7% spicy foods (**Table 1**).

Table 1: Distribution of nutritional and gastrointestinal symptoms

Nutrition and Gastrointestinal Symptoms	Pre-Chemotherapy	3rd Week of Chemotherapy	6th Week of Cemotherapy
	n (%)	n (%)	n (%)
Weight Z score			
Between -2 and +2	13 (86.7)	14 (93.3)	13 (86.7)
≤-2	0 (0)	0 (0)	1 (6.7)
≥+2	2 (13.3)	1 (6.7)	1 (6.7)
Height Z score			
Between -2 and +2	14 (93.3)	14 (93.3)	13 (86.7)
≤-2	1 (6.7)	1 (6.7)	1 (6.7)
≥+2	0 (0)	0 (0)	1 (6.7)
BMI Z score			
Between -2 and +2 (normal)	14 (93.3)	13 (86.7)	13 (86.7)
≤-2 (insufficient nutrition)	0 (0)	2 (13.3)	2 (13.3)
≥+2 (obese)	1 (6.7)	0 (0)	0 (0)
Weight loss			
Yes	4 (26.7)	13 (86.7)	10 (66.7)
No	11 (73.3)	2 (13.3)	5 (33.3)
Dry mouth			
Yes	3 (20.0)	8 (53.3)	5 (33.3)
No	12 (80.0)	7 (46.7)	10 (66.7)
Swallowing difficulty			
Yes	5 (33.3)	8 (53.3)	4 (26.7)
No	10 (66.7)	7 (46.7)	11 (73.3)
Sensitivity to hot food or beverages			
Yes	0 (0)	5 (33.3)	4 (26.7)
No	15 (100.0)	10 (66.7)	11 (73.3)
Sensitivity to cold food or beverages			
Yes	0 (0)	3 (20.0)	2 (13.3)
No	15 (100.0)	12 (80.0)	13 (86.7)
Lack of appetite			
Yes	6 (40.0)	11 (73.3)	9 (60.0)
No	9 (60.0)	4 (26.7)	6 (40.0)
Abdominal pain			
Yes	3 (20.0)	7 (46.7)	6 (40.0)
No	12 (80.0)	8 (53.3)	9 (60.0)
Taste alteration			
Yes	2 (13.3)	8 (53.3)	10 (66.7)
No	13 (86.7)	7 (46.7)	5 (33.3)
Oral health care			
Yes	15 (100.0)		
No	0 (0)		
Product used in oral health care*			
Mycostatin	7 (46.7)		
Sodium bicarbonate	15 (100.0)		
Chlorhexidine	15 (100.0)		
Steps taken to overcome taste alteration			
Yes	7 (46.7)		
No	8 (53.3)		
Measures adopted to overcome taste alteration			
Eating favorite foods	5 (33.3)		
Not eating	5 (33.3)		
Adding spices to food	3 (33.3)		

*More than one option was selected.

Mean TAS-CRC scores were 1.86±2.72 before chemotherapy, 4.40±5.77 on the third week, and 5.26±6.28 on the sixth week. Mean pre-chemotherapy TAS-CRC scores differed significantly from those on the third and sixth weeks (P<.05) (**Table 2**).

Table 2: Mean TAS-CRC scores before and on the third and sixth weeks of chemotherapy

Mean TAS-CRC score	Min-Max	M ± SD
Pre-chemotherapy TAS-CRC	0-10	1.86±2.72
Third week of chemotherapy	0-22	4.40±5.77
Sixth week of chemotherapy	0-22	5.26±6.28

Note. TAS-CRC= Taste Alteration Scale for Children Receiving Chemotherapy, M=Mean, SD= Standard deviation,

While no significant differences were determined between mean pre-chemotherapy and third week TAS-CRC scores, or between third and sixth week of chemotherapy scores (P>.05 for both), mean pre-chemotherapy and sixth week of chemotherapy TAS-CRC scores differed significantly (P<.05) (**Table 3**).

Table 3: A Comparison of mean and median TAS-CRC scores before and on the third and sixth weeks of chemotherapy

Mean TAS-CRC score	M ± SD	Median (Q1-Q3)	P
TAS-CRC before chemotherapy	1.86±2.72	1 (0-3)	
TAS-CRC on the third week of chemotherapy	4.40±5.77	2 (1-7)	.046*
TAS-CRC on the sixth week of chemotherapy	5.26±6.28	3 (2-6)	

Friedman test; Q1:1st quartile; Q3:3rd quartile, *p<.05, Note. TAS-CRC= Taste Alteration Scale for Children Receiving Chemotherapy, M=Mean, SD= Standard deviation,

Table 4 show that mean TAS-CRC scores on the third and sixth weeks of chemotherapy were higher than the pre-chemotherapy values, and statistically significant differences were determined between the three TAS-CRC scores (P<.05).

Table 4: A Comparison of mean TAS-CRC scores before and on the third and sixth weeks of chemotherapy

Pre-Chemotherapy TAS-CRC M ± SD	TAS-CRC on the Third Week of Chemotherapy M ± SD	Z-p
1.86±2.72	4.40±5.77	Z=-1.827 p=.068
Pre-Chemotherapy TAS-CRC M ± SD	TAS-CRC on the Sixth Week of Chemotherapy M ± SD	Z-p
1.86±2.72	5.26±6.28	Z=-2.112 p=.035*
TAS-CRC on the Third Week of Chemotherapy M ± SD	TAS-CRC on the Sixth Week of Chemotherapy M ± SD	Z-p
4.40±5.77	5.26±6.28	Z=-1.303 p=.192

*p<.05, Note. TAS-CRC= Taste Alteration Scale for Children Receiving Chemotherapy, M=Mean, SD= Standard deviation

In terms of pre-chemotherapy STTA grade distributions, loss of taste acuity was Grade 0 in 66.7% of children, Grade 1 in 6.7%, Grade 2 in 13.3%, and Grade 3 in 13.3%. On the third week of chemotherapy, loss of taste acuity was Grade 0 in 20.0%, Grade 1 in 46.7%, and Grade 2 in 33.3%. On the sixth week of chemotherapy, loss of taste acuity was Grade 0 in 20.0%, Grade 1 in 26.7%, Grade 2 in 40.0%, and Grade 3 in 13.3% (**Table 5**).

Table 5: Distributions of STTA items before and on the third and sixth weeks of chemotherapy

Scale Items	Pre-Chemotherapy		Third Week of Chemotherapy		Sixth Week of Chemotherapy	
	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)
Grade 0: Pre-treatment taste acuity	10 (66.7)	5 (33.3)	3 (20.0)	12 (80.0)	3 (20.0)	12 (80.0)
Grade 1: Mild loss of taste acuity, but not troublesome in daily life	1 (6.7)	14 (93.3)	7 (46.7)	8 (53.3)	4 (26.7)	11 (73.3)
Grade 2: Moderate loss of taste acuity, sometimes causing inconvenience in daily life	2 (13.3)	13 (86.7)	5 (33.3)	10 (66.7)	6 (40.0)	9 (60.0)
Grade 3: Severe loss of taste acuity generally troublesome in daily life	2 (13.3)	13 (86.7)	0 (0)	15 (100.0)	2 (13.3)	13 (86.7)
Grade 4: Complete or almost complete loss of taste acuity	0 (0)	15 (100.0)	0 (0)	15 (100.0)	0 (0)	15 (100.0)

Note. STTA= Subjective Total Taste Acuity

DISCUSSION

Discussion of Findings Concerning Nutrition and Gastrointestinal Symptoms

Insufficient nutrition leads to an increase in mortality and morbidity by raising the incidence of complications, reducing tolerance to treatment, and causing malnutrition, and is therefore an important component of the treatment of patients with cancer.[10,11] Oral sensory activities play a role in the development of nutritional habits.[11] Taste perception also plays a role in digestion, absorption, and storage by activating the neuronal pathways. Taste perception function disturbance therefore has an adverse impact on appetite and body weight and can therefore cause symptoms including nausea-vomiting, hypersensitivity, and impairment of intestinal and bladder functions.[11,12,17] Cancer pathology can cause gustatory and olfactory changes capable of affecting appetite and nutrition.[14,17]

In the present study, little change was observed in weight Z scores on the third and sixth weeks of chemotherapy compared to pre-chemotherapy values, while height and BMI Z scores decreased slightly. In a study of admission to intensive care of pediatric cancer patients, Feng et al. reported insufficient nutrition in 11.3% of children based on weight Z scores, in 16.3% based on height Z scores, and in 21.3% based on BMI Z scores.[18] Bilsin and Bal Yılmaz reported that 17.9% of children with cancer were below normal limits in terms of weight percentile values, while 7.4% were above normal limits.[9] Skolin et al. weighed and measured children on the first day of admission to hospital, weekly for the first six weeks, and three months after initiation of treatment. Based on those measurements, the authors reported weight loss up to three months after commencement of treatment, while height acquisition was significantly delayed.[19] The results of the present study were consistent with those of the previous literature.

Rapidly proliferating cancer cells play a role in the release of cytokines and chemokines that result in an increase in macrophages and neutrophils. The resulting inflammation causes cachexia and changes in nutritional habits by affecting blood circulation and areas of the brain concerned with taste and smell. The change in taste perception is thus controlled both by taste buds and the taste center in the brain.[11] Consistent with the previous literature, in the present study, children's gastrointestinal symptoms such as weight loss, dry mouth, difficulty in swallowing, sensitivity to hot/cold foods, lack of appetite, abdominal pain, and taste alteration increased on the third and sixth weeks of chemotherapy compared to pre-chemotherapy. These findings support our H1 hypothesis. Studies on this subject have reported that 36-77.0% of pediatric oncological patients experience taste perception changes.[1,3] Similarly to the present research, previous studies have also reported that symptoms of oral mucositis, dry mouth, difficulty in swallowing, lack of appetite, nausea, and vomiting are widely seen in children undergoing chemotherapy.[10,11,20]

Approximately half of the children in this research adopted measures to cope with taste alteration, including, in descending order, consuming foods they liked, not eating, and adding spices to foods. Karaman et al. found that 39.0% of children with cancer employed methods such as adding spices, using flavor enhancers, and increasing fluid intake.[21] Bilsin and Bal Yılmaz reported that 44.2% of children attempted to cope with taste alteration, using methods such as consuming sweet foods, chewing gum, and using mouthwash.[9] In addition, Loves et al. observed that children employed methods such as eating favored foods at a rate of 42.0%, while 39.0% added flavor enhancers to foods, 35.0% consumed fluids, 31.0% brushed their teeth, and 25.0% sucked on sugar.[3] The results of the present study were consistent with the literature. We think that the differences in methods used in taste alteration are due to variations in children's home and hospital conditions.

A Discussion of Findings Concerning Foods Regarded as Pleasant or Unpleasant Following Taste Alteration

Taste alteration can give adversely affect eating behaviors and quality of life and reduce pleasure derived from eating.[10,11,17] Since children's eating preferences are still developing, they are also more affected by this situation.[1] In the present study, after taste alteration had commenced, children most frequently liked home-made foods, followed by fruit, pizza-toasted sandwiches, pasta, and potatoes, while they most frequently disliked hospital food, followed by fruit-desserts, eggs/omelets, and spicy foods. In a study of children aged 4-18 with cancer, Loves et al. described home-made foods, salty foods, and meat as the most preferred foods following taste alteration, and flavorless/salt-free foods, fatty foods, and spicy and hot foods as some of the least popular.[3] Bilsin and Bal Yılmaz described fruit, bitter foods, and yoghurt as

the most popular foods, and hospital food, red meat, and eggs as the least popular.[9] Karaman et al. described fish and meat products, followed by milk and milk products as the least popular foods after treatment.[21] Skolin et al. reported that 38.0% of the children in their study avoided sausage sandwiches and chicken.[19] The results of the present study were partly consistent with the previous literature. We think that the discrepancies in the findings may be attributable to variations in patients' eating cultures.

Discussion of Mean TAS-CRC Scores and Findings Concerning STTA Items Before and on the Third and Sixth Weeks of Chemotherapy

Specific chemotherapy doses can affect the types, onset, and duration of taste alterations.[17] Very few studies have examined taste perception changes in children on the basis of chemotherapy stages. This study investigated in which period taste alteration and many associated symptoms were experienced most intensely by applying taste alteration and taste acuity scales to children in the same treatment period. Children experienced greater taste alteration on the third and sixth weeks of chemotherapy compared to pre-chemotherapy. These results support our H1 hypothesis. Brinksma et al. investigated taste alterations twice in their study of taste and smell functions in children with cancer, on the first day of chemotherapy and 21 days after the start of chemotherapy. They reported significant differences in sweet, spicy, and total taste scores between the two measurement periods. Children scored higher on the taste test performed 21 days after chemotherapy, their taste sensitivities increased, and they experienced greater taste alterations.[1] The results of that study are similar to those of the current research.

Loss of taste acuity in the present study was greater at the third and sixth weeks of chemotherapy compared to pre-chemotherapy. These results support our H2 hypothesis. Two previous studies have addressed taste alteration and taste acuity together. Loss of taste acuity increased in line with taste alteration in both.[15,22] Our findings were compatible with the results of those two studies.

CONCLUSION

The weight Z scores of the children in this study changed little at the third and sixth weeks of chemotherapy compared to baseline, while slight decreases were observed in height and BMI Z scores. Taste alteration and loss of taste acuity were greater at the third and sixth weeks of chemotherapy compared to baseline.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Dicle University Non-invasive Clinical Research Ethics Committee (Date: 02.2021, Decision No: 2020/296).

Informed Consent: All patients signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

Note: This study is Master's thesis. This study presented as oral presentation in 11th International Medicine and Health Sciences Researches Congress Oral Presentation, Online, 24-25 December 2022 Ankara, Turkey.

REFERENCES

1. Van den Brink M, IJpma I, van Belkom B, Fiocco M, Havermans RC, Tissing WJE. Smell and taste function in childhood cancer patients: A feasibility study. Support Care Cancer. 2020;29(3):1619-28.
2. Drareni K, Dougkas A, Giboreau A, Laville M, Souquet PJ, Bensafi M. Relationship between food behavior and taste and smell alterations in cancer patients undergoing chemotherapy: A structured review. Semin Oncol. 2019;46(2):160-72.
3. Loves R, Green G, Joseph-Frederick Z, et al. Describing taste changes and their potential impacts on paediatric patients receiving cancer treatments. BMJ Support Palliat Care. 2023; 7;13(e2):382-8.
4. Boltong A, Keast R, Aranda S. Talking about taste: how do oncology clinicians discuss and document taste problems?. Cancer Forum. 2011;35(2).
5. Van den Brink M, IJpma I, Tissing WJE, Havermans RC. Taste dysfunction in children-a clinical perspective and review of assessment methods. Chem Senses. 2021;1;46:1-10.
6. Guru HR, Koul R, Aiman A, Zargar OA. Nutritional profile and management of pediatric oncology patients at a tertiary care hospital from Kashmir: Where do we stand? Int J Health Clin Res. 2021;4(16):66-8.
7. Çanga N. (2013). Determination of changes in taste and nutritional status of children with solid tumor having chemotherapy. (Unpublished master's thesis), Hacettepe University, Ankara.
8. Pang D, Qian L, Chen ZJ, et al. Psychometric properties of the Chinese version of the chemotherapy-induced taste alteration scale. Eur J Oncol Nurs. 2019;42:7-13.
9. Bilsin E, Bal Yilmaz H. Development and validation of the taste alteration scale forchildren receiving chemotherapy. J Res Nurs. 2018;23(7):568-80.
10. Murtaza B, Hichami A, Khan AS, Ghiringhelli F, Khan NA. Alteration in taste perception in cancer: causes and strategies of treatment. Front Physiol. 2017;8:134.
11. Rawat N, Chanu SE, Chauhan V. Chemotherapy associated side effects among children with cancer. International Journal of Health Sciences and Research. 2021;11(2):236-42.
12. Epstein JB, de Andrade ESSM, Epstein GL, Leal JHS, Barasch A, Smutzer G. Taste disorders following cancer treatment: report of a case series. Support Care Cancer. 2019;27(12):4587-95.
13. Rubin P, Constine LS, Fajardo LF, Phillips TL, Wasserman TH. RTOG Late Effects Working Group. Overview. Late Effects of Normal Tissues (LENT) scoring system.Int J Radiat Oncol Biol Phys. 1995;30;31(5):1041-2.
14. Child Metrics [Internet]. [cited 2017]. Available from: https://www.ceddcozum.com/
15. Sülger Bicici D, Bilsin Kocamaz E. Taste alteration, food habits and nutritional status of childhood cancer survivors. J Contemp Med 2024;14(6):309-14.
16. Rehwaldt M, Wickham R, Purl S, et al. Self-care strategies to cope with taste changes after chemotherapy. Oncol Nurs Forum. 2009;36(2):E47-56.

17. Feng S, Cheng L, Lu H, Shen N. Nutritional status and clinical outcomes in children with cancer on admission to intensive care units. Nutr Cancer. 2021;73(1):83-8.
18. Skolin I, Wahlin YB, Broman DA, Koivisto Hursti UK, Vikstrom Larsson M, Hernell O. Altered food intake and taste perception in children with cancer after startof chemotherapy: perspectives of children, parents and nurses. Support Care Cancer. 2006;14(4):369-78.
19. American Cancer Society. Taste and smell changes. 2020 [updated 2020 Feb 1; cited 2022 Dec 21]. https://www.cancer.org/cancer/managing-cancer/side-effects/eating-problems/taste-smell-changes.html
20. Fistikci Y, Bilsin Kocamaz E. Eating behavior, nutritional status, and taste perception alteration in children with cancer. J Pediatr Hematol Oncol, 2024;46:88–95.
21. Karaman N. Chemoterapy induced taste and smell changes in pediatric cancerpatients. Turk J Oncol. 2013;28(3):101-4.
22. Alelayan H, Wen H, Li H, Ge J, Han W, Liao X. The therapy-related symptom checklist for children as a method for monitoring symptoms in chinese children with cancer: Linguistic validation and cross-cultural adaptation. Pain Manag Nurs. 2022;23(6):855-60.

JOURNAL OF
CONTEMPORARY MEDICINE

DOI:10.16899/jcm.1659015
J Contemp Med 2025;15(3):139-141

Case Report / Olgu sunumu

Transdermal Ginseng Patches as a Rare Trigger of Psychosis: Implications for Herbal Product Safety

Transdermal Ginseng Yamaları ve Psikoz İlişkisi: Bitkisel Ürün Güvenliğinin Önemi

Omer Jaradat[1], Süleyman Ersoy[2]

[1]Clinic of Emergency Medicine, Kırşehir Training and Research Hospital, Kırşehir, Turkiye
[2]Department of Emergency Medicine, Faculty of Medicine, Kırşehir Ahi Evran University, Kırşehir, Turkiye

Abstract

This case report describes a 49-year-old woman who developed ginseng-induced psychosis after using transdermal ginseng patches. Presenting with visual hallucinations, disorganized thoughts, and anxious behavior, she had no prior psychiatric history. Diagnostic tests, including brain imaging and EEG, were normal. The patient's symptoms resolved after discontinuing the patches and receiving risperidone. Ginseng, commonly used for physical and mental fatigue, rarely causes psychosis. This case highlights the potential psychiatric side effects of herbal products, particularly transdermal forms, which lack regulatory oversight. Emergency physicians should consider herbal use in patients with psychotic symptoms, emphasizing the need for caution and regulation of such products.

Keywords: Ginseng, herbal medicine, psychotic disorders, transdermal patch, adverse drug reaction

Öz

Bu vaka raporu, transdermal ginseng bantları kullandıktan sonra ginseng kaynaklı psikoz geliştiren 49 yaşında bir kadını anlatmaktadır. Görsel halüsinasyonlar, dağınık düşünceler ve kaygılı davranışlar sergileyen hastanın öncesinde psikiyatrik öyküsü yoktu. Beyin görüntüleme ve EEG dahil tanısal testler normaldi. Hastanın semptomları, bantların kesilmesi ve risperidon tedavisi sonrasında tamamen düzeldi. Fiziksel ve zihinsel yorgunluk için yaygın olarak kullanılan ginseng, nadiren psikoza neden olur. Bu vaka, özellikle düzenleyici denetimden yoksun transdermal formlar da dahil olmak üzere bitkisel ürünlerin potansiyel psikiyatrik yan etkilerini vurgulamaktadır. Acil hekimleri, psikotik semptomları olan hastalarda bitkisel ürün kullanımını göz önünde bulundurmalı ve bu tür ürünlerin dikkatli kullanımı ve düzenlenmesi gerekliliğini vurgulamalıdır.

Anahtar Kelimeler: Ginseng, bitkisel ilaç, psikotik bozukluklar, transdermal yama, istenmeyen ilaç reaksiyonu

INTRODUCTION

Ginseng, derived from the root of Panax species, is a widely utilized herbal remedy in Asian traditional medicine. It is reputed for its adaptogenic properties in addressing physical fatigue, cognitive enhancement, and sexual dysfunction.[1] Despite its therapeutic popularity, ginseng is associated with adverse effects such as nervousness, insomnia, and hypertension, though psychotic manifestations are extemely rare.[2] The pharmacological activity of ginseng is attributed to ginsenosides, triterpenoid saponins that modulate neurotransmitter systems, including dopaminergic and serotonergic pathways.[3] While oral consumption of ginseng has been sporadically associated with psychiatric symptoms, no previous cases have implicated transdermal delivery systems. This report presents the first documented case of ginseng-induced psychosis following the use of transdermal patches, highlighting the need for increased clinical awareness of unconventional herbal administration routes.

Corresponding *(İletişim)*: Ömer Jaradat, Kirsehir Training and Research Hospital, Clinic of Emergency Medicine, Kirsehir, Turkiye
E-mail *(E-posta)*: dromerjaradat@gmail.com
Received *(Geliş Tarihi)*: 16.03.2025 **Accepted *(Kabul Tarihi)*:** 21.05.2025

CASE

A 49-year-old woman with no psychiatric history was brought to the emergency department by her spouse due to acute-onset bizarre behavior over nine hours. The patient exhibited repetitive actions, including compulsive opening faucets and fixating on running water, alongside verbalizing incoherent fears of "drowning in her thoughts." Her husband reported she had applied five over-the-counter transdermal patches, purchased from a local pharmacy, marketed as "energy boosters" containing ginseng extract (**Figure 1**). Vital signs revealed tachycardia (110 bpm) but were otherwise unremarkable. Mental status examination demonstrated increased psychomotor agitation, visual hallucinations (e.g., "seeing shadows swallow the walls"), disorganised thought processes, and profound anxiety.

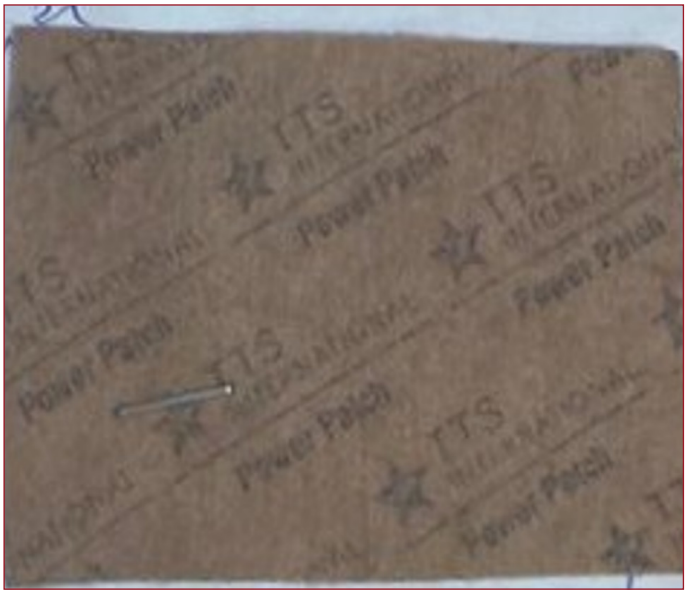

Figure 1. A sample of the transdermal patches used by the patient

Initial laboratory tests; Complete blood count, electrolytes, renal/hepatic function, thyroid panel, and toxicology screens (urine and blood) were within normal limits. Neuroimaging (CT, MRI, DWI) and electroencephalography (EEG) ruled out structural abnormalities, vascular events, or seizure activity. A neurological consultation confirmed the absence of organic pathology and prompted a psychiatric evaluation. The patient was diagnosed with ginseng-induced psychosis based on the temporal correlation between patch application and symptom onset, coupled with the exclusion of alternative etiologies. Management included immediate discontinuation of the patches and initiation of risperidone 1 mg daily. Within 72 hours, her symptoms resolved completely, and she remained asymptomatic at a one-month outpatient follow-up.

DISCUSSION

Psychosis, characterised by reality distortion through hallucinations, delusions, or disorganised cognition, is typically associated with primary psychiatric disorders but may also arise secondary to drug use, metabolic disorders, or herbal supplements.[4] This case highlights the under-recognised neuropsychiatric risks of ginseng, particularly via transdermal routes. Despite ginsenosides, the bioactive constituents of ginseng, increasing dopamine and serotonin levels, providing anti-depressant and anxiolytic effects, there are cases of psychosis as an adverse effect of ginseng monopreparations.[5,6] Transdermal delivery can bypass first-pass metabolism, which increases the bioavailability of bioactive compounds. While this method is beneficial for avoiding hepatic metabolism and ensuring sustained drug release, it also presents unique risks. These include unregulated absorption kinetics and the absence of standardized dosing guidelines.[7]

The patient's use of multiple patches likely resulted in cumulative ginsenoside exposure exceeding homeostatic thresholds, triggering neurochemical imbalances. Notably, transdermal herbal products are not classified as drugs in many jurisdictions, evading rigorous safety evaluations mandated for medicinal drugs.[8] A systematic review by Boullata and Nace[9] identified inconsistent labelling and contamination as critical safety concerns for herbal supplements, with <15% of products providing adequate risk disclosures. This regulatory vacuum is particularly perilous for transdermal formulations, where variable skin permeability and patch composition can lead to unpredictable systemic exposure.[7] Also variability can arise from unmeasured constituents like ginsenans, making dose standardization challenging.[10]

Previous reports of ginseng-induced psychosis are limited to oral consumption. Joshi and Faubion[11] described a patient who developed manic psychosis after ingesting ginseng tea, with symptoms remitting upon discontinuation. In contrast, transdermal delivery complicates clinical recognition, as patients and providers may overlook topical products during history-taking. This case highlights the need for clinicians to meticulously inquire about all herbal product use including topical, inhaled, or transdermal forms; In patients presenting with acute psychosis. Furthermore, it aligns with emerging evidence that herbal supplements, even in "natural" formulations, possess significant neuropharmacological activity warranting stricter regulatory oversight.[9]

This case represents the first reported instance of transdermal ginseng-induced psychosis, expanding the documented spectrum of herbal supplement adverse effects. The rapid resolution of symptoms following patch removal and antipsychotic intervention reinforces causality. Clinicians must recognize transdermal herbal products as potential etiologic agents in psychosis, particularly in patients lacking

traditional risk factors. Regulatory agencies should mandate standardized labeling, dose transparency, and adverse effect warnings for herbal transdermal products to mitigate risks. Future research should focus on pharmacokinetic profiling of transdermal ginsenosides and identifying genetic or metabolic vulnerabilities predisposing individuals to neuropsychiatric complications.

ETHICAL DECLARATIONS

Informed Consent: All patients signed the free and informed consent form.
Referee Evaluation Process: Externally peer-reviewed.
Conflict of Interest Statement: The authors have no conflicts of interest to declare.
Financial Disclosure: The authors declared that this study has received no financial support.
Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.
Note: This case was orally presented at the 3rd International Congress on Emergency Medicine (ICON-EM), hosted at the Rixos Sungate Hotel and Convention Center in Antalya, Turkiye, from November 5 to 8, 2023.

REFERENCES

1. Kim JH, Yi YS, Kim MY, et al. Role of ginsenosides, the main active components of Panax ginseng, in inflammatory responses and diseases. J Ginseng Res. 2017;41(4):435-43.
2. Lee NH, Yoo SR, Kim HG, et al. Safety and tolerability of Panax ginseng root extract: a long-term follow-up study. J Ginseng Res. 2012;36(4):331-5.
3. Lee S, Rhee DK. Effects of ginseng on stress-related depression, anxiety, and the hypothalamic-pituitary-adrenal axis. J Ginseng Res. 2017;41(4):589-94.
4. Tsuang MT, Faraone SV. The genetics of mood disorders. Baltimore, MD: Johns Hopkins University Press; 1990.
5. Jin Y, Cui R, Zhao L, Fan J, Li B. Mechanisms of Panax ginseng action as an antidepressant. Cell Prolif. 2019;52(6):e12696.
6. Coon JT, Ernst E. Panax ginseng: a systematic review of adverse effects and drug interactions. Drug Saf. 2002;25(5):323-44.
7. Prausnitz MR, Langer R. Transdermal drug delivery. Nat Biotechnol. 2008;26(11):1261-8.
8. Boullata JI, Nace AM. Safety issues with herbal medicine. Pharmacotherapy. 2000;20(3):257-69.
9. Barnes J, Mills SY, Abbot NC, et al. Different standards for reporting ADRs to herbal remedies and conventional OTC medicines: face-to-face interviews with 515 users of herbal remedies. Br J Clin Pharmacol. 1998;45(5):496-500.
10. Qi LW, Wang CZ, Yuan CS. Ginsenosides from American ginseng: chemical and pharmacological diversity. Phytochemistry. 2011;72(8):689-99.
11. Joshi KG, Faubion MD. Mania and Psychosis Associated with St. John's Wort and Ginseng. Psychiatry. 2005;2(9):56-61.

JOURNAL OF
CONTEMPORARY MEDICINE

DOI:10.16899/jcm.1601333
J Contemp Med 2025;15(3):142-143

Letter to the Editor/ Editöre Mektup

Delayed Tracheal Perforation Following Thyroidectomy: A Rare Complication

Tiroidektomi Sonrası Gecikmiş Trakeal Perforasyon: Nadir Bir Komplikasyon

Zeki Öğüt[1], Adem Tunçer[2]

[1]Elazığ Fethi Sekin City Hospital,General Surgery Clinic, Elazığ, Turkey
[2] Istanbul Aydın Unıvercıty, Florya Vm Medıcal Park Practıce And Research Hospıtal, Istanbul, Turkey

Dear Editor,

Thyroidectomy is the most common curative treatment for benign and malignant thyroid diseases.[1] Complications include hypocalcemia, vocal cord paralysis, hypoparathyroidism, haematoma, wound infection and tracheal injury.[2] Repeated surgeries, tumor invasion, inexperience of surgical technique and experience, postoperative infections may cause adhesions and increase the risk of complications. Among these complications, late tracheal perforation without intraoperative tracheal injury is a rare occurrence.

A 50-year-old woman presented with neck swelling, a history of chronic cough and a smoking history of 180 packs/year. After evaluation, a total thyroidectomy was performed with a diagnosis of multiple nodular goiter. There were no intraoperative complications during the thyroidectomy. The routine Valsalva manoeuvre after thyroidectomy showed no air leak in the trachea. Postoperative follow-up was uneventful and the patient was discharged two days later. Histopathological evaluation was reported as Hurthle cell neoplasia.

On the 10th postoperative day, the patient was readmitted with emphysema in the neck and dyspnea after an intense coughing attack. Subcutaneous emphysema and emphysema in the lung were tried to be treated with percutaneous drainage. Surgical intervention was decided because the amount of secretion drained increased. On exploration, a tracheal perforation, approximately 0.3 cm in diameter, was found at the localization of the right thyroid lobe, which was thought to be due to electrocautery burn. The edges of the trachea were debrided and a right strap muscle flap was prepared and fixed over the tracheal fistula with absorbable sutures. The patient was discharged 6 days after the second surgery and the 3-month follow-up was uneventful.

Risk factors for tracheal perforation after thyroidectomy include female sex, thyrotoxic goiter, prolonged intubation with high cuff pressure, inappropriate use of diathermy, and persistent, uncontrolled cough.[3] In our case, ischemic tracheal perforation was thought to have developed due to increased tracheal pressure after persistent cough unresponsive to medical treatment. Energy devices are widely used in thyroidectomy. We believe that attention should be paid to secondary injuries caused by these devices. In our case, we believe that the monopolar cautery device injured the area where the thyroid tissue was separated from the trachea in the final stage of the operation. Peri-operative recognition of tracheal perforation is important. Treatment options include primary suture with or without muscle flap, conservative management, tracheostomy, T-tube or stent placement in the trachea, and anastomosis after tracheal debridement.[4] Delayed tracheal necrosis and perforation after thyroidectomy are postoperative complications to be aware of. Early recognition and treatment of this complication are important.

Keywords: Energy devices, thyroidectomy, tracheal perforation

Corresponding *(İletişim)*: Mehmet Zeki Öğüt, Elazığ Fethi Sekin City Hospital, General Surgery Clinic, Elazığ, Turkey
E-mail *(E-posta)*: drzeki44@gmail.com
Received *(Geliş Tarihi)*: 14.12.2024 **Accepted *(Kabul Tarihi)*:** 19.03.2025

ETHICAL DECLARATIONS

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

REFERENCES

1. Vassiliou I, Tympa A, Arkadopoulos N, Nikolakopoulos F, Petropoulou T, Smyrniotis V. Total thyroidectomy as the single surgical option for benign and malignant thyroid disease: a surgical challenge. Arch Med Sci. 2013;1:74-8.
2. Rosato L, Avenia N, Bernante P, et al. Complications of thyroid surgery: analysis of a multicentric study on 14,934 patients operated on in Italy over 5 years. World J Surg. 2004;28(3):271-6.
3. Jia Z, Feng Y, Wang H, Liang L. Tracheal perforation caused by too deep suture during thyroidectomy: a case report and literature review. J Clin Med Res. 2022;3(1):21.
4. Tartaglia N, Iadarola R, Di Lascia A, Cianci P, Fersini A, Ambrosi A. What is the treatment of tracheal lesions associated with traditional thyroidectomy? Case report and systematic review. World J Emerg Surg. 2018;13(1):15.

JOURNAL OF
CONTEMPORARY MEDICINE

DOI:10.16899/jcm.1582362
J Contemp Med 2025;15(3):144-145

Letter to the Editor/ Editöre Mektup

Fecal Calprotectin as a Predictor of Complications in IBD: A Commentary on the article by Erkut et al.

İnflamatuvar Bağırsak Hastalığında Komplikasyonların Bir Göstergesi Olarak Fekal Kalprotektin: Erkut ve Arkadaşlarının Makalesi Üzerine Bir Yorum

Batuhan Başpınar[1], İbrahim Ethem Güven[2]

[1]Department of Gastroenterology, Kilis Prof. Dr. Alaeddin Yavaşca State Hospital, Kilis, Turkiye
[2]Department of Gastroenterology, Ankara Yenimahalle Training and Research Hospital, Ankara, Turkiye

Dear Editor,

We write in response to the article titled "Fecal Calprotectin at the Time of Diagnosis May Indicate the Presence of Complications in Inflammatory Bowel Disease" and published in the Journal of Contemporary Medicine by Erkut et al.[1] This study offers valuable insights into fecal calprotectin (FC) as a biomarker for predicting complications in inflammatory bowel disease (IBD), underscoring its potential as a non-invasive tool to aid clinical decision-making.

The study contributes significantly to existing knowledge regarding the management and follow-up of IBD in several aspects. Firstly, the correlation between elevated FC levels and increased complications, as demonstrated, highlights the need for early monitoring and intervention in high-risk patients. As Erkut et al. observed, patients with FC levels exceeding 100 µg/g showed a markedly higher risk of complications both at diagnosis and during follow-up, aligning with previous studies that have underscored FC's role in assessing disease severity and activity in IBD patients.[2,3]

Furthermore, the association of FC with other inflammation markers, such as C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR), reinforces its value as a complementary tool. Studies have consistently shown that these markers, when analyzed in conjunction with FC, enhance the accuracy of IBD activity assessment.[4] We commend the authors' comprehensive approach, which incorporated these markers, thereby offering a robust framework for predicting disease outcomes and guiding treatment adjustments.

However, the retrospective nature and limited sample size of the study may affect its generalizability. Further studies with larger cohorts are essential to validate these findings. We also suggest exploring longitudinal trends in FC to predict not only immediate but long-term disease complications, which could provide even greater clinical utility.[5] In our practice, tracking these markers longitudinally has helped personalize patient care, particularly for those at high risk of surgical interventions.

CONCLUSION

We appreciate Erkut et al.'s contribution to IBD management and follow-up. This study paves the way for more research on biomarkers like FC, which could revolutionize the management and prognosis of IBD by enabling proactive, individualized patient care.

Sincerely,

Keywords: Fecal calprotectin, inflammatory bowel disease, complications, acute phase reactants

ETHICAL DECLARATIONS

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

Corresponding *(İletişim)*: Batuhan Başpınar, Department of Gastroenterology, Kilis Prof. Dr. Alaeddin Yavaşca State Hospital, Kilis, Turkiye
E-mail *(E-posta)*: batuhanbaspinar@gmail.com
Received *(Geliş Tarihi)*: 10.11.2024 **Accepted *(Kabul Tarihi)*:** 28.04.2025

Financial Disclosure: The authors declared that this study has received no financial support.

Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

REFERENCES

1. Erkut M, Ozkaya E, Fidan S, Cosar AM. Fecal Calprotectin at the Time of Diagnosis May Indicate the Presence of Complications in Inflammatory Bowel Disease. J Contemp Med. 2024;14(1):1-8. doi:10.16899/jcm.1362566
2. Flynn S, Eisenstein S. Inflammatory bowel disease presentation and diagnosis. Surg Clin North Am. 2019;99:1051-62.
3. Goldstone RN, Steinhagen RM. Abdominal emergencies in inflammatory bowel disease. Surg Clin North Am.2019;99:1141-50.
4. Ricciuto A, Griffiths AM. Clinical value of fecal calprotectin. Crit Rev Clin Lab Sci. 2019;56:307-20.
5. Sipponen T, Kolho KL. Fecal calprotectin in diagnosis and clinical assessment of inflammatory bowel disease. Scand J Gastroenterol. 2015;50:74-80.