DÜZCE ÜNİVERSİTESİ

# SAĞLIK BİLİMLERİNDE DEĞER

## VALUE IN HEALTH SCIENCES

Mayıs/May 2025 Cilt/Vol: 15 Sayı/Issue: 02

e-ISSN: 2792-0542

**DÜZCE ÜNİVERSİTESİ** / DÜZCE UNIVERSITY

# SAĞLIK BİLİMLERİNDE DEĞER

**(Eski Adı: Düzce Üniversitesi Sağlık Bilimleri Enstitüsü Dergisi)**

## Value in Health Sciences

**(Former name: Journal of Duzce University Health Sciences Institute)**

**e-ISSN: 2792-0542**
**(Eski/Former e-ISSN: 2146-443X)**

**Cilt/Volume 15 - Sayı/Issue 2**
**Mayıs/May 2025**

**Sağlık Bilimlerinde Değer (Sağlık Bil Değer)**
**e-ISSN: 2792-0542**

**Value in Health Sciences (Value Health Sci)**

**Düzce Üniversitesi Adına İmtiyaz Sahibi / Publisher on behalf of Düzce University**
Prof. Dr. Nedim SÖZBİR



**İletişim / Contact**
sabd@duzce.edu.tr

Sağlık Bil Değer, uluslararası hakemli bir dergidir ve yılda üç sayı elektronik olarak yayımlanır. Yayın dili Türkçe veya İngilizcedir. Yayımlanan makalelerin sorumluluğu yazarlara aittir.

Value Health Sci is an international peer-reviewed journal, and it is published three times a year electronically. The language of publication is Turkish or English. The responsibility of the articles published belongs to the authors.

**Tarandığı İndeksler / Abstracting & Indexing**

Türkiye Atıf Dizini (Turkey Citation Index), TR Dizin (TÜBİTAK/ULAKBİM), Türk Medline (Turkish Medline), Sobiad, Google Scholar, ROAD

# İÇİNDEKİLER / CONTENTS

**ARAŞTIRMA MAKALELERİ /RESEARCH ARTICLES**

# İÇİNDEKİLER / CONTENTS

**ARAŞTIRMA MAKALELERİ /RESEARCH ARTICLES**

# İÇİNDEKİLER / CONTENTS

Araştırma Makalesi / Research Article

Sağlık Bilimlerinde Değer / Sağlık Bil Değer
Value in Health Sciences / Value Health Sci
ISSN: 2792-0542 sabd@duzce.edu.tr 2025; 15(2): 159-167
doi: https://dx.doi.org/10.33631/sabd.1579811

# The Effect of Quercetin on Oxidative Stress Parameters in A Fructose-Induced Experimental Metabolic Syndrome Model

Fazıl Deniz ÖZER[1], Kardelen KOCAMAN KALKAN[1], Belkis NARLI[1], Canan YILMAZ[1]

**ABSTRACT**

**Aim:** With the rising prevalence of Metabolic Syndrome (MetS), antioxidant therapies for managing oxidative stress are gaining attention. Fructose, a major metabolic stressor and a prevalent sweetener in processed foods, plays a significant role in this condition. This study evaluates quercetin's effects on MetS components, specifically its ability to alleviate oxidative stress in liver tissue within a fructose-induced MetS model.

**Material and Methods**: 24 Sprague-Dawley rats were randomly divided into four groups: control, fructose, quercetin, and fructose+quercetin. Quercetin (15 mg/kg/day) was administered via gavage, and a 20% fructose solution was provided in drinking water over 10 weeks. Key metabolic parameters, including body weight, blood pressure, serum glucose, triglycerides, insulin levels, and insulin resistance, were assessed to confirm MetS. Liver tissue was analyzed for oxidative stress markers, including malondialdehyde (MDA), advanced oxidation protein products (AOPP), nitric oxide (NO), total antioxidant status (TAS), total oxidant status (TOS), and the oxidative stress index (OSI).

**Results:** Fructose administration successfully induced key metabolic syndrome components, such as obesity, hypertension, hypertriglyceridemia, hyperglycemia, and insulin resistance. Quercetin significantly reduced fructose-induced hypertension and insulin resistance, though its effects on obesity, hyperglycemia, and hypertriglyceridemia were limited. Fructose exposure markedly elevated liver MDA, AOPP, and TOS levels, with nonsignificant increases in NO and TAS. Co-administration of quercetin with fructose resulted in significantly higher MDA levels compared to controls, while AOPP levels were notably reduced.

**Conclusion:** At the administered dose, quercetin showed limited efficacy in mitigating fructose-induced lipid peroxidation; however, it displayed notable antioxidant activity by modulating protein oxidation and NO levels. These findings provide valuable insights into the pathogenesis of metabolic syndrome and suggest potential therapeutic avenues for targeting its underlying components.

**Keywords:** Fructose; quercetin; oxidative stress; liver; rat; metabolic syndrome.

## Fruktoz ile İndüklenmiş Deneysel Metabolik Sendrom Modelinde Kuersetinin Oksidatif Stres Parametrelerine Etkisi

**ÖZ**

**Amaç:** Metabolik Sendromun (MetS) artan yaygınlığı ile birlikte, oksidatif stresi yönetmek için antioksidan tedavilere olan ilgi artmaktadır. Fruktoz, önemli bir metabolik stresör ve işlenmiş gıdalarda yaygın olarak kullanılan bir tatlandırıcı olarak bu durumda önemli bir rol oynamaktadır. Bu çalışma, quercetinin MetS bileşenleri üzerindeki etkilerini, özellikle fruktoz ile indüklenen MetS modelinde karaciğer dokusundaki oksidatif stresi hafifletme yeteneğini değerlendirmektedir.

**Gereç ve Yöntemler:** 24 tane Sprague-Dawley sıçanı rastgele dört gruba ayrıldı: kontrol, fruktoz, kuersetin ve fruktoz+kuersetin. Quercetin (15 mg/kg/gün) oral gavaj yoluyla uygulanırken, %20 fruktoz çözeltisi 10 hafta boyunca içme suyu ile verildi. MetS'in doğrulanması için vücut ağırlığı, kan basıncı, serum glukoz, trigliserid, insülin seviyeleri ve insülin direnci gibi temel metabolik parametreler değerlendirildi. Karaciğer dokusu malondialdehit (MDA), ileri oksidasyon protein ürünleri (AOPP), nitrik oksit (NO), toplam antioksidan kapasite (TAS), toplam oksidan kapasite (TOS) ve oksidatif stres indeksi (OSI) gibi oksidatif stres belirteçleri açısından analiz edildi.

**Bulgular**: Fruktoz uygulaması, obezite, hipertansiyon, hipertrigliseridemi, hiperglisemi ve insülin direnci gibi temel metabolik sendrom bileşenlerini başarıyla indükledi. Kuersetin, fruktoz kaynaklı hipertansiyon ve insülin direncini önemli ölçüde azalttı, ancak obezite, hiperglisemi ve hipertrigliseridemi üzerindeki etkileri sınırlıydı. Fruktoz uygulaması, karaciğer MDA, AOPP ve TOS seviyelerini belirgin şekilde artırırken, NO ve TAS seviyelerindeki artış istatistiksel olarak anlamlı değildi. Fruktoz ile birlikte kuersetin uygulanması, kontrol grubuna kıyasla anlamlı derecede yüksek MDA

1 Gazi University Faculty of Medicine, Department of Medical Biochemistry, Ankara, Türkiye
Sorumlu Yazar / Corresponding Author Kardelen KOCAMAN KALKAN, e-mail: kocamankardelenn@gmail.com
Geliş Tarihi / Received: 06.11.2024, Kabul Tarihi / Accepted: 07.01.2025

seviyelerine yol açarken, AOPP seviyelerinde belirgin bir azalma gözlendi.
**Sonuç:** Uygulanan dozda kuersetin, fruktozun yol açtığı lipid peroksidasyonunu hafifletmede sınırlı bir etki gösterdi; ancak protein oksidasyonu ve NO seviyelerini modüle ederek dikkate değer bir antioksidan aktivite gözlendi. Bu bulgular, metabolik sendrom patogenezi hakkında değerli bilgiler sunmakta ve temel bileşenlerine yönelik potansiyel terapötik yaklaşımlara işaret etmektedir.
**Anahtar Kelimeler:** Fruktoz; kuersetin; oksidatif stres; karaciğer; sıçan; metabolik sendrom.

## INTRODUCTION

Rapidly evolving lifestyles and dietary habits are central to the rising prevalence of critical health issues, including metabolic syndrome. This complex syndrome is marked by a constellation of interrelated factors such as obesity, insulin resistance, hypertension, and dyslipidemia. The presence of metabolic syndrome substantially heightens the risk of cardiovascular disease, type 2 diabetes, and various chronic conditions, thus posing a significant threat to overall health (1,2).

In this regard, fructose has garnered significant attention due to its potential implications for metabolic health. Naturally occurring in various sugar-laden foods and particularly abundant in processed products, fructose has been implicated as a potential catalyst in the development of metabolic syndrome. Research indicates that excessive fructose intake may play a pivotal role in triggering the onset of this condition (3,4).

Addressing complex health challenges like metabolic syndrome increasingly involves exploring the therapeutic potential of bioactive compounds. In this context, quercetin—a naturally occurring flavonoid found in numerous fruits, vegetables, and plants—has drawn particular interest due to its potential to mitigate the effects of metabolic syndrome. Chemically recognized as 3,3',4',5,7-pentahydroxyflavone, quercetin possesses notable antioxidant, anti-inflammatory, and anticancer properties. Through its antioxidant activity, quercetin combats oxidative stress by neutralizing free radicals, a key factor implicated in the pathogenesis of metabolic syndrome. Additionally, quercetin's anti-inflammatory effects, modulation of cellular signaling pathways, and capacity to confer protection against metabolic dysregulation underscore its promise as a therapeutic agent in this context (5–7).

To gain a comprehensive understanding of metabolic syndrome and strategies for mitigating its effects, it is essential to investigate the mechanistic pathways through which fructose alters biological processes and examine the potential of natural compounds like quercetin to modulate these pathways. In this study, we aim to elucidate the impact of quercetin on oxidative stress parameters within a fructose-induced experimental model of metabolic syndrome. This investigation will allow us to assess quercetin's capacity to alleviate the multifaceted nature of metabolic syndrome and yield valuable insights that may inform future therapeutic approaches.

## MATERIAL AND METHODS

### *Ethical Considerations*

Our study was approved by Gazi University Animal Experiments Local Ethics Committee (G.Ü.ET-17.088).

### *Animals and Experimental Design*

24 adult male Sprague Dawley rats, with an average weight of 225±15 g, were allocated for the experimental model of MetS and randomly assigned into four groups.

The animals were housed under controlled conditions at 22±2°C with a 12-hour light-dark cycle. All rats were provided with ad libitum access to standard rat chow and tap water throughout the 10-week study period (8). During the experiment, a 0.2% dimethyl sulfoxide (DMSO) solution was administered via gavage to the control group. The fructose group received a freshly prepared 20% D-fructose solution in their drinking water (9) and a 0.2% DMSO solution via oral gavage. In the quercetin group, 15 mg/kg of quercetin (dissolved in a 0.2% DMSO solution) was administered by oral gavage (9). The fructose + quercetin group received both fructose and quercetin concurrently.

### *Body Weight and Blood Pressure Monitoring*

The body weights of the animals were recorded weekly from the onset of the experiment. Systolic blood pressure was measured at baseline, mid-point, and conclusion of the study using a Tail-Cuff system (BIOPAC Systems) (10). At the end of the study, the Lee index was calculated for each animal, with values exceeding 0.3 classified as obese (11).

### *Tissue Collection and Sample Preparation*

After the 10-week period, animals were sacrificed under ketamine-xylazine anesthesia, and intracardiac blood samples were collected. Liver tissues were excised, snap-frozen in liquid nitrogen, and stored at -80°C alongside the collected serum samples.

### *Biochemical Analysis*

**Serum Analysis:** Serum glucose and triglyceride levels were measured using enzymatic analysis kits on a Beckman AU2700 biochemistry autoanalyzer, while insulin levels were determined based on the sandwich enzyme immunoassay principle (Millipore, USA). The HOMA-IR value was calculated using the formula: [fasting insulin (mU/L) × fasting glucose (mmol/L)] / 22.5 (1).

**Liver Tissue Homogenization and Sample Preparation:** Liver tissue samples were homogenized in a 1:10 ratio with 50 mM Tris-HCl buffer (pH 7.4) on ice to preserve enzymatic activity and prevent degradation. This homogenization process ensured thorough mixing and maintained the integrity of temperature-sensitive components. Following homogenization, samples were subjected to centrifugation at 15,000 rpm for 15 minutes in a refrigerated centrifuge to separate cellular debris from soluble components. The supernatants were carefully collected for subsequent biochemical analyses, including measurements of tissue MDA, AOPP, NO, TAS, TOS and protein levels.

### *Measurement of Oxidative Stress Markers*

**Protein Quantification:** Protein concentrations in liver tissue samples were quantified according to the Lowry Method (12), a widely recognized assay for determining protein content.

**MDA and AOPP Analysis:** Tissue MDA levels, indicative of lipid peroxidation, were measured following the protocol established by Ohkawa et al. (13). Additionally, tissue AOPP (advanced oxidation protein products) levels were assessed using the spectrophotometric technique described by Witko-Sarsat et al. (14), allowing for the evaluation of protein oxidation markers in the samples.

NO, TAS, and TOS Analysis: Tissue NO levels were measured using a commercial colorimetric kit from Cayman (USA), while TAS and TOS levels were assessed with kits from Rel-Assay (Türkiye). The OSI value was calculated by proportioning the TOS values to TAS values, providing a measure of overall oxidative stress in the tissue samples. The OSI calculation was performed according to the following formula: OSI (arbitrary unit, AU) = [(TOS, μmol $H_2O_2$ eq/L) / (TAS, μmol Trolox eq/L)] (15).

**Statistical Analysis**

Statistical analyses were performed using IBM SPSS Statistics, version 21.0. The normality of the data was evaluated using the Shapiro-Wilk test, and none of the parameters were found to follow a normal distribution. Therefore, the Kruskal-Wallis test was applied for multiple group comparisons, and pairwise comparisons were conducted using the Mann-Whitney U test. Data are presented as mean ± standard deviation. A p-value of less than 0.05 was considered statistically significant.

## RESULTS

The Lee index, systolic blood pressure, glucose, insulin, lipid profile, and HOMA-IR values for the experimental groups were meticulously documented in a previous study, eliminating the need for repetition here. Building on that foundation, this continuation study specifically examines the impact of fructose on oxidative stress parameters within liver tissue. To add, each result is provided as mean ± standard deviation, with precise p-values presented in Table 1 to substantiate the statistical validity of the findings.

Liver tissue MDA levels were statistically elevated in the fructose (0.731 ± 0.05 nmol/mg protein, p = 0.004) and fructose+quercetin (0.754 ± 0.03 nmol/mg protein, p = 0.004) groups compared to the control group (0.046 ± 0.00 nmol/mg protein). Although the quercetin group showed an increase in MDA levels (0.054 ± 0.01 nmol/mg protein, p = 0.004), this was not statistically significant. Notably, in the quercetin-only group, MDA levels were lower than in the fructose-treated groups. No statistical difference was observed between the fructose and fructose+quercetin groups. Regarding AOPP levels, a reduction was observed in both the quercetin (0.48 ± 0.10 nmol/mg protein, p = 0.01) and fructose+quercetin (0.33 ± 0.14 nmol/mg protein, p = 0.004) groups relative to the control group (0.52 ± 0.16 nmol/mg protein), although this decrease was not statistically significant between these groups

**Table 1.** Liver tissue MDA, AOPP, NO, TAS and TOS levels

| | **MDA (nmol/mg protein)** | **AOPP (nmol/mg protein)** | **NO (nmol/mg protein)** | **TAS (umol Trolox Equiv./mg protein)** | **TOS (nmol $H_2O_2$ Equiv./mg protein)** | **OSI (Arbitrary Unit)** |
|---|---|---|---|---|---|---|
| **Control** | 0.046±0.00 | 0.52±0.16 | 0.070±0.02 | 23.81±4.5 | 0.49±0.03 | 0.0021±0.00019 |
| **Fructose** | 0.731±0.05[a]<br>**$p^a$=0.004** | 0.81±0.18[a]<br>**$p^a$=0.025** | 0.082±0.04<br>$p^a$=0.873 | 26.46±4.4<br>$p^a$=0.297 | 0.53±0.01[a]<br>**$p^a$=0.037** | 0.0021±0.00014 |
| **Quercetin** | 0.054±0.01[b]<br>$p^a$=0.575<br>**$p^b$=0.004** | 0.48±0.10[b]<br>$p^a$=0.873<br>**$p^b$=0.01** | 0.065±0.01<br>$p^a$=0.631<br>$p^b$=0.631 | 23.31±3.88<br>$p^a$=0.749<br>$p^b$=0.262 | 0.48±0.05<br>$p^a$=1<br>$p^b$=0.078 | 0.0021±0.00005 |
| **Fructose + Quercetin** | 0.754±0.03[a,c]<br>**$p^a$=0.004**<br>$p^b$=0.3<br>**$p^c$=0.004** | 0.33±0.14[b]<br>$p^a$=0.109<br>**$p^b$=0.004**<br>$p^c$=0.150 | 0.052±0.02<br>$p^a$=0.2<br>$p^b$=0.262<br>$p^b$=0.337 | 27.43±3.81<br>$p^a$=0.173<br>$p^b$=0.873<br>$p^c$=0.078 | 0.52±0.06<br>$p^a$=0.109<br>$p^b$=0.749<br>$p^c$=0.2 | 0.0019±0.00008 |

Malondialdehyde (MDA), Advanced oxidation protein products (AOPP), Nitric oxide (NO), Total antioxidant status (TAS), Total oxidant status (TOS), and the oxidative stress index (OSI).

a: compared to the control group p<0.05, b: compared to the fructose group p<0.05, c: compared to the quercetin group p<0.05

The results highlight the potential effects of quercetin on oxidative stress, with statistical changes in MDA and AOPP levels observed in specific experimental groups.

When comparing the fructose and fructose+quercetin groups, a statistically significant decrease in AOPP levels was observed (fructose: 0.81±0.18 vs fructose+quercetin: 0.33±0.14, p=0.004). However, no statistically significant differences were found between the groups in NO (fructose: 0.082±0.04 vs fructose+quercetin: 0.052±0.02) and TAS levels (fructose: 26.46±4.4 vs fructose+quercetin: 27.43±3.81). On the other hand, TOS levels were statistically increased in the fructose group (0.53±0.01, p=0.037) and decreased in the quercetin group (0.48±0.05), but this decrease was not statistically significant. Additionally, no statistically significant difference was detected in the comparison of tissue oxidative stress indices (OSI values) among the groups (p = 0.685).

## DISCUSSION

While previous research has explored the effects of quercetin at various doses and durations in the MetS model, our study contributes to the existing body of knowledge by introducing several unique aspects. Specifically, our focus on oxidative stress markers in the liver tissue under a fructose-induced MetS model sets our study apart. Although there are numerous studies in the literature examining the relationship between quercetin and oxidative stress, we aimed to conduct a more detailed analysis of its effects on specific markers such as MDA, AOPP, TOS, and NO. Additionally, we investigate how quercetin may modulate these markers in conjunction with fructose administration, an area that has been less extensively explored in previous studies. Recent meta-analyses and systematic reviews support our findings by highlighting quercetin's potential as an antioxidant with a beneficial impact on oxidative stress markers, such as MDA and AOPP, in MetS models (6,16). Some studies further demonstrate that quercetin supplementation improves endothelial function and insulin sensitivity in MetS patients (17,18). However, variability in experimental conditions and the specific metabolic pathways involved suggests that more research is necessary to optimize quercetin's therapeutic application.

Additionally, the present study investigates the interaction between quercetin and fructose-induced oxidative stress with a focus on liver-specific responses, offering insights into the tissue-specific mechanisms that were not fully addressed in previous studies. Our findings highlight the potential balancing effect of quercetin on oxidative stress, particularly through its ability to reduce protein oxidation (AOPP) while not significantly altering other markers like TAS and NO. This offers a novel perspective on how quercetin may influence metabolic dysfunctions associated with fructose-induced metabolic syndrome.

Thus, our study adds value by further elucidating the complex relationship between quercetin, oxidative stress, and metabolic dysfunction, presenting data from a well-defined experimental model with specific focus on liver tissue responses, which provides a fresh angle to the existing literature.

Consuming high-fructose nutrition significantly contributes to the development of MetS in both animal and human models. Numerous studies, ranging from 5% to 30% fructose administration in drinking water, consistently demonstrate the induction of MetS (1,19–21). However, the metabolic responses in rats vary based on the experimental design, with reported differences linked to the choice of rat strain (Wistar/Sprague-Dawley), the method of fructose administration (oral or incorporated into feed), the age of the animals (young or mature), as well as the duration and dosage of fructose exposure (22,23).

In our research, we utilized the Sprague–Dawley rat strain, recognized for its heightened susceptibility to fructose-induced MetS (24). The induction of MetS was successfully achieved by introducing a 20% fructose solution into the animals' drinking water over a period of 10 weeks.

It is worth highlighting that quercetin, a flavonoid abundant in fruits and vegetables, plays a pivotal role in preventing and ameliorating the functional alterations associated with MetS, primarily due to its potent antioxidant properties (7,25,26).

In this study, we reused a previously validated fructose-induced MetS model described in the literature to investigate the effects of quercetin administration on MetS-related parameters in liver tissue. This model, which we have successfully implemented and experimentally validated, accurately reflects the pathophysiology of MetS and provides a reliable basis for evaluating potential therapeutic agents (27,28). By analyzing key markers such as MDA, AOPP, NO, TAS, and TOS in liver tissue, we aimed to evaluate quercetin’s effects on antioxidant capacity, nitric oxide levels, and oxidative stress. These markers reflect critical biochemical processes associated with the pathophysiology of MetS. Our findings provided valuable insights into quercetin’s regulatory effects on these processes and contributed to a deeper understanding of its therapeutic potential in MetS.

The variations in quercetin's effects are influenced not only by dosage but also by differences in experimental designs. Factors such as the choice of animal models, methods of fructose administration (e.g., oral feeding or inclusion in drinking water), experiment duration, and the age of the animals play a crucial role in the observed inconsistencies. For example, the susceptibility of the Sprague–Dawley rat strain to fructose-induced MetS, as highlighted in the study, emphasizes the need to carefully consider the specific characteristics of the selected animal model.

In conclusion, the impact of quercetin on metabolic parameters, particularly in the context of MetS and fructose administration, is influenced by multiple factors. The dose-dependent effects of quercetin, along with variations in experimental conditions such as animal models, diet composition, and assessment methods, highlight the need for further research to clarify the precise mechanisms and optimal conditions for its efficacy (29,30).

The findings of this study align with previous research emphasizing quercetin's potential as an antioxidant agent; however, significant differences exist regarding its efficacy across different parameters (31). In our study, while quercetin significantly reduced AOPP levels (p = 0.004), indicating its capacity to mitigate protein oxidation, it demonstrated limited effects on lipid

peroxidation markers such as MDA ($p > 0.05$). Conversely, a study by Gorbenko et al. (2021) using a higher dose of quercetin (50 mg/kg) in a T2DM model reported pronounced reductions in oxidative stress markers across both protein and lipid pathways, including the normalization of mitochondrial antioxidant enzyme activities. This discrepancy could stem from variations in quercetin dosage, treatment duration, or the metabolic conditions induced (MetS vs. T2DM). Furthermore, the referenced study highlighted the dose-dependent suppression of NADPH oxidase and xanthine oxidase activities, suggesting additional mechanisms by which quercetin may confer its antioxidative effects, mechanisms that may be underrepresented in our model due to the lower administered dose (31). These contrasting outcomes underscore the importance of dose optimization and the targeted exploration of quercetin's multifaceted actions in metabolic disorders.

On the other hand, the potential interactions between quercetin and fructose warrant further investigation to better understand the complex interplay between dietary components and metabolic responses. These contrasting outcomes underline the complexity of quercetin's effects on metabolic parameters, emphasizing the need for standardized experimental conditions, careful consideration of dosage and duration, and a thorough understanding of the specific metabolic pathways influenced by quercetin. Notably, the lack of significant effects of quercetin alone, coupled with its notable impact when combined with fructose, suggests the need for additional research to determine the optimal dosage and duration for quercetin's effects.

Future studies with controlled variables and larger sample sizes are warranted to unravel the precise mechanisms involved. Such research will help provide a more detailed understanding of quercetin's effects on oxidative stress and metabolic dysfunction.

Our study revealed that the co-administration of quercetin with fructose significantly lowered insulin levels, led to a modest increase in glucose levels, and had no substantial effect on insulin resistance. This outcome diverges from previous studies, adding a nuanced perspective to quercetin’s role in regulating glucose homeostasis. These findings are further substantiated by reference to our prior research (27,28).

Abo-Youssef et al. proposed a mechanism for quercetin's anti-diabetic effect, suggesting that it acts by reducing glucose transfer to enterocytes via glucose transporter II and enhancing GLUT-4 activity in muscles. The study, involving a diabetic rat model and a 14-week administration of quercetin at 50 mg/kg/day, demonstrated reduced insulin levels and HOMA-IR scores, indicating an improvement in insulin sensitivity (32).

On the other hand, Vessal et al. and Roslan et al. presented different perspectives on the anti-diabetic effects of quercetin. Vessal et al. attributed the anti-diabetic effect to quercetin's ability to increase insulin secretion by promoting pancreatic cell regeneration. In Roslan et al’s study, various doses of quercetin administered to diabetic rats for 28 days resulted in a significant increase in insulin levels, emphasizing the therapeutic efficacy of quercetin in diabetes (29,33).

The inconsistency between our study and these findings may arise from variations in the dose and duration of quercetin administration, as well as potential differences in rat lineages. It's important to note that the intricate interplay of quercetin with glucose metabolism involves multiple factors, and the optimal dosage and duration for desired effects may vary.

In conclusion, the divergent outcomes highlight the complexity of quercetin's effects on insulin levels, glucose homeostasis, and insulin resistance. Further research with standardized experimental conditions, including consistent dosages, durations, and methodologies, is essential to elucidate the precise mechanisms and therapeutic potential of quercetin in the context of diabetes and metabolic disorders. Additionally, exploring the impact of quercetin in different rat lineages could provide valuable insights into potential variations in responses to this flavonoid.

In this study, we investigated the interplay between MetS, a pivotal risk factor for cardiovascular diseases, and its association with insulin resistance and endothelial integrity. Nitric oxide (NO) levels, as an essential biomarker of endothelial function, were measured in a fructose-induced MetS model. Given that NO production is mediated by distinct pathways involving endothelial nitric oxide synthase (eNOS) and inducible nitric oxide synthase (iNOS), we aimed to elucidate the impact of quercetin on these pathways. Specifically, we hypothesized that fructose-mediated alterations in NO levels might be predominantly driven by iNOS activation, a hallmark of oxidative stress and inflammation.

Fructose administration led to a significant increase in NO levels compared to the control group ($0.070 \pm 0.02$ vs. $0.082 \pm 0.04$ nmol/mg protein). This increase likely reflects heightened iNOS activity, which is associated with oxidative stress and inflammation commonly observed in MetS. Fructose-induced oxidative stress may promote the production of superoxide radicals, which can interact with NO to form peroxynitrite, a potent oxidant contributing to endothelial dysfunction. While fructose-induced oxidative stress likely increases NO levels through iNOS activation, it is also important to consider potential changes in eNOS activity, particularly in the context of endothelial dysfunction. This finding aligns with previous studies suggesting that fructose exacerbates endothelial damage via the iNOS-mediated pathway (17).

Quercetin administration resulted in a decrease in NO levels compared to the control group ($0.065 \pm 0.01$ vs. $0.070 \pm 0.02$ nmol/mg protein). This reduction suggests a potential inhibitory effect of quercetin on iNOS activity, consistent with its reported anti-inflammatory and antioxidant properties. Furthermore, quercetin may preserve eNOS activity under non-inflammatory conditions, which could contribute to its vascular protective effects. Literature indicates that quercetin’s influence on NO levels is highly context-dependent, varying based on the experimental model, dosage, and target tissue (40). While quercetin's effects on NO levels are primarily attributed to iNOS inhibition, its potential to preserve eNOS activity under non-inflammatory conditions suggests a dual action that warrants further exploration in different models.

The combination of quercetin and fructose led to a notable decrease in NO levels compared to the fructose group

alone (0.052 ± 0.02 vs. 0.082 ± 0.04 nmol/mg protein). This finding indicates that quercetin may partially counteract fructose-induced NO production, likely through its inhibitory effects on iNOS or its ability to mitigate oxidative stress. Although the reduction did not reach statistical significance, it suggests a modulatory role of quercetin in conditions of heightened oxidative stress. This aligns with reports that quercetin's effects are dose-dependent and may vary based on its interaction with oxidative and inflammatory pathways.

In conclusion, this study highlights the differential effects of fructose and quercetin on NO levels in a MetS model. Fructose-induced NO elevation appears to be mediated by iNOS activation, contributing to oxidative stress and endothelial dysfunction. In contrast, quercetin demonstrated a potential inhibitory effect on iNOS, reducing NO levels in both standalone and combination groups. These findings underscore the context-dependent nature of quercetin's effects, reflecting its dual role as an antioxidant and a modulator of NO pathways. By addressing the interplay between iNOS and eNOS, this study provides a foundation for future research exploring quercetin's therapeutic potential in metabolic and vascular disorders.

One limitation of this study is the absence of dose-response analysis for quercetin, which could provide further insights into its effects on NO levels. Additionally, specific NOS isoform activity (eNOS vs. iNOS) was not directly measured, limiting our ability to delineate the exact pathways involved. Future studies should aim to quantify NOS isoform activity and include varying doses of quercetin to better understand its regulatory role in NO metabolism. Such investigations would clarify whether quercetin's effects are mediated by direct iNOS inhibition, eNOS activation, or a combination of both mechanisms.

In our study, a statistically significant increase was observed in MDA, AOPP and TOS parameters in the fructose group compared to the control group. Conversely, the increase in NO and TAS levels did not reach statistical significance. This discrepancy in NO levels, despite significant changes in oxidative stress markers, suggests a complex interplay between quercetin, fructose-induced metabolic alterations, and endothelial function. Further investigation into the specific mechanisms underlying these observations is crucial for unraveling the intricate dynamics of quercetin's impact on oxidative stress and NO regulation in the context of metabolic syndrome.

In studies investigating quercetin's effects on the oxidant-antioxidant balance in various disease models, its potential to mitigate oxidative stress has been consistently highlighted. For instance, in a streptozotocin (STZ)-induced diabetic rat model, the diabetes group demonstrated elevated malondialdehyde (MDA) and NADPH activities alongside increased fasting glucose levels. Correspondingly, a reduction in the activities of antioxidant enzymes, including superoxide dismutase (SOD) and catalase (CAT), was observed. Quercetin administration led to a moderate decrease in glucose levels, reductions in MDA and NADPH activities, and an enhancement of SOD and CAT activities. Similarly, serum activities of antioxidant enzymes such as SOD, CAT, glutathione peroxidase (GPx), and glutathione S-transferase (GST) significantly improved following oral quercetin treatment in the diabetic model, demonstrating its antioxidative properties (29).

In the present study, which focuses on a fructose-induced MetS model, we observed trends consistent with literature. Quercetin modulated oxidative stress markers, including MDA, advanced oxidation protein products (AOPP), and TOS within liver tissue. However, distinct differences in metabolic pathways between diabetes and fructose-induced MetS models may explain variations in quercetin's effects on parameters such as NO and TAS. The oxidative burden and response lag observed in our model suggest that disease-specific factors, quercetin dosage, and duration critically influence its antioxidant efficacy. These findings collectively underscore the importance of context-specific evaluations of quercetin's therapeutic potential, bridging insights from diverse metabolic conditions.

These results collectively suggest that quercetin may exert protective effects on the oxidative stress associated with diabetes mellitus, potentially by modulating antioxidant enzyme activities. However, the precise mechanisms involved in quercetin's antioxidant actions and its impact on specific pathways warrant further investigation for a comprehensive understanding of its therapeutic potential in diabetes-related oxidative imbalance.

Flavonoids are known for their diverse biological activities, including the modulation of oxidative stress, inflammation, and apoptosis, which are critical in various metabolic and disease models. Previous research on different flavonoids has demonstrated their ability to reduce oxidative stress and apoptosis in animal models of diabetes induced by distinct mechanisms. For example, one study investigated a flavonoid's efficacy in alleviating pancreatic β-cell apoptosis by modulating pro-apoptotic pathways and oxidative stress markers in a rat model of diabetes. Although the model and specific pathways differ from our study, these findings highlight the conserved mechanisms through which flavonoids, including quercetin, exert their therapeutic effects. These parallel underscores quercetin's potential as a promising candidate for addressing oxidative stress-related metabolic disorders (34).

Furthermore, when comparing the tissue OSI values among different groups, no statistically significant difference was observed ($p=0.685$) in our study. These findings suggest that, at the administered dose, quercetin did not exert a dominant oxidant or antioxidant effect. The implications of these results underscore the need for further exploration into the nuanced effects of quercetin at different doses, durations, and under various experimental conditions to fully comprehend its potential benefits in oxidative stress management in the context of diabetes.

The concept that every organism begins its life cycle with a specific energy reserve capacity, which is utilized in proportion to metabolic speed, aligns with how metabolic processes like fructose metabolism can influence oxidative stress (1,35). Increased metabolic activity, such as the enhanced activity of the polyol pathway and mitochondrial dysfunction during fructose metabolism, leads to the generation of reactive oxygen species (ROS). These ROS interact with organic molecules, contributing to oxidative damage that may affect lifespan (34). Markers such as MDA and AOPP directly reflect lipid and protein

oxidation resulting from ROS, while TAS and NO are influenced by both enzymatic and non-enzymatic antioxidant systems. The response of these antioxidant systems may take longer to exhibit significant changes, suggesting a delayed counteraction to oxidative damage. This delay highlights how the rate of oxidative stress and the body's ability to manage it may influence the balance between energy consumption, oxidative damage, and overall health outcomes.

In our study, a comprehensive assessment of oxidative stress markers revealed that fructose administration led to a statistically significant increase in MDA ($0.731 \pm 0.05$, $p = 0.004$), AOPP ($0.81 \pm 0.18$, $p = 0.025$), and TOS ($0.53 \pm 0.01$, $p = 0.037$) levels. However, the increase in NO ($0.082 \pm 0.04$) and TAS ($26.46 \pm 4.4$) levels did not reach statistical significance ($p>0.05$). This finding highlights the complexity of oxidative stress mechanisms, which may not solely depend on these markers.

Previous studies have demonstrated that the dose and duration of fructose exposure significantly influence oxidative stress parameters. For instance, a study reported that prolonged exposure to high doses of fructose led to significant alterations in both pro-oxidant and antioxidant markers (7). In our study, the moderate dose and relatively short duration of fructose administration may have limited its impact on NO and TAS levels.

The observed discrepancies in oxidative stress responses may also reflect tissue-specific variations in antioxidant defense systems. For example, TAS reflects the cumulative antioxidant capacity of non-enzymatic and enzymatic components, which can vary depending on the metabolic state and compensatory mechanisms activated during oxidative stress. Similarly, NO production may be influenced by additional regulatory pathways, including nitric oxide synthase activity and substrate availability. These findings highlight the nuanced interplay between oxidative damage and antioxidant defense in fructose-induced oxidative stress.

These findings underscore the importance of considering both dose and duration in studies examining fructose-induced oxidative stress. While our results clearly demonstrate oxidative damage as evidenced by increased MDA, AOPP, and TOS, the nuanced responses of NO and TAS highlight the complexity of the oxidative stress-antioxidant defense balance in liver tissue. Future studies employing varying doses and durations of fructose exposure could further elucidate these dynamics and provide a deeper understanding of the mechanisms underlying these responses.

Interestingly, when quercetin was co-administered with fructose, we observed notable changes in oxidative stress markers. The levels of MDA, TAS, and TOS showed no significant difference compared to the fructose-only group ($p>0.05$), suggesting that quercetin may have a balancing effect on oxidative stress. This observation is in line with previous studies suggesting that quercetin can modulate oxidative stress, although its effect may be dose-dependent or influenced by the duration of treatment. In contrast, both AOPP ($0.33\pm0.14$, $p=0.004$) and NO ($0.052\pm0.02$) levels showed a marked decrease, with the reduction in AOPP reaching statistical significance ($p=0.004$). This indicates that quercetin may effectively counteract fructose-induced oxidative damage, particularly by inhibiting protein oxidation pathways. These findings support the notion that quercetin, through its antioxidant properties, may attenuate the oxidative stress associated with metabolic dysfunction induced by fructose.

Furthermore, the administration of quercetin alone did not result in significant alterations in the evaluated parameters, a finding consistent with current literature, which similarly shows limited studies examining liver tissue markers beyond NO. The subtle effects of quercetin on oxidative stress indicators underscore the need for further research to clarify its potential hepatoprotective properties and its complex role in sustaining redox balance. Such insights could advance our understanding of quercetin's nuanced impact on liver health and its broader therapeutic applications.

## CONCLUSION

In our study, the induction of the MetS model was successfully achieved through a 10-week administration of 20% fructose in the drinking water of experimental animals. This resulted in the manifestation of hypertension, hypertriglyceridemia, increased insulin levels, and insulin resistance, meeting the criteria indicative of MetS. Subsequently, the antioxidant potential of quercetin at this specific dose was meticulously investigated in the liver tissue.

To ascertain obesity in the MetS rat model, the Lee index was calculated. Quercetin was administered both independently and with fructose to explore its therapeutic effect on MDA, NO, TAS, and TOS levels. Our study contributes to understanding quercetin's impact on metabolic parameters in MetS, particularly its role in mitigating oxidative stress.

The MetS model was successfully established through fructose administration, leading to obesity, hypertension, hypertriglyceridemia, hyperglycemia, and insulin resistance. Quercetin was effective in ameliorating hypertension and insulin resistance but had limited effects on obesity, hyperglycemia, and hypertriglyceridemia.

Analysis of oxidative stress markers revealed a significant increase in MDA, AOPP, and TOS levels in fructose groups compared to controls. However, the increase in NO and TAS levels was not significant. No differences were observed between the control and quercetin groups in any parameter.

In conclusion, our study suggests that a 10-week administration of quercetin may be beneficial, particularly in reducing protein oxidation in the fructose-mediated MetS model. Future studies with larger sample sizes and diverse methodologies could provide broader insights into these findings.

In future investigations, it is imperative for quercetin studies to delve into elucidating the intricate mechanisms underlying obesity and insulin resistance within Metabolic Syndrome models. This exploration should encompass diverse doses and durations of quercetin administration, aiming to unravel potential synergistic effects when combined with other antioxidant drugs. We advocate for comprehensive research projects that thoroughly investigate the molecular targets and mechanisms of action of quercetin, utilizing advanced methodologies such as transcriptomic, proteomic, and metabolomic analyses. Such multifaceted approaches will provide deeper insights

into quercetin's therapeutic potential and elucidate its role in modulating cellular pathways. Such endeavors hold the promise of providing profound insights into the pathogenesis of MetS and offering innovative avenues for its treatment.

**Funding Sources**
There is no sponsor or source in the preparation of data or the manuscript. Canan Yılmaz, who is the advisor of this thesis, financed the study with her own resources.

**Authors's Contributions:** Idea/Concept: F.D.Ö., C.Y.; Design: F.D.Ö., K.K.K., C.Y.; Data Collection and/or Processing: F.D.Ö., K.K.K., B.N., C.Y.; Analysis and/or Interpretation: K.K.K., B.N., C.Y.; Literature Review: F.D.Ö., K.K.K., C.Y.; Writing the Article: K.K.K., C.Y.; Critical Review: F.D.Ö., B.N., C.Y.

## REFERENCES

1. Dupas J, Feray A, Goanvec C, Guernec A, Samson N, Bougaran P, et al. Metabolic syndrome and hypertension resulting from fructose enriched diet in wistar rats. Biomed Res Int. 2017; 2017. https://doi.org/10.1155/2017/2494067
2. Edwards RL, Lyon T, Litwin SE, Rabovsky A, Symons JD, Jalili T. Quercetin reduces blood pressure in hypertensive subjects. J Nutr. 2007; 137(11): 2405-11. https://doi.org/10.1093/jn/137.11.2405
3. Papakyriakopoulou P, Velidakis N, Khattab E, Valsami G, Korakianitis I, Kadoglou NPE. Potential Pharmaceutical applications of quercetin in cardiovascular diseases. Pharmaceuticals. 2022; 15(8): 1-23. https://doi.org/10.3390/ph15081019
4. Lubawy M. High-fructose diet – ınduced hyperuricemia accompanying metabolic syndrome – mechanisms and dietary therapy proposals. nt. J. Environ. Res. Public Health. 2023; 20(4): 3596. https://doi.org/10.3390/ijerph20043596
5. Soleimani M, Barone S, Luo H, Zahedi K. Pathogenesis of Hypertension in Metabolic Syndrome: The Role of Fructose and Salt. Int J Mol Sci. 2023; 24(5): 4294. https://doi.org/10.3390/ijms24054294
6. Hosseini A, Razavi BM, Banach M, Hosseinzadeh H. Quercetin and metabolic syndrome: A review. Phyther Res. 2021; 35(10): 5352-64. https://doi.org/10.1002/ptr.7144.
7. Qi W, Qi W, Xiong D, Long M. Quercetin: Its antioxidant mechanism, antibacterial properties and potential application in prevention and control of toxipathy. Molecules. 2022; 27(19): 6545. https://doi.org/10.3390/molecules27196545.
8. Vashishth K, Singh SK, Jain A, Bhatia A, Sharma YP. Pathological involvement of apoptotic and inflammatory molecules in cardiovascular remodeling in rats on high fructose diet-induced metabolic syndrome. J Food Biochem. 2022; 46(7): 14107. https://doi.org/10.1111/jfbc.14107
9. Kitagawa A, Ohta Y, Ohashi K, Yashiro K, Fukuzawa K. Effect of high fructose-induced metabolic syndrome on tissue vitamin e and lipid peroxide levels in rats. J Nutr Sci Vitaminol (Tokyo). 2020; 66(2): 200-6. https://doi.org/10.3177/jnsv.66.200.
10. Wang Y, Thatcher SE, Cassis LA. Measuring Blood Pressure Using a Noninvasive Tail Cuff Method in Mice. Methods Mol Biol. 2017; 1614: 69-73. https://doi.org/10.1007/978-1-4939-7030-8_6.
11. Bernardis LL, Patterson BD. Correlation between "Lee index" and carcass fat content in weanling and adult female rats with hypothalamic lesions. J Endocrinol. 1968; 40(4): 527–8. https://doi.org/10.1677/joe.0.0400527.
12. Lowry OH, Rosebrough NJ, Farr AL, Randall RJ. Protein measurement with the Folin phenol reagent. J Biol Chem. 1951; 193(1): 265-75. http://dx.doi.org/10.1016/S0021-9258(19)52451-6
13. Ohkawa H, Ohishi N, Yagi K. Assay for lipid peroxides in animal tissues by thiobarbituric acid reaction. Anal Biochem. 1979; 95(2): 351-8. https://doi.org/10.1016/0003-2697(79)90738-3.
14. Witko-Sarsat V, Friedlander M, Capeillère-Blandin C, Nguyen-Khoa T, Nguyen AT, Zingraff J, et al. Advanced oxidation protein products as a novel marker of oxidative stress in uremia. Kidney Int. 1996; 49(5): 1304-13. https://doi.org/10.1038/ki.1996.186.
15. Sánchez-Rodríguez MA, Mendoza-Núñez VM. Oxidative stress indexes for diagnosis of health or disease in humans. Oxid Med Cell Longev. 2019; 2019. https://doi.org/10.1155/2019/4128152.
16. Alizadeh, Seyedeh Roya Ebrahimzadeh MA. Quercetin derivatives: Drug design, development, and biological activities, a review. Eur J Med Chem. 2022; 5: 229. https://doi.org/10.1016/j.ejmech.2021.114068.
17. Suganya N, Dornadula S, Chatterjee S, Mohanram RK. Quercetin improves endothelial function in diabetic rats through inhibition of endoplasmic reticulum stress-mediated oxidative stress. Eur J Pharmacol. 2018; 819: 80-8. https://doi.org/10.1016/j.ejphar.2017.11.034
18. Zhou W, Wang F, Qian X, Luo S, Wang Z, Gao X, et al. Quercetin protects endothelial function from inflammation induced by localized disturbed flow by inhibiting NRP2 -VEGFC complex. Int Immunopharmacol. 2023; 116: 109842. https://doi.org/10.1016/j.intimp.2023.109842
19. El-Domiaty HF, Sweed E, Kora MA, Zaki NG, Khodir SA. Activation of angiotensin-converting enzyme 2 ameliorates metabolic syndrome-induced renal damage in rats by renal TLR4 and nuclear transcription factor κB downregulation. Front Med. 2022; 9: 1-15. https://doi.org/10.3389/fmed.2022.904756.
20. Toop CR, Gentili S. Fructose beverage consumption induces a metabolic syndrome phenotype in the rat: A systematic review and meta-analysis. Nutrients. 2016; 8(9): 577. https://doi.org/10.3390/nu8090577
21. Ibrahim KG, Chivandi E, Mojiminiyi FBO, Erlwanger KH. The response of male and female rats to a high-fructose diet during adolescence following early administration of Hibiscus sabdariffa aqueous calyx extracts. J Dev Orig Health Dis. 2017; 8(6):

628-637.
https://doi.org/10.1017/S204017441700040X
22. Sari DR, Ramadhan RN, Agustin D, Munir M, Izzatunnisa N, Susanto J, et al. The effect of exercise ıntensity on anthropometric parameters and renal damage in high fructose-ınduced mice. Retos. 2024; 51: 1194-209.
https://doi.org/10.47197/retos.v51.101189
23. dos Santos F, Moraes-Silva IC, Moreira ED, Irigoyen MC. The role of the baroreflex and parasympathetic nervous system in fructose-induced cardiac and metabolic alterations. Sci Rep. 2018; 8(1): 1-9. http://dx.doi.org/10.1038/s41598-018-29336-3
24. Mamikutty N, Thent ZC, Sapri SR, Sahruddin NN, Mohd Yusof MR, Haji Suhaimi F. The establishment of metabolic syndrome model by induction of fructose drinking water in male Wistar rats. Biomed Res Int. 2014; 2014.
https://doi.org/10.1155/2014/263897
25. Xu D, Hu MJ, Wang YQ, Cui YL. Antioxidant activities of quercetin and its complexes for medicinal application. Molecules. 2019; 24(6): 1123. https://doi.org/10.3390/molecules24061123
26. Yang D, Wang T, Long M, Li P. Quercetin: Its Main Pharmacological Activity and Potential Application in Clinical Medicine. Oxid Med Cell Longev. 2020; 2020. https://doi.org/10.1155/2020/8825387
27. Kocaman Kalkan K, Şen S, Narlı B, Seymen CM, Yılmaz C. Effects of quercetin on hepatic fibroblast growth factor-21 (FGF-21) and peroxisome proliferator-activated receptor gamma coactivator 1-alpha (PGC-1α) levels in rats fed with high fructose. Mol Biol Rep. 2023; 50(6): 4983-97. https://doi.org/10.1007/s11033-023-08444-y
28. Er F. Fruktoz aracılıklı metabolik sendrom modelinde kuersetin uygulaması ve egzersizin etkisi. Gazi University; 2017.
29. Roslan J, Giribabu N, Karim K, Salleh N. Quercetin ameliorates oxidative stress, inflammation and apoptosis in the heart of streptozotocin-nicotinamide-induced adult male diabetic rats. Biomed Pharmacother. 2017; 86: 570-82.
http://dx.doi.org/10.1016/j.biopha.2016.12.044
30. Zhao X, Wang J, Deng Y, Liao L, Zhou M, Peng C, et al. Quercetin as a protective agent for liver diseases: A comprehensive descriptive review of the molecular mechanism. Phyther Res. 2021; 35(9): 4727-47. https://doi.org/10.1002/ptr.7104
31. Gorbenko NI, Borikov OY, Kiprych T V, Ivanova O V, Taran K V, Litvinova TS. Quercetin improves myocardial redox status in rats with type 2 diabetes. Endocr Regul. 2021; 55(3): 142-52. https://doi.org/10.2478/enr-2021-0015.
32. Abo-youssef AM. Protective effect of rosiglitazone, quercetin, and their combination on fructose-induced metabolic syndrome in rats. Indian J Pharmacol. 2015; 47(6): 620-6. https://doi.org/10.4103/0253-7613.169577
33. Vessal M, Hemmati M, Vasei M. Antidiabetic effects of quercetin in streptozocin-induced diabetic rats. Comp Biochem Physiol Part C Toxicol Pharmacol. 2003; 135(3): 357-64. https://doi.org/10.1016/s1532-0456(03)00140-6
34. Susanti N, Mustika A, Khotib J. Clinacanthus nutans leaf extract reduces pancreatic β-cell apoptosis by inhibiting JNK activation and modulating oxidative stress and inflammation in streptozotocin-induced diabetic rats. Open Vet J. 2024; 14(2): 730-7.
https://doi.org/10.5455/OVJ.2024.v14.i2.13
35. Tsai CF, Chen GW, Chen YC, Shen CK, Lu DY, Yang LY, et al. Regulatory effects of quercetin on M1/M2 macrophage polarization and oxidative/antioxidative balance. Nutrients. 2022; 14(1): 1-21. https://doi.org/10.3390/nu14010067

Araştırma Makalesi / Research Article

Sağlık Bilimlerinde Değer / Sağlık Bil Değer
Value in Health Sciences / Value Health Sci
ISSN: 2792-0542 sabd@duzce.edu.tr 2025; 15(2): 168-171
doi: https://dx.doi.org/10.33631/sabd.1510400

# 2014-2024 Yılları Arasında İzole Edilen Salmonella Türlerinin Antibiyotiklere Direnç Profilleri

Yeliz TANRIVERDİ ÇAYCI [1], İlknur BIYIK [1], Canberk ÇINAR [1], Mahmoud YOSER [1], Asuman BİRİNCİ [1]

**ÖZ**

**Amaç:** *Salmonella* türlerinin barsak enfeksiyonlarına yol açması ve direnç oranlarındaki ciddi artışlar; antibiyotik direncinin izlenmesini anlamlı hale getirmiştir. *Salmonella* suşlarının yayılmasını daha iyi izlemek ve kontrol etmek için, ilaç direncinden sorumlu mekanizmaları bilmek ve diğer *Salmonella* suşlarına nasıl aktarıldığını anlamak oldukça önemlidir. Bölgemizdeki *Salmonella* izolatlarının sıklığını, yıllara göre antibiyotik direnç değişim oranlarını ve ampirik tedavi seçeneklerini araştırmak amaçlandı.

**Gereç ve Yöntemler:** Tıbbi Mikrobiyoloji laboratuvarında Ocak 2014-Ocak 2024 tarihleri arasında farklı klinik örneklerden izole edilen *Salmonella* türleri çalışmaya dahil edilmiştir. Farklı klinik örneklerden biri olan gaita örnekleri *Salmonella-Shigella* agar ve Eozin-Metilen-Blue agara ekilmiştir. Diğer örnekler ise kanlı agar ve Eozin-Metilen-Blue agara ekim yapılmıştır. Bu örnekler, 24 saat 37°C'de inkübe edildikten sonra değerlendirilmiştir. İzolatların antibiyotik duyarlılıklarının değerlendirilmesinde The European Committee on Antimicrobial Susceptibility Testing kriterleri kullanılmıştır.

**Bulgular:** *Salmonella* türleri 589 örnekten izole edilmiştir. Gaita örneğinden izole edilen 444 *Salmonella* suşunun ampisilin, siprofloksasin, trimetoprim/sulfametoksazole direnç oranlarının sırasıyla %14,63, %12,61, %4,72 olduğu belirlenmiştir. Elde ettiğimiz *Salmonella* spp.'nin 2014-2024 yılları arasında izole edilme oranlarının sırasıyla; %3,40, %6,62, %6,79, %6,96, %7,30, %8,49, %13,07, %9,68, %6,96, %28,86, %1,87 olduğu bulunmuştur.

**Sonuç:** Salmonelloz şüphesi olan olguların tedavisinde ampirik antimikrobik ilaçların doğru seçimi için direnç patenlerinin izlenmesi gereklidir. Çalışmamız epidemiyolojik verilerin belirlenmesi ve bu konuda yapılacak yeni çalışmalara katkıda bulunması açısından önemlidir.

**Anahtar Kelimeler:** Antibiyotik direnci; gaita; s*almonella*.

## Antibiotic Resistance Profiles of Salmonella Species Isolated between 2014-2024

**ABSTRACT**

**Aim:** The fact that *Salmonella* species cause intestinal infections and the significant increases in resistance rates have made it meaningful to monitor antibiotic resistance. In order to better monitor and control the spread of *Salmonella* strains, it is crucial to know the mechanisms responsible for drug resistance and understand how it is transmitted to other *Salmonella* strains. We aimed to investigate the frequency of *Salmonella* isolates in our region, the rates of antibiotic resistance change over the years and empirical treatment options.

**Material and Methods:** *Salmonella* species isolated from different clinical samples in Medical Microbiology laboratory between January 2014 and January 2024 were included in the study. One of the different clinical samples, stool samples, was inoculated on Salmonella-Shigella agar and Eosin-Methylene-Blue agar. Other samples were inoculated on blood agar and Eosin-Methylene-Blue agar. These samples were incubated at 37°C for 24 hours and then evaluated. The European Committee on Antimicrobial Susceptibility Testing criteria were used.

**Results:** *Salmonella* species were isolated from 589 samples. The resistance rates of 444 *Salmonella* strains isolated from stool samples to ampicillin, ciprofloxacin, trimethoprim/sulfamethoxazole were 14.63%, 12.61%, 4.72%, respectively. The isolation rates of *Salmonella* spp. between 2014 and 2024 were 3.40%, 6.62%, 6.79%, 6.96%, 7.30%, 8.49%, 13.07%, 9.68%, 6.96%, 28.86%, 1.87%, respectively.

**Conclusion:** Monitoring of resistance patterns is necessary for the correct selection of empirical antimicrobial drugs in the treatment of cases with suspected salmonellosis. Our study is important in terms of determining epidemiologic data and contributing to new studies on this subject.

**Keywords:** Antibiotic resistance; feces; *salmonella*.

1 Ondokuz Mayıs Üniversitesi Tıp Fakültesi, Tıbbi Mikrobiyoloji Anabilim Dalı, Samsun, Türkiye
Sorumlu Yazar / Corresponding Author Canberk ÇINAR, e-mail: cinarcanberk57@gmail.com
Geliş Tarihi / Received: 04.07.2024, Kabul Tarihi / Accepted: 07.01.2025

## GİRİŞ

*Enterobacteriaceae* familyasında yer alan *Salmonella* türleri Gram negatif basillerdir. Dünya üzerindeki morbidite ve mortalitenin önemli bir sebebidir. Dünyada ortalama olarak her yıl 2,5-3 milyar ishal vakasından sorumludur. *Salmonella*'nın bulaşması sıklıkla hayvansal kökenli gıdaların ve kontamine suların tüketimiyle ilişkilidir (1). *Salmonella* ilk kez 1884 yılında Amerikalı bakteriyolog Daniel Elmer Salmon tarafından bir hayvan bağırsağından izole edilmiştir. Salmonelloz vakalarının %80 kadarı bilinen bir salgının parçası olarak tanınmamakta ve sporadik vakalar olarak kabul edilmektedir (2). *Salmonella bongori* ve *Salmonella enterica* olarak iki taksonomik aileye ayrılan *Salmonella* türleri, somatik (O) antijenine göre farklı serogrupları, virulans (Vi) ve flajellar (H) antijenlerine göre çeşitli serotipleri tanımlanmıştır. *S. enterica* kendi içindeki serotiplere göre faklı klinik tablolara neden olmaktadır. Bu klinik tabloların en önemlileri; bakteriyemi, enterik ateş (tifo), lokalize organ enfeksiyonları ve asemptomatik taşıyıcılıktır (3). Özellikle enterik ateş kanalizasyon alt yapısının yetersiz olduğu yerlerde sık görülür. Gelişmiş ülkelerde görülen enterik ateş olgularının çoğu ise endemik bölgelere seyahat ile meydana gelmektedir (4). Son yıllarda tüm dünyada *Salmonella* türlerinde antimikrobiyal direnç oranlarının arttığı bildirilmektedir. Birinci basamak tedavide kullanılan; ampisilin (AMP), trimetoprim-sülfametoksazol (SXT) kloramfenikol gibi antimikrobiyallerin yanı sıra, seftriaksona ve kinolonlara da direnç bildirilmiştir. Antibiyotik direncini takip etmek; antibiyotik kullanımının gerekli olduğu durumlarda ampirik tedavi seçeneklerini belirlemek açısından oldukça önemlidir (5). Çoklu ilaca dirençli (ÇİD) *Salmonella* suşlarının yayılmasını daha iyi izlemek ve kontrol etmek için, ilaç direncinden sorumlu mekanizmaları bilmek ve diğer *Salmonella* suşlarına nasıl aktarıldığını anlamak oldukça önemlidir (3). Bu çalışmada 2014-2024 yılları arasında laboratuvarımıza gelen klinik örneklerden izole edilen *Salmonella* izolatlarının yıllara göre antimikrobiyal direnç oranlarının belirlenerek ampirik tedavi seçeneklerine katkıda bulunması ve bölgemizdeki direnç oranlarının araştırılması amaçlanmıştır.

## GEREÇ VE YÖNTEMLER

Bu çalışma için Ondokuz Mayıs Üniversitesi Klinik Araştırmalar Etik Kurulundan (Tarih: 25/08/2022, Sayı: 392 karar no ile) onay alınmıştır. Tıbbi Mikrobiyoloji laboratuvarına Ocak 2014-Ocak 2024 yılları arasında gelen dışkı, kan, idrar ve apse/yara yeri kültürlerinde üreyen *Salmonella* izolatları değerlendirmeye alınmıştır. Gaita örnekleri *Salmonella-Shigella* (SS) agar ve Eozin-Metilen Blue (EMB) agar (Becton Dickinson, ABD) besiyerine, diğer örnekler kanlı agar (Becton Dickinson, ABD) ve EMB agar besiyerine ekimi yapılmıştır. Ekimi yapılan örnekler, 24 saat boyunca 37°C 'de inkübe edildikten sonra değerlendirilmiştir. Bakteri türlerinin tanımlanmasında Vitek MS (BioMérieux, Fransa) ve bakterilerin antibiyotik duyarlılığının belirlenmesinde Vitek2 (BioMérieux, Fransa) compact otomatize sistemleri kullanılmıştır. İzolatların antibiyotik duyarlılıklarının değerlendirilmesinde ilgili döneme ait The European Committee on Antimicrobial Susceptibility Testing (EUCAST) kriterleri kullanılmıştır.

## BULGULAR

Çalışmaya dahil edilen 589 izolatın %68,93 'ü (406) *Salmonella enteritidis* (*S.enteriditis*) %30,90 'ı (182), *Salmonella.*spp. %0,17'si (1) *S.paratyphi A* olarak tanımlanmıştır. Hastaların %57,89'u (341) erkek, %42,11'i (248) kadındır. *Salmonella* türlerinin %75,38'i (444) dışkı örneklerinde, %9,51'i (56) kan örneklerinde, %7,64' ü (45) steril vücut sıvısı örneklerinde, %7,47'si (44) idrar örneklerinden izole edilmiştir. İzole edilen örneklerin dağılımı Tablo 1'de verilmiştir. İzole edilen örneklerin en çok gönderildiği servis pediatri olmuştur ve servislerin dağılımı Tablo 2'de gösterilmiştir. Çalışmaya dahil edilen *Salmonella* serotiplerinin antimikrobiyal duyarlılıkları Tablo 3'te yer almaktadır. Buna göre tüm *Salmonella* türlerinin %14,09'u (83) AMP, %15,78'i (93) siprofloksasine (CİP), %4,07'si (24) SXT dirençli bulunmuştur. *S. enteritidis* izolatlarının %11,57'si (47) AMP dirençli, %16,25'i (66) CİP dirençli %3,44'ü (14) SXT'ye dirençli bulunmuştur. *Salmonella* spp. izolatlarının ise %19,23'ü (35) AMP dirençli, %14,83'ü (27) CİP dirençli, %5,49'sı (10) SXT dirençli bulunmuştur. Tek olarak izole edilen *S.paratyphi A* ise sadece AMP dirençli olarak bulunmuştur. *Salmonella* izolatlarının yıllara göre farklı antibiyotiklere direnç profili Tablo 4'te gösterilmiştir. Çalışmaya dahil edilen izolatların 41 tanesinde seftriakson, seftazidim ve sefepim antibiyotiklerinin duyarlılıkları araştırılmış olup tamamı duyarlı bulunmuştur. Duyarlı bulunan bu izolatların dokuz tanesinde (%41) rutin olarak test edilen antibiyotiklerden CİP dirençli bulunmuştur, bir tanesinde (%2,4) CİP ve SXT dirençli bulunmuştur, yedi tanesinde (%17) ise AMP ve CİP dirençli olarak bulunmuştur. Seftriakson ve seftazidim dirençli bir izolat ise sadece SXT duyarlı olarak bulunmuştur. Beş izolatta ise kloramfenikol duyarlılığı araştırılmış ve tüm izolatlar kloramfenikole duyarlı bulunmuştur. Bu izolatlardan bir tanesi AMP dirençli olarak bulunmuştur.

**Tablo 1.** İzole edilen örneklerin dağılımı

| Örnek Tipi | Sayı (%) |
|---|---|
| **Dışkı** | 444 (75,38) |
| **Kan** | 56 (9,51) |
| **Diğer (Steril Vücut Sıvıları)** | 45 (7,64) |
| **İdrar** | 44 (7,47) |

**Tablo 2.** Örneklerin gönderildiği servislerin dağılımı

| Örneklerin Gönderildiği Servisler | Sayı (%) |
|---|---|
| **Pediatri** | 253 (43) |
| **Dahiliye** | 112 (19) |
| **Enfeksiyon hastalıkları** | 82 (14) |
| **Acil** | 72 (12) |
| **Diğer** | 46 (8) |
| **Cerrahi** | 24 (4) |

**Tablo 3.** *Salmonella* izolatlarının antibiyotik direnç oranları

| | ***S.enteritidis*** **(n=406)** | ***Salmonella*** **spp. (n=182)** | ***S. paratyphi A*** **(n=1)** | **Toplam (n=589)** |
|---|---|---|---|---|
| **Antibiyotik direnci** | **% (sayı)** | **% (sayı)** | **% (sayı)** | **% (sayı)** |
| **AMP** | 11,57 (47) | 19,23 (35) | 100 (1) | 14,09 (83) |
| **CİP** | 16,25 (66) | 14,83 (27) | 0 (0) | 15,78 (93) |
| **SXT** | 3,44 (14) | 5,49 (10) | 0 (0) | 4,07 (24) |

Ampisilin (AMP), Siprofloksasin (CİP), trimetoprim-sülfametoksazol (SXT)

**Tablo 4.** *Salmonella* izolatlarının yıllara göre farklı antibiyotiklere direnç oranları

| **Direnç paterni** | **Tek antibiyotiğe direnç** | **İkili direnç** | **Üçlü direnç** |
|---|---|---|---|
| **Yıllar (İzole edilen *Salmonella* sayıları)** | | | |
| **2014 (20)** | 4 (4 AMP) | - | - |
| **2015 (39)** | 24 (17 AMP, 1 CİP, 6 SXT) | 4 (1 AMP-CİP, 3 AMP-SXT) | - |
| **2016 (40)** | 18 (8 AMP, 7 CİP, 3 SXT) | 2 (2 CİP-SXT) | - |
| **2017 (41)** | 15 (7 AMP, 5 CİP, 3 SXT) | 4 (1 AMP-CİP, 1 AMP-SXT, 2 CİP-SXT) | - |
| **2018 (43)** | 8 (7 AMP, 6 CİP) | 3 (3 AMP-CİP) | - |
| **2019 (50)** | 18 (5 AMP, 11 CİP, 2 SXT) | 5 (4 AMP-CİP, 1 AMP-SXT, 1 CİP-SXT) | - |
| **2020 (77)** | 31 (12 AMP, 16 CİP, 3 SXT) | 13 (10 AMP-CİP, 3 CİP-SXT) | - |
| **2021 (57)** | 34 (16 AMP, 15 CİP, 3 SXT) | 26 (11 AMP-CİP) | 2 (2 AMP-CİP-SXT) |
| **2022 (41)** | 17 (3 AMP, 11 CİP, 3 SXT) | 1 (1 AMP-CİP) | - |
| **2023 (170)** | 29 (4 AMP, 21 CİP, 4 SXT) | 3 (1 AMP-SXT, 2 CİP-SXT) | 1 (1 AMP-CİP-SXT) |
| **2024 (11)** | - | - | - |

Ampisilin (AMP), Siprofloksasin (CİP), trimetoprim-sülfametoksazol (SXT)

## TARTIŞMA

*Salmonella* spp.'nin çeşitli antibiyotiklere karşı direnci *Salmonella* enfeksiyonunun tedavisini zorlaştırmaktadır (6). 1960' ların başında *Salmonella*'nın tek bir antibiyotiğe; kloramfenikole karşı direnci ilk kez rapor edildi. O tarihten bu yana, Amerika Birleşik Devletleri (ABD), İngiltere ve Suudi Arabistan da dahil olmak üzere birçok ülkede bir veya daha fazla antimikrobiyale karşı direnç bildirilmiştir (7). AMP, kloramfenikol ve SXT gibi antimikrobiyal ajanlar *Salmonella* enfeksiyonları için geleneksel tedaviler olarak kullanılır. Geleneksel antibiyotiklere karşı direncin ortaya çıkmasıyla birlikte, florokinolonlar ve geniş spektrumlu sefalosporinler çoklu ilaca dirençli *Salmonella* tedavisinde tercih edilen antimikrobiyal ajanlar olarak ortaya çıkmıştır (8). Antibiyotik direnç genleri bakteriler arasında çok kolay bir şekilde aktarılabildiği için çoklu ilaca dirençli suşlar hızla artmaktadır (9). Günümüzde 3. ve 4. kuşak sefalosporinler ve kinolonlar gibi klinik açıdan önemli antimikrobiyallere karşı direncin ortaya çıkmasıyla tablo daha da ağırlaşmaktadır (10). Dirençli *Salmonella* türlerinin ortaya çıkması, insanlarda ve hayvanlarda bakteriyel enfeksiyonların şiddetinin artmasına da neden olmuştur. Epidemiyolojik çalışmalar, dirençli *Salmonella* suşlarının duyarlı suşlardan daha şiddetli veya uzun süreli sendromlara neden olduğunu göstermektedir, bu da dirençli suşlarının duyarlı olanlardan daha virülan olduğu anlamına gelir (11). *Salmonella* cinsinde antimikrobiyal direnç üzerine gerek ülkemizde gerekse dünyada çok çeşitli çalışmalar yapılmıştır. Ülkemizde *Salmonella* türlerinin antibiyotiklere olan duyarlılıklarının araştırıldığı çalışmalarda, çalışmamızdaki bulgulara benzer şekilde birinci seçenek tedavi edici antibiyotiklere karşı daha yüksek oranlarda direnç bildirilmektedir (12). Bu konuda Arıkan ve ark. yaptıkları çalışmada izole edilen *Salmonella* türlerinde AMP direncini %15,4, SXT direncini %5,1, CİP direncini %3,7 bulmuşlardır (13). Muhammed ve ark. yaptıkları bir çalışmada *Salmonella* türlerinde AMP direncini %30,4, SXT direncini %39,1, CİP direncini %4,3 olarak bulmuşlardır. Aynı çalışmada ikili ve üçlü direncin ise arttığına vurgu yapılmıştır (14). Thung ve ark. yaptıkları bir çalışmada en az üç antibiyotiğe karşı çoklu direnç olduğunu bildirmişlerdir (15). Gündoğdu ve ark. 75 *Salmonella* izolatı ile yaptıkları çalışmada %55,7'sini ampisiline, %7,6'sını trimetoprim-sülfametoksazole, %7,6'sını siprofloksasine, %6,3'ünü sefotaksime ve %1,3'ü kloramfenikole dirençli saptamışlardır (5). Direnç ile ilgili çalışmalarda azitromisin' in *Salmonella* izolatlarına karşı daha iyi etkinlik gösterdiği bildirilmiştir (12). McAteer ve ark. ABD'de 1999-2015 yılları arasında yaptıkları çalışmada *Salmonella* izolatlarında florokinolon direncini %61, çoklu ilaca direnç oranını da %22 bulmuşlardır. Seftriakson ve azitromisine de tüm izolatları duyarlı bulmuşlardır (16). *Salmonella* izolatları arasında, geleneksel birinci basamak antimikrobiyaller olan AMP, kinolonlar ve SXT'ye karşı direnç, genellikle plazmitlerde bulunan direnç belirleyicilerden kaynaklanır. AMP ve sefalosporin direnci sıklıkla β-laktamazlar ile meydana gelir. Kinolon ve SXT direnci de Topoizomeraz ve

Dihidrofolat redüktaz (*dfr*) gibi genlerde mutasyon ile kazanılabilir (17). Biz bölgemizde yaptığımız bu çalışmada *S. enteritidis* ve *S. enteritidis* dışı izolatlarda AMP ve CIP direncini literatür ile uyumlu bulduk. SXT 'ye karşı direncin yapılan çalışmalara göre daha az olduğunu ancak yıllar içinde arttığını gözlemledik. Bunun dışında özellikle ikili ve üçlü direnç paterninin arttığını gözlemledik.

## SONUÇ

Sonuç olarak, *Salmonella* enfeksiyonlarda ve direnç gelişiminde yıllar içerisinde artış eğilimi dikkat çekmektedir. Ülkemizde saptanan *Salmonella* izolatlarında serogrup tayini ve antibiyotik direncinin araştırılması epidemiyolojik verilerin oluşturulması açısından yararlı olacaktır. AMP ve kinolon direncinin diğer antibiyotiklere göre son dönemde daha fazla arttığını görmekteyiz. Bu sebeple *Salmonella* kaynaklı sepsis ve enterik ateş gibi klinik tablolarda antibiyotik duyarlılık sonuçları çıkıncaya kadar yapılacak ampirik tedavide SXT ve 3. kuşak sefalosporinlerin kullanılmasının uygun olabileceğini düşünebiliriz. Sonuç olarak, *Salmonella* türlerinde antibiyotik direncinin artması antibiyotik kullanılmasının gerektiği durumlarda, ampirik tedavi seçeneklerinin etkileneceğini belirtmektedir. Biz çalışmamızda on yıllık verileri retrospektif olarak inceledik. İzole edilme oranı ve direnç oranlarındaki artışı tespit ettik. *Salmonella* türlerindeki antibiyotik direncinin daha iyi izlenebilmesi için daha uzun süreli ve farklı bölgelerden çalışmalarla takibe ihtiyaç vardır.

**Yazarların Katkıları:** Fikir/Kavram: Y.T.Ç.; Tasarım: Y.T.Ç.; Veri Toplanması ve/veya İşlenmesi: M.Y., İ.B.; Analiz ve/veya Yorum: Y.T.Ç., A.B.; Literatür Taraması: Y.T.Ç., C.Ç.; Makale Yazımı: İ.B., C.Ç., M.Y.; Eleştirel İnceleme: Y.T.Ç., A.B.

## KAYNAKLAR

1. Bula-Rudas FJ, Rathore MH, Maraqa NF. Salmonella infections in childhood. Adv Pediatr. 2015; 62(1): 29-58.
2. Ryan MP, O'Dwyer J, Adley CC. Evaluation of the complex nomenclature of the clinically and veterinary significant pathogen salmonella. Biomed Res Int. 2017; 1: 3782182.
3. Yücel E. Salmonella enfeksiyonları; tanı ve tedavisi. Klinik Tıp Pediatri Derg. 2020; 12(3): 133-9.
4. Mac Fadden DR, Bogoch I, Andrews RJ. Advances in diagnosis, treatment and prevention of invasive salmonella infections. Curr Opin Infect Dis. 2016; 29(5): 453-8.
5. Gündogdu A, Kilic H, Ulu-Kilic A, Parkan OM, Ture Z. Distribution and antimicrobial resistance of salmonella serovars ısolated in Kayseri Region. KLIMIK Journal. 2017; 30(1): 22-7.
6. Chaudhari R, Kanika S, Prashant K. Biochemical and molecular mechanisms of antibiotic resistance in Salmonella spp. Res Microbiol. 2023; 174 (1-2): 103985.
7. Yoke-Kqueen C, Learn-Han L, Noorzaleha AS, Son R, Sabrina S, Jiun-Horng S, et al. Characterization of multiple-antimicrobial-resistant Salmonella enterica subsp. enterica isolated from indigenous vegetables and poultry in Malaysia. Lett Appl Microbiol. 2008; 46(3): 318-24.
8. Eng SK, Pusparajah P, Ab Mutalib NS, Ser HL, Chan KG, Lee LH. Salmonella: a review on pathogenesis, epidemiology and antibiotic resistance. Frontiers in Life Science. 2015; 8(3): 284-93.
9. Babacan O, Karadeniz H. Çiğ tavuk etlerinden izole edilen Salmonella spp. suşlarının antibiyotik duyarlılıklarının araştırılması. Veteriner Hekimler Derneği Derg. 2019; 90(2): 105-14.
10. Akkaya NSS, Ak S. Tavuklarda salmonella serovarları ve antibiyotik direnci. Dicle Üniversitesi Veteriner Fakültesi Derg. 2024; 17(1): 81-6.
11. Travers K, Barza M. Morbidity of infections caused by antimicrobial-resistant bacteria. Clin Infect Dis. 2002; 34 (Suppl 3): S131-4.
12. Hoşbul T, Aydoğan CN, Kaya S, Levent B, Albayrak HT, Şahiner F, et al. Salmonella ve shigella klinik izolatlarında azitromisin minimum inhibitör konsantrasyon değerlerinin ve karbapenem direncinin araştırılması. Mikrobiyol Bul. 2021; 55(4): 480-91.
13. Arıkan KÖ, Güven GB. Çocuklarda salmonella enfeksiyonları: klinik özellikler ve antibiyotik direnç profilinin yıllara göre değişimi. Forbes Tıp Derg. 2021; 2(2): 87-91.
14. Mohammed Y, Dubie T. Isolation, identification and antimicrobial susceptibility profile of Salmonella isolated from poultry farms in Addis Ababa, Ethiopia. Vet Med Sci. 2022; 8(3): 1166-73.
15. Thung TY, Mahyudin NA, Basri DF, Wan Mohamed Radzi CW, Nakaguchi Y, Nishibuchi M et al. Prevalence and antibiotic resistance of Salmonella enteritidis and Salmonella typhimurium in raw chicken meat at retail markets in Malaysia. Poulty Science. 2016; 95(8): 1888-93.
16. McAteer J, Derado G, Hughes M, Bhatnagar A, Medalla F, Chatham-Stevens K, et al. Typhoid fever in the U.S. pediatric population, 1999-2015: opportunities for improvement. Clin Infect Dis. 2020; 73(11): e4581-e4589.
17. Crump JA, Sjölund-Karlsson M, Gordon MA, Parry CM. Epidemiology, clinical presentation, laboratory diagnosis, antimicrobial resistance, and antimicrobial management of invasive salmonella infections. Clin Microbiol Rev. 2015; 28(4): 901-37.

Araştırma Makalesi / Research Article

Sağlık Bilimlerinde Değer / Sağlık Bil Değer
Value in Health Sciences / Value Health Sci
ISSN: 2792-0542 sabd@duzce.edu.tr 2025; 15(2): 172-177
doi: https://dx.doi.org/10.33631/sabd.1570942

# Investigation of the Relationships between Selected Anthropometric Characteristics, Anaerobic Power and Leg Strength in Child Windsurfing Athletes

Ceyhun Emre EZİLMEZ[1], Zeynep İnci KARADENİZLİ[2]

**ABSTRACT**

**Aim:** Windsurfing is a sportive, adventure activity that can be done by individuals of all ages after a training process. This study was conducted to determine the relationships between selected anthropometric characteristics, leg strength and anaerobic power in windsurfing athletes aged 10-15 years.

**Material and Methods:** A total of 18 athletes from Marmara Sailing Club (age: 12.83 ±2.20 years, height: 151.50 ±13.24 cm, body weight: 45.94 ±11.48 kg, body mass index: 20.25 ±3.00 kg/m²) participated voluntarily. Participating athletes were selected from those who have been actively surfing for at least 1 year. Some anthropometric (height, body weight, body mass index, leg length, sitting height) and motoric (leg strength, vertical jump, anaerobic power) tests were performed. The data were analyzed by Spearman Correlation analysis.

**Results:** As a result of the analysis, it was determined that there were highly statistically significant between height and anaerobic power, sitting height and leg length, highly significant relationships between body weight and anaerobic power, leg length, sitting height and body mass index, highly significant relationships between anaerobic power and sitting height, age and leg length, moderately significant relationships between sitting height and age and moderately significant relationships between leg strength and anaerobic power.

**Conclusion:** It can be said that anaerobic power can be positively affected if athletes are selected by paying attention to anthropometric characteristics. Coaches in the windsurfing branch are recommended to make athlete selection and training plans by considering these results.

**Keywords:** Anaerobic power; leg length; leg strength; windsurfing.

## Rüzgar Sörfü Yapan Çocuk Sporcularda Seçilmiş Antropometrik Özellikler, Anaerobik Güç ve Bacak Kuvveti Arasındaki İlişkilerin İncelenmesi

**ÖZ**

**Amaç:** Rüzgâr sörfü, bir eğitim sürecinden sonra her yaştan bireyin yapabileceği bir sportif, macera aktivitesidir. Bu çalışma, 10-15 yaş aralığındaki rüzgar sörfü sporcularında seçilmiş antropometrik özellikler, bacak kuvveti ve anaerobik güç arasındaki ilişkileri belirlemek amacıyla yapılmıştır.

**Gereç ve Yöntemler:** Araştırmaya Marmara Yelken Kulübü sporcularından toplam 18 sporcu (yaş: 12,83 ±2,20 yıl, boy: 151,50 ±13,24 cm, vücut ağırlığı: 45,94 ±11,48 kg, vücut kütle indeksi: 20,25 ±3,00 kg/m²) gönüllü olarak katılmıştır. Katılım gösteren sporcular en az 1 yıldır aktif olarak sörf yapanlardan belirlenmiştir. Sporculara bazı antropometrik (boy, vücut ağırlığı, vücut kütle indeksi, bacak uzunluğu, otuma yüksekliği) ve motorik (bacak kuvveti, dikey sıçrama, anaerobik güç) testler uygulanmıştır. Verilerin analizi Spearman Korelasyon analizi ile yapılmıştır.

**Bulgular:** Analizler sonucunda, boy uzunluğu ile anaerobik güç, oturma yüksekliği, bacak uzunluğu arasında yüksek düzeyde istatistiksel olarak anlamlı, vücut ağırlığı ile anaerobik güç, bacak uzunluğu, oturma yüksekliği, vücut kütle indeksi arasında yüksek düzeyde anlamlı, anaerobik güç ile oturma yüksekliği, yaş, bacak uzunluğu arasında yüksek düzeyde anlamlı, oturma yüksekliği ile yaş arasında orta düzeyde anlamlı ve bacak kuvveti ile anaerobik güç arasında orta düzeyde anlamlı ilişki olduğu tespit edilmiştir.

**Sonuç:** Antropometrik özelliklere dikkat edilerek sporcu seçimlerinin yapılması halinde anaerobik gücün de olumlu

1 Duzce University Department of Interdisciplinary Movement and Training Sciences, Düzce, Türkiye
2 Duzce University, Faculty of Sport Sciences, Düzce, Türkiye

Sorumlu Yazar / Corresponding Author: Zeynep İnci KARADENİZLİ, e-mail: incikaradenizli@duzce.edu.tr
Geliş Tarihi / Received: 21.10.2024, Kabul Tarihi / Accepted: 15.01.2025

etkilenebileceği söylenebilir. Rüzgar sörfü branşındaki antrenörlere, bu sonuçları göz önünde bulundurarak sporcu seçimi ve antrenman planlamaları yapmaları önerilmektedir.
**Anahtar Kelimeler:** Anaerobik güç; bacak kuvveti; bacak uzunluğu; rüzgar sörfü.

## INTRODUCTION

Although windsurfing is not exactly known, it is generally accepted that it originated 800 years ago in Polynesia. Surfing is practiced in many different ways. The most well- known ones are wave surfing, windsurfing, kite surfing, but there are also varieties such as body surfing, stand-up paddle surfing, boat wave surfing, and wing surfing (1). Windsurfing gained international acceptance in the 1980s and was accepted as an Olympic sport in the following years (2,3). Windsurfing emerged from the combination of two different branches, sailing and surfing. The main goal in surfing is to try to stay in balance by holding the sail with the hands while the hands and feet are shoulder-width apart and tense on the surfboard, and to give direction and speed to the surfboard by moving the sail according to the direction of the wind (4).

In windsurfing, when sufficient speed is reached with the right equipment or when riding a wave, it becomes possible to perform jumps, somersaults, and sharp turns. Additionally, windsurfers can achieve speeds that no other sailboat can reach. (5). It is thought that a high degree of strength is required to achieve high performance in this sport branch in addition to structural features (6). In addition, it has been reported that windsurfing athletes have a lower body mass index and fat percentage compared to athletes in other branches. It is stated that this situation may provide positive feedback to athletes in low weather conditions and negative feedback in high weather conditions (7).

While surfing, arm, leg and core muscle forces are needed. As a result of the combination of these forces, the sailboat and board can be controlled and used in the desired direction. In this way, surfing performance can increase with the effect of force. Endurance is also needed to sustain this strength performance for a long time. The endurance of a windsurfing athlete enables him/her to surf longer and overcome the resistance of the sail against the wind. An endurance athlete can make fewer technical mistakes while surfing, which may contribute to a higher performance compared to their competitors (8). Based on this information, the aim of this study was to investigate the relationships between selected anthropometric characteristics, anaerobic power and leg strength in windsurfing child athletes. As a result of the study, windsurfing branch coaches will be advised to plan and perform their work in line with the relationships that may emerge between the variables**.**

## MATERIAL AND METHODS

### Characteristics of the Research Group

This study was conducted to determine the relationships between selected anthropometric characteristics, leg stretchable wooden chair was recorded in cm with a tape measure (10).

**Leg Length:** The leg length of each athlete was measured and recorded in centimeters in the supine position

strength and anaerobic power in windsurfing athletes aged 10-15 years. The number of participants was determined using the G*Power analysis program (version 3.1.9.3, Germany). In this context, 'Correlation: Point Biserial Model' statistical test was selected from the T-test group and 'One-tailed' was preferred. The effect size was chosen as 0.55, Type I error rate (α err prob) as 0.05, and power (1-β err prob) as 0.80. As a result of the analysis, it was understood that at least 16 participants should be included in the study. In this context, the study was conducted with the voluntary participation of 18 athletes. The population of this study consisted of children aged 10-15 years who windsurf in Istanbul province and the sample consisted of 18 athletes who have been actively windsurfing for at least 1 year in Marmara Sailing Club. Participation in the study was based on volunteerism. Participants were selected among those who had not had any sportive injury in the last 1 year.

A total of 18 athletes from Marmara Sailing Club (age: 12.83 ±2.20 years, height 151.50 ±13.24 cm, body weight: 45.94 ±11.48 kg, body mass index (BMI): 20.25 ±3.00 kg/m²) participated voluntarily. Participating athletes were determined from those who have been actively surfing for at least 1 year.

Before the study, the parental consent form was obtained and necessary information was provided. All protocols and procedures in the study were carried out in accordance with the 2013 Declaration of Helsinki principles, and the ethics committee approval of the study was obtained by Düzce University Scientific Research and Publication Ethics Committee with the decision date of 16.05.2024 and decision number 2024/168.

### Research Model

In this study, experimental model, one of the quantitative research methods, was used.

### Data Collection Tools

The athletes were informed that they should eat 2-3 hours before coming to the tests, sleep well the evening before the tests, and not take any medication that may affect their performance. Athletes were also asked to participate in the tests wearing appropriate shorts, t- shirts and sneakers.

The measurements were made on the same day at the Marmara Sailing Club facilities. Athletes' height, body weight, leg length, sitting height were measured. Among the motoric characteristics, vertical jump for anaerobic power and leg strength were measured with a dynamometer.

**Body Height:** The height of the study group was measured in cm at the top of the head with the children barefoot, head in the Frankfort plane, chin parallel to the ground, eyes facing forward, and body in an upright posture (9). The measurement was made with a height scale (Seca stadiometer) with a precision of 0.01 cm.

**Body Weight:** The body weights of the research group were measured in kg using a digital scale with the children wearing shorts and t-shirts (9).

**Sitting Height:** The distance between the chair surface and the peak of the head of the athlete sitting on a non-

bilaterally from the anterior superioriliac point of the thigh to the distal point of the medial malleolus of the foot (11).

**Vertical Jump Test:** The athlete reaches upwards with one arm to the maximum point in front of the test area. The

distance between the point on the wall and the ground was determined with a mesuro. The difference between the distance the athlete could reach and the highest distance he/she could reach by jumping was determined and the height was recorded in cm. The test was repeated twice to determine the best score (12).

**Leg Strength**: The athletes placed their feet on the dynamometer with their knees bent, arms stretched, trunk slightly tilted forward and pulled the dynamometer bar vertically upwards using maximum leg strength. The measurement was performed using a Takei back and leg dynamometer (13).

**Anaerobic Power Calculation**: Anaerobic power (AP) values of the athletes were determined with Lewis formula by using vertical jump and body weight values. AP: It was calculated using Lewis formula; (√4.9 x (body weight) x √D) (D: Jump Distance) (14).

**Statistical Analysis**

The data were analyzed using the SPSS 22.0 program. The normality test of the data was performed with the Shapiro-Wilk test. Since the data did not show normal distribution, the relationships between the variables were analyzed Spearman Correlation analysis. Significance value was initially accepted as $p<0.05$

**RESULTS**

Descriptive statistics of the windsurfing athletes in the study are as shown in Table 1.

**Table 1.** Descriptive statistics of the windsurfing athletes

| | n | Min. | Max. | X̄±SD |
|---|---|---|---|---|
| **Body height (cm)** | 18 | 122.0 | 182.0 | 151.50±13.24 |
| **Body weight (kg)** | 18 | 27.0 | 74.0 | 45.94±11.48 |
| **Age (years)** | 18 | 10.0 | 15.0 | 12.83±2.20 |
| **Sport age (years)** | 18 | 1.0 | 3.0 | 1.50±0.78 |
| **Body mass index (kg/m2)** | 18 | 16.4 | 28.8 | 20.25±3.00 |
| **Sitting height (cm)** | 18 | 68.0 | 94.0 | 82.44±7.00 |
| **Leg length (cm)** | 18 | 72.0 | 102.0 | 89.16±7.13 |
| **Anaerobic Power (W)** | 18 | 258.0 | 949.1 | 482.05±156.13 |
| **Leg Force (kg)** | 18 | 32.0 | 134.5 | 77.30±28.91 |

The relationships between the variables in the study are as shown in Table 2.

**Table 2.** Relationships between anthropometric, motoric characteristics, leg strength and anaerobic power parameters

| **Spearman Correlation** | | **b** | **c** | **d** | **e** | **f** | **g** | **h** |
|---|---|---|---|---|---|---|---|---|
| **Body Height (a)** | r | 0.890 | 0.638 | 0.559 | 0.806 | 0.910 | 0.796 | 0.872 |
| | p | **<0.001** | **0.004**** | **0.016*** | **<0.001** | **<0.001** | **<0.001** | **<0.001** |
| | n | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
| **Body Weight (b)** | r | 1.000 | 0.568 | 0.792 | 0.791 | 0.780 | 0.653 | 0.879 |
| | p | . | **0.014*** | **<0.001** | **<0.001** | **<0.001** | **0.003**** | **<0.001** |
| | n | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
| **Leg Strenght (c)** | r | | 1,000 | 0.278 | 0.631 | 0.532 | 0.576 | 0.589 |
| | p | | . | 0.264 | **0.005**** | **0.023*** | **0.012*** | **0.010*** |
| | n | | 18 | 18 | 18 | 18 | 18 | 18 |
| **BMI (d)** | r | | | 1.000 | 0.640 | 0.588 | 0.362 | 0.556 |
| | p | | | . | **0.004**** | **0.010*** | 0.140 | **0.017*** |
| | n | | | 18 | 18 | 18 | 18 | 18 |
| **Anaerobic Power (e)** | r | | | | 1.000 | 0.712 | 0.721 | 0.750 |
| | p | | | | . | **0.001**** | **0.001**** | **<0.001** |
| | n | | | | 18 | 18 | 18 | 18 |
| **Sitting Height (f)** | r | | | | | 1.000 | 0.809 | 0.683 |
| | p | | | | | . | **<0.001** | **0.002**** |
| | n | | | | | 18 | 18 | 18 |
| **Age (g)** | r | | | | | | 1.000 | 0.664 |
| | p | | | | | | . | **0.003**** |
| | n | | | | | | 18 | 18 |
| **Leg Length (h)** | r | | | | | | | 1.000 |
| | p | | | | | | | . |
| | N | | | | | | | 18 |

**p<0.01 *p<0.05

BMI: Body Mass Index

As a result of the Spearman correlation analysis, according to Cohen (1988) (15), there is a highly positive and statistically significant relationship between body height and body weight (r=0.890, p<0.01), AP (r=0.806, p<0.01), sitting height (r=0.910, p<0.00), age (r=0.796, p<0.01), leg length (r=0.872, p<0.01), leg strength (r=0.638, p=0.04), and BMI (r=0.559, p=0.016). Body weight is highly positive and statistically significant relationship with leg strength (r=0.568, p=0.014), age (r=0.653, p<0.05), BMI (r=0.792, p<0.01), AP (r=0.791, p<0.01), sitting height (r=0.780, p<0.01), and leg length (r=0.879, p<0.01). Leg strength highly positive and statistically significant relationship with AP (r=0.631, p=0.05), sitting height (r=0.532, p=0.023), age (r=0.576, p=0.012), and leg length (r=0.589, p=0.010). BMI is highly positive and statistically significant relationship with AP (r=0.640, p<0.05), sitting height (r=0.588, p=0.010), and leg length (r=0.556, p=0.017). AP is highly positive and statistically significant relationship with sitting height (r=0.712, p<0.01), age (r=0.721, p<0.01), and leg length (r=0.750, p<0.01). Sitting height is highly positive and statistically significant relationship with age (r=0.809, p<0.01) and leg length (r=0.683, p<0.05). Age is highly positive and statistically significant relationship with leg length (r=0.664, p<0.05). No significant correlation was observed between the other variables (p>0.05) (Table 2).

## DISCUSSION

This study was conducted to determine the relationships between selected anthropometric characteristics, leg strength and anaerobic power values in windsurfing child athletes. When the findings were examined, the mean age of the surfers was 12.83 ±2.20 years, mean height was 151.50 ±13.24 cm, body weight was 45.94 ±11.48 kg, BMI was 20.25 ±3.00 kg/m$^2$, leg length was 89.16 ±7.13 cm, sitting height was 82.44 ±7 cm, leg strength was 77.30 ±28.91 kg and anaerobic power values were 482.05 ±156.13 watts (Table 1).

In a study conducted with windsurfers aged 12-18 years, it was reported that the mean height of the athletes was 171.62 ±8.45 cm, mean body weight was 63.82 ±14.51 kg, and BMI was 21.43 ±3.04 kg/m$^2$ (16). In another study, anthropometric characteristics of optimist athletes aged between 11-15 years were evaluated. In the study, the participants were divided into 2 groups. As a result of the evaluation made in the two groups, those between the 1st and 45th place in the end-of-race ranking (Group 1) and those between the 135th and later places (Group 2) were determined. The average age of the athletes in the first group was 14 ±0.7 years, height 160 ±5.4 cm, body weight 48.8 ±6.37 kg, leg length 90.7 ±3.9 cm. The average age of the athletes in the second group was 13.2 ± 1.1 years, height 155 ±8 cm, body weight 44.2 ±7.1 kg, and leg length 86.3 ±14.5 cm (17). The BMI and leg length values obtained in our study are similar to the mentioned studies. On the other hand, the mean height and body weight values in our study were lower than those found in the mentioned studies. These results are thought to be due to the different age groups in the studies.

In a different study, the relationships between sitting height, height, body weight and BMI were examined in 626 windsurfing athletes aged 6-16 years. It was reported that the mean body weight was 33.95 ±11.26 kg in girls and 34.05 ±11.50 kg in boys, height was 138.84 ±13.92 cm in girls and 140.19 ±15.01 cm in boys, body mass index was 17.12 ±3.16 kg/m$^2$ and 16.86 ±2.96 kg/m$^2$ in boys (18). The mean height, body weight and BMI values in our study were higher than the results of the mentioned studies. These results are thought to be due to the difference in age groups in the studies.

In another study, anthropometric and motoric measurements were made with 27 windsurfers who were national team athletes aged 14-15 years. As a result of the study, it was reported that height was 168.66 ±10.56 cm, body weight was 56.21 ±8.83 kg and body mass index was 19.65 ±1.79 kg/m$^2$, leg length was 91.12 ±7.11 cm and leg strength was 127.77 ±66.58 kg (19). When the findings of our study are compared with the results of this literature, it is seen that the mean values are lower in terms of these variables (Table 1). This is thought to be due to the fact that the participants in the mentioned literature consisted of national athletes. Considering the other variables in our study, the mean sitting height was found to be 82.44 ±7 cm (Table 1). In a study, the mean sitting height of 626 windsurfing athletes aged 6- 16 years was found to be 72.82 ±7.24 cm in boys and 72.39 ±7.15 cm in girls, and it was reported that there was a statistically significant difference between the two genders in terms of sitting height (18). When compared with the findings in our study, it was observed that the values obtained were higher (Table 1).

In a different study conducted with national and international windsurfers between the ages of 14-24, the relationships between values such as age, height, BMI, performance ranking, and duration of sports age were examined. As a result of the study, it was reported that there was no statistically significant relationship between the mentioned parameters (7). In our study, it was found that there were significant relationships between height and age, body weight and BMI values (Table 2). It is thought that this may be due to the fact that the participants in our study were in better condition than the others in terms of performance and anthropometric structure, although their average age was lower.

In a study conducted with soccer players and sedentary individuals, it was reported that as height and age increased, sitting height also increased; therefore, taller individuals would have a higher sitting height and these criteria should be taken into consideration when making sportive choices (20). In another study, the relationships between sitting height, height, body weight and body mass index were examined in 626 windsurfing athletes aged 6-16 years. As a result, it was reported that there was a highly significant positive relationship between sitting height and height (18). In our study, it was observed that there were highly significant positive relationships between sitting height and age, height and body mass index (Table 2). Our study supports the results of the literature in terms of these variables.

The relationships between anthropometric, motoric measurements and strength were investigated in 27 windsurfers who were national team athletes aged 14-15 years. As a result of the study, it was stated that there was a significant positive relationship between height and leg strength parameters that may be effective in the performance of windsurfing athletes (19). In our study, a

highly significant positive relationship was found between height and leg strength variables (Table 2). Our study supports the aforementioned literature result in terms of these variables. In a study conducted with sub-elite athletes, it was reported that body weight and height were associated with anaerobic power and there was a relationship between body weight and strength (21).

Anaerobic power is important in terms of organizing training programs in sports, writing exercise prescriptions and determining exercise intensity (22). In the literature, leg strength is positively correlated with anaerobic power. In a study examining the relationship between leg strength and anaerobic power in young male handball players, it was observed that the variables of the study, anaerobic power and leg strength, had a positive, moderate and statistically significant relationship (23). In another study, it was determined that there was a significant relationship between leg muscle volume, absolute anaerobic power and capacity values (24). In another study in this field, it was reported that absolute anaerobic power and capacity values may increase with the increase in leg volume even if body weight, skinfold thickness and age were kept under control (25). In the study aiming to determine the relationship between body composition, leg volume, leg mass, anaerobic performance and leg strength in climbers, it was determined that there was a positive significant relationship between isometric leg strength and anaerobic performance. Based on this result, it was stated that mountaineers with more leg volume may have better anaerobic performance (26). In a study conducted with female volleyball players, it was stated that an 8-week strength training program positively affected the anaerobic power performance of the athletes (27). In a study conducted to investigate the relationship between leg strength and anaerobic power in futsal athletes, it was reported that leg strength positively affected anaerobic power performance (28). In a study conducted in 14-15-year-old wrestlers, when the relationship between isokinetic muscle strength and balance and anaerobic power was examined, it was reported that there were positive significant relationships between these three variables (29). In a study in which strength and anaerobic power parameters of young and junior category tennis players were examined, a significant relationship was found between isokinetic muscle strength and anaerobic power (30). In a study conducted with female soccer players, it was reported that the relationship between lower extremity strength values and anaerobic power and vertical jump values increased (31). Although some of the research results in the mentioned literature are not directly related to windsurfing, they are similar to the values in our study. Because in the results of our study, it was determined that there were high positive correlations between anaerobic power and leg strength, leg length, sitting height, height, body weight, BMI and age values (Table 2).

## CONCLUSION

In this study, the findings obtained from pediatric windsurfing athletes aged 10-15 years show that height, body weight, sitting height, body mass index and leg length are related to anaerobic power. In addition, there was a moderately significant relationship between leg strength and anaerobic power. In line with these results, it is recommended that windsurfing coaches should take these factors into consideration when selecting athletes and planning training programs. However, it should be kept in mind that this study was based on a limited sample and other factors may also affect the performance of athletes. Therefore, it is also recommended to consider larger sample groups and different variables in future studies.

**Acknowledgement:** This research article is a publication produced from the master's thesis subject of Düzce University, Department of Interdisciplinary Movement and Training Sciences programme.

**Authors's Contributions:** Idea/Concept: C.E.E., Z.İ.K.; Design: C.E.E., Z.İ.K.; Data Collection and/or Processing: C.E.E.; Analysis and/or Interpretation: C.E.E., Z.İ.K.; Literature Review: C.E.E.; Writing the Article: C.E.E., Z.İ.K.; Critical Review: H.K.

## REFERENCES

1. Rice E L. Surfing. J Sports Med Phys Fitness. 2021; 61(8): 1098-103.
2. Gerzile G. Windsurf. İstanbul: Varan'la Yol Boyunca; 2022.
3. Aksu M, Kayabalı Ç. Windsurfing. standart: Economic and Technical Journal. 2007; 46(542): 89-93.
4. Andrianopoulos V, Vogiatzis I. Windsurfing: The physiology of athletic performance and training. Extreme Sports Medicine. 2017; 357-63. https://doi.org/10.1007/978-3-319-28265-7_27
5. I.S.A.F. Racing rules of sailing. 2009; 52-67.
6. Muratlı S, Kalyoncu O, Şahin G. Antrenman ve müsabaka. İstanbul: Ladin Matbaası; 2007.
7. Jaszczur-Nowicki J, Smulsky V. Age and morphological characteristics of high-performance windsurfers. Pedagogy of Physical Culture and Sports. 2005; 127-31.
8. Yalçın O. Analyzing the effect of windsurfing basic education program on the physical and motor features of the children aged between 13-15 [Master Thesis]. Çanakkale Onsekiz Mart University Institute of Health Scienes. 2016.
9. Günay M. Sport Physiology and Performance Measurement. Ankara: Gazi Publishing House; 2013.
10. Çıkmaz S, Taşkınalp O, Uluçam E, Yılmaz A, Çakıroğlu M. anthropometric measurements and proportions of body constitution in football players. Trakya University Journal of Medical Faculty. 2005; 22(1): 32-6.
11. Engquist KD, Smith CA, Chimera NJ, Warren M. Performance comparison of student-athletes and general college students on the functional movement screen and the Y balance test. Journal of Strength and Conditioning Research. 2015; 29(8): 2296-303.
12. Alpine S. Fitness testing protocol. Australia: Ski And Snowboard; 2015.
13. Pişkin N, Aktuğ Z. Investigation of the effect of blood flow restriction training applied to the lower extremity on leg volume leg mass and leg strength. International Journal IJSET Sport, Exercise & Training Scienes. 2022; 8(3): 82-93.

14. Özkan A, Köklü Y, Ersöz G. Anaerobic performance and measurement methods. Ankara: Gazi Publishing House; 2010.
15. Cohen J. Statistical power analysis for the behavioral sciences. Hillsdale (NJ): Lawrence Erlbaum Associates; 1988.
16. Oliver A, Caraballo I, Perez-Bey A, Gomez A, Dominguez R. Anthropometric characteristics of young elite sailors based on performance level. Journal of Exercise Science & Fitness. 2023; 21: 125-30.
17. Palomino-Martín A, Quintana-Santana D, Quiroga-Escudero ME, Gonzalez-Munoz A. Incidence of anthropometric variables on the performance of top Optimist sailors. Journal of Human Sport and Exercise. 2017; 12(1): 41-57.
18. Karakaş S, Okyay P, Önen Ö, Ergin F, Beşer E. The relationship between sitting height and height, weight, and body mass index in primary school students in Aydın province. İnönü University Journal of Medical Faculty. 2004; 11(2): 73-7.
19. Ödemiş M, Nalbant Ö. Relationship between anthropometric characteristics and strength in national team lower age categories of windsurfers. Journal of ROL Sports Sciences: Special Issue. 2023; 1: 348-63.
20. Mendeş B, Mendeş E, Tepe A. The effect of bust height on some selected physical and physiological parameters ın footballers and sedentaries. Gaziantep University Journal of Sports Sciences. 2016; 1(1): 57-68.
21. Aslan CS, Büyükdere C, Köklü Y, Özkan A, Özdemir FNŞ. The relationships among body composition, anaerobic performance and back strength characteristics of sub-elite athletes. Journal of Human Scienes. 2011; 8(1): 1612-28.
22. Yıldız SA. What is the meaning of aerobic and anaerobic capacity? Eurasian Journal of Pulmonology. 2012; 14(1): 1-8.
23. Kaya ÖB, Aydos L. Examining the relationship between leg and anaerobic strength of elite young handball players. ASUJSHR. 2022; 3(1): 31-47.
24. De Ste Croix MBA, Armstrong N, Chia MYH, Welsman JR, Parsons G, Sharpe P. Changes in short-term power output in 10 to 12-year-olds. Journal of Sports Sciences. 2000; 19: 141-8.
25. Armstrong N, Welsman JR, Chia MYH. Short-term power output in relation to growth and maturation. British Journal of Sports Medicine. 2001; 35: 118-24.
26. Özkan A, Sarol H. The relationship between body composition, leg volume, leg mass, anaerobic performance, and leg strength in mountaineers. Spormetre Journal of Physical Education and Sports Sciences. 2008; 6(4): 175-81.
27. Okludil K, Serin E. The effect of a Bosu balance and strength exercise program on body composition, anaerobic power, and balance ability in adolescent female volleyball players. Ondokuz Mayıs University Journal of Sports and Performance Research. 2022; 13(3): 257-74.
28. Köse M, Kin-İşler A, Özkan A, Aytar A, Alvurdu S. The relationship between repeated sprint ability, isokinetic leg strength, and anaerobic performance in futsal players. Spormetre Journal. 2019; 17(4): 190-200.
29. Çalışkan D. Investigation of the relationships between isokinetic muscle strength, balance, and anaerobic power parameters in wrestlers aged 14-15 [Master's thesis]. Ordu: Ordu University, Department of Physical Education and Sports; 2020.
30. Güzel E, Can İ. Investigation of the relationship between strength, balance, and anaerobic power characteristics of male tennis players in junior and youth categories. CBÜ Journal of Physical Education and Sport Sciences. 2022; 17(2): 7.
31. Apaydın N. Investigation of the relationships between lower extremity muscle strength, vertical jump, and anaerobic power parameters in female football players [Master's thesis]. Ordu University, Department of Physical Education and Sports; 2020.

Araştırma Makalesi / Research Article

Sağlık Bilimlerinde Değer / Sağlık Bil Değer
Value in Health Sciences / Value Health Sci
ISSN: 2792-0542 sabd@duzce.edu.tr 2025; 15(2): 178-185
doi: https://dx.doi.org/10.33631/sabd.1450611

# Perspectives of Women with Overweight and Obesity on Physical Activity: A Qualitative Study

Merve SIKLAROGLU [1], Ayla TUZCU INCE [2]

**ABSTRACT**

**Aim:** The rates of obesity and physical inactivity are relatively high among women in Türkiye, increasing the need for physical activity programs. This study aimed to provide information for physical activity programs by gaining an in-depth understanding of the perspectives on physical activity of women with overweight and obesity.

**Material and Methods:** The research was based on a qualitative case study design and was conducted between June and July 2022 in Antalya, Türkiye. It used the purposive sampling and snowball sampling methods and included 20 women who were overweight or obese. Data were collected face-to-face using the individual in-depth interview method. This study used the qualitative data analysis method, and all data documentation, organization, and theming were performed using the Nvivo-10 software package.

**Results:** The participants' mean age was 43.30 ± 10.22 years, and their mean body mass index was 35.57 ± 4.63 kg/m². Five major themes emerged: being healthy, types of physical activity, encouragement, unsatisfactory experiences, and preferences to increase physical activity.

**Conclusion:** All participants stated that protection and maintenance of health encouraged them to do physical activities. Most participants preferred walking and exercising at home as physical activity. Pain and tiredness, neglect, cultural aspects, and environmental restrictions were unsatisfactory physical activity experiences. It is believed that providing education on the negative experiences and demands of women with overweight and obesity regarding physical activity in primary health care services and encouraging them to do different types of physical activity is important for public health.

**Keywords:** Exercise; women; qualitative research; obesity.

## Fazla Kilolu ve Obez Kadınların Fiziksel Aktiviteye İlişkin Görüşleri: Nitel Bir Çalışma

**ÖZ**

**Amaç:** Türkiye'de kadınlarda obezite ve yetersiz fiziksel aktivite oranı oldukça yüksek olup girişimsel programlara gereksinim artmıştır. Bu çalışma, aşırı kilolu ve obeziteli kadınların fiziksel aktivite hakkında görüşlerini derinlemesine anlayarak fiziksel aktivite programlarına bilgi sağlamayı amaçladı.

**Gereç ve Yöntemler**: Nitel bir durum çalışması tasarımına dayandırılmış olan araştırma, Haziran ve Temmuz 2022 tarihleri arasında Antalya, Türkiye'de gerçekleştirildi. Amaçlı örnekleme ve kartopu örnekleme yöntemlerinin kullanıldığı çalışmaya fazla kilolu veya obezitesi olan 20 kadın dahil edildi. Veriler bireysel derinlemesine görüşme yöntemi kullanılarak yüz yüze toplandı. Bu çalışmada nitel veri analizi yöntemi kullanılmış ve tüm veri dokümantasyonu, organizasyonu ve temaları Nvivo-10 yazılım paketi kullanılarak gerçekleştirildi.

**Bulgular:** Katılımcıların yaş ortalaması 43,30±10,22 olup, beden kitle indeksi ortalamaları 35,57±4,63 kg/m²'dir. Çalışmada beş ana tema ortaya çıktı: sağlıklı olmak, fiziksel aktivite tipleri, teşvik, memnuniyetsiz deneyimler ve fiziksel aktiviteyi artırmak için talepler.

**Sonuç:** Katılımcıların tamamı fiziksel aktivite yapmalarında teşvik gerekçesi olarak sağlığın korunması ve sürdürülmesini belirtmiştir. Çoğu katılımcı fiziksel aktivite olarak yürüyüş ve evde egzersiz yapmayı tercih etmektedir. Ağrı ve yorgunluk hissetme, ihmal, kültürel faktörler ve çevresel kısıtlamalar gibi faktörler fiziksel aktivite için memnun edici olmayan deneyimlerdendir. Birinci basamak sağlık hizmetlerinde, fazla kilolu ve obez kadınların fiziksel aktiviteye ilişkin olumsuz deneyimleri ve talepleri göz önünde bulundurularak eğitim yapılmasının ve farklı fiziksel aktivite türlerine teşvik edilmesinin toplum sağlığı için önemli olduğu düşünülmektedir.

**Anahtar kelimeler:** Egzersiz; kadın; nitel araştırma; obezite.

1 Akdeniz University, Faculty of Nursing, Department of Public Health Nursing, Antalya, Türkiye.
2 Akdeniz University, Faculty of Nursing, Department of Public Health Nursing, Antalya, Türkiye.

Sorumlu Yazar / Corresponding Author: Ayla TUZCU İNCE, e-mail: atuzcu@akdeniz.edu.tr
Geliş Tarihi / Received: 11.03.2024, Kabul Tarihi / Accepted: 19.01.2025

## INTRODUCTION

The prevalence of obesity is increasing rapidly worldwide (1). The WHO reports that 39% of adults are overweight (body mass index [BMI] = 25.0-29.9 kg/m2), and 13% are obese (BMI ≥ 30 kg/m2) (1). Obesity is an established risk factor for type-2 diabetes, cancers, and cardiovascular diseases, which place a considerable disease burden on many low- and high-income countries (2). It is necessary to maintain a healthy weight or prevent individuals with overweight from gaining more weight to reduce the risk of obesity-related health problems (3). It has been reported that individuals with obesity have a lower risk of death than sedentary individuals with a healthy BMI, regardless of their etiology. In addition, regular physical activity (PA) can reduce weight gain and the risk of weight cycling after weight loss (1,4). Many clinical studies examined the effects of PA on obesity (5–7). Individuals with obesity should do ≥ 30 minutes of moderate-intensity aerobic PA five days a week or ≥ 20 minutes of vigorous-intensity aerobic PA three days a week (8).

Reducing the prevalence of obesity and physical inactivity, two major health problems, is very difficult worldwide. Studies have shown that more than half of individuals with obesity are not sufficiently active (8,9). Individuals with overweight or obesity often have physical, social, and psychological barriers to performing the recommended level of PA (10). A study conducted on physically inactive women in USA determined that a lack of social (family and friends) support and workload, tiredness, or stress due to working conditions were obstacles to PA behavior (11). A study on South Asian women determined that role expectations, lack of time, and environmental factors prevented them from doing PA (12). A study on Saudi women with obesity determined that they could not allocate time for PA due to role expectations and lack of social support (13). A study conducted in the USA stated that women with overweight or obesity needed to be provided with a social environment where they could come together with more physically active individuals to increase their participation in PAs (14).

Türkiye ranks first in Europe in terms of adults with overweight (66.8%) and obesity (32.1%) (15). The rate of physical inactivity among Turkish women is 36% (16). In the literature, it has been determined that the rate of low physical activity is higher in women than in men (9,10,16). The participation of women with overweight or obesity in regular PA can help attenuate increased health risks and costs. The perspectives of women with overweight or obesity on PA should be described in detail, and their needs and barriers should be determined to supply the planned or implemented intervention programs for PA with information. Studies have been conducted in different countries to determine the views of overweight and obese women on physical activity, but no study on this subject has been found in our country (11-13). This study aimed to provide information for physical activity programs by gaining an in-depth understanding of the perspectives on physical activity of women with overweight and obesity aged 30-64 years in Türkiye.

## MATERIAL AND METHODS

### Study Design

A qualitative case study design was used in this study (17). The case study is a method in which a single case or phenomenon is examined in depth longitudinally, data is collected systematically, and the occurrences in the real environment are investigated (18,19). This research is reported according to the Standards for Reporting Qualitative Research (SRQR) guidelines (20).

### Sample and Participants

The study was conducted at No. 17 Dt. Selahattin Topcu Family Health Center (FHC) in Antalya, Türkiye. The study was conducted in only one FHC. This FHC, where the study was conducted, was chosen because it has a heterogeneous structure in terms of socio-demographic and socio-cultural aspects. In this study, the homogeneous sampling technique, one of the purposeful sampling methods, was used (18). The study's sample 20 comprised women who presented to the FHC in June-July 2022, were aged 30-64 years the age group with the highest rate of overweight and obesity in Türkiye (16). Twenty women participated in the study are the number of participants reached theoretical saturation in data collection. In this study, reaching theoretical saturation was achieved by not hearing anything new while continuing to interview the participants and by repeating the data. Women who had no disability preventing participation in PAs, had no self-reported psychiatric disorders, could speak and understand Turkish, and volunteered to participate in this study were included.

### Data Collection

Data were collected through individual interviews conducted between June and July 2022 using a descriptive information form prepared by the researchers following a literature review and an individual interview guide prepared based on the researchers' prior knowledge and observations about the field of study. Both researchers have taken courses on qualitative research, and the corresponding author has publications on qualitative research.

The descriptive information form comprised 12 questions about age, marital status, family type, life expectancy in the city of residence, education, employment and income status, BMI, perceived health status, chronic diseases and smoking. Two researchers with publications in qualitative research were consulted about the semi-structured interview form comprising seven main open-ended questions supplementary questions. The interview questions are presented in Table 1. The understandability of the research questions was evaluated by applying them to two overweight and obese women who were not included in the study. After the pilot application, the necessary adjustments were made, and the questionnaire was finalized.

In-depth, face-to-face individual interviews were conducted in the FHC in an environment free of noise and interruptions. After both researchers (Siklaroğlu and Tuzcu Ince) introduced themselves to the participants, the second researcher explained the study's purpose in detail and obtained their written consent. During the interviews, participants were given sufficient time to freely express

their feelings and opinions, and thorough communication was established. The first researcher made observations during the interviews and recorded them on a voice recorder. Each interview lasted 50 minutes on average.

**Table 1.** Interview guide

| |
|---|
| Question 1. What does PA mean to you? |
| Question 2. Does anyone in your family do regular PA (walking, swimming, exercising at home, etc.)? If so, who are they? |
| Question 3. Is there any PA you are currently doing? Can you describe them? |
| Question 4. What are the factors that encourage/encourage you do PA? Why? |
| Question 5. Are there any restrictions preventing you from doing PA? If yes, what are they? |
| Question 6. Do you think PA is affecting your health? How? |
| Question 7. What should be done to increase the PA behavior of women in the community? How? |

PA: Physical Activity.

### Data Analysis

Mean ± standard deviation (SD), frequency and percentage were used to define the data on the descriptive characteristics of participants. Creswell's qualitative data analysis steps were followed for analysis (21). First, all interviews were transcribed into a Microsoft Office Word document. Demographic data, transcriptions, and field notes were entered into the NVivo-10 software for data organization and thematic analysis. The researchers read the transcripts several times to obtain a general idea of all the data. Codes were assigned to selected texts related to the study topic (called "nodes" in NVivo). Data expressing common concepts were assigned to the most appropriate nodes. The process continued until no new data could be added to the nodes, and subcategories were created. Then, general themes covering these subcategories were created. Finally, a report of the findings was produced (21).

It has been stated that credibility, transferability, confirmability, and dependability criteria should be sought for rigor in qualitative research (22). Credibility refers to the extent to which the interpretation of the data represents participants' experiences. The data and identified themes/sub-themes were discussed with the co-authors to check whether they represented participants' experiences. Transferability refers to the extent to which the study's results can be applied to other settings or groups and the number of informants (22). When selecting the sample, the sampling criteria were first determined. Then, a purposive sampling method based on volunteerism was used to obtain the participants' opinions and experiences to achieve transferability. We attempted to provide diversity regarding participants' demographic characteristics to ensure data diversity. Confirmability refers to the extent to which the study's findings are free from bias (22). The coding was conducted independently by two researchers. The intercoder scoring agreement was calculated (Kappa coefficient = 0.83), showing a very good level (23,24). Coding disagreements were resolved through discussion until a complete agreement was reached. The NVivo-10 software, which has an open audit trail, was used for dependability.

### Ethics Committee Approval

Before commencement, the approval of the Akdeniz University Faculty of Medicine Clinical Research Ethics Committee (no: 70904504/284; date: 04/20/2022) and the official permission of the Akdeniz Provincial Health Directorate were obtained for this study. Participants were given verbal and written information about the study's purpose, data collection methods, and confidentiality in accordance with the Declaration of Helsinki. All study documents were coded to ensure participant confidentiality (e.g., Participant 1: P1).

## RESULTS

### Participants' Characteristics

The mean age of all participants in this study was 43.30 ± 10.22 years (min = 30, max = 64). In addition, 85.0% were married, 55.0% were unemployed, and 50.0% had less income than their expenses. The participants' mean BMI was 35.57 ± 4.63 kg/m$^2$. In addition, 50.0% perceived their general health status as good, 55.0% did not have a chronic disease, and 70.0% did not smoke (Table 2).

**Table 2.** Descriptive characteristics (n=20)

| **Variables** | | **n** | **(%)** |
|---|---|---|---|
| Age (Mean ± SD) | 43.30 ± 10.22 | | |
| BMI (Mean ± SD) | 35.57 ± 4.63 | | |
| Marital status | Single | 3 | (15.0) |
| | Married/with partner | 17 | (85.0) |
| Family type | Nuclear family | 15 | (75.0) |
| | Extended family | 5 | (25.0) |
| Life expectancy in Antalya | Under 10 years | 3 | (15.0) |
| | 10 years and above | 17 | (85.0) |
| Education status | Primary school and below | 9 | (45.0) |
| | Middle school and high school | 5 | (25.0) |
| | Associate degree and above | 6 | (30.0) |
| Employment status | Yes | 9 | (45.0) |
| | No | 11 | (55.0) |
| Income status | Income less than expense | 10 | (50.0) |
| | Income equals expense | 7 | (35.0) |
| | Income more than expenses | 3 | (15.0) |
| Perceived health status | Very good | 1 | (5.0) |
| | Good | 10 | (50.0) |
| | Middle | 5 | (25.0) |
| | Poor | 4 | (20.0) |
| Presence of chronic diseases | Yes | 9 | (45.0) |
| | No | 11 | (55.0) |
| Smoking | Yes | 6 | (30.0) |
| | No | 14 | (70.0) |

BMI: Body Mass Index; SD: Standard Deviation

### Perspectives of Women with Overweight and Obesity on Physical Activity

This study presents the views of overweight or obese women regarding PA with 5 main themes and 37 sub-themes (Table 3).

**Table 3.** Main themes and sub-themes (n=20)

| Main themes | Sub-themes |
|---|---|
| Being healthy | Moving |
| | Losing weight |
| | Resting |
| Types of PA | Walking |
| | Exercising at home |
| | Vigorous exercises |
| | Swimming |
| | Exercising in the park |
| Encouragement | Health protection and maintenance |
| | Encouragement by family and relatives |
| | Encouragement by neighbors and friends |
| | Self-confidence and happiness |
| | Sharing responsibilities in the family |
| | Encouragement by health workers |
| | The effect of open spaces |
| | Better physical appearance |
| Unsatisfactory experiences | Pain and tiredness |
| | Neglect |
| | Cultural factors |
| | Lack of encouragement by family and environment |
| | Reluctance |
| | Environmental safety |
| | Climate |
| | Problems related to sports fields |
| | Health problems |
| | Being overweight |
| Preferences to increase PA | Increase the number of parks |
| | Sports areas and make sports centers free of charge or cheap |
| | Improving the environment of sports fields |
| | PA follow-up and education in FHCs |
| | Announcing sports events |
| | Peer support should be increased |
| | Reduce women's household tasks and workload |
| | Having a place in sports areas to engage children |
| | Rewarding those who do PA |
| | Doing PA in places where women gather |
| | Increasing scientific research on PA to promote it |

FHC: Family Health Center; PA: Physical Activity

Theme 1: Being Healthy

This theme covers the sub-themes of moving, losing weight, and resting. Most participants stated that PA meant moving. One woman said, "PA means general movement of the body to me" (P10, age 39, undergraduate). Three participants defined PA as losing weight. One woman said, "To me, PA means losing weight to be healthy" (P1, age 42, associate degree). Only one participant said she thought PA rested the body: "PA is something that relaxes people… Resting the body by moving… It is because people do not rest only when they sit" (P7, age 31, high school).

Theme 2: Types of physical activity

Under this theme, participants' current regular PAs were determined to be walking, exercising at home, vigorous exercises, swimming, and exercising in the park. Most participants said they went for a walk in different places, such as neighborhoods, parks, beaches, and mountains. For example, one woman said, "My husband and I often go walking along the beach" (P5, age 57, primary school). Fourteen participants stated they exercised at home, such as aerobics, weight-lifting, treadmill workouts, stationary bike workouts, Pilate's band exercises, and following exercise videos. One woman said, "I do stationary bike workouts at home. I try to do physical movements on the bike to strengthen my legs. I pedal on the bike by tying sandbags weighing 1-1.5 kg to my feet" (P18, age 64, primary school). About half of the participants stated they did vigorous exercises such as Pilates, Zumba, dancing, step movements, volleyball, and running. For example, one woman said, "We video call and do Zumba, salsa, and step movements with my friends" (P13, age 30, high school). Seven participants said they went swimming in the sea: "I go swimming in the afternoon on Thursdays and Sundays. I swim for two or three hours and come back" (P8, age 42, high school). A quarter of the participants stated they did PAs with sports equipment in the park. One participant said, "I use the sports equipment in the park. I am satisfied with them very much" (P19, age 37, primary school).

Theme 3: Encouragement

The sub-themes identified under this theme included health protection and maintenance, encouragement by family and relatives, encouragement by neighbors and friends, self-confidence, and happiness, sharing responsibilities in the family, encouragement by health workers, the effect of open spaces, and better physical appearance. All participants emphasized that health protection and maintenance were incentives for doing PA. Participants listed the effects of PA as losing weight, exercising muscles, preventing diseases, and reducing pain. For example, one participant said, "Movement preserves muscle structure. When your muscles are strong, you have no restriction of movement. You can do exercises more comfortably when you have no restrictions on movement. You lose weight. When you exercise, you will not have cardiovascular problems" (P11, age 39, undergraduate).

Almost all participants stated that their family/relatives and neighbors/friends influenced their decision to do PA. Two women's statements were as follows: "My daughter and son told me to go for a walk, attend sports programs, and never to mind the housework" (P12, age 58, literate); "I go walking with my friends and use sports equipment. They encourage me to do PA" (P19, age 37, primary school).

Most participants said that doing PA gave them self-confidence and happiness. One participant said, "Happiness hormones are released while doing PA. If I am engaged in doing exercise that I love, I like doing PA" (P10, age 39, undergraduate). Nine participants emphasized that sharing the care of children and elderly individuals at home and the household chores impacted their decision to do PA. One participant said, "When my husband comes home, he takes care of the children. When he takes care of the children, I can go for a walk for an hour" (P15, age 36, undergraduate).

One-fourth of the participants emphasized that healthcare professionals affected their decision to do PA. "Even my doctor's guidance helped me start doing PA" (P14, age 39, primary school). Three participants stated that open space affected doing PA: "Environments with flowers, insects, and trees increase engagement in walking" (P7, age 31, high school). Some participants emphasized the effect of doing PA on looking fit: "When people look at me, I can make them say my physical appearance is nice. I'm trying to make people say that" (P8, age 42, high school).

Theme 4: Unsatisfactory Experiences

The sub-themes identified under this theme were experiencing pain and tiredness, neglect, cultural factors, lack of encouragement by family and environment, reluctance, environmental safety, climate, problems related to sports fields, health problems, and being overweight. Almost all participants mentioned that they felt pain and tiredness while doing PA. For example, one participant said, "When I walk, I immediately start to get tired. My knees hurt" (P13, age 30, high school). It was determined that sixteen participants neglected themselves and postponed doing PA due to housework, job-related work, and caring for children or elderly individuals. One woman said, "I am busy preparing meals for the children and doing the laundry and dishes. Indeed, my children are older, but motherhood never ends. My husband is like a child, and as if there are three children at home, including him. When I try to help them and meet their needs, I cannot do PA" (P17, age 43, primary school).

Most participants stated that cultural factors, such as embarrassment, social pressure, and religious beliefs, negatively affected them doing PA. One woman said, "We live in a Muslim country. There is a need for environments where conservative women can exercise comfortably. We cannot do exercise comfortably in open spaces; it is as if everyone is looking at us" (P4, age 40, graduate). Eleven participants stated that their families and circles did not encourage them to do PA. One participant said, "If anyone around me encouraged me to go walking and do PA, and if there was such a person, I would be heartened. But there are no such people around me" (P16, age 44, undergraduate). About half of the participants stated they felt reluctant to do PA: "I promise myself that I will start doing PA with determination and I will succeed, but I lose motivation very quickly, and my desire to do PA is lost" (P10, age 39, undergraduate).

Nearly half of the participants stated that the low level of environmental safety negatively affected them doing PA. Participants emphasized dogs in parks and individuals consuming alcohol there and in neighborhoods as environmental safety issues. One participant said, "How safe can it be when young people come to the park with a beer in hand? When they bring the dogs and take off their leashes, the dogs fight with each other" (P11, age 39, undergraduate). Seven participants stated that climate affected doing PA: "Antalya city is extremely hot in summer; people do not want to do anything because of the heat. Excessive humidity also feels uncomfortable" (P15, age 36, undergraduate). A quarter of the participants mentioned problems related to the sports fields under the unsatisfactory experiences theme. In this theme, participants emphasized their discomfort with the common use of sports equipment in the parks and the stuffy indoor sports areas. One participant said, "There was a place opened by the municipality for PA. I went there, but it was very stuffy. I did not go there again" (P12, age 58, literate). Four participants stated that their health problems negatively affected them doing PA. One participant said, "Before my health deteriorated, I was very active. I did everything" (P6, age 54, primary school). Only three participants stated that being overweight negatively affected them doing PA: "Being overweight prevents me from doing PA. Weight challenges you" (P9, age 31, middle school).

Theme 5: Preferences to Increase PA

Participants emphasized their preferences to increase PA under this theme. Most participants stated that it was necessary to increase the number of parks and sports areas and make sports centers free of charge or cheap. One participant said, "For example, there should be gyms in every neighborhood. There should be gyms close to our homes" (P9, age 31, middle school). Another participant said, "Gyms may be free of charge, or they may charge a small fee" (P17, age 43, primary school).

More than half of the participants stated that improving the environment of sports fields could increase PA. One participant said, "There must be large areas, not small spaces. People should not get stuck in one place. If this is provided, women can do PA comfortably. There must be a certain quota. If there is no quota, there will be a crowd of people; women will not attend. People should come here in groups, and two hours should be given to each group" (P19, age 37, primary school).

Nearly half of the participants emphasized that PA follow-up and education in FHCs would positively affect increasing it. A participant said, "Women should be questioned and informed about PA once a year in FHCs" (P16, age 44, undergraduate). Four participants stated that announcing sports events was important to increase PA in society. One participant said, "Municipalities and neighborhood headmen should announce sports events. Posters should be distributed in the neighborhoods, people should be informed, and announcements should be made in the districts. I am sure it would be incredibly effective if sports events were announced several days a week" (P8, age 42, high school).

Four participants stated that peer support should be increased. One participant said, "For example, if someone in a friend environment encourages doing PA, others will follow it. The activity is planned, and PA is done together. Then maybe, women's PA may gradually increase" (P20, age 33, high school). Only three participants mentioned their preference to reduce women's household tasks and workload to increase PA. One participant said, "The working time of women can be shortened. They work not

only at work but also at home" (P4, age 40, graduate). Few participants discussed topics such as having a place in sports areas to engage children, rewarding those who do PA, doing PA in places where women gather, and increasing scientific research on PA to promote it.

## DISCUSSION

This study described and explained the perspectives on PA of adult women with overweight and obesity living in Türkiye's Western Mediterranean region. Its results, discussed based on the literature, can provide a good guide for Türkiye and similar countries with low PA rates.

The study's participants described PA as moving, losing weight, and resting to be healthy, consistent with the results of two published studies (25,26). Similarly, in a qualitative study, the importance of PA for health was explained as improving the body, increasing energy, reducing stress, and developing mentally and emotionally (27).

This study's participants mostly preferred walking, exercising at home, exercising vigorously, and swimming. In a study conducted in the USA, women stated that their PAs were doing housework, walking, dancing, and doing Tai Chi, respectively (27). Similarly, another study indicated that women went running, dancing, and swimming and did weight lifting, housework, and Zumba as PA (25). In a study conducted in India, women said they did outdoor activities or treadmill workouts, jogging, yoga, cycling, dancing, swimming, and housework (12). Our participants preferred walking more because they had less awareness about other activities, and Antalya's climate was suitable for walking, especially in the spring and winter. Despite the advantage of swimming in Antalya's city center, women preferred swimming less, possibly due to cultural factors and not knowing how to swim.

This study's participants emphasized the positive effect of PA on health and self-confidence and that the encouragement of their relatives and the recommendation of health personnel positively affected them doing PA. Consistent with this study, another study found that social interaction with individuals doing PA was a facilitating factor in doing it (26). Two studies conducted in Sweden and England stated that family support facilitated PA and that social interaction with the immediate environment was a strong motivating factor (28,29). Another study indicated that religious beliefs, family, and group environments encouraged women with overweight or obesity to do PA (27). A study on women in the UK found that PA improved physical and mental state and promoted doing PA (30). A quantitative study on women in Türkiye determined that being a member of health/fitness clubs encouraged doing PA (31).

In this study, most women's unsatisfactory experiences with PA were pain and tiredness, neglect, and cultural factors. Consistent with this study, another study found that participants' health problems, feeling tired, weather conditions, and the absence of a friend who did PA prevented them from doing PA (27). In a study conducted in Spain, diseases, economic difficulties, cultural factors, lack of social support, and lack of environmental security were barriers to doing PA (32). A study on Korean American women stated that tiredness, pain, and illness were barriers to doing PA (11). A study conducted in Saudi Arabia showed that women with obesity could not do PA due to cultural reasons and the inability to lose weight effectively (13). A study in China stated that unsuitable weather conditions, housework, and health problems prevented PA (26). A quantitative study conducted in Türkiye reported that paid sports facilities and their low number and cultural and sex-related factors negatively affected women's PAs (31). Cultural factors negatively affect women's PAs in Türkiye and should not be ignored. In this study, most participants stated that increasing the number of parks and sports areas, making them free or cheap, and encouraging PA behavior in FHCs to promote PA was necessary. One study stated that rewarding those who did PA, increasing group programs in gyms, providing electronic devices for individuals to monitor their PA levels, creating a health calendar, and sports trainers' knowledge, understanding, and caring would positively affect increasing PA (27). A study conducted in England determined that free sports facilities increased participation in PA (33). Another study emphasized that preparing fun and motivating PA programs accompanied by expert trainers was important to promote PA (28). While weather conditions are suitable in Türkiye, there are insufficient open areas for walking and PA activities, especially in big cities. In this study, the participants' recommendations to increase the number of parks and sports areas were based on this problem.

This study had strengths. The data meet strict criteria for accuracy and validity. The content of the data is valid because all participants spoke freely during the interviews and explained their views and experiences comprehensively. In addition, this study is the first qualitative study about physical activity with overweight and obese women. The limitation of the study is that it was conducted with overweight and obese women in a specific region of Türkiye. Therefore, the study findings cannot be generalized to Türkiye. Further studies are needed to assess the physical activity behaviors of overweight and obese women in other provinces of Türkiye.

## CONCLUSION

In conclusion, this study's findings are significant to help better understand the perspectives of middle-aged adult women regarding PA in detail. Our study determined that women with overweight and obesity mostly preferred walking outside and exercising at home. Women mostly emphasized that PA should be done for health, and that parks and sports areas should be increased for PA. They also stated that pain during physical activity, cultural factors and inadequate environmental safety negatively affect PA. These women, who are at high risk for chronic diseases, need to increase their current PA level and undertake different types of exercise in addition to walking to reduce their BMI. Women's knowledge and awareness of PA types can be enhanced by different training methods (e.g., mobile, web-based, or virtual reality training) and social media. The number of afforested walking areas, which are most preferred by women in Türkiye, should be increased. Local administrations should implement free/low-paid PA programs (e.g., Plates, yoga, or swimming) run by athletes or physiotherapists and increase sports areas that consider cultural values.

Ensuring that women, who have a fundamental role in forming healthy societies, undertake sufficient PA and have a normal BMI will contribute to developing healthy societies and reducing health costs.

**Acknowledgments:** The authors thank all the participants.

**Authors's Contributions:** Idea/Concept: M.Ş., A.T.İ.; Design: M.Ş., A.T.İ.; Data Collection and/or Processing: M.Ş., A.T.İ.; Analysis and/or Interpretation: M.Ş., A.T.İ.; Literature Review: M.Ş., A.T.İ.; Writing the Article: M.Ş., A.T.İ.; Critical Review: A.T.İ.

## REFERENCES


1. Prevalence of overweight and obesity among adults. World Health Organization [Internet]. [Updated: 2024; Cited: 2022 May 10]. Available from: https://www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-overweight-among-adults-bmi-=-25-(age-standardized-estimate)-(-).
2. Overweight and obesity causes and risk factors. National Hearth Lung and Blood Institute [Internet]. [Updated: 2022 March 24; Cited: 2023 April 14]. Available from: https://www.nhlbi.nih.gov/health/overweight-and-obesity/causes.
3. Benefits of physical activity. Centers for Disease Control and Prevention [Internet]. [Updated: 2023 August 1; Cited 2022 March 27]. Available from: https://www.cdc.gov/physicalactivity/basics/pa-health/index.htm.
4. Schutz D, Busetto L, Dicker D, Farpour-Lambert N, Pryke R, Toplak H, et al. European practical and patient-centred guidelines for adult obesity management in primary care. Obes Facts. 2019; 12: 40-66.
5. Castro EA, Carrac EV, Cupeiro R, López-Plaza B, Teixeira PJ, González-Lamuño D, et al. The effects of the type of exercise and physical activity on eating behavior and body composition in overweight and obese subjects. Nutrients. 2020; 12(2): 557.
6. Rodriguez J, Neyrinck AM, Kerckhoven M Van, Gianfrancesco MA, Renguet E, Bertrand L, et al. Physical activity enhances the improvement of body mass index and metabolism by inulin: A multicenter randomized placebo-controlled trial performed in obese individuals. BMC Med. 2022; 20(1): 110.
7. Kotarsky CJ, Johnson NR, Mahoney SJ, Mitchell SL, Schimek RL, Stastny SN, et al. Time-restricted eating and concurrent exercise training reduces fat mass and increases lean mass in overweight and obese adults. Physiol Rep. 2021; 9(10): e14868.
8. Churilla JR, Johnson TM, Richardson MR, Williams BD, Rariden BS, Boltz AJ. Mode of physical activity participation by body mass index: 2015 behavioural risk factor surveillance system. Res Sports Med. 2018; 26(2): 147-57.
9. Bastin A, Romain AJ, Marleau J, Baillot A. Health behaviours, intentions and barriers to change among obesity classes I, II and III. Clin Obes. 2019; 9(1): e12287.
10. Haskell W, Lee I, Pate R, Powell K, Blair S, Franklin B, et al. Physical activity and public health: Updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. Med Sci Sport Exerc. 2007; 39(8): 1423-34.
11. Choi JW, Cho J, Shin NM, Tsoh J. Exploring barriers to and facilitators of physical activity among Korean American women. West J Nurs Res. 2021; 43(9): 817-27.
12. Daniel M, Abendroth M, Erlen JA. Barriers and motives to PA in South Asian Indian immigrant women. West J Nurs Res. 2018; 40(9): 1339-56.
13. Alissa NA. Cultural challenges to weight management: A qualitative study of Saudi women's experiences. J Community Health Nurs. 2022; 39(1): 12-24.
14. Choi JW, Fukuoka Y. Does having a buddy help women with young children increase physical activity? Lessons learned from a pilot study. Women Health. 2019; 59(2): 115-31.
15. World Health Organization. World Health Organization European regional obesity report 2022. Copenhagen: World Health Organization Regional Office for Europe; 2022.
16. Health statistics yearbook 2019. Ministry of Health [Internet]. [Updated: 2024; Cited: 2021 April 20]. Available from: https://sbsgm.saglik.gov.tr/TR,82338/saglik-istatistikleri-yilligi-2019-yayinlanmistir.html.
17. Bradshaw C, Atkinson S, Doody O. Employing a qualitative description approach in health care research. Glob Qual Nurs Res. 2017; 4: 1-8.
18. Bal H. Qualitative research methods and techniques (applied-exampled). 1st ed. Istanbul: Kayhan Printing; 2016.
19. Sandelowski M. Whatever happened to qualitative description? Res Nurs Health. 2000; 23: 334-40.
20. Standards for reporting qualitative research a synthesis of recommendations. Equator Network [Internet]. [Updated: 2024; Cited: 2022 January 10]. Available from: https://journals.lww.com/academicmedicine/fulltext/2014/09000/Standards_for_Reporting_Qualitative_Research__A.21.aspx.
21. Creswell J. Qualitative inquiry & research design. 3rd ed. Thousand Oaks, CA: Sage Publications; 2013.
22. Lincoln YS, Guba EG. Naturalistic inquiry. Newbury Park, CA: Sage Publications; 1985.
23. McHugh ML. Interrater reliability: The kappa statistics. Biochemia Medica. 2012; 22(3): 276-82.
24. Gunbayi I. Developing a qualitative research manuscript based on systematic curriculum and instructional development. European Journal of Social Sciences Studies. 2018; 3(3): 124-53.
25. Vanden Bosch M, Wesley E, Strouse S. Perceptions of physical activity in middle-aged women with type 2 diabetes. West J Nurs Res. 2021; 43(7): 640-8.
26. Huang Y, Ng OL, Ha ASC. A qualitative exploration of facilitators and barriers to physical activity participation among Chinese retired adults in Hong Kong. I Int J Environ Res Public Health. 2022; 19(6): 3495.
27. Owusu C, Antognoli E, Nock N, Hergenroeder P, Austin K, Bennet E, et al. Perspective of older African-American and Non-Hispanic white breast cancer survivors from diverse socioeconomic backgrounds

toward physical activity: A qualitative study. J Geriatr Oncol. 2018; 9(3): 235-42.
28. Burton NW, Barber BL, Khan A. A qualitative study of barriers and enablers of physical activity among female Emirati University students. Int J Environ Res Public Health. 2021; 18(7): 3380.
29. Taylor C, Bhavnani V, Zasada M, Ussher M, Bick D. Barriers and facilitators to uptake and retention of inner-city ethnically diverse women in a postnatal weight management intervention: A mixed-methods process evaluation within a feasibility trial in England. BMJ Open. 2020; 10(7): e034747.
30. Lum KJ, Simpson EEA. The impact of physical activity on psychological well-being in women aged 45-55 years during the Covid pandemic: A mixed-methods investigation. Maturitas. 2021; 153: 19-25.
31. Emir E, Kucuk-Kilic S, Gurbuz B, Oncu E. Leisurely participation of Turkish women's: Constraints and facilitators. Turkiye Klinikleri J Sports Sci. 2022; 14(1): 69-78.
32. Sanz-Remacha M, García-González L, Sevil Serrano J, Generelo Lanaspa E, Aibar Solana A. Barriers to physical activity in disadvantaged population: A qualitative comparison between Roma and Non-Roma women. Res Q Exerc Sport. 2019; 90(4): 567-77.
33. Higgerson J, Halliday E, Ortiz-Nunez A, Brown R, Barr B. Impact of free access to leisure facilities and community outreach on inequalities in physical activity: A quasi-experimental study. J Epidemiol Community Health. 2018; 72(3): 252-8.

Araştırma Makalesi / Research Article

Sağlık Bilimlerinde Değer / Sağlık Bil Değer
Value in Health Sciences / Value Health Sci
ISSN: 2792-0542 sabd@duzce.edu.tr 2025; 12(5): 186-197
doi: https://dx.doi.org/10.33631/sabd.1443158

# Midwives' Thoughts on Professional Proficiency and Competency: A Qualitative Study

**Betul UNCU [1], Elif DOGAN [1], Rukiye DUMAN [2], Nurten KAYA [2]**

**ABSTRACT**

**Aim:** This study was conducted in a qualitative method in order to determine the thoughts of midwives on professional proficiency and competency.

**Material and Methods:** A preliminary study was conducted and the scores of 278 midwives from The Perceptions Empowerment in Midwifery Scale (PEMS) were determined. Between those individuals, 5 midwives with highest and 5 midwives with lowest PEMS score were chosen. The data were collected with the Midwife Descriptive Information Form and Semi-Structured Interview Form and online face-to-face interview method. The data recorded during the interview were evaluated by making frame analysis.

**Results:** The opinions of the midwives; themes of Proficiency ("Public Health", "Pregnancy", "Birth", "Postpartum", "Newborn", "Women", "Counseling", and "Research") and Competency ("General Competencies", "Pre-pregnancy and Antenatal", "Care during labor and birth", "Ongoing care of women and newborns") was evaluated. It was observed that there was high compatibility in Proficiency for the themes of "Pregnancy", "Birth" "Postpartum", "Newborn" and "Counseling" and in Competency for the themes of "General Competencies", "Antenatal" and "Care during labour and birth". While it was observed that there was low compatibility in Proficiency for the themes of "Public Health", "Women", "Research", and in Competence for the theme of "Pre-pregnancy".

**Conclusion:** While midwives consider themselves competent and proficient during pregnancy, childbirth and postpartum periods; limited mention of their competencies and proficiencies in community health, pre-pregnancy and research. Improvements can be made in the undergraduate education curriculum for areas where midwives do not feel proficiency and competency**.**

**Keywords:** Midwives; midwifery; professional competency; professional proficiency.

## Ebelerin Mesleki Yetkinlik ve Yeterliliğe İlişkin Düşünceleri: Kalitatif Bir Çalışma

**ÖZ**

**Amaç:** Bu çalışma ebelerin mesleki yetkinlik ve yeterliliğe ilişkin düşüncelerini belirlemek amacıyla kalitatif türde yapılmıştır.

**Gereç ve Yöntemler:** Ön araştırma yapılarak 278 ebenin Ebelik Mesleğinin Yetkileri ile İlgili Algı Ölçeği'nden aldıkları puanlar belirlendi. Bu kişiler arasından ölçek puanı en yüksek ve en düşük olan 5 ebe seçildi. Veriler Ebe Tanımlayıcı Bilgi Formu ve Yarı Yapılandırılmış Görüşme Formu ile çevrimiçi yüz yüze görüşme yöntemiyle toplanmıştır. Görüşme sırasında kaydedilen veriler çerçeve analizi yapılarak değerlendirilmiştir.

**Bulgular:** Ebelerin görüşlerinin; Yetkinlik için "halk sağlığı", "gebelik", "doğum", "postpartum", "yenidoğan", "kadın", "danışmanlık" ve "araştırma"; Yeterlilik için "genel yeterlilikler", "gebelik öncesi ve doğum öncesi", "doğum ve doğum sırasında bakım", "kadın ve yenidoğanın sürekli bakımı" temalarına uyumu değerlendirildi. Yüksek uyumun yetkinlik için "gebelik", "doğum", "postpartum", "yenidoğan" ve "danışmanlık"; yeterlilik için "genel yeterlilikler", "doğum öncesi" ve "doğum ve doğum sırasında bakım" temalarında olduğu, düşük uyumun yetkinlik için "halk sağlığı", "kadın" ve "araştırma", yeterlilik için "gebelik öncesi" temalarında olduğu görüldü.

**Sonuç**: Ebeler gebelik, doğum ve doğum sonu dönemlerde kendilerini yetkin ve yeterli görürken; toplum sağlığı, gebelik öncesi dönem ve araştırmaya ilişkin yetkinlik ve yeterliliklerinden sınırlı olarak bahsettiler. Ebelerin yetkinlik ve yeterliliklerini hissetmedikleri alanlara yönelik lisans eğitim müfredatında iyileştirmeler yapılabilir.

**Anahtar Kelimeler:** Ebeler; ebelik; mesleki yeterlilik; mesleki yetkinlik.

1 Istanbul University-Cerrahpasa, Institute of Graduate Studies, Istanbul, Türkiye.
2 Istanbul University-Cerrahpasa, Faculty of Health Science, Department of Midwifery, Istanbul, Türkiye.

Sorumlu Yazar / Corresponding Author: Rukiye DUMAN, e-mail: rukiye.duman@iuc.edu.tr
Geliş Tarihi / Received: 26.02.2024Kabul Tarihi / Accepted: 07.02.2025
*Bu çalışma sözel bildiri olarak sunulmuştur ve Türkçe dilinde tam metin olarak yayınlanmıştır (6. Uluslararası 7. Ulusal Ebelik Kongresi, 25-27 Eylül 2023, Ankara/Türkiye).

## INTRODUCTION

Midwifery, born from women's need for help in childbirth, is the oldest profession based on the existence of humanity (1). The necessity of basing midwifery, which is an ancient profession, on science and art has gained more importance today. The primary tool in the professionalization of midwifery is to determine the educational and professional standards of midwifery. The International Confederation of Midwives (ICM) updates and publishes guides based on constantly developing and changing research so that the standards and competency areas of midwifery education are known worldwide and can be put into practice (2). Midwifery education in Türkiye is given according to the Midwifery National Core Education Program (MNCEP), which is based on the basic competency and proficiency areas of ICM (3).

Turkish Language Association (TLA), defines proficiency as "state of being proficient, perfection" and competency as "state of being competent" or "special knowledge, competence that provides the power to do a job" (4). On Cambridge Dictionary proficiency is; "the ability to do something very well" for competency; It is defined as "an important skill that is needed to do a job (5). The World Health Organization (WHO) defined the definition of proficiency in midwifery as a skill framework that reflects the knowledge, attitude and psychomotor elements derived from midwifery practices (6). ICM, on the other hand, summarizes competency in midwifery as the minimum knowledge, skills and professional behavior required for a person to use the title of midwife (2). Competency is the results that determine effective performance. Proficiency is the behavior that must be shown to achieve these results. While competency shows the characteristics of the job in which the person is competent proficiency shows the characteristics of the person that make the person proficient in their job. In other words, while one defines what people can do, the other focuses on how they do it (7).

According to the literature (3,8), the proficiency areas of midwifery are "public health, pregnancy, birth, postpartum, newborn, woman, counseling and research". ICM has organized midwifery competencies under 4 interrelated categories. These; (1) general competencies, (2) pre-pregnancy and antenatal, (3) care during labor and birth, (4) ongoing care of women and newborns (2).

In order for midwives to fulfill their roles and responsibilities, they should be aware of their areas of proficiencies and competencies. There are quantitative studies examining the proficiency and competency of midwives (9-12). This type of research reflects the general judgments of midwives on their proficiency and competency. However, examining and understanding midwives' opinions on their own areas of proficiency and competency, along with the reasons behind and ways to improve them, will significantly contribute to identifying problems in this field and developing potential solutions. As a matter of fact, the reflection of the results obtained from qualitative research to practice is higher than that of quantitative research. However, it should be noted that qualitative and quantitative methods are complementary to each other rather than contradicting each other (13). Quality midwifery care for women and their relatives, families and society play a key role in protecting and improving health and also contributes to the solution of many socio-cultural problems. Benefiting from in-depth interviews conducted within the scope of this study; Midwives' views on proficiency and competency will be interpreted, problems in this regard will be determined and solution suggestions will be developed. This study was conducted in a qualitative design in order to determine the views of midwives on professional proficiency and competency. Below are the research questions:

-How are midwives' views on professional proficiency compatible with the literature?

-How are midwives' views on professional competency compatible with ICM's competencies?

## MATERIAL AND METHODS

### Type of the Study

This study, which has a qualitative research design, was conducted in March 2023 with 10 midwives working as midwives across Türkiye.

### Sample Selection

In the study, the sequential mixed design method was used to determine the midwives to be sampled. The sequential mixed design is a research design that is carried out first quantitatively, then qualitatively, or in reverse order of time. The outputs of the first research guide the implementation in the next phase (14). Perceptions of Empowerment in Midwifery Scale (PEMS) scores of the midwives within the scope of the research were determined in the unpublished study titled "Midwives' Perceptions of Empowerment in Terms of Relevant", which is the preliminary research of this study. The five midwives with the highest and lowest PEMS scores were included in the study and formed the sample of this study. The individual, professional characteristics and PEMS scores of these midwives are shown in Table 1. The codes P1, P2, …, and P10 were used for the participants.

### Data Collection Tools

***Midwife Descriptive Information Form:*** This form has been prepared in line with the literature and consists of 4 questions regarding the individual and professional characteristics of the participants (age, education, etc.) (8-15).

***Semi-Structured Interview Form:*** This form, prepared in the light of similar studies in the literature in order to reveal in depth the participants' perceptions of proficiency and competency in the field of midwifery, consists of 3 basic questions and 8 probe questions (Table 2) (8-15).

### Procedure

The first phase of this study was conducted with a total of 278 midwives who met the inclusion criteria between December 2022 to January 2023. Midwives were included in the study from seven geographical regions of Türkiye using the stratified sampling method from random sampling methods. The number of midwives included by region is as follows: Central Anatolia n=38, Eastern Anatolia n=39, Black Sea n=35, Southeastern Anatolia n=39, Aegean n=45, Marmara n=43, Mediterranean n=39. The study titled "Investigation of Perception of Empowerment in Midwifery in Terms of Related Variables" (16), which was conducted by collecting data on an online platform, determined the 5 midwives with the highest and lowest average scores on the 'Perceptions

Empowerment in Midwifery Scale' (PEMS). The determined midwives were contacted again via e-mail and their willingness to participate in the qualitative study was questioned and it was determined that 10 midwives wanted to participate in the study. The meeting hours were determined with these midwives and the interviews were held on the online platform in March 2023. In addition, a directive regarding the interview environment was prepared (calm and quiet, an environment where the participant was alone, etc.) and presented to the participants. Interviews were held via Zoom and Google Meet applications. The participants were told about the purpose of the research, that audio and video recordings would be taken, that the researcher could take notes when necessary, and that no harm would come to the interviewee due to the interview. In addition, it was explained that the statements of the participants and their names would not be disclosed anywhere and stated that if they wanted to end the interview, this would be respected. After the explanation was given, verbal and written consent (with the consent forms sent to their e-mails) was obtained from the participants who accepted the study. The interviews lasted approximately 45 minutes and were conducted by a researcher (BU) among the authors.

**Analysis and Evaluation of Data**

Data obtained from the interview were analyzed through frame analysis. Framework analysis, unlike quantitative research, is the ongoing interaction between data collection, analysis, and theory development, in which data collection and data analysis processes are sequential and the research process is not mutually exclusive (17). In the analysis of the data MAXQDA Analytics Pro qualitative data analysis program. The transcription was made in the first stage, taking into account the memory factor in Microsoft Word environment. A total of 82 pages of transcription was obtained. The voice recordings of the participants were listened twice, and the transcription was read. Within the scope of the framework analysis, the expressions of the participants were coded to the predetermined themes. In line with the literature, themes were determined according to the midwives' proficiency and competencies areas (2,3,8). Coding was done by the two authors (BU, ED). After coding, all the researchers got together and agreed on a set of codes to be applied to all transcripts. The codes were then grouped into clearly defined categories. Integrity was achieved by controlling the relationship between the sub-themes that make up the themes and the relationship of each theme with the others. The themes and sub-themes of these themes were created and presented in a hierarchical code map in Table 3.

In order to ensure the internal reliability (consistency) of the research, all the findings were given directly without comment. All four researchers analyzed the data by discussing, agreeing and deciding together. Interview data were stated in quotation marks and italicized in the findings section, exactly as stated. The number at the end of the statements corresponds to the number given to the interviewer; Low Score (LS) refers to the midwife with a low PEMS score, and High Score (HS) refers to the midwife with a high PEMS score.

**Ethical Aspect of the Study**

For the study, ethics committee permission (Date: 2023, Number: 115) was obtained from Istanbul University-Cerrahpasa Social and Human Sciences Research Ethics Committee. In addition, the participants were informed that their identity information would be kept confidential and that the data would only be used for this study. After the information was given, verbal and written consent (with the consent forms sent to their e-mails) was obtained from the participants who accepted the study. While reporting the data, coding (such as P1, P2, etc.) was used instead of the participant's name as shown in Table 1.

**Table 1.** Individual, occupational characteristics and the perceptions empowerment in midwifery scale sub-dimensions scores of midwive

| Participant | Age | Professional Experience (years) | Education Level | Worked Unit | City | SM* | Sk** | So*** | Interview duration (minute) |
|---|---|---|---|---|---|---|---|---|---|
| P1, LS¥ | 32 | 10 | Bachelor degree | Family Health Center | Ankara | 2.50 | 1.83 | 1.71 | 48 |
| P2, HSΩ | 33 | 10 | Bachelor degree | Delivery Room | Sanliurfa | 4.17 | 4.83 | 3.85 | 45 |
| P3, LS¥ | 33 | 9 | Bachelor degree | Gynecology Service | Ankara | 2.00 | 2.61 | 2.00 | 50 |
| P4, HSΩ | 27 | 6 | Bachelor degree | Delivery Room | Malatya | 4.17 | 4.33 | 4.29 | 40 |
| P5, HSΩ | 41 | 17 | Master's degree | Breastfeeding Outpatient Clinic | Kahramanmaras | 4.00 | 4.33 | 4.14 | 43 |
| P6, LS¥ | 33 | 8 | Bachelor degree | Family Health Center | Konya | 2.00 | 2.33 | 1.57 | 45 |
| P7, LS¥ | 28 | 5 | Bachelor degree | Gynecology Operating Room | Istanbul | 2.00 | 2.33 | 2.00 | 42 |
| P8, HSΩ | 31 | 5 | Bachelor degree | Delivery Room | Istanbul | 4.17 | 4.16 | 4.14 | 55 |

LS: Low score from the Perceptions Empowerment in Midwifery Scale (PEMS); ΩHS: High score from the PEMS; *Support and Management subscale of PEMS; **Skill subscale of PEMS; ***Source subscale of PEMS

**Table 2.** Semi-structured interview form

| |
|---|
| 1. Who is a midwife?<br>-What are the independent roles of the midwife? |
| 2. In which periods of a woman's life does the midwife play a role?<br>-Preconceptional period role<br>-Role in the pregnancy process<br>-The role of birth and postpartum period<br>-Role in the klimectarium period |
| 3. What is the role of the midwife in improving newborn health?<br>-Immunization<br>-Nutrition<br>-Growth-Development Tracking |

**Table 3.** Hierarchical code map of the created themes and their sub-themes

| Main-Theme/Theme | Sub-Theme | Codes |
|---|---|---|
| Proficiency | Public Health | Vaccination, screenings, nutrition, exercise, immunization, sexual health, sexual intercourse |
| | Pregnancy | Iron supplement, weight control, vaginal examination |
| | Birth | Manage, position, support, leading, trust, contraction, pain, hand skill |
| | Postpartum | Bleeding, breastfeeding, infection, abnormal condition, risk, problem, depression |
| | Newborn | Jaundice, pacifier, mastitis, diaper rash, breastfeeding, skin-to-skin contact, developmental delay, attachment, reflex, baby bottle |
| | Women | Breast cancer, menopause, marriage, menstrual cycle, puberty |
| | Counseling | Family planning, sexual life, breastfeeding, psychological support, psychosocial, anemia, tests, hygiene, anti-vaccine, complementary food, education |
| | Research | ---- |
| Competency | General Competencies | Blood pressure, injection, wound dressing, empathy skills, being patient, support staff, compassion, from the cradle to the grave, stages of a woman's life, medication administration, certificate, doing the profession with love |
| | Pre-pregnancy and Antenatal | Leopold's maneuvers, IUD (Intrauterine Device), ultrasound, nonstress test (NST), birth preparation class, information, trimester, pregnancy education, reproductive health, prenatal care, folic acid supplementation, sexually transmitted diseases, sexual activity during pregnancy |
| | Care during labour and birth | Wound care, episiotomy, induction, forceps, communication, contact, suturing, breathing exercises, hospital discharge |
| | Ongoing Care of Women and Newborns | Cervical cancer, exclusive breastfeeding, formula milk, vitamin d, uterine massage, pap smear test, breast examination, heel prick test, weight monitoring, percentile |

## RESULTS

### Findings Regarding Individual Characteristics

Ten midwives were included in the study. The age range of the participants was determined as 27-41 years, and the range of professional experience years was 5-17 years. When the education level was examined, it was understood that the midwives were mostly undergraduate graduates (n=7). It was determined that the working areas of midwives were the family health center (n=3), delivery room (n=3), gynecology operating room (n=2), breast milk and breastfeeding outpatient clinic (n=1), and gynecology service (n=1). The lowest score on the 'Support and Management' subscale of PEMS, which has a score range of 1–5 across all subscales, was 1.83, while the highest was 4.17. For the 'Skill' subscale, the lowest score was 1.83, and the highest was 4.83. In the 'Source' subscale, the scores ranged from a low of 1.57 to a high of 4.29 (Table 1).

### Findings Regarding Competency and Proficiency in Midwifery

In this qualitative study evaluating the competency and proficiency of the midwifery profession in Türkiye through the perspectives of midwives, the alignment with Proficiency themes (“Public Health”, “Pregnancy”, “Birth”, “Postpartum”, “Newborn”, “Women”, “Counseling” and “Research”) and Competency themes (“General Competencies”, “Pre-pregnancy and Antenatal”, “Care during labour and birth”, “Ongoing care of women and newborns”) was examined according to the views of 5 midwives with low PEMS scores and 5 midwives with high PEMS scores (Figure 1). In addition, the frequencies of the words obtained from the analysis of the interviews are shown in Figure 2.

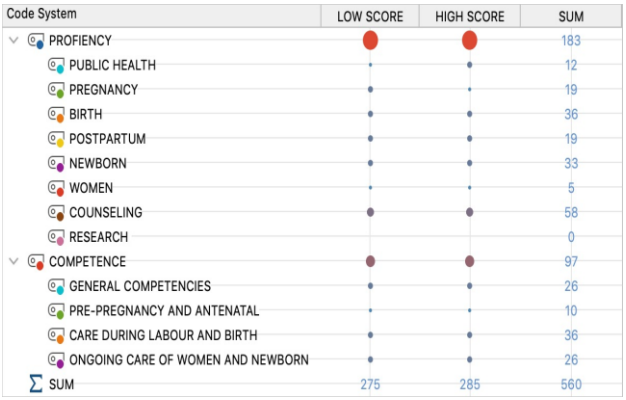



**Figure 1.** The views of 5 midwives with low PEMS scores and 5 midwives with high PEMS scores

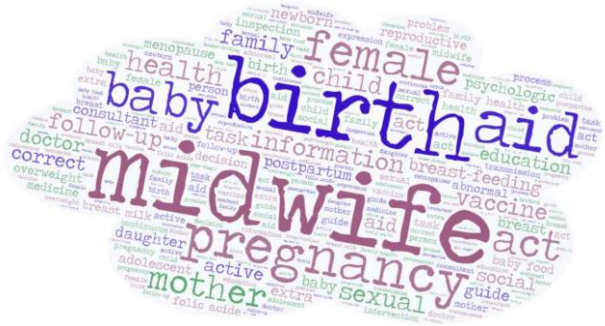



**Figure 2.** The frequencies of the words obtained from the analysis of the interviews

**Main theme 1. Areas of Proficiency According to Midwives**

***Sub-theme 1.1: Public Health***

It was observed that midwives mostly focused on sexual and reproductive health in their statements about public health, and they focused more on adolescents in this regard. Among the participant statements, it was determined that there was only one midwife who talked about public health, and her statement is given below.

*"So, the role of a midwife isn't confined to the delivery room, and the delivery room doesn't solely mean a midwife. I mean, whether it's pregnancy, the baby, or the woman, a midwife can play a role in any social setting." (P5, HS)*

***Sub-theme 1.2: Pregnancy***

Some of the midwives stated that they are mostly under the supervision and management of physicians in the care of the pregnancy period. In addition, most of the midwives stated that they are proficient in following and managing the pregnancy by mentioning the issues of maintaining the health of the fetus during pregnancy. They also talked extensively about their role in maternity schools. Sample statements of the participants are given below.

*"I personally provide training to pregnant women in pregnancy classes, informing them about childbirth, encouraging them, and teaching them about risky situations." (P2,HS)*

*"I'm not sure how to express it, but I don't have a complete understanding of it. I'm not a judge, but for example, abroad, midwifery is more defined, and midwives can do many things that doctors can do, such as writing prescriptions and performing ultrasound examinations. I wish it were the same here in Türkiye, but unfortunately, our roles are quite limited. As far as I know, our independent responsibilities here are limited to monitoring pregnancies, assisting in deliveries, and caring for newborns. I'm not sure if I'm wrong, but I know we don't have much independence in our practice." (P9,HS)*

***Sub-theme 1.3: Birth***

According to the statements of midwives, midwives in Türkiye consider themselves proficient in practice and decision-making, as in the example statement given below.

*"A midwife should be able to lead all births, regardless of the delivery method, whether it's breech, shoulder dystocia, or a twin pregnancy, whenever conditions allow. However, when the mother and newborn are at risk, a cesarean section may be necessary. In such cases, the midwife should be able to seek assistance from a doctor or other medical professionals." (P9,HS).*

Although some midwives state that they remain in the shadows of physicians depending on the nature of the institution they work for, they think that they should be brave and own the management of the birth. An example statement on this subject is below.

*"Regardless of the position, in some places, the doctor manages the birth, and the midwife only acts as an accompanist, especially in private hospitals. However, in state hospitals or maternity homes, the midwife plays the leading role—she takes on the role of the doctor and manages the birth entirely on her own. This is what I mean by the process." (P10, LS)*

***Sub-theme 1.4: Postpartum***

Midwives stated that they adopted their roles and responsibilities in the postpartum period. Breastfeeding, family planning, breast care, and mothers' support for their caregiver roles among the frequently mentioned topics. An example statement on this subject is below.

*"We need to follow up if the woman experiences depression during the postpartum period, which is very important. For example, we need to monitor bleeding, as I mentioned earlier. We should suggest uterine massage and discuss breast care. That's pretty much it, I think that's all I can remember. We also provide family planning methods during the postpartum period. I personally provide family planning methods. Women sometimes think they can continue their previous method while breastfeeding, so to prevent this, we ensure that every woman receives information about family planning. Each time they come in, we ask whether they are using family planning methods." (P1, LS)*

In addition, it was emphasized that the postpartum period is not limited to hospital care only, and the following example expression was chosen.

*"It is not only about the birth; the midwife also follows up with the mother during the puerperium, or postpartum period. I believe the midwife manages everything comprehensively, starting from the time a woman becomes pregnant and continuing through the postpartum period until the end of the six-week recovery phase." (P2, HS)*

***Sub-theme 1.5: Newborn***

As in the example statement below, it is seen that the midwives within the scope of the research are proficient in maintaining and promoting newborn health.

*"Here, we need to understand the baby's criteria very well and approach it scientifically. We need to monitor the weight. The midwife's role here is to be well-informed about the baby's developmental milestones. How much should the baby weigh at each month? After that, the growth charts guide us. At what age do social skills typically develop? What can happen during the so-called 'developmental leap' periods? It's essential to track these carefully." (P5, HS)*

It was observed that the midwives working in the family practice were quite proficient in maintaining the health of newborns.

*"When we consider midwives working in family medicine, they need to follow up on vaccinations. Well, information about this should be provided. It's related to the newborn… That's all." (P7, LS)*

*"The following segment in terms of growth and development is mostly our midwives working in PHCs from health care centers." (P8, HS)*

***Sub-theme 1.6: Women***

According to the statements of the midwives, it was determined that they were not aware of their proficiency in protecting and strengthening women's health. It was observed that they mostly acted in accordance with the physician's request.

*"She can give a smear test. She can get a mammogram. Other than that, I don't think there's much she can do." (P3, LS)*

Few of the midwives included in the research stated that they play a role in all phases of women's life and that they are proficient within the scope of maintaining health.

*"We are involved at all stages of a woman's life. For example, when a woman who has gone through menopause comes to us, I'm not referring to this as a therapeutic role, but rather during the information phase. We also inform women about vaginal infections. We support women in maintaining perineal hygiene, not just during childbirth or pregnancy, but at all stages." (P2, HS)*

***Sub-theme 1.7: Counseling***

Midwives have adopted their role in counseling, and it is seen that they are proficient in this field. Sample statements of the participants are given below.

*"First of all, it's a job in a social sense—understanding the woman. When you meet a woman, it's not just a patient-provider relationship. Sometimes, you need to understand her psychological state or evaluate her social circumstances. At times, you may act as a family counselor, a social counselor, or even a psychologist." (P5, HS)*

*"We still give advice on breastfeeding. We actually do a lot of training on this, but right now I can't think of all of them." (P6, LS)*

***Sub-theme 1.8: Research***

The midwives did not mention anything related to the research theme.

**Main theme 2. Competency in Midwifery**

***Sub-theme 2.1: General Competencies***

As seen in the example below, it was seen that the general competencies of midwives were mostly based on basic clinical skills.

*"To perform injections, dressings, simple suturing procedures; to carry out examinations and routine follow-ups for pregnant women, infants, and children; and to report non-routine situations to the doctor. To monitor the progress of normal births when working in places like delivery rooms, to assist during birth or manage the process, and to administer medications within the doses specified by law—though this typically involves only a few drugs. To support women during the postpartum period, provide baby follow-ups, and offer breastfeeding education. Additionally, if working in areas outside the scope of the midwifery profession, such as hospital wards, to act in accordance with the established procedures there." (P10, LS)*

Some participants stated that they could be assigned to nursing fields.

*"As midwives in the field, we can be assigned to work wherever nurses are. Well, since our professional role outside of childbirth primarily involves providing care, and nurses work in a similar way, I don't think there's much difference between the two professions apart from childbirth." (P7, LS)*

***Sub-theme 2.2: Pre-pregnancy and Antenatal***

***Pre-pregnancy***

In their statements, the midwives mentioned that they have more counseling and information roles in the pre-pregnancy period, and they did not mention the issues of protecting and maintaining health.

*"Well, if a pregnancy is planned, I suggest she complete her routine tests first. I recommend starting folic acid before the first three months. If she has anemia or a chronic illness, I inform her to address it. Or, if she's not planning a pregnancy, I also provide information about family planning methods—specifically for women." (P2, HS)*

*"She can prepare a woman who wants to get pregnant in every aspect: physiologically, psychologically, medically, and so on." (P4, HS)*

In addition, it was determined from the following statements that his competencies regarding the pre-pregnancy period were limited.

*"Can give warnings about dental health." (P1, LS)*

*"Well, first of all… what do I do when someone considering pregnancy comes to me? (Thinks for a long time.) Honestly, I don't know." (P7, LS)*

***Antenatal***

It was concluded from the statements of the midwives that they were sufficient during the pregnancy period. Example expressions are given below.

*"During pregnancy, we manage all the stages ourselves." (P2, HS)*

*"Monitoring supplements, vitamins, and weight gain during pregnancy; ensuring proper nutrition for the baby; following up on ultrasounds; gathering information about development; and providing necessary guidance. In certain months or when a problem is detected, development is assessed through blood tests to identify issues that can be detected this way. Additionally, routine measurements such as height, weight, and head circumference are used to check if development is progressing as expected." (P10, LS)*

*"Informing the patient about any abnormalities that may arise during a normal pregnancy, explaining what is normal and what is not, and conducting necessary checks at specific intervals. Guiding the patient on what to do in abnormal situations and explaining how to proceed in such cases. Providing preventive health services such as vaccinations. Recommending supplements like iron medications when needed. Preparing the patient for birth, providing information about the process, and explaining what to expect in the final weeks of pregnancy. In later months, also providing information on family planning methods. That's about it. There may be some details I've missed." (P6, LS)*

***Sub-theme 2.3: Care During Birth Labour and Birth***

Midwives stated that they were competent in managing the birth process, identifying risks and implementing emergency interventions. In addition, it was determined that they were competent in recognizing the emergency symptoms in the early postpartum period and making the necessary interventions.

*"She can manage the birth process… If necessary, she can assist during birth, and if required, repair an episiotomy or sutures. Most importantly, she can provide psychological support to the mother-to-be." (P8, HS)*

*"First of all, the midwife should check for bleeding. We also evaluate the patients to determine if there is an odor to the bleeding, whether it has a foul smell, or if there is an infection. We start vitamin D for babies and inform parents about when to begin it. We also advise them to schedule a hip ultrasound, hearing test, or eye examination for the baby." (P1, LS)*

***Sub-theme 2.4: Ongoing Care of Women and Newborns***

***Women***

In their statements about women, the midwives only mentioned their competencies for postpartum, menopause

and family planning services. Example statements are given below.

*"In the postpartum period…." (P8, HS)*

*"So I think they can give information about how the menopause begins and how it progresses." (P7, LS)*

*"And every time they come, we ask them whether they use family planning or not." (P1, LS)*

***Newborn***

Midwives stated that they have the competencies in line with the training they received within the scope of protection and maintenance of newborn health from birth. Example statements are below.

*"Improving newborn health, starting vitamin D, screening, how to give a bath after the umbilical cord falls off, and how it should be done—these are the topics we discuss. Beyond these, mothers often lack knowledge, such as room temperature, for example, which we also explain. Additionally, we provide breastfeeding education to help the baby nurse properly and avoid jaundice. If the baby appears very yellow initially, we recommend frequent breastfeeding. Then, for example, at the 9th month, we conduct a blood test, even though the newborn is still 0-3 months old." (P1, LS)*

*"Then, they should follow up on vaccinations. Whether at primary healthcare (PHC) or later at the hospital, they should be called in for vaccinations." (P3, LS)*

## DISCUSSION

This study was carried out to determine the opinions of midwives on competency and proficiency. It was observed that the midwives in the study worked in clinical areas that would express their opinions on competency and proficiency. It was determined that the statements obtained as a result of the interviews were partially compatible with the competencies determined by the ICM for midwives. The opinions of midwives within the scope of the research on competency and proficiency are discussed below, taking into account the literature.

By defining proficiency areas in midwifery, what midwives can do is expressed and according to the literature, midwives are proficient in the fields of "Public Health", "Pregnancy", "Birth", "Postpartum", "Newborn", "Women", "Counseling", and "Research" (8). It was observed that the expressions of the midwives within the scope of the research were significantly compatible with the proficiency themes.

The public health proficiencies of the midwife include providing quality and culturally appropriate care to women, newborns and families with children. In order for the midwife to provide optimal care for public health, they must have comprehensive knowledge of the subject such as obstetrics, gynecology, neonatology, social sciences, ethics, etc. Midwives are proficient in areas such as maintaining and promoting community health, counseling services, and family planning (18-20). In addition, the Royal College of Midwives (RCM) defines community health as trying to identify health risks and find the best ways to minimize them so that everyone has a chance to live a healthy life. It is known that midwives are proficient in protecting health (such as immunization, testing and screening), improving it (such as encouraging smoking cessation, and weight control) and being accessible (midwives always inform about public health) (21).

There are many studies documenting the services of midwives in family planning (22, 23). However, midwives within the scope of the research, such as nutrition, physical activity and exercise, regular sleep, mental and social health; they did not mentioned about issues such as breast self-examination and cancer screenings in terms of maintaining health. In addition to these listed health indicators, midwives are advocates of women's rights, and within the scope of this role, they also take part in issues such as the protection of women's rights and the fight against domestic violence. As a result, the midwives in the study did not mention most of their proficiencies related to public health.

Although midwives play an important role in public health, they may not be sufficiently aware of their contributions as a result of providing these services continuously and making them part of their professional routine. This may lead to them not adequately expressing the impact and importance of their professional activities on public health.

A meta-analysis showed that women need midwife support during pregnancy and that pregnant women who receive midwife support have a reduced risk of preterm birth (24). In this study, although midwives considered themselves proficient in the care of women during pregnancy, it was observed that they complained about being dependent on physicians during follow-up.

Midwives play an important active role during pregnancy, providing various care and support services. However, the fact that physicians are the determining factors in the procedures performed, such as prescribing and using ultrasound, may cause midwives to underestimate their own competence. This situation shows that midwives need to better understand the value of the care and services they provide and the importance of their own contributions.

It is seen that women who gave birth in China, where techniques and practices to facilitate birth are applied in addition to midwife support during birth, are satisfied with the experience of birth accompanied by a midwife (25). Contrary to this situation, it is understood that quality midwifery care cannot be maintained in Germany. Midwives in Germany think that they should be free in maternity care and management, similar to the findings of this research. In a study, it is suggested that the areas of proficiency between midwives and obstetricians should be defined more clearly under the guidance of examples from other European countries (26). According to another study conducted in Germany, women preferred to give birth in centers with physicians, despite their concerns, instead of birth under the leadership of midwives (27). According to the results of a study conducted in the Netherlands with in-depth interview techniques with 20 midwives, obstetricians affect midwives' attitudes during childbirth (28). In a qualitative study conducted with mothers who gave birth in Türkiye, it was seen that women needed social support throughout the birth process and the positive effect of midwife support was mentioned (29). Although midwife support is available for all births in Türkiye, physicians take their wages according to the insurance system and it is seen as if all births are done by physicians. This situation limits the inclusion of midwifery care as an indicator among health data (30). In this study, midwives reported that they were proficient in childbirth, but they

said that there was a physician-centered approach in practice.

According to the results of a study conducted with midwives in Sweden, when the risks of adverse outcomes increase or complications occur in the postpartum period, women are referred to medical doctor-led care (31). In this study, midwives frequently mentioned the postpartum breastfeeding issue, talked about the monitoring of the mother's mental state, and was seen as a field of proficiency in the postpartum period.

The fact that midwives frequently emphasize breastfeeding is a positive reflection of their participation in breastfeeding certification programs offered by the ministry. This situation shows the impact of certification programs on increasing midwives' knowledge and skills regarding breastfeeding and the development of their competence in breastfeeding.

It is known that as a result of the delivery made by the midwife, the rates of breast milk intake of the newborn increase, the admission of the newborn to the intensive care unit decreases, and the length of hospital stay is shortened (32). In this study, midwives considered themselves proficient in protecting, maintaining and promoting newborn health.

In addition, the emphasis on newborn and child health courses in midwifery education has been effective in increasing the knowledge and skills of midwives in this area. On the other hand, the NRP (Neonatal Resuscitation Program) certification program offered by the ministry for midwives may have increased their competence in this area and made them feel more competent.

The midwife's proficiencies regarding women include protecting women's human rights, informing and encouraging her to make independent decisions on their own issues. Midwives imbue a sense of empowerment in women through the care they provide as human rights defenders (33). In a study, midwives emphasized the importance of a relationship based on trust while giving care to women, and said that besides the woman, significant other people and the family should also take part in this relationship (34). The midwives within the scope of the research talked less about the empowerment of women by evaluating them in their social life, and they focused more on pregnancy, birth and newborn issues.

Reasons why midwives do not talk enough about women's rights may include their focus on clinical services and lack of training or knowledge on the subject. In addition, the influence of health institutions and societal norms may limit their awareness of women's rights.

Counseling proficiencies of the midwife include healthy nutrition, advice of iron and folic acid supplements, exercise, immunization, prevention of sexually transmitted infections and family planning methods, care in case of stillbirth, neonatal death, congenital malformations within the scope of health protection and promotion (2). In a study, weight control and physical activity counseling were found to be effective in obese pregnant women in midwife counseling (35). Although midwives describe themselves as proficient in counseling, they state that they mostly provide counseling on issues such as pregnancy and breastfeeding. Midwives provide the most counselling services and therefore may have generally under-reported the importance and impact of these services. However, the fact that counseling activities are largely limited to breastfeeding and pregnancy suggests that this may be related to the area in which midwives work.

Midwives' research not only provides autonomy, leadership and expertise in their professional practice, but also contributes to the development of research skills and the use of evidence (36). The midwives in this study did not mention the research subject at all, and this was interpreted as a negative result. The fact that midwives are uninterested in research and that research is not mentioned among the independent roles of the midwife is an important issue that needs to be emphasized. This has a negative impact on professional development and specialization. Midwives may not feel c proficiency in conducting research because factors such as lack of emphasis on research methods in midwifery education, lack of experience, lack of resources and support, time constraints and difficulties in professional practice conditions may prevent them from developing their skills in this area. It is thought that increasing the postgraduate education programs in midwifery and supporting the participation of midwives in these programs will improve the proficiencies and competencies of midwives for research.

Competency in midwifery refers to how midwives perform their roles, duties, and responsibilities. According to ICM, midwifery competencies are categorized into four main areas: (1) general competencies, (2) pre-pregnancy and antenatal care, (3) care during labor and birth, and (4) ongoing care of women and newborns.

For general competency in midwifery, ICM states that midwives take responsibilities in health matters, make efforts to improve themselves and the midwifery profession, follow scientific research, support basic human rights in midwifery care, comply with laws, comply with determined ethical codes and rules, care about women's individual choices in care, accept the woman that they are in interaction with her family, medical team and society, facilitates the normal birth processes, evaluates the general health and well-being of women and newborns, prevents and treats problems related to reproductive health from the early period, when necessary; recognizes the related complications and refers them on time, gives care to the women who are exposed to physical and sexual violence and abuse (2).

In a study conducted in New Zealand and Scotland, it was suggested that the assessment of midwives' proficiency levels would have a risk-reducing effect on maternal and newborn mortality and morbidity (37). According to Huang et al. (38), midwives have a high perception of general competency. However, in another study, midwives with more than 5 years of experience stated that although they considered themselves competent, newly graduated midwives lacked a sense of independence and lacked care and task sharing skills (39). The general competencies of the midwives within the scope of this study were mostly based on basic clinical skills, in this context, they considered themselves competent in evaluating general health and well-being for women and newborns, preventing and counseling problems related to reproductive health from the adolescence period, and protecting and maintaining newborn health. Midwives demonstrate high proficiency in clinical skills because

midwifery education has certain criteria, and these criteria require intense skill. This comprehensive practice-based education greatly contributes to midwives developing their clinical skills and achieving a high level of competence in practice. However, they did not remember the issues of developing their profession and following scientific research, giving care to women who were exposed to physical and sexual violence and abuse. This may be due to a lack of knowledge and awareness of these issues, inadequate educational opportunities, or the fact that these issues are overshadowed by daily professional duties.

According to ICM, midwives diagnose the health status of women before and during pregnancy, monitor the pregnancy process and wellness of the fetus, identify and manage complicated pregnancies, improve women's positive health behaviors, provide guidance on pregnancy, childbirth, breastfeeding and parenting, provides care on unwanted pregnancies. In a qualitative study, it was found that the counseling provided by midwives during pregnancy reduced the obstetric complications encountered during pregnancy and delivery (40). In another study conducted in Kenya, it was emphasized that midwives should be active before and during pregnancy (41).

Midwives within the scope of this study did not talk about determining the health status of women before pregnancy, developing behaviors that will positively affect pre-pregnancy health, managing complicated pregnancies and providing care in unwanted pregnancies for the topic of providing pre-pregnancy care. Despite their low adoption of pre-pregnancy competencies, midwives were generally aware of their pregnancy-related competencies. It was thought that motivations were damaged due to the limited access of midwives to women in the pre-pregnancy period and being in the shadows of doctors during pregnancy, and this situation was effective in the results of this study.

Among the competencies of the midwife are supporting the physiology of the pregnant and normal birth, being an advocate for normal birth, protecting the consent of the pregnant woman, encouraging evidence-based practices such as reducing unnecessary interventions, evaluating and diagnosing the pregnant woman and acting, counseling and referral, and emergency interventions (2). According to ICM, midwives support the woman psychologically during childbirth, ensure safe vaginal delivery and prevent complications, and provide newborn care immediately after delivery. In a qualitative study, it was reported that midwives are aware of their competency in the birth process (42).

In this study, midwives found themselves sufficient in birth. Obligatory criteria for graduation in the midwifery education process in Türkiye have been defined and in this context, midwifery students are required to have 40 births during midwifery education. It is thought that the competency of midwives at birth is closely related to this situation.

It has been reported that the midwife should take a role in providing care to the mother regarding the end of the birth and preventing deviations from normal, providing information on family planning, care of the newborn baby, and the importance of breast milk. Midwives are competent in newborn care and nutrition, detection and prevention of complications, and newborn follow-up (2). In a study investigating the level of knowledge of midwives about postpartum complications and newborn care, it was found that midwives were most knowledgeable about postpartum hemorrhage and breastfeeding (43). Similarly, in a systematic review, it is reported that the majority of midwives support breastfeeding with a professional attitude (44). In another study, it was reported that midwives considered themselves competent to manage postpartum complications, especially postpartum hemorrhage (45).

In this study, midwives considered themselves competent in breastfeeding and breast milk, newborn care, and family planning, but they think they do not have that much knowledge about women's health. Although there is a shortage of 900,000 midwives globally, there are 56,352 midwives in Türkiye and there are 6.75 midwives per 10,000 people (46, 47). A limited number of midwives prioritize some of their roles and may overlook some requirements, especially on women's health, because they do not have time. The result obtained is thought to be a situation related to missing care. Midwives may not see themselves as competent in women's health because the emphasis on pregnancy, birth, postpartum and newborn skills in midwifery undergraduate education may often prevent them from having more comprehensive training and practice opportunities in this field.

The study was limited by the fact that it was conducted with midwives with the highest and lowest PEMS scores. The views of midwives with intermediate scores were not included. The statements of midwives may be affected by differences in their study areas and geographical regions. The fact that the interviews were conducted on an online platform caused limitations for participants with internet access problems.

## CONCLUSIONS

It is thought that studies on competency and proficiency in midwifery will contribute to the individualization of care, ensuring its continuity, increasing its quality and determining the points that need to be developed. Midwives mostly focus on childbirth in the areas of proficiency and competency related to women. Midwives think that they are more proficient and competent in the units they work in and stated that they have become less skilled in other areas of midwifery. In line with these results, the following can be suggested:

- Midwives' perceptions of proficiency and competency should be strengthened.
- Improvements can be made in the undergraduate education curriculum for areas where midwives do not feel proficiency and competency.
- Future studies examining midwives' perceptions of proficiency and competency can be designed by taking regional differences into account.

**Acknowledgements**

We acknowledged all the midwives who participated in the study.

**Authors's Contributions:** Idea/Concept: B.U., E.D., N.K.; Design: B.U., E.D., R.D; Data Collection and/or Processing: B.U., R.D; Analysis and/or Interpretation: B.U.; Literature Review: E.D.; Writing the Article: B.U., E.D., R.D., N.K.; Critical Review: İ B.U., E.D., R.D., N.K.

**REFERENCES**


1. Karahan N. Midwifery history. In: Kaya N, editor. Philosophy of midwifery. Istanbul: Academy Press and Publishing; 2022. p. 7-34.
2. The International Confederation of Midwives (ICM). The international confederation of midwives (ICM) essential competencies for midwifery practice framework. 2019. Available from: https://internationalmidwives.org/our-work/policy-and-practice/essential-competencies-for-midwifery-practice.html
3. Yok.int [Internet]. Council of Higher Education (Türkiye). Midwifery National Core Education Program (MNCEP) 2016. [Updated: 2016; Cited: 2023 October 9]. Available from: https://www.yok.gov.tr/Documents/Kurumsal/egitim_ogretim_dairesi/Ulusal-cekirdek-egitimi-programlari/ebelik.pdf. 2016
4. Tdk. int [Internet]. Turkish Language Association; 2023. [Updated: 2023; Cited: 2023 October 9]. Available from: https://sozluk.gov.tr/
5. Camb. int [Internet]. Cambridge Dictionary; 2023. [Updated: 2023; Cited: 2023 October 9]. Available from: https://dictionary.cambridge.org
6. Who. int [Internet]. World Health Organization. Regional Office for Europe. Nurses and midwives for health: WHO European strategy for nursing and midwifery education: Section 1–8: guidelines for Member States on the implementation of the strategy. 2001. World Health Organization. Regional Office for Europe. [Updated: 2001; Cited: 2023 October 9]. Available from: https://iris.who.int/handle/10665/108405
7. Güdücü N. International midwifery competencies and accreditation of midwifery education. In: Kaya N, editor. Philosophy of midwifery. Istanbul: Academy Press and Publishing; 2022. p. 97-140.
8. Çolak MB, Can HÖ. Competence, competency and use of technology in midwives. Turkiye Klinikleri J of Health Sci. 2021; 6(2): 340-9. https://doi.org/10.5336/healthsci.2020-75575
9. Matthews A, Scott PA, Gallagher P. The development and psychometric evaluation of the perceptions of empowerment in midwifery scale. Midwifery. 2009; 25(3): 327-35. https://doi.org/10.1016/j.midw.2007.02.006
10. Murat Öztürk D, Sayıner FD, Bayar A. Turkish adaptation of perceptions of empowerment in midwifery scale: validity and reliability study. Gümüşhane University J of Health Sci. 2018; 7(1): 28-34.
11. Lukasse M, Pajalic Z. Norwegian midwives' perceptions of empowerment. Sexual & reproductive healthcare: Official Journal of the Swedish Association of Midwives. 2016; 7: 58-64. https://doi.org/10.1016/j.srhc.2015.11.010
12. Tallam EC, Kaura D, Mash R. Self-perceived competency of midwives in Kenya: A descriptive cross-sectional study. African Journal of Primary Health Care & Family Med. 2022; 14(1): e1–e9. https://doi.org/10.4102/phcfm.v14i1.3477
13. Choy LT. The strengths and weaknesses of research methodology: Comparison and complimentary between qualitative and quantitative approaches. IOSR J of Humanities and Social Sci. 2014; 19(4): 99-104.
14. Tashakkori A, Johnson RB, Teddlie C. Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences (2nd ed.). Thousand Oaks, CA: SAGE Publications 2021.
15. Gökduman Keleş M, Altinkaya S. The opinions of midwives about their competence: A qualitative study. J of Health Sci. 2022; 31(2): 145-51. https://doi.org/10.34108/eujhs.915118
16. Doğan E, Duman R, Uncu B, Kaya N. Investigation of perception of empowerment in midwifery in terms of related variables. Atlas Journal of Medicine. 2025; 5(12). https://doi.org/10.54270/atljm.2025.73
17. Gale NK, Heath G, Cameron E, Rashid S, Redwood S. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. BMC Medical Research Methodology. 2013; 13: 117. https://doi.org/10.1186/1471-2288-13-117
18. Kessler JL, Phillippi JC. Incorporating a primary care practicum in midwifery education. Journal of Midwifery & Women's Health 2015. 60(3): 258-62. https://doi.org/10.1111/jmwh.12296
19. McNeill J, Doran J, Lynn F, Anderson G, Alderdice F. Public health education for midwives and midwifery students: a mixed methods study. BMC Pregnancy and Child. 2012; 12: 142. https://doi.org/10.1186/1471-2393-12-142
20. Nove A, Ten Hoope-Bender P, Boyce M, Bar-Zeev S, de Bernis L, Lal G, et al. The state of the world's midwifery 2021 report: findings to drive global policy and practice. Human Resources for Health 2021; 19(1): 146. https://doi.org/10.1186/s12960-021-00694-w
21. rcog. int [Internet]. Royal College of Midwives (RCOG). Midwives and public health. 2023. [Updated: 2023; Cited: 2023 October 9]. Available from: https://www.rcm.org.uk/promoting/professional-practice/midwives-public-health/
22. Botfield JR, Tulloch M, Contziu H, Bateson D, Phipps H, Wright SM, et al. Who is responsible for postpartum contraception advice and provision? The perspective of hospital-based maternity clinicians in New South Wales, Australia. The Australian & New Zealand J of Obstetrics & Gynaecology. 2022; 10.1111/ajo.13627. Advance online publication. https://doi.org/10.1111/ajo.13627
23. Yurdakul M, Ardıç Çobaner A. A qualitative resarch on the changing role of family health centers' midwives and nurses in family planning services. Inter. Refereed J of Gynaecological Diseases and Maternal Child Health 2016; 6: 34-47. https://doi.org/10.17367/JACSD.2016619468
24. East CE, Biro MA, Fredericks S, Lau R. Support during pregnancy for women at increased risk of low birthweight babies. The Cochrane Database of Systematic Reviews 2019; 4(4): CD000198. https://doi.org/10.1002/14651858.CD000198.pub3
25. Liu Y, Li T, Guo N, Jiang H, Li Y, Xu C, et al. Women's experience and satisfaction with midwife-

led maternity care: a cross-sectional survey in China. BMC Pregnancy and Child. 2021; 21(1): 151. https://doi.org/10.1186/s12884-021-03638-3
26. Lohmann S, Mattern E, Ayerle GM. Midwives' perceptions of women's preferences related to midwifery care in Germany: A focus group study. Midwifery. 2018; 61: 53-62. https://doi.org/10.1016/j.midw.2018.02.005
27. Gerzen L, Tietjen SL, Heep A, Puth MT, Schmid M, Gembruch U, et al. Why are women deciding against birth in alongside midwifery units? A prospective single-center study from Germany. J of Perinatal Med. 2022; 50(8): 1124-34. https://doi.org/10.1515/jpm-2022-0041
28. Zondag LDC, Maas VYF, Beuckens A, Nieuwenhuijze MJ. Experiences, beliefs, and values influencing midwives' attitudes toward the use of childbirth interventions. J of Midwifery & Women's Health .2022; 67(5): 618-25. https://doi.org/10.1111/jmwh.13392
29. Demir R. Women's social support preferences and experiences at birth: A qualitative study. Balikesir Health Sci. J. 2023; 12 (1): 201-10. https://doi.org/10.53424/balikesirsbd.1125091
30. hacettepe.int [Internet]. Türkiye Demographic and Health Survey (TDHS). Türkiye demographic and health survey advanced analysis report. hacettepe university institue of population studies, republic of Türkiye ministry of health. 2018. [Updated: 2018; Cited: 2023 October 9]. Available from: https://fs.hacettepe.edu.tr/hips/dosyalar/Ara%C5%9Ft%C4%B1rmalar%20-%20raporlar/2018%20TNSA/TNSA_2018_ileri_analiz_raporu.pdf
31. Eikemo R, Vikström A, Nyman V, Jonas W, Barimani M. Support during the postnatal period: Evaluating new mothers' and midwives' experiences of a new, coordinated postnatal care model in a midwifery clinic in Sweden. Scandinavian J of Caring Sci. 2023; 37(1): 260-70. https://doi.org/10.1111/scs.13103
32. Dani C, Papini S, Iannuzzi L, Pratesi S. Midwife-to-newborn ratio and neonatal outcome in healthy term infants. Acta Paediatrica (Oslo, Norway: 1992). 2020; 109(9): 1787-90. https://doi.org/10.1111/apa.15180
33. Menage D, Bailey E, Lees S, Coad J. Women's lived experience of compassionate midwifery: Human and professional. Midwifery. 2020; 85: 102662. https://doi.org/10.1016/j.midw.2020.102662
34. Bradfield Z, Hauck Y, Kelly M, Duggan R. "It's what midwifery is all about": Western Australian midwives' experiences of being 'with woman' during labour and birth in the known midwife model. BMC Pregnancy and Child. 2019; 19(1): 29. https://doi.org/10.1186/s12884-018-2144-z
35. Gonzalez-Plaza E, Bellart J, Arranz Á, Luján-Barroso L, Crespo Mirasol E, Seguranyes G. Effectiveness of a step counter smartband and midwife counseling intervention on gestational weight gain and physical activity in pregnant women with obesity (pas and pes study): randomized controlled trial. JMIR Mhealth and Health. 2022; 10(2): e28886. https://doi.org/10.2196/28886
36. Goemaes R, Beeckman D, Goossens J, Shawe J, Verhaeghe S, Van Hecke A. Advanced midwifery practice: An evolutionary concept analysis. Midwifery. 2016; 42: 29-37. https://doi.org/10.1016/j.midw.2016.09.004
37. Gilkison A, Rankin J, Kensington M, Daellenbach R, Davies, L, Deery R, Crowther S. A woman's hand and a lion's heart: Skills and attributes for rural midwifery practice in New Zealand and Scotland. Midwifery. 2018; 58: 10916. https://doi.org/10.1016/j.midw.2017.12.009
38. Huang J, Lu H, Li J, Zhou N, Zang Y, Ren L, Wang J. Comparison of midwives' self-perceived essential competencies between low and high maternal mortality ratio provinces in China. J of Clinical Nurs. 2020; 29(23-24): 4733-47. https://doi.org/10.1111/jocn.15514
39. Netshisaulu KG, Maputle MS. Expected clinical competence from midwifery graduates during community service placement in Limpopo province, South Africa. Health SA=SA Geson. 2018; 23: 1166. https://doi.org/10.4102/hsag.v23i0.1166
40. Siegle A, Sayn-Wittgenstein FZ, Roes M. Sustainability of hospital-based midwife-led antenatal care consultation - a qualitative study. BMC Health Services Res. 2021; 21(1): 858. https://doi.org/10.1186/s12913-021-06863-w
41. Shikuku DN, Tanui G, Wabomba M, Wanjala D, Friday J, Peru T, et al. The effect of the community midwifery model on maternal and newborn health service utilization and outcomes in Busia County of Kenya: a quasi-experimental study. BMC Pregnancy and Chil. 2020; 20(1): 708. https://doi.org/10.1186/s12884-020-03405-w
42. Aune I, Amundsen HH, Skaget Aas LC. Is a midwife's continuous presence during childbirth a matter of course? Midwives' experiences and thoughts about factors that may influence their continuous support of women during labour. Midwifery. 2014; 30(1): 89-95. https://doi.org/10.1016/j.midw.2013.02.001
43. Adams YJ, Ray HE, Sladek L, Amason J. Knowledge of immediate newborn care and management of complications among midwives in Ghana. Midwifery. 2023; 121: 103654. https://doi.org/10.1016/j.midw.2023.103654
44. Swerts M, Westhof E, Bogaerts A, Lemiengre J. Supporting breast-feeding women from the perspective of the midwife: A systematic review of the literature. Midwifery. 2016; 37: 32-40. https://doi.org/10.1016/j.midw.2016.02.016
45. Adams YJ, Sladek L. A descriptive, cross-sectional study of postpartum education: midwives' self-reported knowledge and teaching of postpartum complications in Ghana. Rep. Health. 2022; 19(1): 77. https://doi.org/10.1186/s12978-022-01376-z
46. who. int [Internet]. World Health Organization (WHO). New report sounds the alarm on global shortage of 900 000 midwives. 2021. [Updated: 2021; Cited: 2023 October 9]. Available from: https://www.who.int/news/item/05-05-2021-new-report-sounds-the-alarm-on-global-shortage-of-900-000-midwives

47. unfpa. int [Internet]. United Nations Population Fund (UNFPA). The state of the world's midwifery. 2021. [Updated: 2021; Cited: 2023 October 9]. Available from: https://www.unfpa.org/sowmy

Araştırma Makalesi / Research Article

Sağlık Bilimlerinde Değer / Sağlık Bil Değer
Value in Health Sciences / Value Health Sci
ISSN: 2792-0542 sabd@duzce.edu.tr 2025; 15(2): 198-203
doi: https://dx.doi.org/10.33631/sabd.1586413

# İntörn Hemşirelik Öğrencilerinin Çocuk İstismarı ve İhmaline Yönelik Bilgi Düzeyleri ve İlişkili Faktörler

Fadime ÜSTÜNER TOP[1], Hasan Hüseyin ÇAM[2]

**ÖZ**

**Amaç:** Araştırmanın amacı intörn hemşirelik öğrencilerinin çocuk istismarı ve ihmalinin belirti ve risklerini tanılamaya ilişkin bilgi düzeylerini belirlemek ve ilişkili faktörleri incelemektir.

**Gereç ve Yöntemler:** Araştırma tanımlayıcı ve ilişkisel tasarım tipte olup, bir sağlık bilimleri fakültesinin hemşirelik bölümü intörn öğrenciler ile gerçekleştirildi. Araştırmaya 126 öğrenci katılmıştır. Verilerin toplanmasında "Kişisel Bilgi Formu" ve "Çocuk İstismarı ve İhmali Belirtilerini ve Risklerini Tanılama Ölçeği" kullanıldı. Veriler; One-Sample Kolmogorov-Smirnov testi, Bağımsız Örneklem T testi, Mann-Whitney U testi ve Kruskal-Wallis H testi kullanılarak analiz edildi.

**Bulgular:** Katılımcıların yaş ortalaması 22,07 ± 1,30 olup, büyük çoğunluğu kız (%79,4) dır. Katılımcıların %96,8'i çocuk istismar ve ihmali konusunda eğitim almıştır. Katılımcıların ölçekten aldıkları toplam bilgi puan ortalamaları 3,79 ± 0,31 olup bilgi düzeylerinin orta düzeyde olduğu belirlendi. En düşük puan (3,34 ± 0,54) "İstismar ve ihmale yatkın çocukların özellikleri" alt boyutundan, en yüksek puanı "İhmalin çocuk üzerindeki belirtileri" (4,18 ± 0,54) boyutundan almışlardır. Ölçeğin diğer alt boyutları puan ortalamaları ise "İstismarın çocuk üzerindeki fiziksel belirtileri" 3,94 ± 0,38, "İstismar ve ihmalin çocuktaki davranışsal belirtileri" 3,85 ± 0,36, "İstismar ve ihmale yatkın ebeveynlerin özellikleri" 3,55 ± 0,45 ve "Çocuk istismarı ve ihmalinde ailesel özellikleri" 3,79 ± 0,31 olarak bulundu. Yaş, cinsiyet, aile yerleşim yeri, aile tipi, anne eğitim durumu, baba eğitim durumu, kaldığı yerleşim yeri ve aile desteği değişkenleri ile Çocuk İstismarı ve İhmali Belirtilerini ve Risklerini Tanılama Ölçeği puanları arasında istatistiksel olarak anlamlı bir farklılık bulunmadı.

**Sonuç**: İstismar ve ihmale ilişkin bilgi düzeyi, her alt boyuttan maksimum 5,0 puan ve ölçek toplam puanı ile karşılaştırıldığında öğrencilerin bilgi düzeylerinin istenilen düzeyde olmadığı görüldü. İstismar ve ihmali tanılamaya yönelik bilgi düzeylerini artıracak müdahaleler yapılmalıdır.

**Anahtar Kelimeler:** Çocuk ihmali; çocuk istismarı, farkındalık; hemşirelik öğrencisi.

# Intern Nursing Students' Knowledge Level on Identification and Risks of Child Abuse and Neglect

**ABSTRACT**

**Aim:** The aim of this study is to determine the knowledge levels of intern nursing students on diagnosing the symptoms and risks of child abuse and neglect and to examine the related factors.

**Material and Methods:** The research was descriptive and relational design type and was conducted with intern nurses in the nursing department of a health sciences faculty. 126 students participated in the research. "Personal Information Form" and "Child Abuse and Neglect Symptoms and Risks Identification Scale" were used to collect data. Data were analyzed using One-Sample Kolmogorov-Smirnov test, Independent Samples T test, Mann-Whitney U test and Kruskal-Wallis H test.

**Results:** The average age of the participants was 22.07 ± 1.30 and the majority were girls (79.4%). 96.8% of the participants received training on child abuse and neglect. The participants' average total knowledge score from the scale was 3.79 ± 0.31, and it was determined that their knowledge level was at a medium level. They received the lowest score (3.34 ± 0.54) from the "Characteristics of children prone to abuse and neglect" sub-dimension, and the highest score from the "Signs of neglect on the child" sub-dimension (4.18 ± 0.54). The mean scores of the other subscales of the scale are "Physical signs of abuse on the child" 3.94 ± 0.38, "Behavioral signs of abuse and neglect in the child" 3.85 ± 0.36, "Characteristics of parents prone to abuse and neglect" 3.55 ± 3.55 ± 0.45 and "Familial characteristics in child abuse and neglect" were found to be 3.79 ± 0.31. No statistically significant difference was found between the scores of the Child Abuse and Neglect Symptoms and Risks Identification Scale and the variables of age, gender, family residence, family type, maternal education level, paternal education level, place of residence, and family support.

1 Giresun Üniversitesi, Sağlık Bilimleri Fakültesi, Hemşirelik Bölümü, Giresun, Türkiye.
2 Kahramanmaraş İstiklal Üniversitesi, Sağlık Bilimleri Fakültesi, Hemşireliği Bölümü, Kahramanmaraş, Türkiye.

Sorumlu Yazar / Corresponding Author Fadime ÜSTÜNER TOP, e-mail: fadikom@hotmail.com
Geliş Tarihi / Received: 16.11.2024, Kabul Tarihi / Accepted: 07.02.2025

**Conclusion:** When the level of knowledge about abuse and neglect was compared with the maximum score of 5.0 from each sub-dimension and the total score of the scale, it was seen that the students' knowledge level was not at the desired level. Interventions should be made to increase knowledge levels for diagnosing abuse and neglect.
**Keywords:** Child neglect; child abuse; awareness; nursing student.

## GİRİŞ

Çocuklar, özellikleri gereği korunmaya en çok ihtiyaç duyan insan grubudur. Bu nedenle çocukların üst düzeyde korunmasını sağlamak amacıyla ulusal ve uluslararası birçok düzenleme yapılmıştır. Ancak birçok düzenlemeye rağmen istismar ve ihmal olguları dünyada ve ülkemizde giderek önemli bir sağlık sorunu haline gelmektedir (1). Çocuk istismarı ve ihmali çocukların fiziksel, duygusal, davranışsal ve psikolojik sağlığını kısa ve uzun vadede ciddi düzeyde etkileyen küresel bir sağlık problemi oluşturmaktadır (2,3). Bireyler, aileler ve toplum için çocuk istismarı ve ihmali ciddi sonuçları olan pahalı sosyal bir yüktür. Çocuk istismar ve ihmalinin nesilden nesile aktarılabilmesi nedeniyle istismar ve ihmal çocukları, aileleri, toplumları, hatta ülkeleri mahvedebilmektedir (2,4).

Çok önemli bir çocuk sağlığı sorunu olan çocuk istismarı ve ihmalin erken teşhis edilmesi durumunda ciddi zararların önüne geçilebilir. Profesyonel sağlık hizmeti sunucuları olarak hemşirelere bu bağlamda çok önemli roller düşmektedir. Hemşireler istismar ve ihmalin erken tanı ve tedavisi, belirti ve bulguların belirlenmesi, risk altındaki toplulukların belirlenmesi, ailelerin ve toplumların bilinçlendirilmesi gibi önemli roller üstlenmelidirler (2). Bu nedenle hemşirelerin çocuk ihmal ve istismarını tespit edebilmeleri için geniş bilgi sahibi olmaları gerekmektedir. Ancak ulusal ve uluslararası çalışmalar hemşirelerin bu konuda yeterli bilgi sahibi olmadıklarını ortaya koymuştur. Türkiye'de bir araştırmada hekimlerin %43,4'ünün, hemşirelerin ise %25'nin çocuk istismarı ve ihmaline yönelik eğitimli olduğu, tanılamaya ilişkin bilgi durumlarının orta düzeyde olduğu saptanmıştır (5). Başka bir araştırmada ise sağlık personelinin %59,1'inin lisans eğitimleri boyunca bu alanda herhangi bir eğitim almadığı, %98,2'sinin ise mezuniyet sonrası herhangi bir eğitime katılmadığı rapor edilmiştir (6). Elarousy ve ark. (7) hemşirelik öğrencilerinin çocuk istismarı ve ihmali konusundaki bilgi durumlarının orta düzeyde olduğunu ve kurs sonrasında bilgi düzeylerinin arttığını saptamıştır. Ok Ha'nın (8) hemşirelik öğrencileriyle yaptığı araştırmada hemşirelik öğrencilerinin çocuk istismarı ve ihmali konusundaki bilgi durumları orta düzeydedir. Başka bir çalışmada ise hemşirelik öğrencilerinin çocuk istismarı ve ihmali konusundaki bilgi düzeylerinin yetersiz olduğu belirtilmektedir (9).

Çocuk istismarı ve ihmali durumlarında sağlık hizmeti sağlayıcılarının belirtileri tanıyabilmesi, teşhis koyabilmesi ve çocuğun tıbbi bakım ve yasal destek almasını sağlayabilmesi gerekir. Ayrıca, pek çok ülkede pediatrik sağlık profesyonellerinin, bir çocuk istismarı vakası tespit edildiğinde ilgili makamlara bildirimde bulunması yasal bir gerekliliktir (10). Çocuk istismarı ve ihmali vakalarını bildirmeye gelince, sağlık hizmeti sağlayıcıları zaman zaman sorunlarla karşılaştıkları bilinmektedir. Sonuç olarak, tıbbi personelin şüpheli çocuk istismarı ve ihmali vakalarını nasıl tanıyacağını, bildireceğini anlaması ve bunu yaparken onların bilgi ve uzmanlığına güvenmesi kritik öneme sahiptir (11). Sağlık profesyonellerinin çocuk istismarı ve ihmali, bu konuda mücadeledeki rolleri ve ilgili tüm protokoller hakkında uygun bilgiye sahip olması gerekir. Hindistan'da Poreddi ve ark. (9) çalışmalarında öğrencilerin çocuk istismarı ve ihmali konusunda bilgilerinin yeterli olmadığını ve eğitime ihtiyaç olduğunu ortaya koymuştur.

Hemşireler, kötü muameleye maruz kalabilecek çocukların bakımında ön saflarda yer aldıklarından şüphelenilen çocuk istismarı ve ihmali vakalarının bildirilmesinde hayati bir rol oynamaktadır (12). Hemşireler işyerlerinde çok sayıda çocukla etkileşimde bulunduğundan, istismar ve ihmal belirtilerini değerlendirme konusunda yeterli bilgi ve çocuk istismarına ilişkin tutumlar, bu tür istismarın farkına varılması ve buna göre hareket edilmesi için gereklidir.

Literatür intörn hemşirelerin çocuk istismarı ve ihmali konusundaki bilgi ve farkındalıklarına ilişkin çalışmaların eksikliğine işaret etmektedir. Bu nedenle bu çalışmada intörn hemşirelerin çocuk istismarı ve ihmaline ilişkin bilgi ve farkındalık düzeylerinin ve ilişkili faktörlerin araştırılması amaçlandı. İntörn hemşirelerinin çocuk istismarı konusundaki farkındalığının arttırılması, çocukların her türlü zarardan korunmasına yardımcı olabilir. Bu bağlamda son sınıf öğrencilerinin mezuniyet öncesinde bu konudaki bilgi düzeylerinin belirlenmesinin, hemşirelik eğitim programlarında varsa eksikliklerin giderilmesine ve bu programların geliştirilmesine katkı sağlayabileceği düşünülmüştür.

## GEREÇ ve YÖNTEMLER

### Araştırma Türü

Araştırma tanımlayıcı ve ilişkisel tasarımla yürütülmüştür.

### Araştırmanın Evreni ve Örneklemi

Araştırma, 2023-2024 Eğitim-Öğretim yılı bahar döneminde Türkiye'nin kuzey doğusunda bulunan bir il merkezinde yürütülmüştür. Araştırmanın evrenini, il merkezinde bulunan bir devlet üniversitesinin Sağlık Bilimleri Fakültesi hemşirelik bölümü son sınıfında okuyan intörn hemşireler oluşturmaktadır. Araştırmada örneklem seçimine gidilmemiş olup, tüm evren (n:129) dahil edilerek, öğrencilerin %97,67 (126) ulaşılmıştır. Araştırmanın yapıldığı okulda hemşirelik 3. Sınıf bahar döneminde Çocuk Sağlığı ve Hastalıkları Hemşireliği dersi yer almakta olup, ders kapsamında öğrenciler çocuk istismar ve imaline yönelik eğitim almaktadır.

### Veri Toplama Araçları

Araştırmanın verileri iki form kullanılarak toplanmıştır. Bunlar; Kişisel Bilgi Formu ile Çocuk İstismarı ve İhmalinin Belirti ve Risklerinin Tanılanma (ÇİİBRT) Ölçeğidir.

### Kişisel Bilgi Formu

Bu formda araştırmacılar tarafından literatür (13-15) doğrultusunda hazırlanan ve öğrencilerin sosyodemografik özelliklerini içeren 14 soru bulunmaktadır. Form, katılımcıların yaşını, cinsiyetini, kardeş sayısını, ailenin gelir durumunu, aile tipini, anne

ve babanın eğitim durumunu, öğrencinin staj programı, çocuk istismarı ve ihmali konusunda eğitim alma durumu, çocuk servisinde çalışma isteğini içeren açık uçlu ve seçmeli sorulardan oluşmaktadır.

**Çocuk İstismarı ve İhmalinin Belirti ve Risklerinin Tanılanması (ÇİİBRT) Ölçeği**

Ölçek 1998 yılında Uysal tarafından oluşturulmuş olup geçerlik ve güvenirlik çalışması yapılmıştır (16). Ölçek 67 madde içeren 5'li Likert tiptedir. Ölçek İstismarın Çocuk Üzerindeki Fiziksel Belirtileri (İÇÜFB) (19 madde), İstismar ve İhmalin Çocuktaki Davranışsal Belirtileri (İİÇDB) (15 madde), İhmalin Çocuk Üzerindeki Belirtileri (İÇÜB) (7 madde), İstismar ve İhmale Yatkın Ebeveynlerin Özellikleri (İİYEÖ) (12 madde), İstismar ve İhmale Yatkın Çocukların Özellikleri (İİYÇÖ) (6 madde), Çocuk İstismarı ve İhmalinde Ailesel Özellikler (ÇİİAÖ) (8 madde) olmak üzere altı alt ölçeğe sahiptir. Her madde için "Hiç doğru değil" seçeneği 1 puan, "Pek doğru değil" seçeneği 2 puan, "Kararsızım" seçeneği 3 puan, "Çok doğru" seçeneği puanlanmaktadır. 4 puan, "çok doğru" seçeneği ise 5 puan olarak değerlendirilmektedir. Ölçek puan ortalaması, ölçekten elde edilen toplam puanın ölçek madde sayısına bölünmesiyle elde edilir ve ölçek, ortalama puan üzerinden değerlendirilir. Ortalama puanın 5'e yaklaşması katılımcıların doğru cevap verdiklerini göstermektedir. Ortalama puanın 3'ten uzaklaşması yanlış cevap verdiklerini göstermektedir. Uysal çalışmasında ölçeğin Cronbach alfa değeri 0,924 bulmuş olup (16), bu çalışmada uygulanan örneklem için ölçeğin Cronbach alfa değeri 0,861 olarak bulundu.

**Verilerin Toplanması**

Araştırmanın verileri yüz yüze yöntemi kullanılarak araştırmacı tarafından toplanmıştır. Öğrencilerin okulda derslerinin olduğu bir gün belirlenerek sınıf ortamında veri toplama araçları dağıtılmıştır. Öncelikle veri toplanma aşamasından önce araştırmacılar öğrencilerle çalışma ile ilgili sözlü bilgilendirme yapmıştır. Araştırmaya katılmaya gönüllü olan ve soruların tamamına cevap veren öğrenciler dahil edilmiştir. Katılımcılar veri toplama formlarını 15-20 dakika içerisinde doldurmuştur.

**İstatistiksel Analiz**

İstatistiksel analizler için IBM SPSS yazılımı kullanıldı. P değerleri <0,05 istatistiksel olarak anlamlı kabul edildi. Veriler; Bağımsız Örneklem T testi, Mann-Whitney U testi ve Kruskal-Wallis H testi kullanılarak analiz edildi. Bir değişkenin normal dağılıma sahip olup olmadığını test etmek için One-Sample Kolmogorov-Smirnov testi kullanıldı. Çocuk İstismar ve İhmalinin Belirti ve Risklerini Tanılama Ölçeği (ÇİİBRT) ve alt boyutları puanlarının normal dağılım gösterdiği (p>0,05) bulundu. Tanımlayıcı istatistikler, sayısal değişkenler için ortalama ± standart sapma; kategorik değişkenler için sayı ve yüzde (%) şeklinde verilmiştir.

**Araştırmanın Etik Boyutu**

Araştırmaya başlamadan önce Üniversitesinin Sosyal Bilimler Fen ve Mühendislik Bilimleri Araştırmaları Etik Kurulundan (Tarih:03.04.2024, Sayı:04/12) etik kurul onayı ve ilgili kurumsal izin alındı. Öğrencilere katılımın gönüllülük esasına dayandığı, isim yazılmayacağı, verilerin toplu değerlendirileceği ve elde edilecek bilgilerin sadece bilimsel amaçlı kullanılacağı konusunda öğrencilere bilgi verildi. Öğrencilerden yazılı gönüllü bilgilendirilmiş onam formu alındı.

**Araştırmanın Sınırlılıkları**

Bu araştırmanın birkaç sınırlılığı vardır. İlk olarak, bu araştırma kesitsel araştırma tasarımı olması nedeniyle değişkenler arasındaki nedensel ilişkiyi kesin olarak analiz edememektedir. İkinci olarak, araştırma bir üniversitenin Sağlık Bilimleri Fakültesi intörn hemşirelik öğrencileri üzerinde yürütüldüğünden, sonuçların Türkiye'deki tüm Sağlık Bilimleri Fakültesi intörn hemşirelik öğrencilerine genellenmesi mümkün değildir. Ancak bu bulgular, intörn hemşirelerin Çocuk İstismarı ve İhmaline yönelik bilgi düzeyleri ve tutumları hakkında bir temel oluşturarak akademik ve klinik alanda gelecekteki araştırmacılara yardımcı olabilir. Bu çalışma aynı zamanda gelecekte yapılacak çalışmalar için karşılaştırma kriteri olarak da yardımcı olabilir.

## BULGULAR

Katılımcıların yaş ortalaması 22,07±1,30 olup, büyük çoğunluğu (%69,8) 22 yaş ve üzerindedir. Diğer sosyo-demografik özellikler incelendiğinde; büyük çoğunluğu (%79,4) kız cinsiyette, %77,8'i kentsel alanda yaşamakta ve çekirdek aile yapısına sahiptir. Katılımcıların %67,5'inin anne eğitim durumu ortaokul ve altı düzeyde ve yaklaşık yarısının (%48,4) ise baba eğitim durumu lise ve üzerindedir. Katılımcıların %29,4'ü ailesinin yanında kalmakta ve yarısından fazlası (%57,1) ise ailesinin kendisini desteklediğini ifade etmiştir. Katılımcıların büyük çoğunluğu (%96,8) çocuk istismarı ve ihmali konusunda bilgisi olduğunu ve yaklaşık yarısı (%57,1) ise pediatri hemşiresi olarak çalışma isteğinde olduklarını bildirmiştir (Tablo 1).

**Tablo 1.** Sosyo-demografik özellikler (n=126).

| Değişkenler | Kategoriler | n | % |
|---|---|---|---|
| Yaş (yıl) | ≤ 21 | 38 | 30,2 |
| ($\bar{x}$ ± SS =22,07±1,30) | ≥ 22 | 88 | 69,8 |
| Cinsiyet | Erkek | 26 | 20,6 |
| | Kız | 100 | 79,4 |
| Aile yerleşim yeri | Kentsel | 98 | 77,8 |
| | Kırsal | 28 | 22,2 |
| Aile tipi | Çekirdek | 98 | 77,8 |
| | Geleneksel | 19 | 15,1 |
| | Parçalanmış | 9 | 7,1 |
| Anne eğitim durumu | ≤ Ortaokul | 85 | 67,5 |
| | ≥ Lise | 41 | 32,5 |
| Baba eğitim durumu | ≤ Ortaokul | 65 | 51,6 |
| | ≥ Lise | 61 | 48,4 |
| Kaldığı yer | Aile yanı | 37 | 29,4 |
| | Diğer (yurt, pansiyon vb.) | 89 | 70,6 |
| Aile desteği | Evet | 72 | 57,1 |
| | Hayır | 54 | 42,9 |
| Çocuk istismarı ve ihmali konusunda eğitim alma | Evet | 122 | 96,8 |
| | Hayır | 4 | 3,2 |
| Pediatri hemşiresi olarak çalışma isteği | Evet | 72 | 57,1 |
| | Hayır | 54 | 42,9 |

$\bar{x}$ ± SS = Ortalama ± Standart Sapma

Katılımcıların ölçekten aldıkları toplam bilgi puan ortalamaları 3,79 ± 0,31 (EKD= 3,03, EBD=4,55) bulunmuştur. Katılımcılar ÇİİBRT ölçeği alt boyutları puan ortalamaları arasında en düşük puanı (3,34 ± 0,54)

"İstismar ve İhmale Yatkın Çocukların Özellikleri" boyutundan alırken, en yüksek puanı ise (4,18 ± 0,54) "İhmalin Çocuk Üzerindeki Belirtileri" boyutundan almışlardır. Ölçeğin diğer alt boyutları puan ortalamaları ise "İstismarın Çocuk Üzerindeki Fiziksel Belirtileri" 3,94 ± 0,38, "İstismar ve İhmalin Çocuktaki Davranışsal Belirtileri" 3,85 ± 0,36, "İstismar ve İhmale Yatkın Ebeveynlerin Özellikleri" 3,55 ± 0,45 ve "Çocuk İstismarı ve İhmalinde Ailesel Özellikleri" 3,71 ± 0,61 olarak bulunmuştur (Tablo 2).

Yaş, cinsiyet, aile yerleşim yeri, aile tipi, anne eğitim durumu, baba eğitim durumu, kaldığı yerleşim yeri ve aile desteği değişkenleri bakımından ÇİİBRT ölçeği puanları arasında istatistiksel olarak anlamlı bir farklılık bulunmamıştır (p>0,05). Çocuk istismarı ve ihmali konusunda bilgi durumu ve pediatri hemşiresi olarak çalışma isteği ile ÇİİBRT ölçeği puan ortalamasına ilişkin analizde istatistiksel olarak anlamlı bir farklılık bulunmamıştır (p>0,05) (Tablo 3).

**Tablo 2.** Çocuk İstismar ve İhmalinin Belirti ve Risklerini Tanılama Ölçeği (ÇİİBRT) ve alt boyutları puan ortalamaları (n=126).

| ÇİİBRT | n | Ortalama ± SS | Ortanca | En küçük değer (EKD) | En büyük değer (EBD) |
|---|---|---|---|---|---|
| **İÇÜFB** | 126 | 3,94 ± 0,38 | 4,00 | 2,84 | 4,68 |
| **İÇÜB** | 126 | 4,18 ± 0,54 | 4,28 | 2,71 | 5,00 |
| **İİÇDB** | 126 | 3,85 ± 0,36 | 3,86 | 2,87 | 4,73 |
| **İİYEÖ** | 126 | 3,55 ± 0,45 | 3,58 | 2,58 | 4,75 |
| **İİYÇÖ** | 126 | 3,34 ± 0,54 | 3,25 | 2,00 | 5,00 |
| **ÇİİAÖ** | 126 | 3,71 ± 0,61 | 3,75 | 2,12 | 5,00 |
| **ÇİİBRT Toplam** | 126 | 3,79 ± 0,31 | 3,82 | 3,03 | 4,55 |

**Tablo 3.** Sosyo-demografik özellikler ile ÇİİBRT Ölçeği puan ortalamasının karşılaştırılması (n=126).

| Değişkenler | Kategoriler | ÇİİBRT Ölçeği | | |
|---|---|---|---|---|
| | | $\bar{X}$ ± SS | Ortanca (EKD-EBD) | P |
| **Yaş (yıl)** | **≤ 21** | 3,86±0,32 | 3,85 (3,36-4,55) | 0,128[a] |
| | **≥ 22** | 3,77±0,30 | 3,80 (3,03-4,31) | |
| **Cinsiyet** | **Erkek** | 3,78±0,31 | 3,88 (3,07-4,16) | 0,853[a] |
| | **Kız** | 3,80±0,31 | 3,79 (3,03-4,55) | |
| **Aile yerleşim yeri** | **Kentsel** | 3,81±0,31 | 3,84 (3,03-4,43) | 0,337[a] |
| | **Kırsal** | 3,74±0,28 | 3,70 (3,18-4,55) | |
| **Aile tipi** | **Çekirdek** | 3,82±0,28 | 3,82 (3,22-4,55) | 0,224[b] |
| | **Geleneksel** | 3,65±0,38 | 3,62 (3,03-4,31) | |
| | **Parçalanmış** | 3,82±0,35 | 3,85 (3,16-4,31) | |
| **Anne eğitim durumu** | **≤ Ortaokul** | 3,79±0,31 | 3,79 (3,07-4,55) | 0,928[a] |
| | **≥ Lise** | 3,80±0,30 | 3,85(3,03-4,31) | |
| **Baba eğitim durumu** | **≤ Ortaokul** | 3,78±0,31 | 3,79 (3,07-4,43) | 0,471[a] |
| | **≥ Lise** | 3,82±0,31 | 3,85(3,03-4,55) | |
| **Kaldığı yer** | **Aile yanı** | 3,79±0,34 | 3,82 (3,07-4,43) | 0,999[a] |
| | **Diğer (yurt, pansiyon vb.)** | 3,79±0,29 | 3,82 (3,03-4,55) | |
| **Aile desteği** | **Evet** | 3,78±0,30 | 3,81 (3,03-4,55) | 0,676[a] |
| | **Hayır** | 3,81±0,31 | 3,82 (3,16-4,43) | |
| **Çocuk istismarı ve ihmali konusunda eğitim alma** | **Evet** | 3,79±0,30 | 3,81(3,03-4,55) | 0,263[c] |
| | **Hayır** | 3,96±0,39 | 4,08 (3,40-4,27) | |
| **Pediatri hemşiresi olarak çalışma isteği** | **Evet** | 3,79±0,28 | 3,81(3,16-4,55) | 0,990[a] |
| | **Hayır** | 3,79±0,34 | 3,82(3,03-4,33) | |

a = Bağımsız Örneklem T testi; b =Kruskal-Wallis H testi; c = Mann-Whitney U testi
$\bar{X}$ ± SS = Ortalama ± Standart Sapma; EKD = En küçük değer; EBD = En büyük değer

## TARTIŞMA

Hemşireler çocuklarla ve aileleriyle ilk karşılaşan koruyucu, tedavi edici ve rehabilite edici alanlarda tanışan ve onları uzun süre gözlemleme şansına sahip olan sağlık personeli olmaları nedeniyle çok yönlü bir yaklaşımla ele alınması gereken konulardan biri olan çocuk ihmal ve istismarının belirlenmesinde ve tedavisinde önemli bir rol oynamaktadır (17). Çocuk istismarı ve ihmalinin önlenmesi, erken tanınabilmesi için gelecekte hemşirelik mesleğini icra edecek hemşirelik öğrencilerinin eğitimleri sırasında bu konu hakkında bilgilendirilmesi gerekmektedir. Böyle bir eğitim programının planlanması için hemşirelik öğrencilerinin farkındalık düzeylerinin belirlenmesi önemlidir (6).

Bu araştırmada intörn hemşirelik öğrencilerinin çocuk istismarı ve ihmaline yönelik büyük bölümünün eğitim aldığını ortaya koymuştur. Ancak literatürde sağlık profesyonellerinin eğitimleri süresince bu konuda yeteri kadar eğitim almadıkları görülmektedir (18,19). Çocuklara yönelik istismar ve ihmal konusunda sağlık personelinin bilgilendirilmemesi vakaların tespit edilememesine neden olmaktadır. Yılmaz (20) tarafından hemşirelerin olguları bildirmeme nedenleri incelendiğinde %70,6'sının konu hakkında bilgisi

olmadığı için bildirimde bulunmadığı tespit edilmiştir. Bu nedenle sağlık personelinin eğitimleri sırasında çocuk istismarı ve ihmali konusunda eğitilmeleri oldukça önemlidir. Ayrıca şüpheli çocuk istismarı ve ihmali vakalarının ele alınması ve rapor edilmesine ilişkin özel kurslar, hemşireler arasında uygun tutumların geliştirilmesine yardımcı olabilir.

Araştırmada intörn hemşirelik öğrencilerinin ÇİİBRT ölçeğinden aldıkları puan ortalaması 3,79 ± 0,31 olup, konuya ilişkin bilgi düzeyleri orta düzeyde bulunmuştur. Benzer şekilde Elarousy ve ark. (7) tarafından hemşirelik öğrencilerinin çocuk istismarı ve ihmali yönelik bilgilerinin orta düzeyde olduğu bulunmuştur. Çalışmamızdan farklı olarak Poreddi ve ark. (9) hemşirelik öğrencilerinin çocuk istismarı ve ihmaline yönelik bilgi düzeylerinin düşük olduğuna dikkat çekmiştir. Yılmaz'ın (20) çalışmasında lisansüstü hemşirelerin genel bilgi puanları 3'ün üzerinde ve bilgi düzeyleri yüksek bulunmuştur. Türkiye'de eğitim gören hemşirelik öğrencileriyle yapılan çalışmaların sonuçları (14,15), çalışmamızın sonucuyla oldukça benzerdir. Bu durumun Türkiye'deki okulların hemşirelik müfredatlarının benzer olmasından kaynaklandığı düşünülmüştür.

Hemşirelik eğitiminde staj programı, öğrencilerin bireysel ve mesleki gelişimlerine katkıda bulunma, mesleki yeterliliklerini artırma, teori ve pratiği bütünleştirme, eleştirel düşünme becerilerini geliştirme, öz yeterliliklerini olumlu yönde etkileme ve iletişim becerilerini arttırmada kilit rol oynamaktadır (21,22). Beklenenin aksine, intörn programına katılan öğrencilerin ÇİİBRT ölçeğinin orta düzeyde puan alması, ankete katılan öğrenciler için yetersiz olduğu şeklinde yorumlanabilir. İstismar ve ihmalin önlenmesinde hemşirelerin en önemli rollerinden biri risk gruplarını ve istismar-ihmal belirtilerini erken dönemde tanımaktır.

İntörn hemşirelik öğrencilerinin ÇİİBRT ölçeği alt boyutu puan ortalamaları incelendiğinde, en yüksek ortalamanın "İhmalin Çocuk Üzerindeki Belirtileri" alt boyutu (4,18 ± 0,54) iken, en düşük ortalamanın ise "İstismar ve İhmale Yatkın Çocukların Özellikleri" (3,34 ± 0,54) alt boyutu (3,3 ± 0,5) olduğu belirlendi. Çalışmamızdan farklı olarak Taş'ın (23) çalışmasında en yüksek ortalama alt ölçek puanı "İstismar ve İhmale Yatkın Çocukların Özellikleri" ait belirlemiştir. Özbey ve ark. (14) çalışmasında da en yüksek ortalama puan "İhmalin Çocuk Üzerindeki Belirtileri" (3,90 ± 0,50) alt boyutunda, en düşük ortalama puan ise "İstismar ve İhmale Yatkın Çocukların Özellikleri" (3,30 ± 0,50) alt boyutunda bulunmuştur olup, bu çalışmayla uyumludur. Hemşirelik öğrencileriyle yapılan başka bir çalışmada ise en yüksek ortalamanın "İhmalin Çocuk Üzerindeki Belirtileri" (4,01 ± 0,53) alt boyutunda görüldüğü, en düşük ortalama puan ise "İstismar ve İhmale Yatkın Çocukların Özelliklerinin Belirlenmesi" (3,43 ± 0,52) alt boyutunda görülmüştür (13). Sağlık bilimleri fakültesinde öğrenim gören öğrencilerle yapılan çalışmada da benzer şekilde öğrencilerin en yüksek puan ortalamasının "İhmalin Çocuk Üzerindeki Belirtileri" (4,05±0,57) alt boyutunda gözlendiği, en düşük puan ortalamasının ise "İstismar ve İhmale Yatkın Çocukların Özelliklerinin Belirlenmesi" (3,06 ± 0,50) alt ölçeğinde gözlemlenmiştir (15). İhmalin çocuk üzerindeki belirtileri alt ölçeğindeki maddeler çoğunlukla çocuğun fiziksel değerlendirmesine bağlı olup temizlik, bakım, büyüme geriliği, aşı durumuna benzer örtülü şekilde anlaşılabilen belirtileri içerdiğinden katılımcıların bu alt ölçekte daha iyi oldukları düşünülmüştür. Sonuçlardan hareket ederek öğrencilerin istismar ve ihmal açısından risk grubu kapsayan çocukları tespit etmek için eğitimlerine destek verilmesinin gerekli olduğu düşünülmüştür.

Araştırmaya göre intörn hemşire öğrencilerinin yaş, cinsiyet, aile yerleşim yeri, aile tipi, anne eğitim durumu, baba eğitim durumu, kaldığı yerleşim yeri ve aile desteği değişkenleri ile ÇİİBRT ölçeği puanını etkilemediği görülmektedir. Hemşirelik öğrencileriyle yürütülen bir çalışmada kız (3,83 ± 0,29) ve erkek (3,73 ± 0,31) katılımcıların toplam puan ortalamaları arasında bu çalışmayla uyumlu şekilde istatistiksel olarak anlamlı fark olmadığı tespit edilmiştir (13). Mavili ve Altun'un (24) çalışmasında araştırmamıza paralel olarak hemşire ve ebelerin genel puan ortalamaları cinsiyet değişkenine göre değerlendirilmiş ancak anlamlı bir ilişki bulunmamıştır. Başka bir çalışmada ise hemşirelik grubunda yürütülen çalışmada kız öğrencilerin (4,71 ± 3,7) ölçek toplam puan ortalamalarının erkek öğrencilere (4,57 ± 3,6) göre anlamlı derecede yüksek olduğu belirlenmiştir (14). Ok Ha (8) da kız öğrencilerin bilgi ve farkındalık düzeylerinin erkek hemşirelik öğrencilerine göre daha yüksek olduğunu bildirmiştir. Ancak bu çalışma sonuca dayanarak sosyo-demografik özelliklerin katılımcıların çocuk istismarı ve ihmalinin belirti ve risklerinin belirlenmesine yönelik bilgi düzeylerini etkileyen anlamlı değişkenler olmadığı yorumu yapılabilir.

Çalışmada çocuk ihmal ve istismarı konusunda eğitim alma durumu ile genel bilgi puan ortalamaları karşılaştırıldığında fark bulunmamıştır. Benzer çalışmalarda ise çocuk ihmal ve istismarı konusunda verilen eğitimin öğrencilerin farkındalığını önemli ölçüde arttırdığı görülmüştür. Elarousy ve ark. (7) çalışmasında ise bizim araştırmamızdan farklı olarak ilgili dersleri alan hemşirelik öğrencilerinin bilgi ve tutumlarının anlamlı düzeyde daha iyi olduğunu bulmuştur. Al-Saif ve ark. (25) hemşirelerin çocuk istismarına ilişkin bilgi ve farkındalığının, ne kadar eğitim aldıklarına bağlı olduğunu ve hatta hemşirelerin çocuk istismarı belirtilerine nasıl tepki vereceği konusunda cinsiyetin de rol oynadığını belirtmiştir. Örneğin, kadın sağlık çalışanları ve beşten fazla eğitim kursuna katılanlar, diğer profesyonellere göre istismarın daha az bildirilmesi (yüksek hassasiyet) konusunda daha fazla endişe duyarken, erkekler çocuk istismarı konusunda daha az endişe duymaktadır.

**SONUÇ**

Sonuç olarak bu çalışmaya katılan intörn hemşirelik öğrencilerinin çocuk istismarı ve ihmaline yönelik bilgi düzeylerinin orta düzeyde olduğu belirlendi.

Bu sonuçlar doğrultusunda hemşirelik bölümü eğitim müfredatında çocuk ihmal ve istismarına ilişkin konuların daha fazla yer alması, öğrencilerin konuya ilişkin farkındalıklarını artırmaya yönelik uygulamalar yapma fırsatlarının sağlanması, bilgi düzeyinin artırılmasına yönelik eğitim programlarının düzenlenmesi çıkarımı yapılabilir. Eğitim süreci kapsamında öğrencilerin çocuk istismarı ve ihmal belirtilerinin belirlenmesine yönelik

değerlendirme yetilerinin arttırılmasının bilgi düzeylerinin arttırılmasında faydalı olabileceği düşünülmektedir. Çocuk istismar ve ihmal düzeylerinin belirlenmesi ve benzer çalışmaların daha büyük örneklem grupları ile yapılması gerekmektedir.

**Yazarların Katkıları:** Fikir/Kavram: F.Ü.T., H.H.Ç.; Tasarım: F.Ü.T., Veri Toplama ve/veya İşleme: F.Ü.T., Analiz ve/veya Yorum: F.Ü.T., H.H.Ç.; Literatür Taraması: F.Ü.T., H.H.Ç.; Makale Yazımı: F.Ü.T., H.H.Ç.; Eleştirel İnceleme: F.Ü.T., H.H.Ç.

**KAYNAKLAR**

1. Gökçay G, Tuğrul Aksakal M. Çocuk sağlığı izlem ilkeleri. Gökçay G, Beyazova U, editörler. İlk beş yaşta çocuk sağlığı izlemi. 1. Baskı. İstanbul: Nobel Tıp Kitapevi; 2017. s. 3-15.
2. Chiang LF, Kress H, Sumner SA, Gleckel J, Kawemama P, Gordon RN. Violence Against Children Surveys (VACS): towards a global surveillance system. Injury Prev. 2016; 22(Suppl 1): i17–i22.
3. Liel C, Meinck F, Steinert JI, Kindler H, Lang K, Eickhorst A. Is the Brief Child Abuse Potential Inventory (BCAPI) a valid measure of child abuse potential among mothers and fathers of young children in Germany? Child Abuse Negl. 2019; 88: 432-44.
4. Hillis S, Mercy J, Amobi A, Kress H. Global prevalence of past-year violence against children: a systematic review and minimum estimates. Pediatrics. 2016; 137(3): e20154079.
5. Kaptan D. The levels of information and awareness about child abuse and neglect of doctors and nurses working in pediatric clinics in the city center of Trabzon [MS dissertation]. Trabzon: Avrasya University Health Sciences Institute; 2017.
6. Akcan A, Demiralay S. Perceptions of department of nursing students on child neglect and abuse. J Educ Train Res. 2016; 5: 275-81.
7. Elarousy W, Helal H, de Villiers L. Child abuse and neglect: student nurses' knowledge and attitudes. J Am Sci. 2012; 8 (7): 665-74.
8. Ok Ha Y. Nursing students' perceptions of child abuse and factor influencing those perceptions. Child Health Nurs Res. 2018; 24: 178-85.
9. Poreddi V, Pashapu DR, Kathyayani BV, Gandhi S, El-Arousy W, Math SB. Nursing students' knowledge of child abuse and neglect in India. Br J Nurs. 2016; 25(5): 264-8.
10. Pakiş I, Demir F, Bektaş G, Altun U, Yıldırım S. Investigation of the awareness and knowledge about child abuse and negligence among doctors and nurses working in the east part of Türkiye. Romanian J Legal Med. 2015; 23(2): 151-6.
11. Russell M, Lazenbatt A, Freeman R, Marcenes W. Child physical abuse: health professionals' perceptions, diagnosis and responses. Br J Community Nurs. 2004; 9(8): 332-9.
12. Green M. Nurses' adherence to mandated reporting of suspected cases of child abuse. J Pediatr Nurs. 2020; 54: 109-13.
13. Tınmaz Pehlivan G. Hemşirelik öğrencilerinin çocuk istismarı ve ihmali konusundaki farkındalık düzeylerinin belirlenmesi ve bu konuda verilen planlı eğitimin etkinliğinin değerlendirilmesi [MS dissertation]. Denizli: Pamukkale Üniversitesi, Sağlık Bilimleri Enstitüsü; 2016.
14. Özbey H, Özcelep GA, Gul U, Kahrıman I. Knowledge and awareness of nursing students about child abuse and neglect. J Nurs Res Pract. 2018; 2(3): 21-5.
15. Kaya MH, Köse S. Üniversite öğrencilerinin çocuk istismar ve ihmaline yönelik farkındalıkları. İstanbul Sosyal Bilimler Dergisi. 2020; 27: 1-14.
16. Uysal A. Çocuk istismarı ve ihmalinin belirti ve risklerini tanılamada hemşire ve ebelerin bilgi düzeylerinin saptanması, [MS dissertation]. İzmir: Ege Üniversitesi Sağlık Bilimleri Enstitüsü; 1998.
17. Kurklu A. Levels of teachers' awareness about child exploitation and negligence [MS dissertation]. Afyon: Afyon Kocatepe University Health Sciences Institute; 2011.
18. Akgun Kostak M, Vatansever C. Views and opinions of faculty of health sciences students about child abuse and neglect. J Health Sci Occ. 2015; 2(1): 1-11. https://doi.org/10.17681/hsp.79915
19. Işık Metinyurt H, Yıldırım Sarı H. Awareness of health professionals about child abuse and neglect. Child and Civilization. 2016; 1(1): 101-21.
20. Yılmaz, B. The investigation of nurse's knowledge level and approach towards child abuse and neglect [MS dissertation]. Ankara, Ankara Universitesi Sağlık Bilimleri Enstütisü; 2015.
21. Tural Büyük E, Rızalar S, Çetin A, Sezgin S. Hemşirelerin intörn eğitim uygulaması hakkındaki görüş ve önerileri. Balikesir Saglik Bilimleri Dergisi. 2014; 3(3): 135-40.
22. Yılmaz M, Çetin Ç, Egelioğlu Cetişli N, Ünsal Avdal E, Tokem Y. Hemşirelik öğrencilerinin ve hemşirelerin intörnlüğe ilişkin görüşleri. Pamukkale Tip Dergisi. 2018; 11(3): 329-36.
23. Taş A. Hacettepe üniversitesi öğrencilerinin çocuk ihmal ve istismarı hakkındaki bilgi düzeylerinin incelenmesi [MS dissertation]. Ankara: Hacettepe Universitesi Sosyal Bilimler Enstitüsü; 2017.
24. Mavili A, Altun G. Aile hekimleri, hemşire ve ebelerin çocuk istismarı ve ihmali konusunda farkındalık düzeyleri: Burdur örneği. Sosyal Çalışma Dergisi. 2022; 6 (1): 41-58.
25. Al-Saif DM, Al-Eissa M, Saleheen H, Al-Mutlaq H, Everson MD, Almuneef MA. Professionals' attitude toward reporting child sexual abuse in Saudi Arabia. J Child Sex Abus. 2018; 27(1): 22-37.

Araştırma Makalesi / Research Article

Sağlık Bilimlerinde Değer / Sağlık Bil Değer
Value in Health Sciences / Value Health Sci
ISSN: 2792-0542 sabd@duzce.edu.tr 2025; 15(2): 204-210
doi: https://dx.doi.org/10.33631/sabd.1479857

# The Relationship between Parental Support for Child Healthy Eating and Healthy Eating Self-Efficacy

Ebru AKÇAY [1], Dijle AYAR [2]

**ABSTRACT**

**Aim:** This study was conducted to evaluate the relationship between family support for healthy eating and healthy eating self-efficacy.

**Material and Methods:** The study was conducted as descriptive and relational. A total of 621 students aged 8-10 attending the 2nd, 3rd, and 4th grades who meet the inclusion criteria and agree to participate in the study. Data were collected using the "Descriptive Information Form", "Healthy Eating Family Support Scale" and "Healthy Eating Self-Efficacy Scale". The demographic data were analyzed using the numbers and percentages. The relationship between family support for healthy eating and self-efficacy for healthy eating was evaluated by Pearson correlation coefficients, and the effect of family support for healthy eating on healthy eating self-efficacy was evaluated by simple regression analysis.

**Results:** When the family support scale for healthy eating of children is examined between the total score averages and the total score averages of healthy eating self-efficacy scale; the family support scale for healthy eating has been determined to have a medium positive relationship between the total score averages of children and the total score averages of healthy eating self-efficacy (respectively; r=0.489; β=0.489; p<0.001), and 24% of the factors affecting healthy eating self-efficacy of children were described with the average family support points for healthy eating of children (F=194.651, p<0.001).

**Conclusion:** As a result of this study; as children's family support for healthy eating increases, their healthy eating self-efficacy increases. In addition, family support for healthy eating predicts healthy eating self-efficacy.

**Keywords:** Healthy eating; family supports; self efficacy.

## Çocuklarda Sağlıklı Yeme ile İlgili Aile Desteği ve Sağlıklı Yeme Öz Yeterliği Arasındaki İlişki

**ÖZ**

**Amaç:** Bu çalışma, çocuklarda sağlıklı yeme ile ilgili aile desteği ve sağlıklı yeme öz yeterliliği arasındaki ilişkiyi değerlendirmek amacıyla yapılmıştır.

**Gereç ve Yöntemler**: Çalışma tanımlayıcı, kesitsel ve ilişkisel olarak yapılmıştır. Çalışmanın dahil etme kriterlerine uyan ve çalışmaya katılmayı kabul eden, yazılı ebeveyn onam formu olan 2., 3., ve 4., sınıfa devam eden 8-10 yaş aralığındaki 621 öğrenci katılmıştır. Veriler, "Tanımlayıcı Bilgi Formu", "Sağlıklı Yeme ile İlgili Aile Desteği Ölçeği" ve "Sağlıklı Yeme Öz Yeterlik Ölçeği" kullanılarak toplanmıştır. Çocukların tanımlayıcı bilgilerinin değerlendirilmesinde sayı, yüzde ve ortalama analizleri kullanılmıştır. Sağlıklı yeme ile ilgili aile desteği ve sağlıklı yeme öz yeterliği arasındaki ilişki pearson korelasyon analizi ile, sağlıklı yeme ile ilgili aile desteğinin sağlıklı yeme öz yeterliği üzerine etkisi basit regresyon analizi ile değerlendirilmiştir.

**Bulgular:** Çocukların sağlıklı yeme ile ilgili aile desteği ve sağlıklı yeme öz yeterlik toplam puan ortalamaları arasındaki ilişki incelendiğinde; çocukların sağlıklı yeme ile ilgili aile desteği toplam puan ortalamaları ve sağlıklı yeme öz yeterlik puan ortalamaları arasında pozitif yönde orta düzeyde anlamlı bir ilişki olduğu (sırasıyla r=0,489; β=0,489; p<0,001) belirlenmiştir. Çocukların sağlıklı yeme öz yeterliliğini etkileyen faktörlerin %24'ünün çocukların sağlıklı yeme ile ilgili aile desteği puan ortalamaları ile açıklandığı bulunmuştur (F= 194,651, p<0,001).

**Sonuç:** Bu çalışmanın sonucunda; çocukların sağlıklı yeme ile ilgili aile destekleri arttıkça sağlıklı yeme öz yeterlilikleri artmaktadır. Ayrıca çocukların sağlıklı yeme ile ilgili aile destekleri, sağlıklı yeme öz yeterliliklerini yordamaktadır.

**Anahtar Kelimeler:** Sağlıklı yeme; aile desteği; öz yeterlik.

1 Dokuz Eylül University Institute of Health Sciences, Department of Child Health and Diseases Nursing, Izmir, Türkiye
2 Alanya Alaaddin Keykubat University, Faculty of Health Sciences, Department of Child Health and Diseases Nursing, Antalya, Türkiye

Sorumlu Yazar / Corresponding Author: Dijle AYAR, e-mail: dijle.ayar@alanya.edu.tr
Geliş Tarihi / Received: 07.05.2024, Kabul Tarihi / Accepted: 09.02.2025

## INTRODUCTION

Adequate and balanced nutrition forms the basis of health and is defined as the intake of the nutrients needed by the individual (1). It is one of the important factors that positively affect physical, mental, emotional and social development in school-age children (2). It is emphasized that unhealthy nutrition is an issue that should be taken into consideration in terms of causing a decrease in the child's learning potential as well as causing diseases (3).

Nutritional habits are important in terms of being acquired during childhood and affecting the diet in adulthood. Some studies predict that 70-80% of children who are obese in childhood will experience obesity in adulthood (4,5). Therefore, it is important to provide children with education on healthy nutrition starting from the school period when healthy behaviors are formed or to examine studies including factors affecting healthy nutrition. It is emphasized that it is a more rational approach to prevent diseases that may be caused by unhealthy nutrition by making healthy nutrition a behavior instead of treating diseases that may occur due to unhealthy nutrition (6). Such an important concept is negatively affected by improper nutritional behaviors (7-9).

In the literature, it has been found that school-age children mostly do not eat breakfast, frequently eat bagels and biscuits at school, have problems in fruit and vegetable consumption, and frequently consume fast foods, energy drinks and unhealthy snacks (7,8,10,11). Especially in the literature, it is emphasized that it is important to raise awareness of healthy eating in children, and this can be achieved by increasing the self-efficacy levels of children regarding healthy eating (10-12).

Healthy eating self-efficacy is defined as the child's perceived level of competence to choose and prefer healthier foods (12). While healthy eating self-efficacy provides an increase in knowledge and behaviors of making healthy food choices, an increase in self-efficacy also increases the possibility of changing and shaping existing habits (13). The school-age period is when the child opens up to the outside world beyond the family, starts making independent decisions, and takes on more responsibility for what and how much to eat (14). Schools or other environments where parents are absent and independent provide opportunities for children to acquire the necessary skills to make healthy decisions about eating decisions (15).

Children who consume healthy foods by preferring low-fat and low-sugar foods have a high level of self-efficacy for healthy eating (12). In the literature, it is emphasized that healthy eating self-efficacy is an important indicator that should be addressed because it is a determinant of eating habits and body mass index values in children. Therefore, it is necessary to evaluate healthy eating and to examine the factors affecting healthy eating self-efficacy (12,15). When the studies were examined, it was found that there were no studies directly examining the effect of family support related to healthy eating on children's healthy eating self-efficacy, but there were studies suggesting that this issue should be emphasized (14,16,17).

Parents play a critical role in the development and maintenance of healthy eating behaviors in children by influencing their dietary preferences and habits (14). Parents' guidance, the types of foods they offer to children, their feeding behaviors, attitudes and eating behavior models affect children's food choices and play an important role in children's healthy eating self-efficacy (1). Parents' guidance and the types of food they offer to children affect the child's nutritional preferences and habits in the long term (1). Parents shape the home environment and support children's regular nutrition to promote healthy eating behaviors. Actions such as organizing family meals where everyone is together, going to fast-food restaurants less, and shopping more in grocery stores where affordable healthy foods are available constitute an opportunity to develop healthy eating behaviors as well as the foundation of healthy eating habits in adulthood (18,19).

The literature review revealed no studies examining the effect of family support for healthy eating on children's healthy eating self-efficacy, an important factor in shaping their eating behaviors. In this context, the aim of the study was to evaluate the relationship between family support for healthy eating and healthy eating self-efficacy in children.

## MATERIAL AND METHODS

This descriptive and correlational study was conducted to evaluate the relationship between family support for healthy eating and healthy eating self-efficacy in school children aged 8-10 years. The study was conducted between October 2021 and June 2022 with 621 students between the ages of 8 and 10, attending 2$^{nd}$, 3$^{rd}$, and 4$^{th}$ grades in schools selected by simple random sampling method among the primary schools affiliated to the Izmir Provincial Directorate of National Education. The study was conducted only with children in the 8-10 age group because the questionnaire forms used in the study were developed specifically for children in this age range, and students who had just started the first grade of primary school may have difficulty in answering the questions on the scale items on their own. While forming the sample of the study, two districts were included by simple random sampling method (lottery method) among the districts of Izmir province. Among the schools in the two districts, 10 schools were included in the study by simple random sampling method (lottery method). The data of the study were collected by the researchers by giving a questionnaire form to the students in the classroom environment. Both scale forms were filled in by children. The researchers stayed in the classroom during the data collection process due to the possibility of students asking questions. Throughout the data collection process, students at each grade level found both questionnaires understandable.

### Population and Sample of the Study

The required sample size was determined as 330 at a significance level of 0.05, power of 80% and medium effect size obtained from this study by using the results of the comparison of mean scores according to socio-economic level by Kabasakal et al., in the G Power program (18). In order to clearly demonstrate the relationship between the variables and to avoid bias in the study, all children who were willing to participate in the study, who had a written consent form (written parental consent) and who met the inclusion criteria were included in the study and questionnaire forms were applied to a total

of 621 children. The percentage of reaching the sample was 95.5%. A total of 650 students in 10 schools were included in the sample of the study and the questionnaire was distributed, but students with missing data and those who did not complete the questionnaire were not included in the study. The inclusion criteria of the study were that the age range of children was 8-10 years old. The exclusion criteria of the study; are lack of written consent by the parents, the desire to leave the study at any stage of the study, any physical disability and special needs in children, and the use of psychiatric medication.

**Data Collection Tools**

In this study, data were collected using the "Descriptive Information Form", "Scale of Family Support Related to Healthy Eating" and "Healthy Eating Self-Efficacy Scale", which were developed by the researchers based on a literature review.

**Descriptive Information Form**

The descriptive information form was created by reviewing the literature (10,12,15,18,19). It included questions about the socio-demographic characteristics of the students including age, gender, grade, parental education level and eating preferences.

**The Parental Support for Healthy Eating (PSHE)**

The Parental Support for Healthy Eating Scale (PSHE) was developed by Story et al., (21) to assess family support for healthy eating. The scale, the Turkish validity and reliability of which was performed by Kabasakal et al., (18), consists of five items and one sub-dimension similar to the original scale. The scale is evaluated with a minimum score of 5 and a maximum score of 15, with a high score indicating positive family support for healthy eating (18). As a result of the Explanatory Factor Analysis (EFA) of the scale, the percentage of explanation was 56.49%. The Cronbach's alpha coefficient of the scale was above 0.70 and was calculated as 0.74 for boys and 0.80 for girls. The scale is a valid and reliable measurement tool that can be used to assess family support for healthy eating in both boys and girls aged 8-10 years (18). In this study, the total Cronbach alpha value of the scale was found to be 0.85.

**Healthy Eating Self-Efficacy Scale for Children (HESES-C)**

The Turkish psychometric properties of the scale developed by Story et al., (20) were examined by Kabasakal et al., (12). The Cronbach's alpha value of the scale was found to be 0.674 for girls and 0.677 for boys. The scale was developed for children aged 8-10 years to be used in the assessment of children's self-efficacy for healthy eating. The scale is a three-point Likert-type scale consisting of nine items and one sub-dimension. An increase in the scale score indicates an increase in self-efficacy for healthy eating (12). The scale is a valid and reliable measurement tool for determining the healthy eating self-efficacy of children aged 8-10 years (12). In this study, the total Cronbach alpha value of the scale was found to be 0.80.

**Statistical Analysis**

Research data were analyzed using SPSS Statistics 25.0 (IBM Corp., Armonk, NY). The demographic data were analyzed using the numbers and percentages. Whether the data fit a normal distribution was analyzed by calculating the kurtosis and skewness coefficients. (Kurtosis and skewness coefficients of data was found between ±2). The relationship between family support for healthy eating and healthy eating self-efficacy was evaluated by Pearson correlation coefficients, and the effect of family support for healthy eating on healthy eating self-efficacy was evaluated by simple linear regression analysis. Tolerance, VIF (variance inflation factor), and condition index values were used to determine which of the independent variables would be included in the model [to determine the existence of multicollinearity]. Independent variables with a VIF value of <10, tolerance value of >0.2, and condition index value of <15 were included in the regression analysis. The significance level of 0.05 was considered acceptable.

**Ethics Committee Approval**

Permission to use the scales was obtained via e-mail from the researchers who performed the Turkish validity and reliability of the scales planned to be used in the study. Ethics committee approval was obtained from Dokuz Eylul University Non-Interventional Research Ethics Committee (Date: 22.09.2021, Decision No: 2021/26-39). Institutional permission dated 14.09.2021 and numbered E-12018877- 604.01.02-31890541 was obtained from Izmir Governorship Provincial Directorate of National Education. Children who voluntarily agreed to participate in the study and had a written parental consent form were included. Since individual rights should be protected in the study, the Helsinki Declaration of Human Rights was adhered to during the study.

**RESULTS**

This study was conducted with 621 students attending 2nd, 3rd, and 4th grades selected by simple random sampling method from primary schools affiliated to Izmir Provincial Directorate of National Education. 47% of the students were male (n=292) and when the grade level was analyzed; 3.54% (n=22) were in the second grade, 36.40% (n=226) were in the third grade, and 60.06% (n=373) were in the fourth grade. Descriptive information about children and parents is given in Table 1**.**

The mean total scores of the children from the scales were found to be 12.23±2.10 and 12.36±2.68, respectively, for the total mean score of the PSHE scale and the HESES-C (Table 2).

When the correlation between the mean total scores of the family support scale related to healthy eating and the mean total scores of the healthy eating self-efficacy scale was examined, it was determined that there was a positive and moderately significant relationship between the mean total scores of the family support scale related to healthy

**Table 1.** Descriptive information form for children and parents (n=621)

| | n | % |
|---|---|---|
| Gender of the Child | | |
| Male | 292 | 47 |
| Female | 329 | 53 |
| Age of the Child | | |
| Age of 8 | 173 | 27.86 |
| Age of 9 | 311 | 50.08 |
| Age of 10 | 137 | 22.06 |
| Class of Child | | |
| 2nd | 22 | 3.54 |
| 3st | 226 | 36.40 |
| 4th | 373 | 60.06 |
| Mother's Education Status | | |
| Illiterate | 18 | 2.90 |
| Primary School | 129 | 20.77 |
| Middle School | 158 | 25.44 |
| High School | 192 | 30.92 |
| Undergraduate | 112 | 18.04 |
| Others | 12 | 1.93 |
| Father's Education Status | n | % |
| Illiterate | 7 | 1.13 |
| Primary School | 130 | 20.94 |
| Middle School | 135 | 21.74 |
| High School | 219 | 35.26 |
| Undergraduate | 119 | 19.16 |
| Others | 11 | 1.77 |
| Availability of breakfast in the morning | | |
| I do it regularly | 482 | 77.61 |
| I do it from time to time | 112 | 18.04 |
| I never have breakfast | 27 | 4.35 |
| Foods commonly eaten for breakfast * | | |
| Egg | 343 | 55.23 |
| Cheese | 348 | 56.04 |
| Olive | 420 | 67.63 |
| Tomato | 413 | 66.51 |
| Cucumber | 348 | 56.04 |
| Pastry-Bagel | 420 | 67.63 |
| Sausage | 343 | 55.23 |
| Bread | 348 | 56.04 |
| Drinks commonly consumed at breakfast | n | % |
| Milk | 242 | 39.00 |
| Fruit juice | 119 | 19.15 |
| Tea | 232 | 37.35 |
| Buttermilk | 28 | 4.50 |
| Lunchtime eating status | | |
| Regularly | 552 | 88.89 |
| Sometimes | 69 | 11.11 |
| The most common foods brought from home to eat during breaks | | |
| Fresh fruit | 344* | 55.40 |
| Dried Fruit | 88 | 14.17 |
| Nuts | 201* | 32.37 |
| Milk | 272* | 43.80 |
| Buttermilk | 213* | 34.30 |
| Kefir | 51 | 8.21 |
| Instant Fruit Juice | 256* | 41.22 |
| Cola-sodas | 25 | 4.02 |
| I won't bring it | 32 | 5.15 |
| * Each child gave more than one answer. | | |

**Table 2.** Mean total scale scores of children (n=621)

| | X | SD |
|---|---|---|
| **PSHE** | 12.23 | 2.10 |
| **HESES-C** | 12.36 | 2.68 |

model studied to examine the relationship between children's family support for healthy eating and healthy eating self-efficacy was significant (F=194.651, p<0.001). As seen in the regression analysis, the family support scale related to healthy eating was a significant predictor of healthy eating self-efficacy (β=.489, p<0.001). The family support scale related to healthy eating variable explained 24% (F= 194.651, p<0.001) of children's healthy eating self-efficacy (21) (Table 4).

**Table 3.** The correlation between family support for healthy eating and healthy eating self-efficacy in children (n=621)

| | 1 | 2 |
|---|---|---|
| | r | |
| 1. Total Points Average of PSHE | 1.0 | |
| 2. Total Points Average of HESES-C | 0.489* | 1.0 |

* p<0.001; r= Correlation coefficient

**Table 4.** The predictive status of family support related to healthy eating on healthy eating self-efficacy in children (n=621)

| | Model 1 |
|---|---|
| | β |
| PSHE | 0.489* |
| R | 0.239 |
| $R^2$ | 0.489 |
| F | 194.651 |
| SE | 1.801 |
| B | 14.117 |
| T | 20.286 |
| P | <0.001 |
| DW | 1.963 |

DW: Durbin Watson; SE: Standard Error; R: Coefficient of Common Correlation; B: Standardize Beta

## DISCUSSION

Although adequate and balanced nutrition is important for a healthy and quality life in every period of life, the importance of nutrition increases even more in the school age period when growth and development accelerate, and learning and comprehension functions gain importance. In this age group in which physical growth and development accelerate, children's energy and nutrient requirements must be met in an adequate and balanced manner in order to ensure rapid growth and development (22).

The most important issue in the nutrition of school-age children is the acquisition of eating habits within the framework of "healthy eating". Breakfast plays a crucial role in healthy nutrition. Breakfast is the most frequently skipped meal in school-age children (23,24). It was found that 22.3% (n=139) of the children in our study did not eat breakfast regularly.

eating and the mean total scores of the healthy eating self-efficacy scale (r=0.489, p<0.001) (Table 3).

A model was created by considering the relationships between the study variables and healthy eating self-efficacy. The model was evaluated using simple regression analysis. It was determined that the regression

In a study conducted by Yılmaz et al., (24) with 183 primary school students to examine obesity, physical activity and self-efficacy levels in primary school students, it was found that 60.1% of the students regularly ate breakfast, and the students who skipped breakfast did not eat breakfast because they did not have enough time (47.6%) and did not want to eat breakfast (42.7%) (24). In a study by Oğuzöncül et al., (25) in which the nutritional habits of children aged 6-15 years were examined, it was emphasized that 17.3% (n=30) of the students did not eat breakfast regularly, and when children could not acquire the habit of planning time appropriately for sleeping, resting, playing and working activities, they could not get up on time in the morning and eat breakfast, and thus skipped the breakfast meal (25). Although the literature and study results show that there is still a need for the acquisition of breakfast habits in school-age children, it is thought that breakfast is important in adequate and balanced nutrition of children. It is recommended that children should acquire the habit of eating breakfast and skipping meals should be prevented for adequate and balanced nutrition (23-25).

In this study, it was found that the foods that children most frequently brought from home to eat during recess breaks were mostly healthy snacks; however, the most frequently brought beverages were ready-to-drink fruit juice at a high rate, unhealthy drinks such as cola and soda at a very low rate, and very few children did not bring any food at all. Studies have emphasized that there are many factors affecting children's choice of healthy snacks (environmental, social, cultural factors, etc.), but it is emphasized that parents play a key role especially in the food choice of school-age children, and especially the attitudes of parents in food choice are decisive (26,27). In a study conducted by Yalımkaya et al., (26) to examine the purchasing behaviors of primary school students from canteens, it was found that students frequently bought packaged and unhealthy foods from the canteen during breaks and consumed ready-made fruit juices (27). In a study conducted by Kösedağ et al., (28) to determine the contents of lunch boxes of 74 primary school students, when lunch boxes were examined according to food groups for 20 days, it was found that students did not have a balanced and regular diet and did not take enough from each food group, and that there were mostly carbohydrate-dominant and uniform foods such as toast and pastries in the lunch boxes of the students (28). The fact that the children in our study mostly brought healthy snacks suggests that both children and parents were aware of healthy eating because they had received education on healthy eating before.

The family environment is the most effective environment in which children's eating habits are shaped. Eating behavior is acquired at the family table. The family's approach to food has a direct or indirect effect on children's food choices (29). The positive or negative reaction of the parents to food will cause the child to take that behavior as

a model and repeat it. When parents offer food, they do not like the child in a more limited way, it may cause a reaction against that food in the child, whereas the child may develop sympathy for the foods they like (30). In our study, the mean total score of the Family Support Scale for Healthy Eating was found to be 12.23±2.10 and the mean total score of the Healthy Eating Self-Efficacy Scale was found to be 12.36±2.68. In addition, it was found that there was a positive and moderately significant relationship between the mean total score of the family support scale related to healthy eating and the mean total score of the healthy eating self-efficacy scale in children, and 24% of the factors affecting children's healthy eating self-efficacy were explained by the mean total score of the family support scale.

Holley et al., (31), it was found that parents of children who chose vegetables and consumed fewer vegetables also consumed fewer vegetables (31). Studies emphasize that it is important for parents to realize how effective they are in helping their children acquire healthy lifestyle behaviors (healthy eating behavior, physical activity, etc.), and that going to the market together to choose healthy snacks and talking about healthy foods with their children are very effective in their children's food choices. For example, parents preparing plates of vegetables and fruits for their children at home during feeding times ensure that children consume healthy snacks instead of junk food. In addition to their children's eating preferences, parents enable children to gain experience in healthy eating by determining consumption patterns and the foods accessible to children (32,33). Many studies in the literature show that there are significant similarities between the foods that parents, especially mothers, dislike and those of the child, and as a result, parents have a great importance in children's eating and nutrition behaviors (34-38). It is thought that parents' healthy eating and drinking behaviors will be effective in children's acquisition of these habits.

Although the findings of our study examining the effect of family support for healthy eating on healthy eating self-efficacy in children are valuable, there are some limitations in the study. The first limitation of the study is that the results obtained are limited to the students included in this study. The last limitation of the study is that due to the limited number of studies on the subject, the discussion section of the study could not be adequately compared with the studies in different sample groups.

## CONCLUSION

As a result of this study, it was found that there was a positive and moderately significant relationship between the mean total scores of the family support scale related to healthy eating and the mean total score of healthy eating self-efficacy in children. Since there is a limited number of studies on this subject, it is thought that the results of this study will shed light on the literature.

It is recommended to plan more comprehensive studies in different sample groups in order to evaluate the effect of family support for healthy eating on healthy eating self-efficacy in children, and to conduct interventional studies on family support for healthy eating and healthy eating self-efficacy in children.

**Authors's Contributions:** Idea/Concept: D.A, E.A; Design: D.A, E.A.; Data Collection and/or Processing: E.A., D.A.; Analysis and/or Interpretation: D.A, E.A., Writing the Article: D.A, E.A; Critical Review: D.A, E.A.

## REFERENCES

1. Eyinacar M. Sağlıklı beslenme alışkanlığı kazandırılması projesi kapsamında ilkokul öğrencilerinin ebeveynlerine verilen beslenme eğitiminin, çocukların beslenme alışkanlıkları üzerine etkileri [yüksek lisans tezi]. Ankara: Hacettepe Üniversitesi Sağlık Bilimleri Enstitüsü; 2019.
2. Çoban T, Özcebe H. Çocuklarda sağlığın geliştirilmesinde sağlık okuryazarlığının rolü. Türkiye Halk Sağlığı Dergisi. 2019; 17(3): 337-49.
3. Taşdemir A. İlköğretim öğrencilerinde beslenme eğitimi üzerine bir araştırma. Sağlık Akademisi Kastamonu. 2019; 4(1): 34-52.
4. Lithopoulos A, Liu S, Rhodes RE, Naylor PJ. The role of identity in parental support for physical activity and healthy eating among overweight and obese children. Health Psychology and Behavioral Medicine. 2020; 8(1): 185-201.
5. Sal Altan S. Ortaokul öğrencilerine yönelik geliştirilen obezite önleme programının etkinliği [doktora tezi]. İzmir: Dokuz Eylül Üniversitesi. 2020.
6. Akder RN, Meseri R, Çakıroğlu FP. Okul çağı çocukluk döneminde beslenme eğitimi. Ankara Sağlık Bilimleri Dergisi. 2018; 7(2): 1-10.
7. Öztürk Y, Alpkaya U, Keskin K, Çubuk A. 11-13 yaş çocukların beslenme davranışları ile obez akranlarına yönelik tutumları arasındaki ilişkinin incelenmesi. Journal of International Social Research. 2017; 10(53): 622-6.
8. Akçay D, Yıldırımlar A. Ebeveynlerin okul kantininde satılan gıdalar ile ilgili görüşleri. Balıkesir Sağlık Bilimleri Dergisi. 2018; 7(1): 14-22.
9. Kocataş S, Yılmaz A. Ortaokul öğrencilerinin obezite sıklığının, beslenme davranışlarının ve fiziksel aktivite düzeylerinin değerlendirilmesi. Journal of Public Health Nursing. 2019; 1(3): 66-83.
10. Kulik NL, Moore EW, Centeio EE, Garn AC, Martin JJ, Shen B et al. Knowledge, attitudes, self-efficacy, and healthy eating behavior among children: results from the building healthy communities trial. Health Education & Behavior. 2019; 46(4): 602-11.
11. Karacabey K, Angın M. Farklı okullarda eğitim gören 10-15 yaş arasındaki çocuklarda beslenme öz yeterlik düzeyinin belirlenmesi. Hemşirelik Bilimi Derg. 2019; 2(2): 14-7.
12. Kabasakal E, Arslan UE, Üner S, Konşuk Ünlü H, Bilir N, Yardım MS ve ark. Çocuklar için sağlıklı yeme öz-yeterlik ölçeğinin Türkçe geçerlik ve güvenirlik çalışması. Türkiye Çocuk Hast Derg. 2021; 15: 72-7.
13. Çolak E. Beslenme eğitimi açısından ortaokul ders kitapları ve öğretim programlarının durumu ve ortaokul öğrencilerinin beslenme öz yeterlilikleri [doktora tezi]. Kastamonu: Kastamonu Üniversitesi; 2019.

14. Balantekin KN, Anzman-Frasca S, Francis LA, Ventura AK, Fisher JO, Johnson SL. Positive parenting approaches and their association with child eating and weight: A narrative review from infancy to adolescence. Pediatric Obesity. 2020; 15(10): e12722.
15. Ha SA, Lee SY, Kim KA, Seo JS, Sohn CM, Park HR et al. Eating habits, physical activity, nutrition knowledge, and self-efficacy by obesity status in upper-grade elementary school students. Nutrition Research and Practice. 2016; 10(6): 597- 605.
16. Groele B, Glabska D, Gutkowska K, Guzek D. Mother's fruit preferences and consumption support similar attitudes and behaviors in their children. Int J Environ Res Public Health. 2018; 15(12): 28-33.
17. Yılmaz G. Çocuklarda yeme davranışı ve annelerin besleme tutumları. Euras J Fam Med. 2020; 9(2):109-16.
18. Kabasakal E, Arslan UE, Üner S, Konşuk Ünlü H, Bilir N, Yardım MS ve ark. Çocukların sağlıklı beslenmesinin değerlendirilmesine yönelik bir Türkçe geçerlik ve güvenirlik çalışması: Sağlıklı yeme ile ilgili aile desteği ölçeği. Sağlık ve Toplum. 2020; (3): 88-95.
19. Berge JM, Fertig AR, Trofholz A, Neumark-Sztainer D, Rogersd E, Loth K. Associations between parental stress, parent feeding practices, and child eating behaviors within the context of food insecurity. Preventive Medicine Reports. 2020; 19: 101146.
20. Story M, Sherwood NE, Himes JH, Davis M, Jacobs DR, Cartwright Y, et al. An after-school obesity prevention program for African-American girls: The Minnesota GEMS pilot study. Ethnicity and Disease, 2003; 13(1): 54-64.
21. Correlation and regression [Internet]. Available from: https://www.bmj.com/about-bmj/resources-readers/publications/statistics-square-one/11-correlation-and-regression
22. Türkiye Beslenme Rehberi TÜBER 2015, T.C. Sağlık Bakanlığı Yayın No: 1031, Ankara 2016.
23. Ünsal A. Beslenmenin önemi ve temel besin öğeleri. Kırşehir Ahi Evran Üniversitesi Sağlık Bilimleri Dergisi. 2019; 2(3): 1-10.
24. Yılmaz M, Ağartıoğlu Kundakçı G, Uyanık G, Ongan D, Yıldırım Sarı H, Akay N ve ark. İlkokul öğrencilerinde obezite, fiziksel aktivite ve özetkililik-yeterlilik düzeylerinin incelenmesi. Ahi Evran Med J. 2022; 6(2): 174-183.
25. Oğuzöncül AF, Bulut İ, Pirinçci E, Yurt N, Deveci SE. Kırsalda yaşayan ilköğretim yaşındaki çocukların hijyen ve beslenme davranışlarının değerlendirilmesi. ESTÜDAM Halk Sağlığı Dergisi. 2020; 5(1): 73-83.
26. Yalım-Kaya S, Şahin E, Duymaz A, Şimşek N. Kantin çalışanlarına göre ilköğretim öğrencilerinin okul kantininden tüketim tercihleri: Adana ve Mersin'de bir inceleme. Futourism Congress, Türkiye. 2018, Eylül 27-29.
27. De Cianni R, Pippinato L, Zanchini R, Brun F, Di Vitaand G, Mancuso T. Parental behaviour in choosing snacks for children aged six to ten: the role of mothers' nutritional awareness. British Food Journal. 2023; 125(2): 713-30.
28. Kösedağ İ, Taşkın-Bedizel NR, Güngör-Cabbar B, Özgür S. İlkokul öğrencilerinin beslenme çantası içeriklerinin farklı değişkenler açısından incelenmesi. Gazi Üniversitesi Gazi Eğitim Fakültesi Dergisi. 2022; 42(3): 2181-211.
29. Güzel A, Üner S, Konşuk Ünlü H, Yardım MS, Arslan UE, Araz Ö ve ark. Evde sağlıklı beslenme önündeki engeller ölçeği Türkçe geçerlik ve güvenirliği. TurkJPH.2020; 18(2): 141-54.
30. Bayhan P, Demir E. Öz S. Çocukların yeme davranışlarında ebeveynlerin etkisini ele alan lisansüstü çalışmaların incelenmesi. Çocuk ve Gelişim Dergisi. 2021; 4(8): 73-87.
31. Holley CE, Haycraft E, Farrow C. Predicting children's fussiness with vegetables: The role of feeding practices. Maternal & Child Nutrition 2018; 14(1): e12442.
32. Lithopoulos A, Liu S, Rhodes RE, Naylor P-J. The role of identity in parental support for physical activity and healthy eating among overweight and obese children. Health Psychology and Behavioral Medicine. 2020; 8(1): 185-201.
33. Cam C, Atay E, Aygar H, Ocal EE, Göktaş S, Işıklı B, et al. Evaluation of Associated Factors with Nutrition Behavior and Dietary Self-efficacy for Healthy Food Choice among Primary School Students. Konuralp Medical Journal. 2021; 13(2): 319-26.
34. Rodríguez-Oliveros G, Altamirano DVO, Pasquel MR, Frongillo EA. Self-efficacy and Social Settings Matter for Fostering Healthy Eating in Mexican School children. Journal of Nutrition Education and Behavior. 2022; 54(12): 1066-75.
35. Akalın S, İrkin R. Ebeveynlerin tutum ve davranışlarının çocukluk çağı obezitesi ile ilişkisi. İzmir Demokrasi Üniversitesi Sağlık Bilimleri Dergisi. 2018; 1(3): 49-62.
36. Köksal G, Gökmen H. Çocuk Hastalıklarında Beslenme Tedavisi. Köksal G editör. Beslenme Yetersizliği Hastalıkları ve Beslenme Tedavisi. Ankara: Hatipoğlu Yayınları; 2016.
37. Baysal A, Arslan P. Doğumdan yetişkinliğe çocuk yemekleri çocuğun bilinçli ve sağlıklı beslenmesi. İstanbul: Özgür Yayınları; 2007.
38. Cooke LJ, Wardle J, Gibson EL, Sapochnik M, Sheiham A, Lawson M. Demographic, familial and trait predictors of fruit and vegetable consumption by preschool children. Public Health Nutrition. 2004; 7(2): 295-302.

Araştırma Makalesi / Research Article

Sağlık Bilimlerinde Değer / Sağlık Bil Değer
Value in Health Sciences / Value Health Sci
ISSN: 2792-0542 sabd@duzce.edu.tr 2025; 15(2): 211-221
doi: https://dx.doi.org/10.33631/sabd.1492846

# Vajinal Doğum Yapan Kadınların Doğum Eyleminden Memnuniyet Düzeyleri ve Etkileyen Faktörlerin Belirlenmesi*

Ayşe KUYULU AKMAN[1], Zehra GÖLBAŞI[2]

**ÖZ**

**Amaç:** Araştırma vajinal yolla doğum yapan kadınların doğum eyleminden memnuniyet düzeylerini ve memnuniyeti etkileyen etmenleri saptamak üzere tanımlayıcı ve açıklayıcı türde yürütülmüştür.

**Gereç ve Yöntemler:** Araştırmanın örneklemini özel hastanede doğum yapan 335 kadın oluşturmuştur. Veriler Tanıtıcı Bilgi Formu ve Normal Doğumda Anne Memnuniyetini Değerlendirme Ölçeği (NDAMDÖ) formları kullanılarak yüz yüze görüşme tekniği ile toplanmıştır. Verilerin değerlendirilmesinde bağımsız gruplarda t testi ve ANOVA kullanılmıştır. Anlamlılık düzeyi $p<0,05$ olarak kabul edilmiştir.

**Bulgular:** Araştırma sonuçlarına göre kadınların NDAMDÖ puan ortalaması 150,65±48,61 olarak saptanmıştır. Ölçeğin kesme noktasına göre kadınların %39,7'sinin (n=133) memnuniyet düzeyinin düşük, %60,3'ünün (n=202) yüksek olduğu belirlenmiştir. Doğum eyleminde oral alıma izin verilen, ağrı ile baş etmede nonfarmakolojik yöntemler kullanan, epidural/spinal anestezi uygulanan, tentene temas sağlanan ve erken emziren kadınların memnuniyet düzeyleri istatistiksel olarak anlamlı ölçüde yüksek bulunmuştur ($p<0,05$). Hareket özgürlüğü tanınmayan, lavman, amniyotomi, oksitosin indüksiyonu ve sürekli NST uygulanan kadınlarda ise memnuniyet düzeyleri istatistiksel olarak anlamlı ölçüde düşük bulunmuştur ($p<0,05$).

**Sonuçlar:** Kadınların yarıdan fazlasının doğum eyleminden memnuniyet düzeyinin yüksek olduğu ve obstetrik müdahalelerin doğum memnuniyetini olumsuz etkilediği söylenebilir. Bu nedenle rutin uygulanan obstetrik müdahalelerin azaltılması ve doğumda hemşire/ebe desteği sağlanması ile kadınların doğum memnuniyetleri artacaktır.

**Anahtar Kelimeler:** Doğum; memnuniyet; etkileyen faktörler.

## Determination of the Levels of Satisfaction with Labor and Affecting Factors of Women Who Had Vaginal Birth

**ABSTRACT**

**Aim:** The research was conducted as a descriptive (solvent) study to determine the satisfaction levels of women who gave birth vaginally and the affecting factors.

**Material and Methods:** The sample of the study consisted of 335 women who gave birth in a private hospital. Data were collected by face-to-face interview technique using the Identification Information Form and the Scale for Measuring Maternal Satisfaction in Normal Birth (SMMSNB). Independent samples t test and ANOVA were used to evaluate the data. The significance level was accepted as $p<0,05$.

**Results:** According to the research results, the women's average SMMSNB score was found to be 150,65±48,61. According to the cut-off point of the scale, it was determined that the satisfaction level of 39,7% (n:133) of the women was low and 60,3% (n:202) was high. The satisfaction levels of women who were allowed oral intake during labor, used non-pharmacological methods to cope with pain, underwent epidural/spinal anesthesia, had skin-to-skin contact, and breastfed early were found to be statistically significantly higher ($p<0.05$). Low satisfaction levels were observed in women who were not given freedom of movement and who underwent enema, amniotomy, oxytocin induction and continuous NST ($p<0,05$).

**Conclusion:** It can be said that more than half of the women have a high level of satisfaction with birth and that obstetric interventions negatively affect birth satisfaction. Therefore, women's birth satisfaction will increase by reducing routine obstetric interventions and providing nurse/midwife support during birth.

**Keywords:** Birth; satisfaction; affecting factors.

1 Ankara Bilkent Şehir Hastanesi, Doğum ve Kadın Hastalıkları Hemşireliği, Ankara, Türkiye.
2 Lokman Hekim Üniversitesi, Sağlık Bilimleri Enstitüsü, Ankara Türkiye

Sorumlu Yazar / Corresponding Author Ayşe KUYULU AKMAN, e-mail: aysekuyulu80@gmail.com
Geliş Tarihi / Received: 30.05.2024, Kabul Tarihi / Accepted: 09.02.2025
*Araştırma 25 Eylül- 27 Eylül 2023 tarihleri arasında Ankara'da gerçekleşen 6.Uluslararası 7. Ulusal Ebelik Kongresi'nde sözlü bildiri olarak sunulmuştur.

## GİRİŞ

Doğum kadın yaşamındaki önemli deneyimlerden biridir. Doğum süreci kadınların bir kısmı için zorlu, acı verici ve belirsizliklerle dolu olaylar dizisi şeklinde olabilmektedir. Bu durum kadınların doğum hakkındaki duygularını ve gelecek doğurganlıklarına yönelik seçimlerini de olumsuz yönde etkileyebilmektedir (1-3). Çalışmalar olumsuz doğum deneyiminin postpartum stres bozuklukları, postpartum depresyon, cinsel disfonksiyon (4-6), istemli düşükler, istenmeyen gebelikler ve küretaj (4,6), sezaryen doğuma yönelim, bebeğe karşı olumsuz duygular, annelik rolüne adaptasyon problemi, emzirmede zorlanma ve bebeği ihmal etme durumu gibi birçok soruna neden olabileceğini göstermektedir (7,8). Kadınların olumlu bir doğum deneyimi yaşamaları ve doğum deneyimlerinden memnun olmaları anne ve yenidoğan sağlığı açısında önemlidir. Bu nedenle son yıllarda araştırmacıların ilgisi, çocuk doğuran kadınların ruh sağlığına, duygusal güvenliğine ve öznel doğum deneyimine odaklanmıştır (9, 10) .

Doğum deneyimi, bir dizi doğum öncesi ve doğum anına ilişkin faktörlerden etkilenen karmaşık bir yapıdır. Bu nedenle doğum eyleminden memnuniyet, kadının bireysel yaşam deneyimi ile birlikte toplumsal, çevresel, örgütsel ve politik olaylardan etkilenen bireysel bir yaşam olayı olarak tanımlamaktadır (10). Uluslararası Ebelik Konfederasyonu da (International Confederation Midwives-ICM) (11) kadınların doğumlarını memnuniyetle hatırlamalarının önemli olduğunu belirtmektedir. Doğum memnuniyeti, annelerin doğumhaneye kabulünden başlayan, doğum ve postpartum dönemlerinde alınan hizmet memnuniyetini içermekte olup sağlık hizmetlerinde maliyet ve kalite bakımından ciddi ölçüde kıymet taşımaktadır (12,13).

Doğum memnuniyeti; annenin doğuma olumlu şekilde hazırlanmasıyla başlayan ve tüm süreç boyunca saygıyı barındıran, sınırsız destek sunulan, sağlıklı bir iletişim ile sürdürülen, gebenin özdenetimini kaybetmeden konforlu şekilde doğum gerçekleştirmesi, uygun ağrı azaltan yöntemlerin uygulanması ve doğumun en alt düzeyde obstetrik yaralanmayla, arzulanan pozisyonda gerçekleşmesi ile sağlanır (8,14).

Doğumda ortaya çıkan olumsuz tecrübelerin seyreltilmesi, alınan doğum hizmetinin kalitesinin yükseltilmesi ve doğum memnuniyetinin yükselten etmenlerin ortaya koyulması sezaryen oranlarının düşürülmesinde değerli bir yol gösterici halini alacaktır.

Hizmetin sunum kalitesi, anne ile sağlık profesyoneli arasındaki etkileşim, hizmetin varlığı, sürekliliği, sağlık çalışanı yeterliliği ve iletişim özellikleri çok katmanlı bir kavram olarak doğum memnuniyetini oluşturmaktadır (15). Bu bağlamda anne memnuniyetinin temelini anne ve yakınlarının arzularının karşılanması, anne ve yakınının yeterli bilgilendirilmesi ve sağlıklı iletişimin sağlanması oluşturmaktadır. Kadınların eğitim düzeyinin artması ve toplumsal hayata katılmasıyla doğum eylemine ilişkin bilgilere ulaşımı kolaylamış ve aldıklarını hizmeti eleştiren bir bakış açısına sahip olmalarına yol açmıştır. Kadınlar doğumlarında verilen sağlık bakımına dahil olmak, karar verme sürecinde kendi durumlarının ne düzeyde olduğunu bilmek ve tanıları hakkında bilgi sahibi olmayı istemektedirler (16). Bu durumda annelerin doğum eyleminden memnuniyetinin ve sağlık hizmet kalitesinin analiz edilmesi, sağlık alanındaki yetersizliklerin belirlenmesinde ve bu yetersizliklerin ortadan kaldırılması açısından son derece kıymetli olacaktır. Sunulan sağlık bakımının bir çıktısı olarak, annelerin doğum eyleminden memnuniyet düzeyleri hemşirelik hizmetlerine yönelik önemli bir geri bildirim olacaktır (17,18).

### Araştırmanın Amacı

Bu araştırma Lokman Hekim Üniversitesi Hastane'lerinde vajinal doğum yapmış kadınların doğum eyleminden memnuniyet düzeyleri ve etkileyen faktörleri belirlemek amacıyla planlanmıştır.

Araştırma Soruları: Bu araştırmada aşağıdaki sorulara yanıt aranmıştır.

1. Vajinal doğum yapan kadınların doğum memnuniyet düzeyleri nedir?
2. Vajinal doğum yapan kadınların doğum memnuniyet düzeylerini etkileyen faktörler nelerdir?

## GEREÇ VE YÖNTEMLER

### Araştırmanın Türü ve Yeri

Araştırmada vajinal doğum yapan kadınların doğum eyleminden memnuniyet düzeylerini ve memnuniyet düzeyini etkileyen faktörleri belirleme amacına yönelik tanımlayıcı ve açıklayıcı bir çalışmadır. Çalışma, 18 Aralık 2021 – 15 Nisan 2022 tarihleri arasında Ankara'da iki özel hastanede yürütülmüştür.

### Evren ve Örneklem

Çalışmanın evrenini, Ankara'da iki özel hastanede vajinal yolla doğum yapan kadınlar oluşturmuştur. Örneklem büyüklüğü, evrendeki birey sayısı bilinmediğinde örneklem büyüklüğü hesaplanması için kullanılan formül yardımıyla %95 güven düzeyinde hesaplanmış ve örneklem büyüklüğü 335 olarak bulunmuştur. Vajinal yolla doğum yapan kadınlara taburcu olmadan önce çalışma hakkında bilgi verilmiş ve çalışmaya katılma konusunda onay vermiş olanlar örnekleme dahil edilmiştir.

**Veri Formları:** Araştırmanın verileri Tanımlayıcı Bilgi Formu ve Doğumda Anne Memnuniyetini Değerlendirme Ölçeği (NDAMDÖ) ile toplanmıştır.

Tanımlayıcı Bilgi Formu; form kadınların bazı bireysel özellikleri (yaş, eğitim, gelir vb), obstetrik öyküsü (doğum sayısı, haftası, vb.), bu doğumuna ilişkin bilgiler (hareket özgürlüğü tanınması, epizyotomi uygulanması, vb.), hizmet aldığı sağlık çalışanına ilişkin bilgileri (bilgi desteği, verilen bakım, vb.) tanımlamak amacıyla hazırlanmış 29 sorudan oluşmaktadır.

Normal Doğumda Anne Memnuniyetini Değerlendirme Ölçeği (NDAMDÖ); Güngör ve Beji tarafından 2009 yılında geliştirilen bu ölçek normal doğum yapan kadınların memnuniyet düzeylerini değerlendirmektedir. NDAMDÖ öz bildirime dayalı bir ölçme aracı olup, 43 maddeden oluşmaktadır. Her bir madde yanıtlayıcı tarafından okunduktan sonra 1-5 arasında değişen bir

puanlama aralığında (1: Katılmıyorum -5: Kesinlikle katılıyorum) yanıtlanmaktadır. On alt boyutu olan ölçeğin her bir maddesine verilen yanıtlar toplanarak toplam puan (en düşük, en yüksek 215); alt boyut maddelerine verilen puanlar toplanarak alt boyut puanları elde edilmektedir. Hem toplam hem de alt boyutlardan alınan puanın yüksek olması memnuniyet düzeyinin de yüksek olduğunu göstermektedir. Ayrıca ölçeğin kesme noktası bulunmakta; 150,5 puanın üzeri "memnuniyet düzeyi yüksek", altı ise "memnuniyet düzeyi düşük" şeklide tanımlanmaktadır.

**Veri Formlarının Uygulanması:** Kadın doğum servisinde yatan vajinal doğum yapmış kadınlara araştırmacı tarafından gerekli açıklama yapılmıştır. Çalışmaya katılmaya dair yazılı ve sözlü onam veren kadınlar çalışmaya dahil edilmiştir. Veri toplama formlarının uygulanması 15-20 dk. sürmüştür.

**Araştırmanın Etik Boyutu:** Çalışma başlamadan bir üniversitenin etik kurul başkanlığından onay (Karar No: 2021/103, Kod No:2021098) ve uygulamanın yapıldığı hastanelerden yazılı izin alınmıştır.

**İstatistiksel Analiz**

Veriler ile ilgili analizler SPSS 26 programında yapılmıştır. Sayısal değişkenler ve kadınların NDAMDÖ puanı ortalama ± standart sapma, maksimum ve minimum değerler olarak sunulmuştur. Kategorik değişkenler sayı ve yüzde (%) olarak gösterilmiştir. Kadınların NDAMDÖ puan ortalamasının normal dağılıma uygunluğunun değerlendirilmesi aşamasında, Shapiro-Wilk testi ile normal dağılıma uygunluk ve Levene testi ile varyans homojenlik varsayımına uygunluk incelenmiştir. İstatistiksel analizde Student T-testi ve ANOVA Tek yönlü varyans analizi (One Way ANOVA) kullanılmıştır. ANOVA testi sonucunda yapılan ileri analizde Tukey kullanılmıştır. Hipotez testi bulgularını değerlendirmek için hata payı %5 ($p<0,05$) olarak alınmıştır.

## BULGULAR

Katılımcıların bazı sosyodemografik özellikleri Tablo 1'de verilmiştir. Tabloda katılımcıların ortalama yaşının 29,57±5,98 olduğu, %39,4'ünün (n=132) üniversite eğitimine sahip, %56,1'inin (n:188) çalışmadığı, %72,5'inin (n:243) ekonomik durumunun gelir gidere denk olduğu ve evlilik yılı ortalamasının 4,77 ± 4,02 olduğu görülmüştür. Kadınların %84,8'inin (n:284) termde doğum yaptığı, %57,0'ının primipar ve %70,1'inin (n=51) bu gebeliğinin planlı olduğu belirlenmiştir.

**Tablo 1.** Kadınların bazı sosyodemografik ve obstetrik özelliklerine göre dağılımı (n=335)

| Özellikler | Sayı | % |
|---|---|---|
| Yaş: X ± SS = 29,57 ± 5,98 | | |
| 24 Yaş ve Altı | 81 | 24,2 |
| 25-34 Yaş | 176 | 52,5 |
| 35 Yaş ve Üzeri | 78 | 23,3 |
| **Eğitim düzeyi** | | |
| Okuma yazması yok | 13 | 3,9 |
| İlkokul | 21 | 6,3 |
| Ortaokul | 57 | 17,0 |
| Lise | 112 | 33,4 |
| Üniversite | 132 | 39,4 |
| **Çalışma durumu** | | |
| Çalışıyor | 147 | 43,9 |
| Çalışmıyor | 188 | 56,1 |
| **Ekonomik durum** | | |
| Kötü (Gelir giderden az) | 40 | 11,9 |
| Orta (Gelir gidere eşit) | 243 | 72,5 |
| İyi (Gelir giderden çok) | 52 | 15,5 |
| Evlilik yılı: X ± SS = 4,77 ± 4,02 | | |
| **Gebeliğin Planlı Olma durumu** | | |
| Planlı | 235 | 70,1 |
| Plansız | 100 | 29,9 |
| **Parite** | | |
| Primipar | 191 | 57,0 |
| Multipar | 144 | 43,0 |
| **Doğumun gerçekleştiği gebelik haftası** | | |
| Preterm | 51 | 15,2 |
| Term | 284 | 84,8 |

Araştırmaya katılan kadınların NDAMDÖ alt boyut ve toplam puan ortalamaları Tablo 2'de verilmiştir. Bulgulara göre, sağlık ekibini algılayışı puanının 15,19±5,09, doğum eyleminde hemşirelik bakımı alt boyut puan ortalamasının 7,29±2,78, rahatlama alt boyut puan ortalamasının 12,56±5,40, kararlara katılım ve bilgilendirme alt boyut puan ortalamasının 29,67±9,50 , bebekle tanışma alt boyut puan ortalamasının 9,46±4,89, postpartum bakım alt boyut puan ortalamasının 20,51±7,60 , hastane odası alt boyut puan ortalamasının 13,16±5,61 , hastane olanakları alt boyut puan ortalamasının 9,44±4,01, mahremiyete saygı alt boyut puan ortalamasının 16,90±3,86 , beklentilerin karşılanması alt boyut puan ortalamasının 16,47±5,89 ve NDAMDÖ toplam puan ortalamasının 150,65±48,61 olduğu bulunmuştur. Ölçeğin kesme noktasına göre kadınların %60,3'ünün (n=202) memnuniyet düzeyinin yüksek olduğu belirlenmiştir (NDAMDÖ Toplam Puan ≥150,5).

**Tablo 2.** NDAMDÖ Toplam ve alt boyutlarına ilişkin puan ortalamaları

| **NDAMDÖ Alt Boyutlarına İlişkin ve Toplam Puan** | **X** ± SS | **Min.** | **Max.** | **Ölçek Min.** | **Ölçek Maks.** |
|---|---|---|---|---|---|
| Sağlık ekibini algılayışı | 15,19 ± 5,09 | 4,00 | 20,00 | 4,00 | 20,00 |
| Doğum eyleminde hemşirelik bakımı | 7,29 ± 2,78 | 2,00 | 10,00 | 2,00 | 10,00 |
| Rahatlatma | 12,56 ± 5,40 | 4,00 | 20,00 | 4,00 | 20,00 |
| Kararlara katılım ve bilgilendirme | 29,67 ± 9,50 | 8,00 | 40,00 | 8,00 | 40,00 |
| Bebekle tanışma | 9,46 ± 4,89 | 3,00 | 15,00 | 3,00 | 15,00 |
| Postpartum bakım | 20,51 ± 7,60 | 6,00 | 30,00 | 6,00 | 30,00 |
| Hastane odası | 13,16 ± 5,61 | 4,00 | 20,00 | 4,00 | 20,00 |
| Hastane olanakları | 9,44 ± 4,01 | 3,00 | 15,00 | 3,00 | 15,00 |
| Mahremiyete saygı | 16,90 ± 3,86 | 4,00 | 20,00 | 4,00 | 20,00 |
| Beklentilerin karşılanması | 16,47 ± 5,89 | 5,00 | 25,00 | 5,00 | 25,00 |
| **TOPLAM PUAN*** | **150,65 ± 48,61** | **51,00** | **215,00** | **51,00** | **215,00** |

Araştırmaya katılan kadınların bazı sosyodemografik özelliklerine göre NDAMDÖ alt boyutlarına ilişkin puanlar ve toplam puan Tablo 3'te verilmiştir. Eğitim durumuna göre NDAMDÖ toplam puan ile sağlık ekibi algılayışı, kararlara katılım ve bilgilendirme, bebekle tanışma, hastane olanakları ve beklentilerin karşılanması puanları arasında istatistiksel olarak anlamlı bir fark bulunmuştur (sırasıyla; p= 0,014; p= 0,005; p= 0,009; p= 0,003; p= 0,028; p= 0,007). Kadınların ekonomik durumlarına göre NDAMDÖ toplam puan ortalaması arasında anlamlı bir fark olmadığı saptanmıştır (p= 0,853).

Pariteye göre memnuniyet incelendiğinde multipar kadınların tüm puan ortalamalarının primiparlardan yüksek olduğu belirlenmiştir (tüm p değerleri <0,05). Doğumun gerçekleştiği gebelik haftasına göre memnuniyet incelendiğinde ise termde doğum yapan kadınların NDAMDÖ toplam puanları ile, rahatlama, karara katılım ve bilgilendirme, bebekle tanışma, postpartrum bakım, hastane odası ve mahremiyete saygı puanlarının preterm doğum yapanlardan istatistiksel olarak anlamlı düzeyde yüksek bulunmuştur (sırasıyla; p=0,004; p=0,002; p=0,024; p<0,001; p=0,002; p=0,048; p=0,009). Gebeliğin planlı olma durumuna göre bakıldığında gebeliği planlı olan kadınların tüm puanlarının plansız gebelik yaşayan kadınlara göre istatistiksel olarak anlamlı düzeyde yüksek olduğu belirlenmiştir (tüm p değerleri <0,05).

Doğumun birinci evresinde yapılan müdahalelere göre kadınların memnuniyet düzeyi incelendiğinde; kadınlardan hareket özgürlüğü tanınan ve lavman, amniotomi uygulanmayan kadınların memnuniyet düzeyinin hareket özgürlüğü tanınmayan ve lavman, amniotomi uygulanan kadınlarda istatistiksel olarak anlamlı düzeyde yüksek olduğu belirlenmiştir (tüm p değerleri <0,05) (Tablo 4). Oral alıma izin verilen, sürekli NST uygulanmayan ve ağrının azaltılmasında non-farmakolojik yöntemler kullanılan kadınların NDAMDÖ toplam ve alt boyutlara ait puanları istatistiksel olarak anlamlı düzeyde yüksek bulunmuştur (tüm p düzeyleri <0,05). Araştırmada epidural/spinal anestezi kullanılmasına göre hem NDAMDÖ toplam hem de tüm alt boyutlara ilişkin puan ortalaması arasında istatistiksel olarak anlamlı bir fark bulunmamıştır (p>0,05).

**Tablo 3.** Kadınların bazı sosyodemografik ve obstetrik özelliklerine göre NDAMDÖ alt boyut ve toplam puan ortalamaları

| Özellikler | Normal Doğumda Anne Memnuniyetini Değerlendirme Ölçeği Alt Boyut ve Toplam Puan Ortalaması | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | n | Sağlık Ekibini Algılayışı | Doğum Eyleminde Hemşirelik Bakımı | Rahatlama | Karara Katılım ve Bilgilendirme | Bebekle Tanışma | Postpartum Bakım | Hastane Odası | Hastane Olanakları | Mahremiyete Saygı | Beklentilerin Karşılanması | Toplam NDAMDÖ |
| | | X±SS | X±SS | X±SS | X±SS | X±SS | X±SS | X±SS | X±SS | X±SS | X±SS | X±SS |
| **Okuryazar değil[1]** | 13 | 15,23±3,88 | 7,46±2,88 | 11,38±5,01 | 30,85±7,77 | 7,92±4,87 | 20,31±7,32 | 11,54±4,93 | 7,54±3,13 | 16,77±2,83 | 14,31±5,44 | 143,31±41,47 |
| **İlkokul[2]** | 21 | 15,10±6,15 | 7,29±3,12 | 13,00±5,10 | 29,33±10,89 | 8,71±5,26 | 19,71±8,32 | 12,24±5,68 | 8,95±4,08 | 16,48±4,14 | 15,86±6,44 | 146,67±50,16 |
| **Ortaokul[3]** | 57 | 13,51±5,78 | 6,67±3,06 | 11,39±5,49 | 26,81±10,27 | 7,95±5,28 | 18,96± 8,02 | 12,14±6,04 | 8,95±4,08 | 16,12±4,38 | 14,72±6,11 | 137,21±52,96 |
| **Lise[4]** | 112 | 14,64±5,16 | 7,04±2,70 | 12,17±5,61 | 28,56±9,50) | 9,13±4,80 | 19,77±7,73 | 13,06±5,64 | 9,04±4,06 | 16,56±4,08 | 16,18±5,77 | 146,17±48,72 |
| **Üniversite[5]** | 132 | 16,38±4,37 | 7,74±2,63 | 13,45±5,19 | 31,77± 8,69 | 10,66±4,49 | 21,96±7,07 | 13,98±5,39 | 10,27±3,89 | 17,61±3,39 | 17,78±5,63 | 161,61±45,26 |
| **İstatistiksel analiz** | | F= 3,809 p= 0,005 | F= 1,832 p= 0,122 | F= 1,933, p= 0,105 | F= 3,448, p= 0,009 | F= 4,066, p= 0,003 | F= 2,150, p= 0,074 | F= 1,617, p= 0,170 | F= 2,752, p= 0,028 | F= 1,983, p= 0,097 | F= 3,559, p= 0,007 | F= 3,195, p= 0,014 |
| **Fark** | | 3<5 | - | - | 3<5 | 3<5 | - | - | 3<5 | - | 3<5 | 3<5 |
| ***Çalışma durumu*** | | | | | | | | | | | | |
| **Çalışmıyor** | 188 | 14,23±5,45 | 6,90±2,90 | 11,95±5,44 | 27,85±9,93 | 8,47±4,97 | 19,31±7,81 | 12,38±5,82 | 8,86±4,06 | 16,31±4,15 | 15,37±5,97 | 141,63±50,19 |
| **Çalışıyor** | 147 | 16,41±4,29 | 7,78±2,56 | 13,35±5,28 | 31,99±8,38 | 10,73±4,49 | 22,05±7,05 | 14,16±5,18 | 10,19±3,82 | 17,66±3,32 | 17,87±5.50 | 162,18±44,06 |
| **İstatistiksel analiz** | | T=-4,094, p<0,001 | T=-2,915, p= 0,004 | T=-2,381, p= 0,018 | T=-4,129, p<0,001 | T=-4,364, p<0,001 | T=-3,373, p<0,001 | T=-2,953, p= 0,003 | T=-3,049, p= 0,002 | T=-3,310, p= 0,001 | T=-3,934, p<0,001 | T=-3,985, p<0,001 |
| ***Ekonomik durumu*** | | | | | | | | | | | | |
| **Gelir giderden az** | 40 | 15,60±4,26 | 7,60±2,65 | 12,18±5,19 | 30,27±8,22 | 9,45±4,84 | 21,00±6,77 | 14,32±4,80 | 9,93±3,55 | 17,15±3,00 | 15,45±5,28 | 152,95±40,43 |
| **Gelir-gidere eşit** | 243 | 15,19±5,16 | 7,25±2,83 | 12,45±5,39 | 29,49±9,58 | 9,37±4,89 | 20,41±7,67 | 12,98±5,75 | 9,33±4,10 | 16,81±4,04 | 16,45±5,95 | 149,72±49,60 |
| **Gelir giderden çok** | 52 | 14,85±5,37 | 7,23±2,71 | 13,40±5,63 | 30,0±10,13 | 9,90±4,98 | 20,63±7,98 | 13,10±5,51 | 9,62±3,92 | 17,13±3,64 | 17,33±6,02 | 153,19±50,36 |
| **İstatistiksel analiz** | | F= 0,247, p= 0,781 | F= 0,287, p= 0,751 | F= 0,786, p= 0,456 | F= 0,154, p= 0,858 | F= 0,258, p= 0,773 | F= 0,112, p= 0,894 | F= 0,991, p= 0,372 | F= 0,434, p= 0,648 | F= 0,243, p= 0,784 | F= 1,152, p= 0,317 | F= 0,159, p= 0,853 |
| ***Parite*** | | | | | | | | | | | | |
| **Multipar** | 144 | 16,41±4,27 | 7,90±2,43 | 13,93±5,16 | 31,94±8,34 | 10,37±4,91 | 22,12±6,90 | 14,62±4,90 | 10,40±3,76 | 17,62±3,36 | 18,67±5,12 | 163,98±42,95 |
| **Primipar** | 191 | 14,26±5,46 | 6,83±2,95 | 11,53±5,37 | 27,95±9,97 | 8,77±4,7 | 19,30±7,89 | 12,06±5,87 | 8,72±4,05 | 16,36±4,13 | 14,81±5,91 | 140,60±50,30 |
| **İstatistiksel analiz** | | T= 4,042, p<0,001 | T= 3,633, p<0,001 | T= 4,136, p<0,001 | T= 3,991, p<0,001 | T= 2,990, p= 0,003 | T= 3,473, p<0,001 | T= 4,346, p<0,001 | T= 3,918, p<0,001 | T= 3,100, p= 0,002 | T= 6,386, p<0,001 | T= 4,581, p<0,001 |
| ***Doğumun gerçekleştiği gebelik haftası*** | | | | | | | | | | | | |
| **Term** | 284 | 15,40±5,01 | 7,38±2,75 | 12,95±5,39 | 30,16±9,30 | 10,07±4,68 | 21,06±7,50 | 13,42±5,55 | 9,63±3,95 | 17,13±3,72 | 16,72±5,91 | 153,92±47,98 |
| **Preterm** | 51 | 13,98±5,38 | 6,78±2,97 | 10,39±4,97 | 26,0±10,20 | 6,6±4,4 | 17,49±7,50 | 11,73±5,81 | 8,43±4,24 | 15,61±4,41 | 15,06±5,63 | 132,43±48,55 |
| **İstatistiksel analiz** | | T= 1,843, p= 0,066 | T= 1,401, p= 0,162 | T= 3,159, p= 0,002 | T= 2,271, p= 0,024 | T= 5,643, p<0,001 | T= 3,126, p= 0,002 | T= 1,989, p= 0,048 | T= 1,970, p= 0,050 | T= 2,620, p= 0,009 | T= 1,863, p= 0,063 | T= 2,940, p= 0,004 |
| ***Bu gebeliğin planlı olma durumu*** | | | | | | | | | | | | |
| **Evet** | 235 | 16,17±4,62 | 7,77±2,63 | 13,45±5,31 | 31,50±8,69 | 10,57±4,55 | 22,05±6,99 | 14,25 ± 5,31 | 10,31±3,78 | 17,30±3,84 | 17,54±5,53 | 160,91±45,39 |
| **Hayır** | 100 | 12,86±5,39 | 6,16±2,82 | 10,49±5,05 | 25,36±9,96 | 6,6±4,68 | 16,90±7,78 | 10,59 ± 5,48 | 7,1±3,80 | 15,96±3,76 | 13,94±5,96 | 126,53±47,59 |
| **İstatistiksel analiz** | | T= 5,370, p<0,001 | T= 4,863, p<0,001 | T= 4,727, p<0,001 | T= 5,357, p<0,001 | T= 6,765, p<0,001 | T= 5,710, p<0,001 | T= 5,717, p<0,001 | T= 6,416, p<0,001 | T= 2,943, p= 0,003 | T= 5,331, p<0,001 | T= 6,252, p<0,001 |

**Tablo 4.** Kadınların doğumun birinci evresinde uygulanan müdahalelere göre NDAMDÖ alt boyut ve toplam puan ortalamaları

| Doğumun Birinci Evresinde Uygulanan Müdahaleler | Normal Doğumda Anne Memnuniyetini Değerlendirme Ölçeği Toplam ve Alt Boyut Puan Ortalamaları | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | n | Sağlık Ekibini Algılayışı | Doğum Eyleminde Hemşirelik Bakımı | Rahatlama | Kararlara Katılım ve Bilgilendirme | Bebekle Tanışma | Postpartum Bakım | Hastane Odası | Hastane Olanakları | Mahremiyete Saygı | Beklentilerin Karşılanması | Toplam NDAMDÖ |
| | | X ± SS | X ± SS | X ± SS | X ± SS | X ± SS | X ± SS | X ± SS | X ± SS | X ± SS | X ± SS | X ± SS |
| ***Hareket özgürlüğü tanınması*** | | | | | | | | | | | | |
| **Evet** | 209 | 17,18±3,64 | 8,29±2,13 | 14,60±4,68 | 33,49±7,18 | 11,81±3,79 | 23,93±5,72 | 15,36±4,55 | 10,95±3,53 | 18,11±3,09 | 18,83±4,99 | 172,56±37,00 |
| **Hayır** | 126 | 11,88±5,42 | 5,62±2,94 | 9,18±4,81 | 23,32±9,49 | 5,56±3,90 | 14,84±6,92 | 9,50±5,29 | 6,94±3,48 | 14,90 ±4,9 | 12,55±5,15 | 114,29±43,60 |
| **İstatistiksel analiz (t, p)** | | 9,720, <0,001 | 8,882 , <0,001 | 10,165, <0,001 | 10,375, <0,001 | 14,472, <0,001 | 12,415,<0,001 | 10,340 , <0,001 | 10,124 , <0,001 | 7,440 7, <0,001 | 11,037, <0,001 | 12,528, <0,001 |
| ***Lavman uygulanması*** | | | | | | | | | | | | |
| **Evet** | 205 | 13,37 ± (5,58) | 6,22±2,91 | 11,09±5,29 | 26,12±10,33 | 8,22±4,80 | 17,89±8,18 | 11,39±5,80 | 8,28 ±3,99 | 16,08±4,13 | 14,56±6,33 | 133,22±51,79) |
| **Hayır** | 130 | 16,34 ± (4,39) | 7,97±2,48 | 13,50±5,28 | 31,91±8,19 | 10,25±4,79 | 22,18±6,72 | 14,28±5,20 | 10,18±3,85 | 17,42±3,59 | 17,68±5,26 | 161,70±43,09) |
| **İstatistiksel analiz (t, p)** | | -5,140 ,<0,001 | -5,676, <0,001 | -4,061, <0,001 | -5,403, <0,001 | -3,785, <0,001 | -4,998, <0,001 | -4,617, <0,001 | -4,330, <0,001 | -3,153, 0,002 | -4,679, <0,001 | -5,226, p<0,001 |
| ***Amniyotomi*** | | | | | | | | | | | | |
| **Evet** | 192 | 14,12±5,43 | 6,65±2,91 | 11,36±5,24 | 27,92±10,04 | 8,77±4,76 | 18,99±7,99 | 12,23±5,94 | 8,80±4,10 | 16,23±4,22 | 15,02±5,82 | 140,09±50,74 |
| **Hayır** | 143 | 15,98±4,67 | 7,76±2,59 | 13,46±5,36 | 30,96±8,88 | 9,97±4,93 | 21,65±7,10 | 13,85±5,26 | 9,93±3,88 | 17,40±3,50 | 17,55±5,72 | 158,51±45,53 |
| **İstatistiksel analiz ( t, p)** | | -3,289, 0,001 | -3,614, <0,001 | -3,592, <0,001 | -2,879, = 0,004 | -2,246, 0,025 | -3,149, 0,002 | -2,587, 0,010 | -2,574, 0,010 | -2,695, 0,007 | -3,966, <0,001 | -3,432, <0,001 |
| ***Oksitosin indüksiyonu*** | | | | | | | | | | | | |
| **Evet** | 239 | 14,84±5,22 | 7,08±2,83 | 12,34±5,36 | 29,17±9,68 | 9,58±4,75 | 20,21±7,76 | 12,79±5,68 | 9,21±4,01 | 16,87±3,87 | 15,99±5,95 | 148,07±49,53 |
| **Hayır** | 96 | 16,04±4,67 | 7,80±2,60 | 13,12±5,51 | 30,91±8,95 | 9,16±5,21 | 21,28±7,17 | 14,07±5,36 | 10,04±3,95 | 16,98±3,87 | 17,67±5,59 | 157,07±45,85 |
| **İstatistiksel analiz (t, p)** | | -2,057, 0,041 | -2,239, 0,026 | -1,205, 0,229 | -1,570, 0,118 | 0,692, 0,490 | -1,213, 0,227 | -1,947, 0,053 | -1,733, 0,084 | -0,233, 0,816 | -2,375, 0,018 | -1,588, 0,114 |
| ***Sürekli NST uygulanması*** | | | | | | | | | | | | |
| **Evet** | 241 | 14,16±5,22 | 6,75±2,84 | 11,40±5,33 | 27,73±9,71 | 8,34±4,83 | 18,95±7,73 | 12,06±5,71 | 8,54±3,99 | 16,27±4,03 | 15,10±5,65 | 139,30±48,32 |
| **Hayır** | 94 | 17,81±3,59 | 8,66±2,09 | 15,55±4,37 | 34,64±6,77 | 12,32±3,75 | 24,53±5,53 | 15,97±4,22 | 11,76±3,03 | 18,52±2,84 | 19,99±4,97 | 179,74±35,65 |
| **İstatistiksel analiz (t, p)** | | -7,290, <0,001 | -6,745, <0,001 | -7,336, <0,001 | -7,373, <0,001 | -8,013, <0,001 | -7,378, <0,001 | -6,850, <0,001 | -7,937, <0,001 | -5,756, <0,001 | -7,778, <0,001 | -8,395, <0,001 |
| ***Oral alıma izin verilmesi*** | | | | | | | | | | | | |
| **Evet** | 168 | 17,41±3,64 | 8,40±2,15 | 15,23±4,36 | 34,07±6,68 | 12,01±3,66 | 24,10±5,83 | 15,62±4,40 | 11,19±3,44 | 18,32±2,68 | 19,07±4,98 | 175,42±35,52 |
| **Hayır** | 167 | 12,97±535 | 6,18±2,91 | 9,91±5,03 | 25,29±9,87 | 6,92±4,63 | 16,95±7,49 | 10,71±5,63 | 7,71±3,78 | 15,49±4,32 | 13,88±5,59 | 126,02±47,42 |
| **İstatistiksel analiz (t, p)** | | 8,885, <0,001 | 7,912, <0,001 | 10,352, <0,001 | 9,550, <0,001 | 11,164, <0,001 | 9,742, <0,001 | 8,884, <0,001 | 8,786, <0,001 | 7,221, <0,001 | 8,974, <0,001 | 10,795, <0,001 |
| ***Epidural/spinal anestezi kullanılması*** | | | | | | | | | | | | |
| **Evet** | 221 | 15,29±5,03 | 7,33±2,79 | 12,96±5,28 | 30,38±9,31 | 10,05±4,62 | 21,12±7,59 | 13,47±5,59 | 9,72±3,94 | 17,08±3,81 | 16,49±5,93 | 153,89±48,20 |
| **Hayır** | 114 | 14,98±5,21 | 7,21±2,80 | 11,79±5,59 | 28,28±9,74 | 8,32±5,19 | 19,33±7,52 | 12,56±5,63 | 8,90±4,11 | 16,55±3,95 | 16,43±5,84 | 144,36±48,99 |
| **İstatistiksel analiz (t, p)** | | 0,523, 0,601 | 0,358, 0,720 | 1,892, 0,059 | 1,925, 0,055 | 3,004, 0,003 | 2,051, 0,041 | 1,400, 0,162 | 1,781, 0,076 | 1,188, 0,236 | 0,087, 0,931 | 1,705, 0,089 |
| ***Ağrı ile baş etmede nonfarmakolojik yöntemlerin kullanması*** | | | | | | | | | | | | |
| **Evet** | 241 | 16,47±4,39 | 7,91±2,49 | 13,93±5,06 | 32,38±8,12 | 11,00±4,30 | 22.76 ± (6.72) | 14,59±5,12 | 10,53±3,69 | 17,71±3,47 | 17,84±5,59 | 165,13±42,81 |
| **Hayır** | 94 | 11,89±5,28 | 5,68±2,87 | 9,05±4,65 | 22,70±9,26 | 5,50±4,00 | 14.76 ± (6.66) | 9,48±5,15 | 6,67±3,41 | 14,84±4,08 | 12,95±5,16 | 113,52±42,66 |
| **İstatistiksel analiz ( t, p)** | | 7,454, <0,001 | 6,629, <0,001 | 8,117, <0,001 | 8,891, <0,001 | 11,078, <0,001 | 9.821, <0.001 | 8,205, <0,001 | 9,078, <0,001 | 6,017, <0,001 | 7,356, <0,001 | 9,922, <0,001 |

**Tablo 5.** Kadınların doğum eyleminin ikinci ve üçüncü evresine yönelik özellikleri ve uygulanan müdahalelere göre DAMDÖ puan ortalaması

| **Doğum Eyleminin İkinci ve Üçüncü Evresine İlişkin Özellikler** | **Normal Doğumda Anne Memnuniyetini Değerlendirme Ölçeği Toplam Ve Alt Boyut Puan Ortalamaları** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **n** | **Sağlık Ekibini Algılayışı** | **Doğum Eyleminde Hemşirelik Bakımı** | **Rahatlama** | **Karara Katılım ve Bilgilendirme** | **Bebekle Tanışma** | **Postpartum Bakım** | **Hastane Odası** | **Hastane Olanakları** | **Mahremiyete Saygı** | **Beklentilerin Karşılanması** | **Toplam** |
| | | **X±SS** | **X±SS** | **X±SS** | **X±SS** | **X±SS** | **X±SS** | **X±SS** | **X±SS** | **X±SS** | **X±SS** | **X±SS** |
| ***Fundal bası yapılması*** | | | | | | | | | | | | |
| Evet | 183 | 13,83±5.37 | 6,55±2,90 | 11,23±5,30 | 27,06±9,85 | 8,60±4,80 | 18,64±7,94 | 11,71±5,82 | 8,42±4,06 | 16,38±4,05 | 14,63±5,81 | 137,04±49.88 |
| Hayır | 152 | 16,82 ±4,19 | 8,17±2,36 | 14,17±5,10 | 32,80±8,03 | 10,50±4,80 | 22,77±6,51 | 14,90±4,82 | 10,68±3,59 | 17,53±3,54 | 18,68±5,20 | 167,03±41,63 |
| İstatistiksel analiz (t, p) | | -5,737, <**0.001** | -5,631, **0.001** | -5,164, <**0,001** | -5,879, <**0,001** | -3,615, <**0,001** | -5,231, <**0,001** | -5,489, <**0,001** | -5,431, <**0,001** | -2,758, 0,006 | -6,715, <**0,001** | -5,996, <**0,001** |
| ***Epizyotomi*** | | | | | | | | | | | | |
| Evet | 198 | 14,42±5,33 | 6,85±2,91 | 11,84±5,46 | 28,10±9,96 | 8,83±4,81 | 19,35±7,84 | 12,17±5,86 | 8,89±4,02 | 16,53±4,01 | 14,95±5,85 | 141,94±49,94 |
| Hayır | 137 | 16,28±4,50 | 7,91±2,47 | 13,61±5,17 | 31,93±8,32 | 10,37±4,87 | 22,19±6,92 | 14,59±4,91 | 10,25±3,87 | 17,45±3,58 | 18,66±5,24 | 163,23±43,82 |
| İstatistiksel analiz | | -3,444, <**0,001** | -3,583, <**0,001** | -2,998, 0,003 | -3,815, <**0,001** | -2,874, =**0,004** | -3,490, <**0,001** | -4,103, <**0,001** | -3,091, **0,002** | -2,155, **0,032** | -6,058, <**0,001** | -4,128, <**0,001** |
| ***Fetal başın doğurtulmasına müdahale edilmesi*** | | | | | | | | | | | | |
| Evet | 296 | 10,05±5,34 | 4,64±2,54 | 8,08±4,23 | 20,00±8,61 | 5,49±3,24 | 13,4 ±7,16 | 7,92±4,64 | 6,21±3,02 | 14,51±5,09 | 10,62±4,17 | 100,95±40,46 |
| Hayır | 39 | 15,86±4,66 | 7,64±2,63 | 13,16±5,27 | 30,94±8,86 | 9,98±4,83 | 21,45±7,16 | 13,85±5,37 | 9,87±3,93 | 17,22±3,56 | 17,24±5,65 | 157,20±45,77 |
| İstatistiksel analiz (t,p) | | -7,197, <**0,001** | -6,715, <**0,001** | -6,837, <**0,001** | -7,267, <**0,001** | -7,616, <**0,001** | -6,566, <**0,001** | -7,358, <**0,001** | -6,857, <**0,001** | -3,213, <**0,002** | -8,910, <**0,001** | -7,305, <**0,001** |
| ***Laserasyon gelişme durumu*** | | | | | | | | | | | | |
| Evet | 244 | 11,63±5,40 | 5,47±2,90 | 9,02±4,52 | 23,09±9,87 | 6,40±4,09 | 15,35±7,62 | 9,10±5,35 | 6,84±3,45 | 15,04±4,34 | 11,9 ±5,51 | 113,85±46,26 |
| Hayır | 91 | 16,51±4,27 | 7,96±2,42 | 13,89±5,11 | 32,12±8,10 | 10,60±4,67 | 22,44±6,65 | 14,67±4,92 | 10,42±3,76 | 17,59±3,43 | 18,17±5,08 | 164,37± 41,94 |
| İstatistiksel analiz (t,p) | | -7,775, <**0,001** | -7,294, <**0,001** | -8,450, <**0,001** | -7,801, <**0,001** | -8,049, <**0,001** | -7,832, <**0,001** | -9,002, <**0,001** | -8,241, <**0,001** | -5,052, <**0,001** | -9,797, <**0,001** | -9,533, <**0,001** |
| ***Doğumdan hemen sonra ten tene temas*** | | | | | | | | | | | | |
| Evet | 241 | 17,07±3,73 | 8,24±2,23 | 14,39±4,78 | 33,44±7,07 | 11,58±3,94 | 23,56±5,92 | 15,18 ±4,66 | 10,89±3,47 | 18,02±3,03 | 18,71±4,93 | 171,09±37,16) |
| Hayır | 94 | 10,34±4,90 | 4,83±2,56 | 7,87±3,88 | 19,99±7,95 | 4,03±2,07 | 12,69±5,57 | 7,97±4,37 | 5,74±2,72 | 14,04±4,29 | 10,72±3,96 | 98,23±32,62 |
| İstatistiksel analiz (t,p) | | 12,032, <**0,001** | 11,364, <**0,001** | 12,919, <**0,001** | 14,334, <**0,001** | 22,766, <**0,001** | 15,352, <**0,001** | 12,941, <**0,001** | 14,331, <**0,001** | 8,220, <**0,001** | 15,440, <**0,001** | 16,667, <**0,001** |
| ***İlk 30 dk emzirmenin başlatılması*** | | | | | | | | | | | | |
| Evet | 194 | 17,87±2,75 | 8,72±1,73 | 15,42±4,13 | 35,05±5,37 | 12,47±3,24 | 24,87±4,81 | 16,25±3,66 | 11,58±3,01 | 18,37±2,71 | 19,83±4,12 | 180,43±27,52 |
| Hayır | 141 | 11,49±5,25 | 5,31±2,75 | 8,63±4,39 | 22,26±8,94 | 5,32±3,56 | 14,5 ±6,60 | 8,91±5,02 | 6,51±3,30 | 14,88±4,28 | 11,84±4,71 | 109,67±40,91 |
| İstatistiksel analiz (t ,p) | | 13,179, <**0,001** | 12,959, <**0,001** | 14,474, <**0,001** | 15,128, <**0,001** | 19,128, <**0,001** | 15.809, <**0.001** | 14,737, <**0,001** | 14,614, <**0,001** | 8,518, <**0,001** | 16,479, <**0,001** | 7,815, <**0,001** |

## TARTIŞMA

Vajinal doğum yapan kadınların doğum eyleminden memnuniyet düzeyleri ve bunu etkileyen değişkenlerin saptanması amacına yönelik yapılan araştırmada ortaya çıkan bulgular güncel kanıtlar doğrultusunda tartışılmıştır. Araştırmamızda NDAMDÖ toplam puan ortalamasının 150,65±48,61 olduğu bulunmuştur. Ölçeğin kesme noktasında göre araştırmaya katılan kadınların %60,3'ünün (n=202) doğum memnuniyet düzeylerinin yüksek olduğu belirlenmiştir. Litaratürü incelediğimizde; Akçay Yaldır (19) ve Bozkurt'un (13) yaptıkları çalışmalarda elde edilen NDAMDÖ toplam puan ortalamalarının çalışma sonucumuzdan daha düşük (93,25±25,83-114,70± 12,21) olduğu dikkati çekmiştir. Altay (20) ve Gökçek'in (21) çalışmlarında elde edilen NDAMDÖ toplam puan ortalamalarının ise çalışma sonucumuzdan daha yüksek olduğu görülmektedir (sırasıyla; 191,4±10,6, 204,491±15,21). Oveysi ve Apay'ın (19) yaptıkları çalışmalarda elde ettikleri NDAMDÖ toplam puan ortalamaları (150,86±17,65) çalışmamıza benzer sonuçlar ortaya koymuş olup memnuniyet düzeylerinin yüksek olduğu gözlenmiştir. Koç (22), Cüce (23), Kurt Can ve Ejder Apay (24), Özcan ve Aslan (25) ve Gültekin Karadağ ve diğerlerinin (26) yaptıkları çalışmaların kesme puanına göre (<150,5) memnuniyet düzeylerinin düşük olduğu gözlenmiştir. (sırasıyla; 131,96±21,02 134,70±28,73, 133,52 ±23,96, 114,70±12,21, 146,60±26,91) Çalışmamızda üniversite mezunu olan grubunun memnuniyet düzeyinin diğerlerinden yüksek olduğu bulunmuştur. Çalışma sonucumuza benzer şekilde Gökçek (21), Henriksen, Grimsrud, Schei ve Lukasse (27) ve Aydemir Arak'ın (28) yaptığı çalışmalarda da eğitim düzeyi yüksek olan kadınların doğum memnuniyetlerini yüksek olduğu belirlenmiştir.

Eğitim düzeyi yükseldikçe annenin doğumuna yönelik karara katılımı, özgüveni ve gereksiz müdahaleler konusundaki farkındalığı artmaktadır. Buna bağlı olarak eğitim düzeyi yükseldikçe doğumda anne memnuniyetinin yükseldiği görülmektedir.

Araştırmamıza katılan kadınların çalışma durumuna göre memnuniyet düzeyi incelendiğinde çalışan kadınların memnuniyet düzeylerinin çalışmayan kadınlardan yüksek olduğu saptanmıştır. Uysal (29) ve Çıtak Bilgin, Ak, Coşkuner Potur ve Ayhan'ın (30) yaptığı çalışmalar çalışmamızla benzer sonuçlar ortaya koymuştur.

Araştırmamızda gelir durumu yüksek olan kadınların memnuniyet düzeylerinin yüksek olduğu gözlenmiştir. Goodman ve diğerleri'nin (5) ve Waldenström, Rudman ve Hildingsson'ın (31) yaptıkları çalışmada gelir durumu iyi olan kadınların doğum memnuniyetlerinin yüksek olduğu gözlenmiş olup çalışmamızla benzerlik göstermektedir. Farklı olarak Gazan'ın (32) ve Gökmen'in (33) çalışmada ekonomik duruma göre kadınların doğum memnuniyeti düzeyleri arasında istatiksel anlamda fark saptanmadığı bildirilmiştir. Son yıllarda doğumlar ciddi harcamaların yapıldığı bir alan olmuştur. Hasta odasının süslenmesi, ikramlar, doğum fotoğrafçılığı, özel doğum destekçisi gibi taleplerin sosyal medya etkisiyle annelerin mutluluk aracı olduğu düşüncesi ortaya çıkmıştır. Bu isteklerini gerçekleştiren annelerin hastanelerden memnuniyetle ayrıldığı belirlenmiştir. Araştırmamıza katılan kadınlardan gelir durumu yüksek olan grubun memnuniyet düzeylerinin daha yüksek olması bu durumun bir sonucu olabilir.

Araştırmamıza katılan kadınların parite durumuna göre memnuniyet düzeyleri incelendiğinde multipar kadınların doğum memnuniyet düzeyleri primipar kadınlardan yüksektir. Çalışmamıza parelel olarak Çıtak Bilgin ve diğerlerinin (30), Akça ve diğerlerinin (34), Menhart ve Prosen'in (35) yaptığı çalışmalarda da pariteye göre doğum memnuniyet arasında anlamlı farklılık olduğu belirtilmektedir. Bunlardan farklı olarak Özöztürk, Aluş Tokat, Aypar Akbağ ve Ekinci'nin (36), Uysal'ın (29) ve Tabak'ın (37) yaptığı çalışmalarda primipar ve multipar kadınlar arasında doğum memnuniyeti açısından bir fark saptanmamıştır. Multipar kadınların primipar kadınlara göre doğum hakkında daha fazla bilgi ve tecrübe sahibi olmaları, karar süreçlerine katılımda daha aktif olmaları ve duygularını daha güçlü kontrol etmelerini sağlayabilmektedir. Primiparların daha önce doğum eylemini deneyimlememeleri ve doğum hakkında bilgi eksiklikleri olması nedeniyle memnuniyetleri düşük olabilir.

Doğum haftasının doğum memnuniyeti üzerine etkisi incelendiğinde; araştırmamızda termde doğum yapan kadınların memnuniyetinin daha yüksek olduğu görülmüştür. Çalışmamıza benzer olarak Bozkurt'un (13) ve Akçay Yaldır'ın (19) yaptığı çalışmada kadınların doğum memnuniyet düzeyleri ile gebelik haftası arasında pozitif yönde anlamlı ilişki olduğu belirlenmiştir. Preterm gebelik haftasına sahip olan annelerin bebeklerine yönelik kaygı durumları ve doğum korkuları doğum memnuniyetini önemli ölçüde etkilediği düşünülebilir.

Araştırmamızda gebeliği planlı olan kadınların doğum memnuniyeti yüksek bulunmuştur. Litetarür incelendiğinde çalışmamıza benzer olarak; Jafari ve diğerlerinin (38), Aktaş ve Gökgöz'ün (39) ve Bal, Gökbulut ve Uçar'ın (40) yaptığı çalışmalarda planlı gebelik yaşayan kadınların doğum memnuniyetinin yüksek olduğu saptanmıştır. Bunun aksine Kurt Can ve Ejder Apay'ın (24), Gökçek'in (21) ve Çıtak Bilgin ve arkadaşlarının (30) yaptığı çalışmalarda ise anlamlı bir farklılık saptanmamıştır.

Araştırmamızda doğumun birinci evresinde hareket özgürlüğü kısıtlanan kadınların doğum memnuniyet düzeylerinin düşük olduğu ortaya çıkmıştır. Çalışmamıza benzer olarak Bilgin'in (41) yaptığı çalışmada hareket özgürlüğü kısıtlanan kadınların doğum memnuniyet düzeylerinin düşük olduğu gözlenmiş olup Akçay Yaldır'ın (19) çalışmasında ise hareket serbestliği sağlanan ve sağlanmayan kadınların memnuniyet düzeyi benzer bulunmuştur.

Araştırmamızda lavman uygulanan kadınların doğum memnuniyet düzeyleri düşük gözlenmiştir. Çalışmamıza benzer olarak Bozkurt'un (13) yaptığı çalışmada lavman uygulanan kadınların doğum memnuniyet düzeylerinin düşük olduğu belirtilmiş olup Özcan ve Arslan'ın (25) çalışmasında lavman uygulanan ve uygulanmayan kadınların memnuniyet düzeyi arasında farklılık olmadığı belirlenmiştir.

Araştırmamızda amniyotomi yapılan kadınların doğum memnuniyet düzeylerinin düşük olduğu bulunmuştur.

Benzer şekilde Tabak'ın (37) çalışmasında amniyotomi yapılan kadınların doğum memnuniyet düzeyleri düşük gözlenmiş olup çalışmamızdan farklı olarak Bilgin'in (41) çalışmasında ise gruplar arasında anlamlı bir farklılık belirlenmemiştir.

Araştırmamızda doğum eyleminde oksitosin indüksiyon uygulanan kadınlar ile uygulanmayan kadınların memnuniyet düzeyinin benzer olduğu bulunmuş olup gruplar arasında istatistiksel olarak anlamlı bir fark saptanmamıştır. Çalışmamıza benzer olarak Çıtak Bilgin ve diğerlerinin (30) ve Özcan ve Aslan'ın (25) yaptığı çalışmalarda oksitosin indüksiyonu uygulamasının memnuniyet düzeyini etkilemediği belirlenmiştir. Ayrıca Ezeanochie, Olaqbuji ve Ande'nin (42) çalışmasında oksitosin indiksiyonu uygulanan kadınların %71,4'ünün doğum memnuniyetinin yüksek olduğu gözlenmiş olup Hamm, Srinivas, Mccoy, Morales ve Levine'nin (43) yaptığı çalışmada oksitosin indüksiyonun doğum memnuniyetini düşürdüğü sonucuna ulaşılmıştır.

Araştırmamızda sürekli NST uygulaması yapılmayan kadınların doğum memnuniyet düzeyleri yüksek gözlenmiş olup çalışmamıza benzer olarak Weeks, Pantoja, Ortiz, Foster, Cavada ve Binfa'nın (44) ve Yeşilçiçek Çalık, Karabulutlu ve Yavuz'un (45) yaptığı çalışmalarda da sürekli NST uygulanmayan kadınların memnuniyet düzeyleri yüksek bulunmuştur.

Araştırmamızda doğum eylemi süresince oral alımına izin verilen kadınların doğum memnuniyet düzeylerinin yüksek olduğu gözlenmiştir. Bu sonuca parelel olarak Bilgin'in (41) 265 kadınla yaptığı çalışmada da oral alıma izin verilmesi durumuna göre kadınların doğum memnuniyetleri arasında istatistiksel olarak anlamlı bir farklılık olduğu bildirilmiştir.

Araştırmamızda epidural/spinal anestezi uygulanan ve uygulanmayan grupların memnuniyet düzeyleri arasında istatiksel olarak anlamlı bir fark saptanmamıştır. Güven Olgun'un (46) Zonguldak ilinde 125 lohusa ile gerçekletiştiği çalışması sonuçlarımızla benzerlik göstermekte olup; gruplar arasında bir fark saptanmadığı ifade edilmiştir. İldan Çalım ve Saruhan'ın (47) ve Bozkurt'un (13) yaptığı çalışmada da gruplar arasında istatiksel bir fark gözlenmiştir.

Araştırmamızda ağrı ile baş etmede nonfarmakolojik yöntemler uygulanan ve uygulanmayan grupların memnuniyet düzeyleri arasında anlamlı bir farklılık saptanmıştır. Çalışmamıza benzer olarak Tandoğan'ın (48), Kaplan'ın (49) çalışmalarında da gruplar arasında anlamlı farklılık gözlendiğini belirtmişlerdir. Ağrı ile baş etmede nonfarmakolojik yöntemin doğum ağrılarını azalttığı ve doğum memnuniyetini artırdığı gözlenmiştir. Çalışmamızda da nonfarmakolojik yöntem kullandığını ifade eden annelerimizde yüksek oranda memnuniyet gözlenmiştir.

Araştırmamızda doğumun ikinci evresinde fundal bası yapılan kadınların doğum memnuniyet düzeylerinin düşük olduğu gözlenmiştir. Bilgin'in (41) 265 kadınla yaptığı çalışmada fundal bası uygulanan grupla uygulanmayan grupların memnuniyet düzeyi arasında anlamlı bir farklılık gözlenmemiştir.

Araştırmamızda doğumun ikinci evresinde epizyotomi uygulanan kadınların doğum memnuniyet düzeyi düşük gözlenmiştir. Çalışmamıza benzer olarak Yaldır'ın (47) ve Bozkurt'un (13) çalışmalarında da epizyotomi uygulanma durumuna göre kadınların doğum memnuniyetleri arasında anlamlı bir farklılık bulunmuştur. Uysal'ın (29), Çıtak Bilgin ve diğerleri (30) ve Altay'ın (20) çalışmalarında ise epizyotomi uygulanan ve uygulanmayan kadınlarının menuniyet düzeylerinin benzer olduğu belirlenmiştir.

Aratştırmamızda laserasyon gelişen kadınların doğum memnuniyet düzeyleri düşük gözlenmiştir. Çalışmamıza benzer nitelikte bir çalışmaya rastlanılmamıştır.

Araştırmamızda doğumdan hemen sonra bebeğiyle ten tene temas yapılan kadınların doğum memnuniyet düzeyleri yüksek gözlenmiştir. Çalışmamıza benzer olarak Genç'in (50) 80 gebeyle deneysel olarak gerçekleştirdiği çalışmada ve Kahalon, Preis ve Benyamini'nin (51) yaptığı çalışmada memnuniyet düzeyinin yüksek gözlendiği belirlenmiştir.

Araştırmamızda ilk 30 dakikada bebeğini emzirmeye başlayan kadınların doğum memnuniyet düzeyleri yüksek gözlenmiştir. Çalışmamıza benzer olarak Bilgin'in (41) ve Ahmed ve Rojjanasrirat'ın (52) çalışmalarında gruplar arasında önemli farklılık bildirilmiştir.

## SONUÇ

Obstetrik girişimlerin (epizyotomi, amniyotomi, fundal bası uygulanması vb.) azaltıldığı, annenin bebekle olan bağının erken dönemde başlatıldığı ve doğum desteğinin profesyonel bir yaklaşımla yapıldığı doğumların memnuniyet düzeylerini olumlu yönde etkilediği belirlenmiştir. Doğum eyleminde nonfarmakolojik yöntemlerin bakım planlarında önemli bir yere sahip olduğu ve ağrı yönetiminde doğum memnuniyetini yükselttiği görülmüştür. Ayrıca sağlık ekibinin bilgilendirilmesi ve doğuma yönelik protokollerin düzenlenmesi, doğum öncesi dönemde ve doğumda kadınlara vajinal doğuma teşvik edici bireysel danışmanlık ve desteğin sağlanması, doğum ve doğum sonrası dönemde kadınların gereksinimlerine yönelik hemşirelik ve ebelik bakım planlarının geliştirilmesi, doğumda nonfarmakolojik yöntemlerin kullanılarak ağrı yönetimi konusunda gebelere bilinç kazandırılması, Doğum ve Kadın Hastalıkları Hemşireliği alanında bu yönde çalışmalar yapılması önerilmektedir.

**Yazarların Katkıları:** Fikir/Kavram: A.K.A., Z.G.; Tasarım: A.K.A., Z.G.; Veri Toplama ve/veya İşleme: A.K.A.; Analiz ve/veya Yorum: A.K.A., Z.G.; Literatür Taraması: A.K.A.; Makale Yazımı: A.K.A., Z.G.; Eleştirel İnceleme: Z.G.

## KAYNAKLAR

1. Marc I, Toureche N, Ernst E, Hodnett ED, Blanchet C, Dodin S, et al. Mind-body interventions during pregnancy for preventing or treating women's anxiety. Cochrane Database of Systematic Reviews. 2011; (7): 5-3.
2. Hodnett ED, Gates S, Hofmeyr GJ, Sakala C. Continuous support for women during childbirth. Cochrane Database of Systematic Reviews. 2012; (10): 3-15.
3. Muslu A, Yanıkkerem E. Doğum beklentileri ve deneyimleri ölçeği'nin Türkçe formunun geçerlilik

güvenirlik çalışması. Dokuz Eylül Üniversitesi Hemşirelik Fakültesi Elektronik Dergisi. 2020; 13(4): 231-44.
4. Rijnders M, Baston H, Schönbeck Y, Van Der Pal K, Prins M, Green J, et al. Perinatal factors related to negative or positive recall of birth experience in women 3 years postpartum in the Netherlands. Birth. 2008; 35(2): 107-16.
5. Goodman P, Mackey MC, Tavakoli AS. Factors related to childbirth satisfaction. Journal of Advanced Nursing. 2004; 46(2): 212-9.
6. Maggioni C, Margola D, Filippi F. Ptsd, risk factors, and expectations among women having a baby: a two-wave longitudinal study. Journal of Psychosomatic Obstetrics & Gynecology. 2006; 27(2): 81-90.
7. Ford E, Ayers S, Wright DB. Measurement of maternal perceptions of support and control in birth (SCIB). Journal of Women's Health. 2009; 18(2): 245-52.
8. Günbay I. Hemşirelerin tam emzirmeye yönelik görüşleri: [Yüksek lisans tezi]. İzmir: İzmir Katip Çelebi Üniversitesi; 2022.
9. Güler K. Evli olmayan bireylerin evlilik kaygısı ile evliliğe yükledikleri anlam ve evlilik beklentileri arasındaki ilişkinin incelenmesi: [Yüksek lisans tezi]. İstanbul. İstanbul Kent Üniversitesi Lisansüstü Eğitim Enstitüsü; 2021.
10. Hollins Martin CJ, Martin CR. Translation and validation of the czech republic version of the birth satisfaction scale-revised (BSS-R). Journal of Reproductive and Infant Psychology. 2022; 42(1): 11-2.
11. Midwives IC. Philosophy and model of midwifery care. Strengthening Midwifery Globally. 2014; 1(1): 1-3.
12. Hollins Martin C, Fleming V. The birth satisfaction scale. International Jurnal of Health Care Quality Assurance. 2011; 24(2): 124-35.
13. Bozkurt Ş. Normal doğumda ve sezaryen doğumda anne memnuniyetinin değerlendirilmesi. [Yüksek lisans tezi]. İstanbul: İstanbul Üniversitesi; 2013.
14. Martin CJH, Martin CR. Development and psychometric properties of the birth satisfaction scale-revised (BSS-R). Midwifery. 2014; 30(6): 610-9.
15. Avis M, Bond M, Arthur A. Exploring patient satisfaction with out-patient services. Journal of Nursing Management. 1995; 3(2): 59-65.
16. Merkouris A, Ifantopoulos J, Lanara V. Patient satisfaction: a key concept for evaluating and improving nursing services. Journal of Nursing Management. 1999; 7(1): 19-28.
17. İçyeroğlu G, Karabulutlu E. Hastaların hemşirelik bakımından memnuniyet düzeylerinin belirlenmesi. Fırat Sağlık Hizmetleri Dergisi. 2011; 6(17): 67-81.
18. Jha P, Larsson M, Christensson K, Skoog Svanberg A. Satisfaction with childbirth services provided in public health facilities: results from a cross-sectional survey among postnatal women in chhattisgarh, india. Global Health Action. 2017; 10(1): 1386932.
19. Oveysi M, Apay SE. Doğumda algılanan destekleyici bakım ve memnuniyet düzeyi arasındaki ilişkinin belirlenmesi. Genel Tıp Dergisi. 2021; 31(3): 232-8.
20. Altay Z. Travayda bilgilendirme desteğinin, doğum sürecine, ağrısına, annenin doğumda desteği algılamasına ve memnuniyete etkisi: [Yüksek lisans tezi]. İstanbul. İstanbul Marmara Üniversitesi; 2019.
21. Tarkan RT. Doğum sürecinde eş desteği ölçeğinin geliştirilmesi: [Yüksek lisans tezi]. Balıkesir. Balikesir Üniversitesi; 2024.
22. Koç Ö. Doğumda anne memnuniyeti ile annelik rolü arasındaki ilişki: [Yüksek lisans tezi]. Erzurum. Atatürk Üniversitesi; 2016.
23. Cüce D. Doğum şekline göre doğumda anne memnuniyetini doğum sonu yaşam kalitesine etkisinin incelenmesi: [Yüksek lisans tezi]. İstanbul. Üsküdar Üniversitesi; 2020.
24. Can EK, Apay SE. Doğum şekli: doğum sonu konfor ve doğumdan memnuniyet düzeylerini etkiler mi? İnönü Üniversitesi Sağlık Hizmetleri Meslek Yüksek Okulu Dergisi. 2020; 8(3): 547-65.
25. Özcan Ş, Aslan E. Normal doğumda ve sezaryen doğumda anne memnuniyetinin belirlenmesi. Florence Nightingale Hemşirelik Dergisi. 2015; 23(1): 41-8.
26. Karadağ AG, Var E, Gökçe R, Dede DU, Gökyıldız Ş. Normal Doğum Yapan Kadınların Doğum Süreci Memnuniyetinin Değerlendirilmesi. 4. Uluslararası Sağlıkta Performans ve Kalite Kongresi; 2016.; Antalya. s.764-765.
27. Henriksen L, Grimsrud E, Schei B, Lukasse M, Group BS. Factors related to a negative birth experience–a mixed methods study. Midwifery. 2017; 51: 33-9.
28. Aydemir Arak N. Doğumda sağlık personelinden algılanan desteğin doğum memnuniyetine etkisi. [Yüksek lisans tezi]. Aydın: Aydın Adnan Menderes Üniversitesi; 2020.
29. Uysal B. Kadınların doğum deneyimi ve doğum sonrası memnuniyetlerinin değerlendirilmesi. [Yüksek lisans tezi]. Eskişehir: Eskişehir Osmangazi Üniversitesi; 2017.
30. Bilgin NÇ, Ak B, Potur DC, Ayhan F. Doğum yapan kadınların doğumdan memnuniyeti ve etkileyen faktörler. Sağlık Bilimleri ve Meslekleri Dergisi. 2018; 5(3): 342-52.
31. Waldenström U, Rudman A, Hildingsson I. Intrapartum and postpartum care in sweden: women's opinions and risk factors for not being satisfied. Acta Obstetricia et Gynecologica Scandinavica. 2006; 85(5): 551-60.
32. Gazan A. Doğum eyleminde destekleyici ebelik bakımının doğum korkusu ve anne memnuniyeti üzerine etkisi. [Yüksek lisans tezi]. Manisa : Manisa Celal Bayar Üniversitesi; 2020.
33. Gökmen Ö. Doğum memnuniyet ölçeği revize formunun türk toplumuna uyarlanması [Yüksek lisans tezi]. Ordu : Ordu Üniversitesi; 2017.
34. Akca A, Corbacioglu Esmer A, Ozyurek ES, Aydin A, Korkmaz N, Gorgen H, et al. The influence of the systematic birth preparation program on childbirth satisfaction. Archives of Gynecology and Obstetrics. 2017; 295: 1127-33.
35. Menhart L, Prosen M. Women's satisfaction with the childbirth experience: a descriptive research. Slovenian Nursing Review. 2017; 51(4): 298-311.

36. Fata S, Tokat MA, Akbağ NNA, Ekinci F. Doğum şekli ve pariteye göre doğum memnuniyeti ile doğum sonu konfor ilişkisi. Turkish Journal of Family Medicine and Primary Care. 2022; 16(1): 179-88.
37. Erdal Ç. Multipar gebelere uygulanan travay diyetinin doğum sürecinde anne ve bebeğe etkisi. [Yüksek lisans tezi]. İstanbul: Biruni Üniversitesi; 2023.
38. Jafari E, Mohebbi P, Mazloomzadeh S. Factors related to women's childbirth satisfaction in physiologic and routine childbirth groups. Iranian Journal of Nursing and Midwifery Research. 2017; 22(3): 219-24.
39. Aktaş D, Gökgöz N. Kadınların doğum yöntemlerine ilişkin düşünce ve memnuniyetlerinin belirlenmesi. Ankara Sağlık Bilimleri Dergisi. 2015; 4(1): 65-82.
40. Bal Z, Gökbulut N, Uçar T. Doğum öncesi bakım memnuniyetinin doğum memnuniyetiyle ilişkisi. İnönü Üniversitesi Sağlık Hizmetleri Meslek Yüksek Okulu Dergisi. 2022; 10(2): 798-808.
41. Bilgin Z. Anne dostu hastane modeli ve annelerin doğum memnuniyetleri. Dokuz Eylül Üniversitesi Hemşirelik Fakültesi Elektronik Dergisi. 2022; 15(3): 279-88.
42. Ezeanochie M, Olagbuji B, Ande A. Women′ s concerns and satisfaction with induced labour at term in a Nigerian population. Nigerian Postgraduate Medical Journal. 2013; 20(1): 1-4.
43. Hamm RF, Srinivas SK, Mccoy J, Morales KH, Levine LD. Standardized cesarean risk counseling with induction: impact on racial disparities in birth satisfaction. American Journal of Perinatology. 2023; 40(16): 1834-40.
44. Weeks F, Pantoja L, Ortiz J, Foster J, Cavada G, Binfa L. Labor and birth care satisfaction associated with medical interventions and accompaniment during labor among Chilean women. Journal of Midwifery & Women's Health. 2017; 62(2): 196-203.
45. Çalik KY, Karabulutlu Ö, Yavuz C. First do no harm-interventions during labor and maternal satisfaction: a descriptive cross-sectional study. BMC Pregnancy and Childbirth. 2018; 18: 1-10.
46. Güven Olgun E. Vajinal doğum yapmış kadınların doğum memnuniyeti ile ilişkili faktörler: Hastane tabanlı araştırma. [Yüksek lisans tezi]. Karabük: Karabük Üniversitesi; 2019.
47. Çalım Sİ, Saruhan A. Travelbee kuramına göre verilen kişilerarası iletişim eğitiminin ebelerin iletişim becerilerine ve annelerin doğum memnuniyetine etkisi. Life Sciences. 2014; 14(4): 104-21.
48. Demir Yıldırım A. Ebeveynliğe hazırlıkta ebelik yaklaşımları. 1. Baskı. Ankara: Akademisyen Yayınevi Kitabevi; 2024.s.97-171.
49. Ekiz EÖ. Laparoskopik histerektomi sonrası uygulanan ayak refleksolojisinin analjezi kullanımını azaltmada ve iyileşmede etkisi. [Yüksek lisans tezi]. İstanbul: Cerrahpaşa Üniversitesi; 2022.
50. Genç K. Term bebeklerde kordon klempleme zamanı ve erken ten temasının anne doğum memnuniyetine etkisi. [Yüksek lisans tezi]. İstanbul: Marmara Üniversitesi; 2019.
51. Kahalon R, Preis H, Benyamini Y. Who benefits most from skin-to-skin mother-infant contact after birth? Survey findings on skin-to-skin and birth satisfaction by mode of birth. Midwifery. 2021; 92: 102862.
52. Ahmed AH, Rojjanasrirat W. Breastfeeding outcomes, self-efficacy, and satisfaction among low-income women with late-preterm, early-term, and full-term infants. Journal of Obstetric, Gynecologic & Neonatal Nursing. 2021; 50(5): 583-96.

Araştırma Makalesi / Research Article

Sağlık Bilimlerinde Değer / Sağlık Bil Değer
Value in Health Sciences / Value Health Sci
ISSN: 2792-0542 sabd@duzce.edu.tr 2025; 15(2): 222-229
doi: https://dx.doi.org/10.33631/sabd.1503247

# Associations Between Chronotype, Mindful Eating, and Depression, Anxiety and Stress in Adults: A Cross-Sectional Study in Türkiye

Hatice Merve BAYRAM [1], Zehra Margot ÇELİK [2]

**ABSTRACT**

**Aim:** The relationship between chronotype and mental well-being underscores the importance of considering individual circadian preferences in promoting healthy eating behaviors and overall well-being. This study aimed to investigate the association between chronotype and depression, stress, anxiety, mindful eating, and intuitive eating among Turkish adults.

**Material and Methods:** This descriptive, cross-sectional study was conducted among adults between October 2023-March 2024 in Istanbul, Türkiye. An online questionnaire including demographic characteristics, Depression, Anxiety, and Stress Scale (DASS-21), Mindful Eating Questionnaire (MEQ), and Intuitive Eating Scale–2nd edition (IES-2) was performed. Additionally, height and body weight were taken with the declaration of the participants. Data were analyzed using SPSS 24.0.

**Results:** In this study, 250 adults (8% morning type, 46% intermediate type, 46% evening type) participated. DASS-21 scores were higher in evening types and statistically different from morning types ($p<0.001$ for depression and stress scores, $p= 0.004$ for anxiety scores). In contrast, MEQ scores were statistically higher in morning types than in intermediate types ($p = 0.030$). A weak positive correlation was found between chronotype and MEQ scores ($r= 0.228$, $p< 0.001$), whereas weak negative correlations were identified with stress scores ($r= -0.245$, $p< 0.001$), anxiety scores ($r= -0.149$, $p= 0.019$), and depression scores ($r= -0.219$, $p<0.001$). Evening type was associated with higher MEQ scores, depression, stress and anxiety according to logistic regression analysis, after with and without adjustment (95% CI: 0.177, $p= 0.014$, and 95% CI 0.174, $p= 0.008$, respectively).

**Conclusion:** Depression, stress, anxiety and mindful eating were associated in adults with the evening type.

**Keywords:** Chronotype; depression; mindfulness; mindful eating.

## Yetişkinlerde Kronotip, Yeme Farkındalığı ile Depresyon, Anksiyete ve Stres Arasındaki İlişki: Türkiye Örneğinde Kesitsel Bir Çalışma

**ÖZ**

**Amaç:** Kronotip ve ruhsal esenlik arasındaki ilişki, sağlıklı beslenme davranışlarının ve genel esenliğin teşvik edilmesinde bireysel sirkadiyen tercihlerin dikkate alınmasının önemini vurgulamaktadır. Bu çalışmada Türk yetişkinlerde kronotip ile depresyon, stres, anksiyete, yeme farkındalığı ve sezgisel yeme arasındaki ilişkinin belirlenmesi amaçlanmıştır.

**Gereç ve Yöntemler:** Bu tanımlayıcı ve kesitsel çalışma, Ekim 2023-Mart 2024 tarihleri arasında İstanbul'da yaşayan yetişkinler ile yürütülmüştür. Katılımcılara demografik özellikler, Depresyon, Anksiyete, Stres Ölçeği-21 (DASS-21), Yeme Farkındalığı Ölçeği (MEQ) ve Sezgisel Yeme Ölçeği-2'yi (IES-2) içeren bir anket formu çevrimiçi olarak uygulanmıştır. Ayrıca katılımcıların vücut ağırlıkları ve boy uzunlukları beyana dayalı olarak alınmıştır. Veriler SPSS 24.0 kullanılarak analiz edilmiştir.

**Bulgular:** Bu çalışmaya 250 yetişkin (%8 sabahcıl tip, %46 orta tip, %46 akşamcıl tipi) katılmıştır. DASS-21 puanları akşamcıl tiplerinde daha yüksek olup, sabahcıl tiplerinden istatistiksel olarak farklı bulunmuştur (depresyon ve stres puanları için $p<0,001$, anksiyete puanları için $p= 0,004$). Buna karşılık, MEQ puanları sabah tiplerinde, ara tiplerden istatistiksel olarak daha yüksek bulunmuştur ($p = 0,030$). Kronotip ile MEQ puanları arasında zayıf pozitif bir korelasyon bulunmuş ($r = 0,228$, $p<0,001$), buna karşılık, stres puanları ($r= -0,245$, $p<0,001$), anksiyete puanları ($r= -0,149$, $p=0,019$) ve depresyon puanları ($r= -0,219$, $p<0,001$) ile zayıf negatif korelasyonlar belirlenmiştir. Akşam tip, ayarlamalar yapılsın ya da yapılmasın lojistik regresyon analizine göre daha yüksek MEQ skorları, depresyon, stres ve anksiyete ile ilişkili bulunmuştur (sırasıyla %95 CI: 0,177, $p= 0.014$ ve %95 CI 0.174, $p= 0.008$).

**Sonuç:** Bu çalışmada akşamcıl tip olan yetişkinlerde depresyon, stres, anksiyete ve yeme farkındalığı ile ilişki saptanmıştır.

**Anahtar Kelimeler:** Kronotip; depresyon; farkındalık; yeme farkındalığı.

1 Istanbul Gelisim University, Faculty of Health Sciences, Department of Nutrition and Dietetics, Istanbul, Türkiye
2 Marmara University, Faculty of Health Sciences, Department of Nutrition and Dietetics, Istanbul, Türkiye
Sorumlu Yazar / Corresponding Author: Hatice Merve BAYRAM, e-mail: hmbayram@gelisim.edu.tr
Geliş Tarihi / Received: 21.06.2024 Kabul Tarihi / Accepted: 24.02.2025

## INTRODUCTION

Chronotype, or circadian preference, describes an individual's inclination for certain times of the day when they feel most alert, active, and ready to sleep. It categorizes individuals along a continuum ranging from "morning types" to "evening types," often known as "early birds" and "night owls" (1). In earlier studies it has been demonstrated that chronotype is associated with various aspects of health and behavior, including eating behaviours, and mental health (1-5). Chronotype has been extensively studied in relation to mental health, including its impact on depression, anxiety, and stress. However, its role in eating behaviors, particularly mindful eating (ME) and intuitive eating (IE), remains less explored.

Mental health conditions, including depression, stress, and anxiety, are prevalent issues worldwide, significantly affecting individuals' quality of life and overall well-being (6,7). According to the World Health Organization (WHO), there has been a 13% increase in mental health disorders in recent years (7). The WHO has reported that mental health conditions have now become the leading cause of disability on a global scale. These conditions have profound ramifications across diverse domains of life, encompassing professional endeavors, academic performance, and interpersonal relationships (6). In Türkiye, the prevalence of mental health disorders is comparable to global trends, with depression and anxiety being among the most common diagnoses (8). Cultural factors in Türkiye, such as dietary habits and societal norms, also influence eating behaviors and chronotypes (9,10). Studies have found that evening chronotypes in Türkiye exhibit a higher propensity for late-night eating, lower adherence to the Mediterranean diet, and an increased risk of poor health outcomes (11,12). However, the interplay between chronotype, eating behaviors, and mental health within Turkish populations remains a relatively understudied area. Earlier research has indicated that individuals with an evening chronotype are more susceptible to mood disorders, a phenomenon that may be attributed to reduced exposure to natural light and the misalignment of their biological rhythms with societal demands (13,14).

Eating behaviors such as ME and IE offer promising frameworks for promoting healthy dietary practices. ME is defined as the act of paying attention to, being aware of, and being focused on the experience of food during food consumption or in a food-related environment. The aim of ME is to help people enjoy the moment and the food and to encourage full presence in the eating experience (15). IE is often used instead of ME, and both concepts are closely related. However, IE does not include the meditation component that ME does (15,16). Like the concept of ME, the practice of IE places a strong emphasis on the importance of listening to internal hunger and satiety indications, rather than engaging in dieting. It also permits the individual to consume food when they are hungry, without any restrictions (16). These concepts have been linked to better physical and mental health outcomes, including reduced eating disorder symptoms and improved dietary habits (17).

Furthermore, literature suggests that the individuals with a morning chronotype exhibited healthier eating behaviours and had better control over overeating than the evening chronotype and were therefore healthier (18). It was found that those who went to sleep later at night had a higher body mass index (BMI), ate less fruit and vegetables, consumed more fast-food at dinner and the total intake of energy was increased (19,20). However, studies specifically linking these patterns to ME and IE are limited.

Chronotype and ME have been studied related to mental health and positive psychological traits. While research is still in its early stages, there is evidence to suggest that chronotype may play a role in influencing mindfulness, self-discipline, and mind wandering (21). This connection between chronotype and mental well-being underscores the importance of considering individual circadian preferences in promoting healthy eating behaviors and overall well-being. Therefore, this study aimed to address these gaps by investigating the primary association between chronotype and mental health outcomes (depression, stress, and anxiety) and the secondary relationship involving eating behaviors (ME and IE). The selection of MEQ and IES-2 scales is particularly relevant, as these tools provide comprehensive insights into individuals' awareness and intuitive regulation of eating, both of which may interact with circadian preferences to influence health.

## MATERIAL AND METHODS

This was a cross-sectional descriptive study and was conducted among adults aged 18-64 years between 1 November 2023 and 1 March 2024 in Istanbul, Türkiye.

An online questionnaire including demographic characteristics (gender, age, education, physical activity status, etc.), Depression, Anxiety, and Stress Scale short form (DASS-21), Mindful Eating Questionnaire (MEQ), and Intuitive Eating Scale – 2nd edition (IES-2) was performed. Furthermore, height and body weight were taken with the declaration of the participants. The mean time taken by participants to complete the online questionnaire was approximately 20 minutes, with most participants completing it within a reasonable range. The questionnaire was administered through a secure online platform, ensuring participant anonymity and reducing social desirability bias. Responses with extremely short completion times (indicative of random answering) or incomplete surveys were excluded from the analysis to ensure data quality. While height and body weight were self-reported, participants were provided with clear instructions to ensure accurate reporting.

The ethics committee of Istanbul Gelisim University Ethics Committee with the number: 2023-09, and date: 20.11.2023 approved this study and the principles of the Declaration of Helsinki were followed. Written and verbal informed consent was obtained from all participants.

### *Morningness-Eveningness Questionnaire*

The scale was developed by Horne and Östberg in 1976 (22). Pündük et al. evaluated the validity and reliability of the Turkish version of the scale, and Cronbach's alpha was found to be 0.812 (23). Consisting of 19 questions, this scale evaluates sleep and wakefulness patterns, performance and lifestyle of individuals. According to the

score obtained in the questionnaire, chronotype types of individuals are determined. A total score between 59 and above is categorized as “morning type”, between 42 and 58 as “intermediate type” and between 16 and 41 as “evening type”. Cronbach's alpha was found to be 0.804 in this study.

***Depression, Anxiety, and Stress Scale Short Form (DASS-21)***

The Depression, Anxiety, and Stress Scale short form (DASS-21), a psychometric instrument developed by Lovibond and Lovibond (24). The Turkish version of the DASS-21 was evaluated for its validity and reliability by Sarıçam, and Cronbach's alpha internal consistency reliability coefficient α= 0.870 for depression subscale, α= 0.850 for anxiety subscale and α= 0.810 for stress subscale (25). The questionnaire was designed to assess levels of depression, anxiety and stress levels and consisted of seven items for each of the three scales. Items 3, 5, 10, 13, 16, 17, and 21 represent the depression score; and according to the total score 0 to 4 means normal, between 5 and 6 of mild depression, 7 to 10 of moderate depression, 11 to 13 of severe depression, and >13 of extremely severe depression. Items 2, 4, 7, 9, 15, 19, and 20 represent the anxiety score; and total scores between 0 to 3 means normal, between 4 and 5 of mild anxiety, between 6 and 7 of moderate anxiety, between 8 and 9 of severe anxiety, and >9 of extremely severe anxiety. Additionally, items 1, 6, 8, 11, 12, 14, and 18 represent the stress score, and the total scores between 0 and 7 means normal, between 8 and 9 of mild stress, 10 and 12 of moderate stress, 13 and 16 of severe stress, and >16 are indicative of extremely severe stress (25). Cronbach's alpha was found to be α= 0.861 for depression subscale, α= 0.815 for anxiety subscale and α= 0.831 for stress subscale in this study.

***Intuitive Eating Scale – 2nd edition (IES-2)***

The IES-2 was developed by Tylka & Kroon Van Diest (2013) with the objective of measuring individuals' propensity to adhere to their physical hunger and satiety indications when making decisions regarding the timing, quantity, and nature of their food intake (26). Bas et al. evaluated the validity and reliability of the Turkish version of the IES-2, and Cronbach's alpha was found to be 0.820 (27). The IES-2 is comprised of 23 items, divided into four sub-scales. The items are rated on a five-point scale, with 1 indicating strong disagreement and 5 indicating strong agreement. Items 1, 2, 3, 6, 7, 8, and 9 are to be scored in reverse. An average score, ranging from 1 to 5, is then calculated by dividing the total score by 23. A higher level of intuitive eating behaviour is indicated by a higher score on the scale. Cronbach's alpha was found to be 0.823 in this study.

***Mindful Eating Questionnaire (MEQ)***

The MEQ is designed to investigate the fundamental causes and processes underlying eating behaviour, rather than focusing on the specific foods consumed, which was developed by Framson et al. (28). Köse et al. conducted the validity and reliability study of the Turkish version of the MEQ, and Cronbach's alpha was found to be 0.733 (29). The Likert-5 type scale comprises 30 questions divided into seven subscales. Items 1, 7, 9, 11, 13, 15, 18, 24, 25, and 27 are scored directly, while the remaining questions are reverse scored. An average score, ranging from 1 to 5, is then calculated by dividing the total score by 30. A higher overall score indicates greater eating awareness. Cronbach's alpha was found to be 0.730 in this study.

**Statistical Analysis**

G*Power was utilized for sample selection, with a prevalence rate of 20%, a type I error rate (α) of 0.05, a type II error rate (β) of 0.5, and a test power (1-β) of 0.95. The sample size for this study was calculated as 208 (30). The data were analyzed using the statistical software package IBM SPSS 24.0. Categorical data was analyzed using Fisher freeman Halton Exact test. The normality of data distribution was assessed using the Kolmogorov–Smirnov test, and anxiety, stress, and depression scores did not show a normal distribution. Descriptive statistics of the data are presented as n (%) and mean±standard deviation if the variable is normally distributed and median (25-75th interquartile range) otherwise. The ANOVA coefficient was employed to compare the mean values of height, weight, BMI, MEQ, and IES-2 scores. Differences between chronotypes were analyzed by Tukey's post hoc coefficient for IES-2, and MEQ scores, whereas depression, stress, and anxiety were analyzed by Kruskall-Wallis coefficient. Additionally, Spearman correlation coefficients was used to determine the relationship between chronotype, BMI, stress, anxiety, depression, IE-2, and MEQ scores (Spearman correlation coefficient was used for stress, anxiety, and depression). The relationships between chronotype and mindful eating, depression, anxiety, and stress were analyzed by logistic regression models and adjusted for gender, BMI, physical activity, occupation, and educational status. For all statistical tests, a p-value of <0.05 was considered statistically significant.

**RESULTS**

The demographical characteristics of participants are shown in Table 1. In this study, 250 adults (8% morning type, 46% intermediate type and 46% evening type) participated. Most of the participants (69.2%) were male. When the educational status was analyzed, 50% of the participants were graduates of high school or lower education or university or higher education. 66.40% of the participants were not employee and did not have a chronic disease. Mean BMI values were $23.35 \pm 4.98$ kg/m$^2$ for the morning type, $23.28 \pm 4.80$ kg/m$^2$ for the intermediate type and $25.85 \pm 4.82$ kg/m$^2$ for the evening type and did not differ between the groups.

Most of the participants were normal according to stress, anxiety and depression classification (64.00%, 40.00%, and 42.00%, respectively).

**Table 1.** Demographical characteristics

| | **Morning type (n = 20)** | **Intermediate type (n = 115)** | **Evening type (n = 115)** |
|---|---|---|---|
| | **n (%)** | **n (%)** | **n (%)** |
| **Age (mean ± SD)** | 27.10 ± 10.77 | 24.55 ± 7.05 | 26.14 ± 9.56 |
| **Gender** | | | |
| Female | 5 (25.00) | 30 (26.08) | 42 (36.52) |
| Male | 15 (75.00) | 85 (73.92) | 73 (63.48) |
| **Education status** | | | |
| High school or lower education | 14 (70.00) | 48 (41.73) | 63 (54.78) |
| University or higher education | 6 (30.00) | 67 (58.27) | 52 (45.22) |
| **Employment status** | | | |
| Employee | 3 (15.00) | 37 (32.17) | 44 (38.26) |
| Not employee | 17 (85.00) | 78 (67.83) | 71 (61.74) |
| **Presence of a chronic disease** | | | |
| No | 17 (85.00) | 78 (67.83) | 71 (61.74) |
| Yes | 3 (15.00) | 37 (32.17) | 44 (38.26) |
| **Regular physical activity** | | | |
| No | 13 (65.00) | 83 (72.18) | 96 (83.48) |
| Yes | 7 (35.00) | 32 (27.82) | 19 (16.52) |
| **Height (cm) (mean ± SD)** | 165.20 ± 6.82 | 164.76 ± 9.37 | 165.16 ± 18.11 |
| **Body weight (kg) (mean ± SD)** | 63.90 ± 14.57 | 63.40 ± 15.50 | 64.83 ± 12.83 |
| **BMI (kg/m$^2$) (mean ± SD)** | 23.35 ± 4.98 | 23.28 ± 4.80 | 25.85 ± 4.82 |
| BMI: Body mass index | | | |

Stress, anxiety and depression scores were found to be higher in the evening type, with a statistically significant difference between morning types and evening types ($p < 0.001$ for depression and stress scores, $p = 0.004$ for anxiety score). However, MEQ scores were higher in morning type, and there was a statistical difference between morning type and intermediate type ($p = 0.010$). In the morning type, 15.00% were classified as severe stress, 10.00% as severe and 15.00% as very severe anxiety, and 15.00% as severe depression. In the intermediate type, 1.74% were classified as severe and very severe stress, 7.83% as severe and 4.35% as very severe anxiety, 4.35% as severe and 3.48% as very severe depression. In the evening type, 6.09% were classified as severe and 5.22% as very severe stress, 11.30% as severe and 18.26% as very severe anxiety, 8.70% as severe and 13.04% as very severe depression. (Table 2).

**Table 2.** Determination of IES-2, MEQ, depression, anxiety, and stress scores of participants according to chronotype

| | **Morning type (n=20)** | **Intermediate type (n=115)** | **Evening type (n=115)** | ***p*-value** | ***p*$^a$-value** | ***p*$^b$-value** | ***p*$^c$-value** |
|---|---|---|---|---|---|---|---|
| | **(Mean ± SD)** | | | | | | |
| **IES-2 score** | 3.19 ± 0.54 | 3.03 ± 0.52 | 3.20 ± 0.55 | 0.567 | - | - | - |
| **MEQ score** | 3.26 ± 0.35 | 2.99 ± 0.18 | 3.17 ± 0.40 | **0.030** | 0.116 | **0.010** | 0.187 |
| | **(Median, 25-75th interquartile range)** | | | | | | |
| **Depression score** | 4.00 (1.00-7.00) | 5.00 (2.00-9.75) | 6.00 (3.00-9.00) | **<0.001** | **<0.001** | 0.335 | 1.000 |
| **Anxiety score** | 4.00 (1.00-7.00) | 5.00 (1.00-7.75) | 6.00 (2.00-8.00) | **0.004** | **0.003** | 0.852 | 1.000 |
| **Stress score** | 6.00 (3.00-8.00) | 7.00 (4.25-10.00) | 7.50 (5.00-10.00 | **<0.001** | **<0.001** | 0.135 | 1.000 |
| | **n (%)** | **n (%)** | **n (%)** | | | | |
| **Classification of stress** | | | | **0.001** | | | |
| Normal | 10 (50.00) | 86 (74.78) | 64 (55.65) | | | | |
| Mild | 4 (20.00) | 18 (15.65) | 13 (11.30) | | | | |
| Moderate | 3 (15.00) | 7 (6.09) | 25 (21.74) | | | | |
| Severe | 3 (15.00) | 2 (1.74) | 7 (6.09) | | | | |
| Extremely severe | - | 2 (1.74) | 6 (5.22) | | | | |
| **Classification of anxiety** | | | | **0.018** | | | |
| Normal | 7 (35.00) | 56 (48.70) | 37 (32.17) | | | | |
| Mild | 5 (25.00) | 16 (13.91) | 18 (15.65) | | | | |
| Moderate | 3 (15.00) | 29 (25.22) | 26 (22.61) | | | | |
| Severe | 2 (10.00) | 9 (7.83) | 13 (11.30) | | | | |
| Extremely severe | 3 (15.00) | 5 (4.35) | 21 (18.26) | | | | |
| **Classification of depression** | | | | **0.004** | | | |
| Normal | 8 (40.00) | 62 (53.91) | 35 (30.43) | | | | |
| Mild | 3 (15.00) | 17 (14.78) | 27 (23.48) | | | | |
| Moderate | 6 (30.00) | 27 (23.48) | 28 (24.35) | | | | |
| Severe | 3 (15.00) | 5 (4.35) | 10 (8.70) | | | | |
| Extremely severe | - | 4 (3.48) | 15 (13.04) | | | | |

[a]: differences between morning type and evening type, [b]: differences between morning type and intermediate type. [c]: differences between intermediate type and evening type
IES-2: Intuitive Eating Scale – 2nd edition; MEQ: Mindful Eating Questionnaire

Table 3 shows the correlation between chronotype, BMI, IES-2, MEQ, stress, anxiety, and depression scores. A weak positive correlation was found between chronotype and MEQ scores (r=0.228, p<0.001). Conversely, weak negative correlations were found with depression scores (r=-0.219, p<0.001), anxiety scores (r=-0.149, p=0.019), and stress scores (r=-0.245, p<0.001). BMI was not correlated with chronotype, IES-2, MEQ, depression, anxiety, and stress scores.

**Table 3.** Correlation coefficients between chronotype, IES-2, MEQ, depression, anxiety, and stress scores, and BMI

| | **1** | | **2** | | **3** | | **4** | | **5** | | **6** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **r** | **p** | **r** | **p** | **r** | **p** | **r** | **p** | **r** | **p** | **r** | **p** |
| **1. Chronotype score** | - | | | | | | | | | | | |
| **2. IES-2 score** | 0.55 | 0.383 | - | | | | | | | | | |
| **3. MEQ score** | 0.228 | **<0.001** | 0.274 | **<0.001** | - | | | | | | | |
| **4. Depression score** | -0.219 | **<0.001** | -0.097 | 0.128 | -0.165 | **0.009** | - | | | | | |
| **5. Anxiety score** | -0.149 | **0.019** | -0.154 | **0.015** | -0.207 | **0.001** | 0.736 | **<0.001** | - | | | |
| **6. Stress score** | -0.245 | **<0.001** | -0.088 | 0.166 | -0.252 | **<0.001** | 0.769 | **<0.001** | 0.719 | **<0.001** | - | |
| **7. BMI** | 0.045 | 0.960 | -0.087 | 0.075 | 0.070 | 0.431 | -0.062 | 0.203 | -0.067 | 0.270 | -0.010 | 0.526 |

IES-2: Intuitive Eating Scale – 2nd edition; MEQ: Mindful Eating Questionnaire; BMI: Body mass index

According to the logistic regression analysis, evening type was associated with higher MEQ, depression, stress, and anxiety scores (OR=0.169, p=0.004; OR=0.183, p=0.007; OR=0.166, p=0.006, and OR=0.192, p=0.013, respectively). The results were similar after adjustment for gender, BMI, physical activity, occupation and educational level (OR=0.174, p=0.008; OR=0.178, p=0.010; OR=0.156, p=0.007, and OR 0.177, p=0.014, respectively).

**Table 4.** Chronotype and its association with mindful eating, depression, anxiety, and stress (p: 0.001)

| **n = 250** | **Chronotype classification** | **UOR (95% CI)** | **p-value** | **AOR[a] (95% CI)** | **p-value** |
|---|---|---|---|---|---|
| **Model 1** | Morning (n = 20) | Reference | | Reference | |
| | Intermediate type (n = 115) | 0.536 (0.268-1.074) | 0.079 | 0.492 (0.234-1.034) | 0.061 |
| | Evening type (n =115) | 0.169 (0.050-0.567) | **0.004** | 0.174 (0.048-0.628) | **0.008** |
| **Model 2** | Morning (n = 20) | Reference | | Reference | |
| | Intermediate type (n = 115) | 0.662 (0.319-1.371) | 0.267 | 0.605 (0.279-1.313) | 0.204 |
| | Evening type (n = 115) | 0.183 (0.053-0.628) | **0.007** | 0.178 (0.048-0.664) | **0.010** |
| **Model 3** | Morning (n = 20) | Reference | | Reference | |
| | Intermediate type (n: 115) | 0.683 (0.328-1.422) | 0.308 | 0.603 (0.277-1.313) | 0.202 |
| | Evening type (n = 115) | 0.166 (0.046-0.592) | **0.006** | 0.156 (0.041-0.601) | **0.007** |
| **Model 4** | Morning (n = 20) | Reference | | Reference | |
| | Intermediate type (n = 115) | 0.753 (0.356-1.592) | 0.457 | 0.671 (0.302-1.490) | 0.327 |
| | Evening type (n = 115) | 0.192 (0.052-0.703) | **0.013** | 0.177 (0.045-0.706) | **0.014** |

[a]Adjusted for gender, BMI, physical activity, occupation, and educational status. *p* for trend was obtained using multivariate logistic regression analyses. Model 1: MEQ score, Model 2: Model 1 + Depression score, Model 3: Model 2 + Anxiety score, Model 4: Model 3 + stress score

## DISCUSSION

Chronotype, which expresses the individual's preference for activity and sleep timing during the day, may be related to mental health and eating behaviors. To the best of our knowledge, this is the first study to determine the association between chronotype and depression, stress, anxiety, ME, and IE among Turkish adults. We demonstrated that evening-type adults displayed higher stress, anxiety, and depression scores and lower ME. Also, after adjusting for gender, BMI, physical activity, occupation, and educational status, the evening type was associated with lower MEQ scores, higher depression, stress, and anxiety scores.

The prevalence of evening chronotypes, characterized by a preference for later sleep and wake times, varies across different populations and age groups. Research found that most of adults were intermediate types in Türkiye (31,32). Additionally, studies indicate that evening chronotypes are particularly common among young adults and adolescents (33). In this study, 8% of the participants were morning type, 46% were intermediate type and 46% were evening type. The high prevalence of evening and intermediate types could be influenced by the age group of the participants as younger individuals often show a tendency toward eveningness compared to older adults.

The relationship between chronotype and depression is well documented in the literature. Tsomokos et al. (2024) reported that evening type adolescents were being more strongly related to depressive symptoms, especially in female gender (14). Walsh et al. (2022) showed that evening chronotypes had more severe depression symptoms than morning and intermediate chronotypes (21). According to our findings, evening types had higher depression scores, and 21.7% of them were classified as having severe or extremely severe depression symptoms.

Additionally, a weak negative correlation was found between chronotype and depression scores. Previous studies have suggested that the link between chronotype and mood may be partly due to the fact that evening types are less exposed to light (34). Another study has shown that the vulnerability of evening chronotypes to mental health problems may also be due to the incompatibility of eveningism with the standard work or school schedule between 9am and 5pm. This incompatibility is associated with sleep disturbance in evening types and, when combined with daytime insomnia, seems to mediate the association between depression and eveningness (35).

There have been inconsistent results in studies that have focused on the relationship between chronotype and anxiety. One study indicated that evening type was associated with higher anxiety levels (36). Similarly, a relationship was observed between evening chronotype and high levels of anxiety (21). In contrast, it was reported that there was no association between anxiety and chronotype (37). In addition, a negative correlation between morning chronotype and anxiety was observed in women, but not in men (38). We found that anxiety scores were higher in evening types, and there was a weak negative correlation between chronotype and anxiety scores. Including chronotype and depression as covariates may help to clarify these mixed findings on anxiety.

The relationship between chronotype and stress is complex and multifaceted. One study found that evening types tend to experience higher levels of stress and negative effect than morning types (39). It was also observed that later chronotypes were found to correlate with severe stress in Indonesian university students (40).

We found that stress scores were higher in evening types, and there was a weak negative correlation between chronotype and stress scores. It was observed that evening chronotype is associated with poor sleep quality, and this has been observed to be related to higher stress levels. In addition, the mediating role of sleep quality in the chronotype-stress association may also be evident in broader emotional outcomes (41).

Mindfulness correlates with both physical and mental health and represents an adaptive self-regulatory skill. However, there are not many studies linking chronotype and mindfulness. A study showed that individuals with morning chronotypes had higher levels of 'mindfulness' than those with intermediate and evening chronotypes (42). Similarly, in a study, morning types had higher levels of overall social support and mindfulness (21). To our knowledge, one study has investigated the relationship between chronotype and ME; however, there are no studies that have investigated the relationship between chronotype and IE. According to Kabasakal Cetin, there is a positive correlation between chronotype and ME in Turkish undergraduate students (43). Similarly to this study, we found that MEQ scores were higher in morning types, and chronotype and MEQ scores were weakly positively correlated. ME emphasizes eating with increased awareness and paying attention to hunger and satiety signals (15). It is also thought that ME may help to promote healthy eating (44). Therefore, increasing awareness of whether or not one is hungry may help to change the eating habits of evening types to healthy ones.

This study has several strengths. It is among the first to investigate the relationships between chronotype, depression, stress, anxiety, ME, and IE among Turkish adults, offering a novel perspective. The use of validated tools such as the Morningness-Eveningness Questionnaire, DASS-21, MEQ, and IES-2 ensures the reliability and validity of the findings. By examining both mental health outcomes and eating behaviors, the study adopts a multidimensional approach, highlighting the broader implications of chronotype on overall health and behavior. However, this study has several limitations. Firstly, it is a cross-sectional study, so it does not indicate the direction of relationships. Secondly, we used an online form to determine depression, anxiety, stress, IE, and ME, rather than a clinical interview. Thirdly, most of the participants were male. Therefore, the results cannot be generalized. Fourthly, BMI was calculated by taking height and body weight from participant declarations. Self-reported data may be less reliable than directly measured data, which may limit the generalisability of the study.

## CONCLUSION

In conclusion, being an evening type may influence depression, stress, anxiety and mindful eating behavior. In addition, after adjusting for gender, BMI, physical activity, occupation, and educational status, the evening type was associated with higher depression, stress, and anxiety scores, and lower MEQ. These findings suggest that developing effective strategies such as chronotype-based counseling, flexible work schedules, targeted behavioral interventions, education and awareness programs, physical activity schedules personalized nutrition plans, or cognitive behavioral therapy, etc. that take chronotype into account may help to reduce mental health problems such as depression, anxiety and stress and increase mindful eating.

**Authors's Contributions:** Idea/Concept: H.M.B., Z.M.Ç.; Design: H.M.B., Z.M.Ç.; Data Collection and/or Processing: H.M.B.; Analysis and/or Interpretation: H.M.B.; Literature Review: H.M.B., Z.M.Ç.; Writing the Article: H.M.B., Z.M.Ç.; Critical Review: H.M.B., Z.M.Ç.

## REFERENCES

1. Lemke T, Hökby S, Wasserman D, Carli V, Hadlaczky G. Associations between sleep habits, quality, chronotype and depression in a large cross-sectional sample of Swedish adolescents. Plos one. 2023; 18(11): e0293580.
2. Arslan M, Ayhan NY, Çolak H, Sarıyer ET, Çevik E. The effect of chronotype on addictive eating behavior and BMI among university students: A cross-sectional study. Nutrients. 2022; 14(14): 2907.
3. Hicks H, Meyer K, Watts A. Differential effects of chronotype on physical activity and cognitive performance in older adults. Front Epidemiol. 2023; 3: 1029221.
4. Taylor BJ, Hasler BP. Chronotype and mental health: recent advances. Curr Psychiatry Rep. 2018; 20(8): 1-10.
5. Zhang D, Yang Y, Zhai S, Qu Y, Li T, Xie Y, et al. Poor sleep pattern is associated with metabolic disorder during transition from adolescence to adulthood. Front Endocrinol (Lausanne). 2023; 14: 1088135.

6. World Health Organization (WHO). Depressive disorder (depression). 2023. Available from: https://www.who.int/news-room/fact-sheets/detail/depression
7. World Health Organization (WHO). Mental health. 2022. Available from: https://www.who.int/health-topics/mental-health#tab=tab_1
8. World Health Organization (WHO). Supporting Turkish mental health policy and service delivery. 2020. Avaiable from: https://www.who.int/about/accountability/results/who-results-report-2020-2021
9. Yalcin T, Ozturk EE. Associations between chronotype, adherence to the Mediterranean diet, and attitude to healthy nutrition. Galician Medical Journal. 2023; 30(1): E202312.
10. Altınsoy C, Yavuz AY. Üniversite öğrencilerinde kronotipin, yeme tutumu ve beden algisi ile ilişkisinin incelenmesi. Samsun Sağlık Bilimleri Dergisi. 2021; 6(1): 136-46.
11. Toktas N, Erman KA, Mert Z. Nutritional Habits According to Human Chronotype and Nutritional Status of Morningness and Eveningness. Journal of Education and Training Studies. 2018; 6(n3a): 61-67.
12. Firat M, Okanlı A, Kanbay Y, Utkan M, Gökmen BD. The prevalence of pandemic anxiety, anxiety and depression during the COVID-19 pandemic in Turkey. Psychiatry Clin Psychopharmacol. 2021; 31(2): 198.
13. Short MA, Booth SA, Omar O, Ostlundh L, Arora T. The relationship between sleep duration and mood in adolescents: A systematic review and meta-analysis. Sleep Med Rev. 2020; 52: 101311.
14. Tsomokos DI, Halstead E, Flouri E. Chronotype and depression in adolescence: Results from a UK birth cohort study. JCPP Advances. 2024; e12245.
15. Nelson JB. Mindful eating: The art of presence while you eat. Diabetes Spect. 2017; 30(3): 171-4.
16. Grider HS, Douglas SM, Raynor HA. The influence of mindful eating and/or intuitive eating approaches on dietary intake: a systematic review. Journal of the Academy of Nutrition and Dietetics. 2021; 121(4): 709-27.
17. Sala M, Shankar Ram S, Vanzhula IA, Levinson CA. Mindfulness and eating disorder psychopathology: A meta-analysis. International Journal of Eating Disorders. 202; 53(6): 834-51.
18. Walker RJ, Christopher AN, Wieth MB, Buchanan J. Personality, time-of-day preference, and eating behavior: The mediational role of morning-eveningness. Personality and individual differences. 2015; 77: 13-7.
19. Beaulieu K, Oustric P, Alkahtani S, Alhussain M, Pedersen H, Salling Quist J, et al. Impact of meal timing and chronotype on food reward and appetite control in young adults. Nutrients. 2020; 12(5): 1506.
20. Verde L, Docimo A, Chirico G, Savastano S, Colao A, Barrea L, Muscogiuri G. How Fast Do “Owls” and “Larks” Eat? Nutrients. 2023; 15(6): 1437.
21. Walsh NA, Repa LM, Garland SN. Mindful larks and lonely owls: The relationship between chronotype, mental health, sleep quality, and social support in young adults. J Sleep Res. 2022; 31(1): e13442.
22. Horne JA, Ostberg OA. Self-assessment questionnaire to determine morningness-eveningness in human circadian rhythms. Int J Chronobiol. 1976; 4(2): 97-110.
23. Pündük Z, Gür H, Ercan İ. Sabahçil-Akşamcil Anketi Türkçe uyarlamasinda güvenilirlik çalişmasi. Türk Psikiyatri Dergisi. 2005; 16(1): 40-5.
24. Lovibond SH, Lovibond PF. Manual for the depression anxiety stress scales. psychology foundation of Australia, Sydney. 1995.
25. Sarıçam H. The psychometric properties of Turkish version of Depression Anxiety Stress Scale-21 (DASS-21) in health control and clinical samples. JCBPR. 2018; 7(1): 19-30. doi: 10.5455/JCBPR.274847
26. Tylka TL, Kroon Van Diest AM. The Intuitive eating scale–2: item refinement and psychometric evaluation with college women and men. J Couns Psychol. 2013; 60: 137-53.
27. Bas M, Karaca KE, Saglam D, Arıtıcı G, Cengiz E, Köksal S, Buyukkaragoz AH. Turkish version of the intuitive eating Scale-2: Validity and reliability among university students. Appetite. 2017; 114: 391-7.
28. Framson C, Kristal AR, Schenk JM, Littman AJ, Zeliadt S, Benitez D. Development and validation of the mindful eating questionnaire. J Am Diet Asoc. 2009; 109(8): 1439-44.
29. Köse G, Tayfur M, Birincioğlu İ, Dönmez A. Yeme Farkındalığı Ölçeği’ni Türkçeye uyarlama çalışması. JCBPR. 2016; 3: 125-134.
30. Serdar CC, Cihan M, Yücel D, Serdar MA. Sample size, power and effect size revisited: Simplified and practical approaches in pre-clinical, clinical and laboratory studies. Biochem Med. 2021; 31: 27–53.
31. Mortaş H, Ayhan B, Navruz Varlı S, Köse S, Ağagündüz D, Bilici S. Rise and shine for eating right: the link between healthy nutrition and chronotype among young adults. Frontiers in Nutrition. 2023; 10: 1285015.
32. Kabasakal Cetin A. Chronotype is associated with addiction-like eating behavior, mindful eating and ultra-processed food intake among undergraduate students. Chronobiology International. 2023; 40(10): 1435-43.
33. Jonušaitė I, Sakalauskaitė-Juodeikienė E, Kizlaitienė R, Giedraitienė N, Sereikė I, Liutkienė J, et al. Chronotypes and their relationship with depression, anxiety, and fatigue among patients with multiple sclerosis in Vilnius, Lithuania. Frontiers in Neurology. 2023; 14: 1298258.
34. Gao Q, Sheng J, Qin S, Zhang L. Chronotypes and affective disorders: A clock for mood? Brain Science Advances. 2019; 5(3): 145-60.
35. Dickinson DL, Wolkow AP, Rajaratnam SM, Drummond SP. Personal sleep debt and daytime sleepiness mediate the relationship between sleep and mental health outcomes in young adults. Depression and Anxiety. 2018; 35(8): 775-83.
36. Cox RC, Olatunji BO. Differential associations between chronotype, anxiety, and negative affect: a structural equation modeling approach. Journal of affective disorders. 2019; 257: 321-30.
37. Alvaro PK, Roberts RM, Harris JK. The independent relationships between insomnia, depression, subtypes

of anxiety, and chronotype during adolescence. Sleep Med. 2014; 15(8): 934-41.
38. Díaz-Morales JF, Sánchez-López MP. Morningness-eveningness and anxiety among adults: A matter of sex/gender? Personality and Individual Differences. 2008; 44(6): 1391-401.
39. Saalwirth C, Leipold B. Sleep and chronotype in relation to work-related stress and negative affect: The moderating role of a flexible start of work. Somnologie. 2021; 25(2): 119-25.
40. Supit A, Gosal M, Mamuaja P, Kumaat S, Paturusi A. Later chronotype correlates with severe depression in Indonesian college students. Sleep Medicine Research. 2021; 12(2): 133-9.
41. Bradford DR, Biello SM, Russell K. Insomnia symptoms mediate the association between eveningness and suicidal ideation, defeat, entrapment, and psychological distress in students. Chronobiology international. 2021; 38(10): 1397-408.
42. Marques DR, Castilho P, Allen Gomes A, Pereira A. Mindfulness and self-compassion along the chronotype: a cross-sectional study. Chronobiology International. 2019; 36(4): 541-7.
43. Kabasakal Cetin A. Chronotype is associated with addiction-like eating behavior, mindful eating and ultra-processed food intake among undergraduate students. Chronobiology International. 2023; 40(10): 1435-43.
44. Tapper K. Mindful eating: what we know so far. Nutr Bull. 2022; 47: 168-85.

Araştırma Makalesi / Research Article

Sağlık Bilimlerinde Değer / Sağlık Bil Değer
Value in Health Sciences / Value Health Sci
ISSN: 2792-0542 sabd@duzce.edu.tr 2025; 15(2): 230-235
doi: https://dx.doi.org/10.33631/sabd.1522738

# Retrospective Evaluation of Changes in Nasopalatine Canal Morphology According to Dentition with Cone Beam Computed Tomography*

Ebru YÜKSEL KAYA [1], Çiğdem ŞEKER [1], Gediz GEDUK [1]

**ABSTRACT**

**Aim**: Nasopalatine canal is one of the important anatomical structures in the anterior maxillary region. The aim of this study was to investigate the changes in nasopalatine canal (NPC) morphology according to dentition status using cone beam computed tomography (CBCT).

**Material and Methods:** CBCT images of a total of 100 patients were analyzed retrospectively. CBCT images were divided into two groups according to the dentition of the anterior maxilla: 50 patients with edentulous anterior maxillary region and 50 patients without tooth loss. After recording age, gender and dentition status of the patients, NPC length, incisive foramen (IF) diameter, stenon foramina (SF) diameter, NPC angle between NPC and palatal plane were measured on the sagittal plane.

**Results:** When relationship between dentition and NPC angle, NPC length, SF and IF diameters were analyzed, no statistically significant difference was found between the variables ($p>0.05$). When the variables were evaluated according to age and gender, NPC length and NPC angle were found to be significantly higher in the male gender ($p<0.05$), while the diameter of the incisive foramen increased with age, and this was statistically significant ($p<0.05$).

**Conclusion:** NPC can show significant anatomical variations in both its morphology and dimensions. A careful preoperative evaluation is necessary to avoid possible complications during dentoalveolar surgery.

**Keywords:** Cone-beam computed tomography; dentition; retrospective studies; nasopalatine canal; incisive foramen.

## Nazopalatin Kanal Morfolojisinin Dentisyona Göre Değişiminin Konik Işınlı Bilgisayarlı Tomografi ile Retrospektif Olarak Değerlendirilmesi

**ÖZ**

**Amaç** Nazopalatin kanal maksiller anterior bölgedeki önemli anatomik yapılardan biridir. Bu çalışmanın amacı nazopalatin kanal (NPK) morfolojisinin dentisyon durumuna göre değişimini konik ışınlı bilgisayarlı tomografi (KIBT) ile incelemektir.

**Gereç ve Yöntemler:** Toplam 100 hastaya ait KIBT görüntüleri retrospektif olarak taranmıştır. KIBT görüntüleri anterior maksillanın dentisyonuna göre iki gruba ayrılmıştır; maksiller anterior bölgesi dişsiz olan 50 hasta ve diş kaybı olmayan 50 hasta. Hastaların yaş, cinsiyet ve dentisyon durumları kaydedildikten sonra sagittal kesit üzerinde NPK uzunluğu, insiziv foramen (İF) çapı, stenson foramina (SF) çapı, NPK ile palatal düzlem arasındaki NPK açısı ölçülmüştür.

**Bulgular:** Dentisyonun NPK açısı, NPK uzunluğu, SF ve IF çapları ile ilişkisi incelendiğinde değişkenler arasında istatistiksel olarak anlamlı bir farklılık bulunamamıştır ($p>0,05$). Değişkenler yaşa ve cinsiyete göre değerlendirildiğinde NPK boyu ve NPK açısı erkek cinsiyette anlamlı oranda yüksek bulunurken ($p<0,05$), insisiv foramen çapının yaş ile arttığı ve bunun istatistiksel olarak anlamlı olduğu görülmüştür ($p<0,05$).

**Sonuç:** NPK hem morfolojisi hem de boyutları açısından önemli anatomik farklılıklar gösterebilir. Dentoalveolar cerrahi sırasında olası komplikasyonları önlemek için dikkatli bir preoperatif değerlendirme gereklidir.

**Anahtar Kelimeler:** Konik ışınlı bilgisayarlı tomografi; dentisyon; retrospektif çalışmalar; nazopalatin kanal; insiziv foramen.

1 Zonguldak Bülent Ecevit University, Faculty of Dentistry, Oral and Maxillofacial Radiology, Zonguldak, Türkiye

Sorumlu Yazar / Corresponding Author Ebru YÜKSEL KAYA, e-mail: dtebruyuksel@gmail.com
Geliş Tarihi / Received: 26.07.2024, Kabul Tarihi / Accepted: 24.02.2025
* This study was presented as an oral presentation at Necmettin Erbakan University 3rd International Dentistry Congress held in Konya between 24-26 May 2024.

## INTRODUCTION

The premaxilla, the anterior section of the maxilla, is an area that is frequently traumatized, requiring a variety of surgical procedures (1-3). These procedures include implant surgery, cyst enucleation, extraction of erupted and impacted teeth, periodontal surgery, apical resection and interventions such as rapid palatal expansion and local anesthesia (3,4). In recent years, dental implant surgery has become a common treatment option with increasing aesthetic expectations. In some cases, patients' aesthetic expectations are even more important than the function of prosthetic rehabilitation (5). The most important anatomical structure in the premaxilla for implant surgery and other surgical procedures that have a significant impact on oral cavity function and dental and facial aesthetics is the nasopalatine canal (6). Nasopalatine canal (NPC) transports nasopalatine nerves and vessels, maxillary artery and branches of the maxillary section of the trigeminal nerve from the nasal cavity to the oral cavity. NPC also contains minor salivary glands, adipose tissue and connective tissue (6-8). The oral cavity opening of NPC is the incisive foramen (IF) in the maxillary midline, just below the incisive papilla located posterior to the maxillary incisors (9). The NPC terminates in the nasal cavity with two separate apertures known as Stenson's foramen (SF) on either side of the nasal septum (10).

Conventional radiographic methods are often preferred for preoperative planning, but these methods may limit the detailed evaluation of the region because superpositions and artifacts are frequently encountered. Computed tomography, with its high contrast resolution, allows for detailed evaluation of bone structure and neighboring anatomical structures. It is less preferred than cone beam computed tomography due to its high radiation dose (11,12). Cone beam computed tomography (CBCT) allows a clear determination of the anatomical structure and potential variations of the area where the operation will be performed. It is also an important imaging method for the evaluation of the morphology, bone structure and dimensions of the region (13,14).

Morphological changes may occur in the NPC due to increased alveolar bone atrophy as a result of loss of maxillary incisors, or neurovascular structures within the NPC may become closer to the area to be operated on (15,16). During implant surgery or other surgical procedures in the anterior maxilla, it is useful to know the anatomical features, morphological variations and dimensions of the NPC in order to maintain the integrity of the neurovascular structures in the nasopalatine canal, control bleeding and reduce potential surgical complications in the region (6). The aim of this study is to examine the dimensions and foramen width of NPC in detail and to evaluate the potential influence of variables such as edentulism, age and gender on these parameters.

## MATERIAL AND METHODS

The study was carried out in compliance with guidelines of the Declaration of Helsinki. It received approval from the University Non-Interventional Clinical Research Ethics Committee (Approval No: 2022/12, dated 22/06/2022).

Between January 2021 and July 2022, CBCT images of 450 cases randomly selected among the images obtained for various reasons from individuals who applied to the Faculty of Dentistry, Department of Dentomaxillofacial Radiology were evaluated. Among these data, the images of patients with any pathology, cleft palate, impacted tooth, dental implant, bone graft, fracture or fixed orthodontic appliance in the area to be examined were excluded. A total of 100 CBCT images that met the inclusion criteria of being 15 years of age or older, having sufficient diagnostic quality of the image including the anterior part of the maxilla, and not containing any artifacts were included in the study. CBCT images were acquired on a Morita Veraview 3D R100 (J Morita Mfg. Corp., Kyoto, Japan) tomograph at 90kVp and 5 mA. CBCT images were evaluated, and measurements were performed by a single Dentomaxillofacial Radiology research assistant in a darkened room using i-Dixel 2.0 software (J. Morita Corporation, Osaka, Japan).

Initially, the images were divided into 2 groups depending on the edentulous status of the premaxilla. Images showing the absence of teeth in premaxilla were categorized into the edentulous group (EG), whereas patients exhibiting no tooth loss in the premaxilla were assigned to the control group (CG). After recording the ages and genders of the patients, the positioning of the head in the images was standardized as follows: firstly, in the axial sections, the head position was adjusted parallel to the antero-posterior line sagittal guideline extending from the anterior nasal spine (ANS) to the posterior nasal spine (PNS) to ensure uniformity in the images within the CBCT sections (Figure 1A). Then, in the sagittal slice, the palatal plane was adjusted parallel to the axial guideline (Figure 1B). In the coronal slices, the base of the nasal cavity was aligned parallel to the horizontal plane (Figure 1C). The dimensions of NPC in millimeters and NPC angle in degrees were determined on the sagittal section. The length of NPC, along with the diameters of IF and SF were measured following the protocol established by Borstein et al. (4) (Figure 2). In the diameter measurement of SF, if there were two or more nasal openings in the NPC, the diameter of all of them were evaluated and averaged. In IF diameter measurement, if there was more than one oral opening in the NPC, the diameter of all of them was evaluated and averaged. When measuring the long axis of the NPC, the distance between the midpoint of the IF and the midpoint of the SF was measured. The NPC angle was determined by measuring the distance from the long axis of the NPC to the palatal surface (Figure 3).

### Statistical Analysis

The study data were analyzed using IBM SPSS Statistics 20.0 (Statistical Package for Social Sciences, Chicago IL, USA) software. The conformity of the data to normal distribution was analyzed by "Shapiro-Wilk" and "Kolmogorov-Smirnov" tests. Descriptive statistics of the data were presented as n (%) and mean±standard deviation if the variable was normally distributed, and median (minimum-maximum) otherwise. For normally distributed variables, the "Two İndependent Samples t-test" was used for comparisons between two independent groups. Kappa coefficients were calculated to assess both intra-observer agreements for each image set. Kappa values were interpreted according to the guidelines of Landis and Koch: $\kappa \leq 0.20$ poor; $\kappa = 0.21–0.40$ fair; $\kappa = 0.41–0.60$ moderate; $\kappa = 0.61–0.80$ good and $\kappa = 0.81–$

1.00 very good. The relationship between continuous variables and age was evaluated using Pearson correlation coefficient. The p value of less than 0.05 was considered significant.

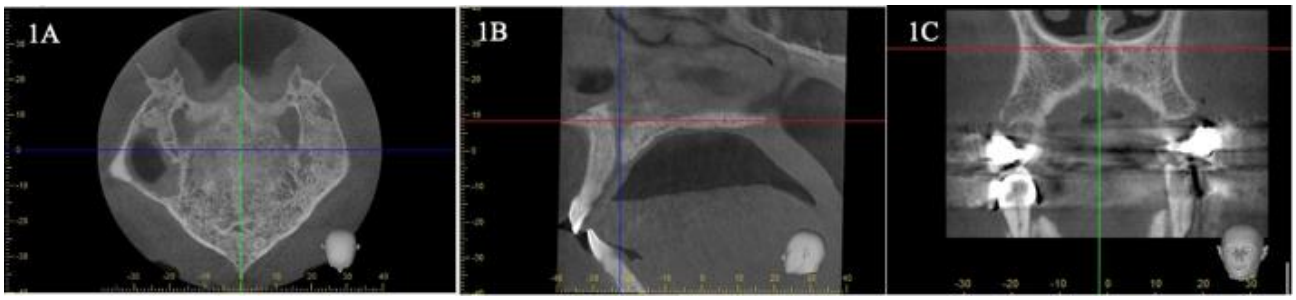



**Figure 1.** Standardisation of images in CBCT slices.
1A: Parallelisation of the antero-posterior line from the anterior nasal spina (ANS) to the posterior nasal spina (PNS) to the sagittal guideline on axial slices. 1B: Adjustment of the palatal plane parallel to the axial guideline in sagittal sections. 1C: Parallelisation of the nasal cavity floor to the horizontal plane in coronal sections.

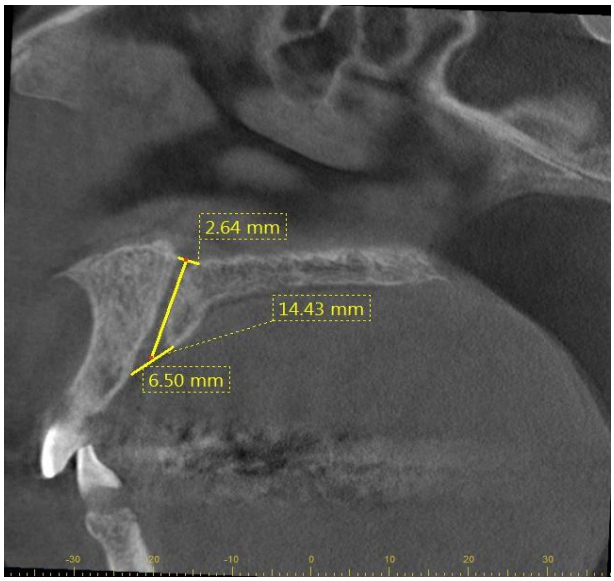



**Figure 2:** Measurement of the length, IF and SF diameters of the NPC

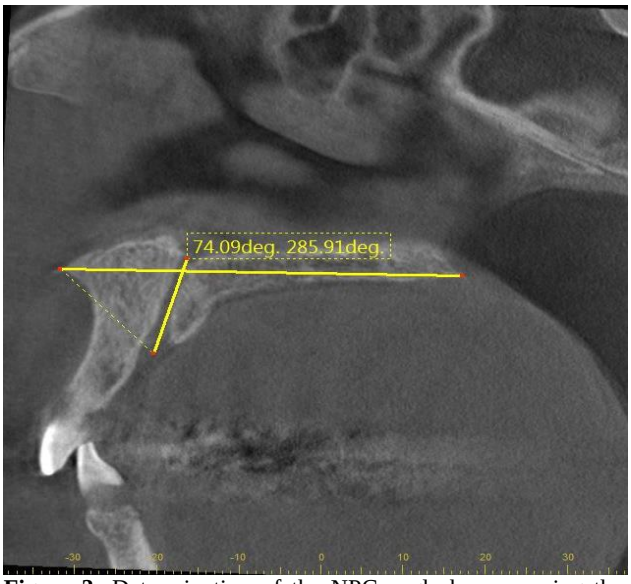



**Figure 3:** Determination of the NPC angle by measuring the angle between the long axis of the NPC and the palatal plane.

## RESULTS

In total, 100 patients were analyzed; their ages ranged from 16 to 92 years (52.60 ± 16.60). Of these patients, 59 were male and 41 were female. The gender and age composition of the study participants are presented in Table 1.

**Table 1.** Age and gender distribution of patients

| | Age | | |
|---|---|---|---|
| Gender | n(%) | Mean | SD(±) |
| Female | 41(41) | 53.92 | 16.01 |
| Male | 59(59) | 51.67 | 17.08 |
| Total | 100(100) | 52.60 | 16.60 |

*n: number of participants, SD: standard deviation, Min: minimum, Max: Maximum.

As a result of the evaluation of NPC size measurements, the mean value of SF diameter was determined as 3.32 ± 1.66 mm in males and 3.31 ± 1.63 mm in females and there were not statistically significant differences between the genders in these measurements (p=0.976). The mean value of IF diameter was 6.54 ± 1.71 mm in women and 6.6 ± 1.81 mm in men, and no statistically significant difference was found between the sexes in these measurements (p=0.867). The mean NPC length was 13.25 ± 2.07 mm in males and 11.33 ± 2.57 mm in females, indicating that the NPC length was statistically significantly greater in males than in females (p<0.001). The average angle of the NPC with the palatal plane was 79.75° ± 7.29 in males and 73.30° ± 7.89 in females. According to these data, it was observed that the NPC angle was observed to be statistically significant greater in males than in females (p<0.001) (Table 2).

When the NPC size measurements were analyzed according to edentulous status, the average SF diameter was 3.49 ± 1.47 mm and 3.14 ± 1.78 mm, and the average IF diameter was 6.67 ± 1.75 mm and 6.46 ± 1.75 mm in the EG and CG patient groups, respectively. When SF diameter and IF diameter were evaluated according to edentulous status, no statistically significant difference was found between the groups (p=0.289 and p=0.544) (Table 3). The mean value of NPC length was 11.72 ± 2.65 mm and 12.51 ± 2.40 mm in EG and CG patient groups, respectively, and there was no statistically significant difference between EG and CG groups for NPC length (p=0.118). The mean value of the NPC angle was 75.27 ± 7.06° and 76.62 ± 9.32° in the EG and CG patient groups, respectively, and no statistically significant difference was found between the groups (p=0.417) (Table 3).

**Table 2.** Evaluation of NPC dimensions according to gender

| Measurements | | | | | t test |
|---|---|---|---|---|---|
| | Gender | n (%) | Mean | SD (±) | *p* |
| SF Diameter (mm) | Male<br>Female<br>Total | 41(41)<br>59(59)<br>100(100) | 3.32<br>3.31<br>3.31 | 1.66<br>1.63<br>1.63 | 0.976 |
| IF Diameter (mm) | Male<br>Female<br>Total | 41(41)<br>59(59)<br>100(100) | 6.60<br>6.54<br>6.57 | 1.81<br>1.71<br>1.74 | 0.867 |
| NPC length (mm) | Male<br>Female<br>Total | 41(41)<br>59(59)<br>100(100) | 13.25<br>11.33<br>12.12 | 2.07<br>2.57<br>2.55 | **<0.001*** |
| NPC angle (°) | Male<br>Female<br>Total | 41(41)<br>59(59)<br>100(100) | 79.75<br>73.3<br>75.95 | 7.29<br>7.89<br>8.25 | **<0.001*** |

* Statistical significance is written in bold. n: number of participants, SD: standard deviation, Min: minimum, Max: Maximum, SF: Stenson foramen, IF: Incisive foramen, NPC: Nasopalatine canal, mm: millimetre, °: angle.

**Table 3.** Evaluation of NPC dimensions according to dentition

| Measurements | Dentition | | | | t test |
|---|---|---|---|---|---|
| | Patient Groups | n (%) | Mean | SD (±) | *p* |
| SF Diameter (mm) | EG<br>CG<br>Total | 50(50)<br>50(50)<br>100(100) | 3.49<br>3.14<br>3.31 | 1.47<br>1.78<br>1.63 | 0.289 |
| IF Diameter (mm) | EG<br>CG<br>Total | 50(50)<br>50(50)<br>100(100) | 6.67<br>6.46<br>6.57 | 1.75<br>1.75<br>1.74 | 0.544 |
| NPC Length (mm) | EG<br>CG<br>Total | 50(50)<br>50(50)<br>100(100) | 11.72<br>12.51<br>12.12 | 2.65<br>2.40<br>2.55 | 0.118 |
| NPC Angle (°) | EG<br>CG<br>Total | 50(50)<br>50(50)<br>100(100) | 75.27<br>76.62<br>75.95 | 7.06<br>9.32<br>8.25 | 0.417 |

*SD: Standard deviation, Min: minimum, Max: Maximum, n: number of participants, EG: edentulous patient group, CG: Control patient group, SF: Stenson's foramen, IF: Incisive foramen, NPC: Nasopalatine canal, mm: millimetre, °: angle.

When NPC measurements were evaluated according to age, we found that only IF diameter was significantly weakly positively associated with age (p=0.025). SF diameter, NPC length and NPC angle had no statistically significant correlation with age (Table 4).

**Table 4.** Evaluation of NPC dimensions according to age

| Age | Pearson Correlation Coefficient | |
|---|---|---|
| | V | *p* |
| SF Diameter | 0,092 | 0,362 |
| IF Diameter | **0,225** | **0,025** |
| NPC Length | -0,009 | 0,928 |
| NPC Angle | -0,065 | 0,517 |

## DISCUSSION

The data obtained from the study revealed that the length of NPC was significantly higher in males than females. This finding is consistent with similar studies in literature (1,2,17-20). According to the literature, it is suggested that the gender difference in NPC size may be due to the fact that generally males have larger cranio-caudal dimensions (20). Although there are studies in literature supporting our findings, there are also studies reporting the opposite (21). This difference may be explained by methodological differences such as the small sample size in the study by Mraiwa et al. (21).

In addition, no significant relationship was found between SF and IF diameters and gender in this study. The results obtained are similar to the studies by Hakbilen and Magat (3), Belgin and Serindere (22), Thakur et al. (20) and Bornstein et al. (4). In contrast to the data obtained, Görürgöz and Öztaş (6) reported that only the diameter of the IF, Acar and Kamburoğlu (1), Khan et al. (23), Özeren Keşkek et al. (24) reported that both IF and SF diameters were larger in males than females. We think that these findings may result from the difference in terms of sampling size.

According to the data obtained, the NPC angle was found to be statistically significantly higher in males than females. Contrary to some studies in the literature (17,25,26), this study is one of the rare studies reporting a significant relationship between NPC angle and gender, similar to the results of Özeren Keşkek et al. (24).

When we evaluated NPC size measurements according to age groups, we found that only IF diameter showed a statistically significantly correlated positive association with age. In parallel with our findings, Özeren Keşkek et al. (24) found that IF width increased significantly with age and SF diameter did not change significantly with age

and reported that this result may be due to the fact that IF dimensions were affected by maxillary alveolar bone resorption but SF at the base of the nose was not affected. According to some studies in the literature, the diameter of the IF and SF also increased with an increasing age (27,28). Mardinger et al. (15) demonstrated that NPC is not a stable structure; on the contrary, it tends to expand in all dimensions after tooth extraction and during the aging process. They suggested that this enlargement is akin to the pneumatization observed in the maxillary sinus after tooth extraction in the maxillary posterior region, attributing the enlargements primarily to bone loss subsequent to tooth extraction. In addition, there are also studies reporting that SF and IF diameter are not affected by age (4,6,17,23). Some researchers have also found that NPC length and NPC angle decreased with increasing age (28-30).

Bornstein et al. (4) reported that age significantly affected NPC length, demonstrating a statistically significant negative correlation between age and NPC length. However, they did not find a relationship between other measurements and age. Similarly, some reports in the literature suggest that NPC length and NPC angle will decrease with increasing age due to the resorption of alveolar bone caused by age increase and tooth loss (15), while some reports failed to detect a meaningful association between age and NPC length and angle (3,6). The differences in NPC length between the studies may be due to the method used, different imaging techniques or different gender distribution of the groups (31).

According to the present study, when the NPC size measurements were evaluated between EG and CG groups, it was determined that the mean SF and IF diameters were larger in EG than in CG, and NPC angle and NPC length were smaller than in the CG, but this result was determined to be not significant between the groups. According to the literature, NPC length decreases after tooth loss because tooth extraction causes bone resorption and remodeling of adjacent anatomical structures (1). Song et al. (32) on cadavers, it was reported that the length of the NPC was longer in those with tooth loss than in those without tooth loss. In addition, as mentioned before, Mardinger et al. (15) stated that the NPC is not a stable structure and shows dimensional changes depending on factors such as increasing age and tooth loss and reported that the diameter of the canal increases after tooth loss. This theory was corroborated by the findings of Belgin and Serindere (22), Demiralp et al. (33) but not by Hakbilen and Magat (3), Liang et al. (8), Güncü et al. (34) Etoz et al. (31) and Tözüm et al. (35).

Tözüm et al. (35) reported that alveolar bone resorption occurred after tooth loss, but the diameter of the resorbed area remained the same or was smaller. The limitations of the study include small sample size, inhomogeneous age distribution in the groups, and unknown duration of edentulousness in edentulous patients. We think that further studies by increasing the sample size, keeping the age distribution homogeneous in the edentulous and control groups and including the time elapsed after tooth loss in the study will make a contribution to the understanding of the relationship between tooth loss and NPC dimensions.

## CONCLUSION

Rehabilitation of edentulism of the premaxilla is of high clinical importance in terms of phonation, function and aesthetics. Especially in elderly patients and patients with tooth loss, changes in NPC diameter and length may occur. In addition, the size and diameter of the NPC may also vary depending on gender. The findings underscore the variability of NPC across different parameters. Hence, we advocate for a three-dimensional assessment of NPC length and diameter prior to surgical procedures, such as dental implant placement or cyst operations, particularly in the maxillary anterior region. This comprehensive evaluation is crucial for achieving favorable surgical outcomes and mitigating potential complications.

**Authors's Contributions:** Idea/Concept: E.Y.K., G.G., Ç.Ş.; Design: E.Y.K., G.G., Ç.Ş.; Data Collection and/or Processing: E.Y.K., G.G.; Analysis and/or Interpretation: G.G.; Literature Review: E.Y.K.; Writing the Article: E.Y.K., G.G., Ç.Ş.; Critical Review: Ç.Ş., G.G.

## REFERENCES

1. Acar B, Kamburoğlu K. Morphological and volumetric evaluation of the nasopalatinal canal in a Turkish population using cone-beam computed tomography. Surg Radiol Anat. 2015; 37(3): 259-65.
2. Al-Amery SM, Nambiar P, Jamaludin M, John J, Ngeow WC. Cone beam computed tomography assessment of the maxillary incisive canal and foramen: considerations of anatomical variations when placing immediate implants. PLoS One. 2015; 10(2): e0117251.
3. Hakbilen S, Magat G. Evaluation of anatomical and morphological characteristics of the nasopalatine canal in a Turkish population by cone beam computed tomography. Folia Morphol (Warsz). 2018; 77(3): 527-35.
4. Bornstein MM, Balsiger R, Sendi P, von Arx T. Morphology of the nasopalatine canal and dental implant surgery: a radiographic analysis of 100 consecutive patients using limited cone-beam computed tomography. Clin Oral Implants Res. 2011; 22(3): 295-301.
5. Teughels W, Merheb J, Quirynen M. Critical horizontal dimensions of interproximal and buccal bone around implants for optimal aesthetic outcomes: a systematic review. Clin Oral Implants Res. 2009; 20 Suppl 4: 134-45.
6. Görürgöz C, Öztaş B. Anatomic characteristics and dimensions of the nasopalatine canal: a radiographic study using cone-beam computed tomography. Folia Morphol (Warsz). 2021; 80(4): 923-34.
7. Keith DA. Phenomenon of mucous retention in the incisive canal. J Oral Surg. 1979; 37(11): 832-4.
8. Liang X, Jacobs R, Martens W, Hu Y, Adriaensens P, Quirynen M, Lambrichts I. Macro- and micro-anatomical, histological and computed tomography scan characterization of the nasopalatine canal. J Clin Periodontol. 2009; 36(7): 598-603.
9. Jacobs R, Lambrichts I, Liang X, Martens W, Mraiwa N, Adriaensens P, et al. Neurovascularization of the anterior jaw bones revisited using high-resolution

magnetic resonance imaging. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2007; 103(5): 683-93.
10. Radlanski RJ, Emmerich S, Renz H. Prenatal morphogenesis of the human incisive canal. Anat Embryol (Berl). 2004; 208(4): 265-71.
11. Cavalcanti MG, Yang J, Ruprecht A, Vannier MW. Accurate linear measurements in the anterior maxilla using orthoradially reformatted spiral computed tomography. Dentomaxillofac Radiol. 1999; 28(3): 137-40.
12. Besimo C, Lambrecht JT, Nidecker A. Dental implant treatment planning with reformatted computed tomography. Dentomaxillofac Radiol. 1995; 24(4): 264-7.
13. Ataman-Duruel ET, Duruel O, Turkyilmaz I, Tözüm TF. Anatomic variation of posterior superior alveolar artery: review of literature and case introduction. J Oral Implantol. 2019; 45(1): 79-85.
14. Goyushov S, Tözüm MD, Tözüm TF. Accessory mental/buccal foramina: case report and review of literature. Implant Dent. 2017; 26(5): 796-801.
15. Mardinger O, Namani-Sadan N, Chaushu G, Schwartz-Arad D. Morphologic changes of the nasopalatine canal related to dental implantation: a radiologic study in different degrees of absorbed maxillae. J Periodontol. 2008; 79(9): 1659-62.
16. Kraut RA, Boyden DK. Location of incisive canal in relation to central incisor implants. Implant Dent. 1998; 7(3): 221-5.
17. Bahşi I, Orhan M, Kervancıoğlu P, Yalçın ED, Aktan AM. Anatomical evaluation of nasopalatine canal on cone beam computed tomography images. Folia Morphol (Warsz). 2019; 78(1): 153-62.
18. Özçakır-Tomruk C, Dölekoğlu S, Özkurt-Kayahan Z, İlgüy D. Evaluation of morphology of the nasopalatine canal using cone-beam computed tomography in a subgroup of Turkish adult population. Surg Radiol Anat. 2016; 38(1): 65-70.
19. Rodricks D, Gupta A, Phulambrikar T, Singh SK, Sharma BK, Agrawal P. Anatomical and morphological characterization of the nasopalatine canal: a cone-beam computed tomography study. Mymensingh Med J. 2016; 25(2): 349-56.
20. Thakur AR, Burde K, Guttal K, Naikmasur VG. Anatomy and morphology of the nasopalatine canal using cone-beam computed tomography. Imaging Sci Dent. 2013; 43(4): 273-81.
21. Mraiwa N, Jacobs R, Van Cleynenbreugel J, Sanderink G, Schutyser F, Suetens P, et al. The nasopalatine canal revisited using 2D and 3D CT imaging. Dentomaxillofac Radiol. 2004; 33(6): 396-402.
22. Belgin, CA and Serindere G. Evaluation of changes in nasopalatine canal morphology according to dentition status by computed tomography. Kocaeli Üniversitesi Sağlık Bilimleri Derg. 2020; 6(3): 233-37.
23. M, Habib S, Ghafoor R. Evaluation of the Nasopalatine Canal (NPC) in a subset of Pakistani population, using Cone Beam Computed Tomography (CBCT). J Pak Med Assoc. 2023; 73(1): 49-53.
24. Özeren Keşkek C, Aytuğar E, Çene E. Retrospective assessment of the anatomy and dimensions of nasopalatine canal with cone-beam computed tomography. J Oral Maxillofac Res. 2022; 13(2): e4.
25. Gönül Y, Bucak A, Atalay Y, Beker-Acay M, Çalişkan A, Sakarya G, et al. MDCT evaluation of nasopalatine canal morphometry and variations: An analysis of 100 patients. Diagn Interv Imaging. 2016; 97(11): 1165-72.
26. Jain NV, Gharatkar AA, Parekh BA, Musani SI, Shah UD. Three-dimensional analysis of the anatomical characteristics and dimensions of the nasopalatine canal using cone beam computed tomography. J Maxillofac Oral Surg. 2017; 16(2): 197-204.
27. Panda M, Shankar T, Raut A, Dev S, Kar AK, Hota S. Cone beam computerized tomography evaluation of incisive canal and anterior maxillary bone thickness for placement of immediate implants. J Indian Prosthodont Soc. 2018; 18(4): 356-63.
28. Panjnoush M, Norouzi H, Kheirandish Y, Shamshiri AR, Mofidi N. Evaluation of morphology and anatomical measurement of nasopalatine canal using cone beam computed tomography. J Dent (Tehran). 2016; 13(4): 287-94.
29. Mishra R, Thimmarasa VB, Jaju PP, Mishra R, Shrivastava A. Influence of gender and age on nasopalatine canal: A cone-beam computed tomography study. Journal of Dental Implants. 2017; 7(1): 15-9.
30. Takeshita K, Funaki K, Jimbo R, Takahashi T. Nasopalatine duct cyst developed in association with dental implant treatment: A case report and histopathological observation. J Oral Maxillofac Pathol. 2013; 17(2): 319.
31. Etoz M, Sisman Y. Evaluation of the nasopalatine canal and variations with cone-beam computed tomography. Surg Radiol Anat. 2014; 36(8): 805-12.
32. Song WC, Jo DI, Lee JY, Kim JN, Hur MS, Hu KS, et al. Microanatomy of the incisive canal using three-dimensional reconstruction of microCT images: an ex vivo study. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2009; 108(4): 583-90.
33. Demiralp KÖ, Kurşun-Çakmak EŞ, Bayrak S, Sahin O, Atakan C, Orhan K. Evaluation of anatomical and volumetric characteristics of the nasopalatine canal in anterior dentate and edentulous ındividuals: A CBCT Study. Implant Dent. 2018; 27(4): 474-79.
34. Güncü GN, Yıldırım YD, Yılmaz HG, Galindo-Moreno P, Velasco-Torres M, Al-Hezaimi K, et al. Is there a gender difference in anatomic features of incisive canal and maxillary environmental bone? Clin Oral Implants Res. 2013; 24(9): 1023-6.
35. Tözüm TF, Güncü GN, Yıldırım YD, Yılmaz HG, Galindo-Moreno P, Velasco-Torres M, et al. Evaluation of maxillary incisive canal characteristics related to dental implant treatment with computerized tomography: a clinical multicenter study. J Periodontol. 2012; 83(3): 337-43.

Araştırma Makalesi / Research Article

Sağlık Bilimlerinde Değer / Sağlık Bil Değer
Value in Health Sciences / Value Health Sci
ISSN: 2792-0542 sabd@duzce.edu.tr 2025; 15(2): 236-243
doi: https://dx.doi.org/10.33631/sabd.1439240

# Depremden Etkilenen Gebelerin Prenatal Bakım Alma Durumlarının Belirlenmesi

Mevhibe ÇOBAN [1], Esra GÜNEY [2]

**ÖZ**

**Amaç:** Bu araştırma depremden etkilenen gebelerin prenatal bakım alma durumlarının belirlenmesi amacıyla yürütüldü.

**Gereç ve Yöntemler:** Araştırma, Haziran – Ağustos 2023 tarihleri arasında Türkiye'de gerçekleştirildi. Araştırmanın evrenini Şubat 2023 tarihli Kahramanmaraş merkezli depremden etkilenen gebeler oluşturdu. Veri toplama formunda yer alan sorular, araştırmacılar tarafından yapılan literatür taraması sonucu oluşturuldu. Araştırmanın verileri web tabanlı anket kullanılarak sosyal medya aracılığı toplandı. Araştırmada örneklem hesaplaması yapılmayıp çalışmaya katılmayı onaylayan ve alınma kriterlerini sağlayan toplam 349 gebe alındı. Çalışma sonrasında Post hoc power analizi yapıldı. Analiz sonrasında %95 güven aralığı ve tek yönlü hipoteze göre testin gücü %99,9 olarak tespit edildi.

**Bulgular:** Çalışmada gebelerin %50'sinden fazlasının düzenli gebelik kontrolü sağlamada, uzman doktor ve aile ebesine ulaşmada, tuvalet, banyo, duş, kişisel bakım ve vücut bakımına ulaşmada sıkıntı yaşadığı, deprem sonrasında yeterince dinlenemediği belirlendi. Bununla birlikte doğum, doğum sonu dönem ve bebek bakımı hakkında kaygı yaşadıkları ve kaygı düzeylerinin arttığı belirlendi.

**Sonuç:** Depremden etkilenen gebelerin prenatal bakım almada sıkıntı yaşadıkları, doğum ve doğum sonu dönemleri hakkında hissettikleri kaygı puanları ile doğum sonu dönemde bebeklerinin bakımları hakkında hissettikleri kaygı puanlarının ortalamanın üstünde olduğu belirlendi.

**Anahtar Kelimeler:** Deprem; gebelik; kaygı; prenatal bakım.

# Determination of Prenatal Care Receipt Status of Pregnant Women Affected by Earthquake and Prenatal Care

**ABSTRACT**

**Aim:** This study was conducted to determine the status of prenatal care received by pregnant women affected by the earthquake.

**Material and Methods:** The research was conducted in Türkiye between June 2023 and August 2023. The population of the research consisted of pregnant women affected by the Kahramanmaraş-centered earthquake in February 2023. The data of the study was collected via social media using a web-based survey. A sample calculation was not made in the study, and all 349 pregnant women who approved to participate in the study and met the inclusion criteria were included. Post hoc power analysis was performed after the study. After the analysis, the power of the test was determined as 99.9% according to the 95% confidence interval and one-way hypothesis.

**Results:** In the study, it was determined that pregnant women had difficulties in providing regular pregnancy check-ups, reaching a specialist doctor and family midwife, accessing toilets, baths, showers, personal care and body care, that they could not rest enough after the earthquake, and that the level of anxiety they felt about birth, postpartum period and baby care increased.

**Conclusion:** It was determined that pregnant women affected by the earthquake had difficulties in receiving prenatal care, and their anxiety scores about the birth and postpartum periods and the anxiety scores about the care of their babies in the postpartum period were above average.

**Keywords:** Earthquake; pregnancy; anxiety; prenatal care

1 İnönü Üniversitesi Sağlık Bilimleri Enstitüsü Ebelik Anabilim Dalı, Malatya, Türkiye.
2 İnönü Üniversitesi Sağlık Bilimleri Fakültesi Ebelik Bölümü Malatya, Türkiye.

Sorumlu Yazar / Corresponding Author Mevhibe ÇOBAN, e-mail: mevhibecoban@gmail.com.tr
Geliş Tarihi / Received: 18.02.2024, Kabul Tarihi / Accepted: 13.03.2025
*Bu çalışma 6. Uluslararası 7. Ulusal Ankara Ebelik Kongresinde (25-27 Eylül 2023) sözlü bildiri olarak sunulmuştur.

## GİRİŞ

Doğum öncesi bakım koruyucu bakımın temel unsurlarından biridir. Prenatal bakım olarak ifade edilen doğum öncesi bakımda gebe ve fetüsü riske atabilecek koşulların tanımlanması ve yönetimi sağlanır (1). Prenatal bakımın amacı, sürekli risk değerlendirmesi, tedavi ve psikososyal desteği içeren sağlık hizmetlerine koordineli bir yaklaşım sağlamaktır (2). Prenatal bakımın yeterliliği tipik olarak iki boyuta dayalı olarak tanımlanır. Bunlardan ilki prenatal bakımın ne zaman başladığı ikincisi ise doğum öncesi bakımın başladığı andan doğuma kadar yapılan prenatal bakım ziyaretlerinin sayısıdır (2). Sağlık Bakanlığı prenatal dönemde her gebenin en az dört kez nitelikli izlenmesi gerektiğini belirtmektedir. Bu izlemlerden ilk izlemin gebeliğin ilk 14 haftası içerisinde, ikinci izlemin gebeliğin 18-24 haftaları içerisinde, üçüncü izlemin gebeliğin 28-32. haftaları içerisinde, dördüncü izlemin ise gebeliğin 36-38. haftaları içerisinde yapılmasını önermektedir (3). Dünya Sağlık Örgütü (DSÖ) de "tüm gebe kadınların ve yeni doğanın gebelik, doğum ve doğum sonrası dönem süresince kaliteli bakım aldığı" bir sağlık politikasını hedeflemekte ve prenatal dönemde ilki 12. haftaya kadar en az 8 izlem yapılmasını önermektedir (4). Prenatal dönemde yapılan bu izlemler ile gebe ve fetüste genetik ve konjenital bozukluklar, demir eksikliği anemisi, bulaşıcı olan ve olmayan hastalıkların fetüs üzerindeki riskinin belirlenmesi dâhil olmak üzere sağlıklı gebelik ve sağlıklı doğum sonu dönem için gerekli olan danışmanlık kolaylaşır (5,6). Prenatal bakım, sağlık kalitesinin yükseltilmesi, teşhis, tedavi, tarama ve hastalıkların önlenmesinde önemli rol oynayan sağlık hizmetlerinin bütününü oluşturur (4,7). Gebelik boyunca süren prenatal bakım gebelikte oluşabilecek komplikasyonları azaltmada doğrudan etkiye sahiptir. Prenatal bakımın dolaylı etkileri ise doğum eylemi öncesi ve eylem sırasında oluşabilecek komplikasyonların önüne geçme, adölesan gebeleri ve riskli gebeleri tespit etmektir. Bakımın doğrudan ve dolaylı etkilerinin anne ve bebekte oluşabilecek morbidite ve mortalite riskini azalttığı belirtilmektedir. Prenatal bakımın gebelik öncesi başlayıp, gebelik ve doğum sonu dönemde de devam etmesi hem anne hem de bebekte oluşabilecek morbidite ve mortalite riskini azaltmaktadır (4). Tüm bu nedenlerden dolayı prenatal bakımın gebeliğin en erken döneminde başlayıp doğuma kadar düzenli aralıklarla sürmesi gerekmektedir (8). Prenatal bakımın düzenli yapılıyor olması anne bebek ölümlerinin azaltılmasında anahtar rol oynamaktadır. Sürdürülebilir Kalkınma Hedefi kapsamında 2030 yılına kadar küresel anne ölüm oranının 100.000 canlı doğumda 70'in altına düşürülmesi amacıyla prenatal bakımların yapılması desteklenmektedir. İlgili bakımların amacı yeni doğanların ve beş yaş altı çocukların engellenebilir ölümlerinin bitirilmesine yardımcı olmaktır (9).

Afet bireylerin kontrolleri dışında ve insan kaynaklı olmayan nedenlerden dolayı meydana gelen, toplumun bir kısmını veya tamamını etkileyen olumsuz doğa ve çevresel olaylardır (10,11). Afet sonucu bireyler fiziksel, ekonomik ve sosyal yönden etkilenirler. Bu olumsuz etkiler hayatın olağan akışında kesintiye neden olarak bireysel ve toplumsal baş etme mekanizmasını bozar. Tüm bireyler, afetin olumsuz etkilerinden dolayı risk altındadır. Ancak çocuklar, kadınlar, gebeler, lohusalar ve yaşlılar savunmasız oldukları ve daha çok bakıma ihtiyaç duydukları için daha büyük bir riske sahiptir (12,13). Ülkemizde de 6 Şubat 2023 tarihinde Kahramanmaraş merkezli 7,8 ve 7,6 büyüklüğünde 9 saat arayla meydana gelen depremler 11 ili etkileyerek bireylerin bakım ihtiyacında aksaklıklara neden olmuştur. Meydana gelen depremler altyapıda önemli hasara yol açmış, birçok gebenin temel sağlık hizmetlerine erişimini engellemiştir. Birleşmiş Milletler Nüfus Fonu (United Nations Population Fund-UNFPA) şu anda Türkiye'de 226.000'den fazla gebenin üreme sağlığı hizmetlerine acil olarak erişmesi gereken depremzedeler arasında yer aldığını ifade etmektedir (14). Depremler, gebelerin check-up, ultrason taramaları ve diğer kritik hizmetler de dahil olmak üzere doğum öncesi bakıma erişimini zorlaştırmış, hastanelerin ve tıp merkezlerinin yıkılması, gebeleri savunmasız ve risk altında bırakmıştır (15). Gebelik döneminde yaşanan bir depremin anne sağlığı ve doğum sonuçları üzerindeki etkisini belirtmek amacıyla yapılan bir çalışmada deprem sonrası kadınların yetersiz kilo alma durumlarının deprem öncesine göre arttığı (%44.1'e karşı %58.9), erken doğum, (%18,91'e karşı %10,90), düşük (%17,11'e karşı %10,54) ve ölü doğum (%3,78'e karşı %1,82) oranlarının depremden sonra önemli ölçüde arttığı belirlenmiştir (16) Ayrıca gebeler temel yaşam gereksinimi olan beslenme, barınma, uyku ve güvenlik ihtiyacına ulaşmada ve bunları sürdürmede sıkıntı yaşamıştır. Bu dönemde düzenli aralıklarla sağlanan prenatal bakım gebede kaygı ve stresin azaltılmasında ve kaygı ve stres kaynaklı gelişebilecek komplikasyonların önlenmesinde, anne ve bebek ölümlerinin ve sezaryen oranlarının azaltılmasında önemli etkiye sahiptir. Birçok yönden gebelerin sağlıklı bir gebelik, doğum ve doğum sonrası dönem geçirmeleri için faydalı olan bu profesyonel bakıma ihtiyaçları vardır. Ancak deprem döneminde arama kurtarma ekiplerinin ve sosyal yardımlaşma ağlarının öncelikli amacı göçük altında olan ve yaralı insanları kurtarmak olduğu için gebelere verilen prenatal bakım göz ardı edilebilmektedir (17). Bu çalışma ile depremden etkilenen gebelerin prenatal bakım alma durumlarının değerlendirilmesi amaçlanmıştır.

Bu araştırmada şu sorulara cevap arandı:

1) Depremden etkilenen gebelerin prenatal bakım alma durumları nedir?

2) Gebelerin deprem sonrası kaygı düzeylerinin dağılımı nedir?

3) Depremden etkilenen gebelerde prenatal bakım alma yetersizliğine neden olan diğer faktörler nelerdir?

## GEREÇ VE YÖNTEMLER

### Araştırmanın Tipi

Araştırma tanımlayıcı ve kesitsel tipte tasarlanmıştır.

### Araştırmanın Evreni ve Örneklemi

Araştırmanın evrenini 6 Şubat 2023 tarihli Kahramanmaraş merkezli depremden etkilenen 11 ildeki gebeler oluşturdu. Araştırmanın verileri Haziran 2023 – Ağustos 2023 tarihleri arasında web tabanlı anket kullanılarak (https://docs.google.com/forms) sosyal medya aracılığı ile (WhatsApp, Facebook Messenger, Instagram) toplandı. Örneklem büyüklüğünden elde edilen verilerin güvenilir ve genellenebilir olup

olmadığını belirlemek amacıyla G*Power V. 3.1.9.6 programı kullanılarak Post hoc power analizi yapıldı. Analiz sonrasında %95 güven aralığı ve tek yönlü hipoteze göre testin gücü %99,9 olarak tespit edildi. Google Forms sistemi üzerinde hazırlanan anket, ilgili sosyal medya ve iletişim platformlarındaki gruplarda yer alan gebelere gönderilen mesajlar aracılığıyla paylaşıldı. Araştırmayı kabul eden gebelere anket çalışmasının amacı ve içeriğiyle ilgili bilgi verildi ve çalışmaya katılmak istediğine dair onam formu gönderildi. Veriler yaklaşık yedi haftada toplandı. Araştırmada 462 gebeye ulaşıldı, 124 gebe anket formlarını eksik doldurduğu, 89 gebe alınma kriterlerini sağlamadığı için çalışmadan çıkarıldı. Araştırmada örneklem hesaplaması yapılmayıp çalışmaya katılmayı onaylayan ve alınma kriterlerini sağlayan toplam 349 gebenin tamamı çalışmaya alındı.

Araştırmaya alınma kriterleri:

- 6 Şubat depreminden etkilenen herhangi bir ilde ikamet eden,
- Sosyal medya hesaplarını aktif şekilde kullanan,
- Sosyal medyada gebeliğe yönelik hesaplara erişimi olan,
- Kendisiyle veya bebeğiyle ilgili herhangi bir sağlık problemi olmayan tüm gebeler araştırmaya alındı.

Araştırmadan çıkarılma kriterleri:

- Gebeliğinde herhangi bir sağlık problemi yaşayan,
- Tanılanmış herhangi bir hastalığa sahip olan,
- Fetüsle ilgili tanılanmış herhangi bir riske sahip olan tüm gebeler araştırmadan çıkarıldı.

**Veri Toplama Araçları**

Veri toplama formu araştırmacılar tarafından literatür taraması yapılarak hazırlandı ve dört bölüm şeklinde yapılandırıldı. İlk bölümde gebelerin sosyodemografik ve obstetrik özelliklerini belirmeye yönelik sorular, ikinci bölümde gebelerin deprem sürecindeki sosyodemografik özelliklerini belirlemeye yönelik sorular, üçüncü bölümde gebelerin deprem sonrası prenatal bakım durumlarını belirlemeye yönelik sorular ve son bölümde ise gebelerin deprem sonrası bazı görüşlerini belirlemeye yönelik hazırlanan sorular yer aldı (16-20,24).

Yapılandırılmış kişisel bilgi formu

*Birinci bölüm:* Bu bölümde gebelerin yaşı, eğitim düzeyi, çalışma durumu, sosyal güvence, gelir düzeyi, aile tipi, evlilik yılı, gebelik haftası, gebelik sayısı, düşük ve kürtaj varlığı, gebeliğin planlı olması ve son doğum şeklini belirlemeye yönelik sorular yer alıyordu.

*İkinci bölüm:* Bu bölümde gebelerin ikamet edilen yer, ikamet edilen yapı, doğumdan sonra ikamet edilecek yapı, ikamet edilen yapıdaki kişi sayısı, birinci derecede akraba kaybı ve maddi kayıp varlığını belirlemeye yönelik sorular yer alıyordu.

*Üçüncü bölüm:* Bu bölümde, deprem sonrası planlanan doğum şekli, depremden sonra düzenli gebelik kontrollerini sağlamada sıkıntı yaşama durumu, depremden sonra aile ebesine ve takipli olduğu kadın doğum uzmanına ulaşmada sıkıntı yaşama durumu, depremden sonra vitamin/mineral desteğine ulaşmada sıkıntı yaşama durumu, depremden sonra laboratuvar tetkikleri/ultrason muayenesine ulaşmada sıkıntı yaşama durumu, depremden sonra banyo/duş, tuvalet ve kişisel bakım/vücut bakımına ulaşmada sıkıntı yaşama durumunu belirlemeye yönelik sorular yer alıyordu (17,24).

*Dördüncü bölüm:* Bu bölümde, gebelerin deprem sonrası bazı görüşlerini puanlayarak belirlemeye yönelik sorular yer alıyordu. Bölümde yer alan "Doğumunuz hakkında hissettiğiniz kaygı düzeyi nedir?. Doğumdan sonra bebeğinizin bakımı hakkında hissettiğiniz kaygı düzeyi nedir?, Doğum sonu (lohusalık) dönem hakkında hissettiğiniz kaygı düzeyi nedir?, Doğumdan sonra korunma yöntemlerine ulaşma hakkında hissettiğiniz kaygı düzeyi nedir?, Doğumdan sonra ebenize ulaşma hakkında hissettiğiniz kaygı düzeyi nedir?, Doğumdan sonra doktorunuza ulaşma hakkında hissettiğiniz kaygı düzeyi nedir?" şeklindeki soruları gebelerin "0: Kaygım yok-10 Oldukça kaygılıyım" şeklinde puanlamaları istendi.

**Verilerin Toplanması**

Veri toplama formları Google Forms sistemi üzerinden dijital form şeklinde tasarlandı. Online anketin ilk sayfasında çalışmanın amacı ve içeriği hakkında kısa bir bilgi notu yer aldı ve katılımcıların çalışmaya katılmaya gönüllü olup olmadıklarını belirten onam formu gönderildi. Araştırmaya katılım gönüllülük esasına göre yapıldı. Bir formun doldurulma süreci yaklaşık 10 dakika sürdü ve veri toplama işlemi ortalama yedi haftada tamamlandı.

**Verilerin Analizi**

Veriler IBM SPSS Statistics for Windows, Version 25,0 paket programında veri seti oluşturularak değerlendirildi. Verilerin analizinde ilk aşamada Kolmogorov Smirnov testi ile verilerin normal dağılıma uygunluğu değerlendirildi ve verilerin normal dağılım sağladığı belirlendi. İstatistiksel değerlendirmede; aritmetik ortalama, yüzdelik dağılım, standart sapma ile değerlendirilmiştir. İstatistiksel anlamlılık $p<0,05$ olarak kabul edildi.

**Araştırmanın Etik Boyutu**

Bu çalışma için ilgili üniversitenin girişimsel olmayan klinik çalışmalar etik kurulundan izin alındı (Tarih: 09.05.2023, Karar Sayısı: 2023/4639). Araştırmanın tüm aşamaları Helsinki Deklarasyonuna göre yürütüldü. Ayrıca anket formlarından önce araştırmaya katılan tüm gebelere araştırma ve veri toplama araçları hakkında bilgilendirilme yazısı oluşturuldu. Katılım için gönüllü olanlar Google form anketinde bunu belirttikten sonra çalışmaya dâhil edildi.

## BULGULAR

Araştırmaya katılan gebelerin bazı sosyodemografik ve obstetrik özelliklerine göre dağılımları Tablo 1' de verildi. Buna göre gebelerin %51,3'ünün 29 yaş ve üzeri olduğu, % 49,6'sının üniversite ve üzeri düzeyinde eğitim aldığı, % 71,3'ünün çalışmadığı, % 78,5'inin sosyal güvencesinin olduğu, %50.4'ünün orta düzey gelire sahip olduğu, % 86,5'inin çekirdek aileye sahip olduğu, % 57,0'ının 1-4 yıl arası evli olduğu, % 77,7'sinin gebeliğinin 3. trimesterde olduğu, % 49,6'sının 2-3. gebeliğe sahip olduğu, sırasıyla % 80,2'sinde düşük, % 87,4'ünde ise küretaj varlığının olmadığı, % 92,8'inin planlı gebelik yaşadığı ve % 53,7'sinin son doğum şeklinin vajinal doğum olduğu belirlendi (Tablo 1).

**Tablo 1.** Gebelerin bazı sosyodemografik ve obstetrik özelliklerine göre dağılımları (n=349)*

| Değişkenler | n | % |
|---|---|---|
| **Yaş** | | |
| 18- 28 yaş | 170 | 48,7 |
| ≥ 29 yaş | 179 | 51,3 |
| **Eğitim düzeyi** | | |
| İlköğretim mezunu (1-8 yıl) | 79 | 22,6 |
| Lise mezunu | 97 | 27,8 |
| ≥ Üniversite | 173 | 49,6 |
| **Çalışma durumu** | | |
| Çalışıyor | 100 | 28,7 |
| Çalışmıyor | 249 | 71,3 |
| **Sosyal güvence** | | |
| Var | 274 | 78,5 |
| Yok | 75 | 21,5 |
| **Gelir düzeyi** | | |
| Gelir giderden az | 134 | 38,4 |
| Gelir gidere denk | 176 | 50,4 |
| Gelir giderden fazla | 39 | 11,2 |
| **Aile tipi** | | |
| Çekirdek aile | 302 | 86,5 |
| Geniş aile | 47 | 13,5 |
| **Evlilik yılı** | | |
| 1-4 yıl | 199 | 57,0 |
| ≥ 5 yıl | 150 | 43,0 |
| **Gebelik haftası** | | |
| 1. trimester | 25 | 7,1 |
| 2. trimester | 53 | 15,2 |
| 3. trimester | 271 | 77,7 |
| **Gebelik sayısı** | | |
| 1. gebelik | 147 | 42,1 |
| 2 - 3. Gebelik | 173 | 49,6 |
| 4 ve üzeri gebelik | 29 | 8,3 |
| **Düşük varlığı** | | |
| Evet | 69 | 19,8 |
| Hayır | 280 | 80,2 |
| **Küretaj varlığı** | | |
| Evet | 44 | 12,6 |
| Hayır | 305 | 87,4 |
| **Planlı gebelik** | | |
| Evet | 324 | 92,8 |
| Hayır | 25 | 7,2 |
| **Son doğum şekli* (n = 239)** | | |
| Sezaryen | 110 | 46,3 |
| Vajinal | 129 | 53,7 |

**Sadece multipar gebeler cevaplamıştır.*

Araştırmaya katılan gebelerin deprem sürecine yönelik sosyodemografik özelliklerinin dağılımları Tablo 2' de verildi. Buna göre gebelerin depremden önce %71,1'inin il de yaşadığı, %55,3' ünün ikamet ettiği yapıdaki kişi sayısının 3-5 olduğu belirlendi. Depremden sonra ise %43,3'ünün ikamet ettiği yapıdaki kişi sayısının 3-5 olduğu, %51'inin kendi evinde ikamet ettiği, %53,6'sının doğumdan sonra kendi evinde ikamet edeceği, %90,3'ünün 1. derece akraba kaybı yaşamadığı, %72,8'inin ise maddi kayıp yaşadığı belirlendi (Tablo 2). Araştırmaya katılan gebelerin deprem sonrası prenatal bakım alma durumlarının dağılımları Tablo 3'te verildi.

**Tablo 2.** Gebelerin deprem sürecine yönelik sosyodemografik özelliklerinin dağılımları (n=349)

| | **Değişkenler** | **n** | **%** |
|---|---|---|---|
| **Depremden önce** | **İkamet edilen yer** | | |
| | İl | 248 | 71,1 |
| | İlçe | 77 | 22,0 |
| | Köy/kasaba | 24 | 6,9 |
| | **İkamet edilen yapıdaki kişi sayısı** | | |
| | 2 kişi | 131 | 37,5 |
| | 3- 5 kişi | 193 | 55,3 |
| | ≥ 6 kişi | 25 | 7,2 |
| **Depremden sonra** | **İkamet edilen yapıdaki kişi sayısı** | | |
| | 2 kişi | 68 | 19,5 |
| | 3- 5 kişi | 151 | 43,3 |
| | ≥ 6 kişi | 130 | 37,2 |
| | **İkamet edilen yapı** | | |
| | Kendi evi | 178 | 51,0 |
| | Yakınımın evi | 109 | 31,2 |
| | Kamu/özel yurt | 6 | 1,7 |
| | Konteyner | 26 | 7,4 |
| | Çadır | 30 | 8,6 |
| | **Doğumdan sonra ikamet edilecek yapı** | | |
| | Kendi evi | 187 | 53,6 |
| | Yakınımın evi | 105 | 30,1 |
| | Kamu/özel yurt | 5 | 1,4 |
| | Konteyner | 27 | 7,7 |
| | Çadır | 25 | 7,2 |
| | **1. derece akraba kaybı** | | |
| | Evet | 34 | 9,7 |
| | Hayır | 315 | 90,3 |
| | **Maddi kayıp** | | |
| | Evet | 254 | 72,8 |
| | Hayır | 95 | 27,2 |

Buna göre gebelerin %83,1'inin depremden sonra planladığı doğum şeklinin değişmediği, %69,1'inin düzenli gebelik kontrollerini sağlamada sıkıntı yaşadığı, %57,3'ünün aile ebesine ulaşmada, %75.9'unun ise takipli olduğu kadın doğum uzmanına ulaşmada sıkıntı yaşadığı, %69,3'ünün gebelikte gerekli vitamin ve minerale ulaşmada sıkıntı yaşamadığı, %69,6'sının gebeliği ile ilgili kan tetkiki yaptırdığı, %94'ünün ultrason muayenesi olduğu, %51,6' sının tuvalet imkanına ulaşmada, % 64,5'inin banyo/duş imkanına ulaşmada, %70,8'inin ise kişisel bakım ve vücut bakımına ulaşmada sıkıntı yaşadığı, %83,7'sinin deprem sonrası yeterince dinlenemediği, %56,2'sinin ailesinin kendisi ve bebeğinin ihtiyacı olan bakım ve desteği

**Tablo 3.** Gebelerin deprem sonrası prenatal bakım alma durumlarının dağılımları (n=349)

| Değişkenler | n | % |
|---|---|---|
| **Depremden sonra planladığınız doğum şekli değişti mi?** | | |
| Evet sezaryen | 42 | 12,0 |
| Evet vajinal | 17 | 4,9 |
| Hayır değişmedi | 290 | 83,1 |
| **Depremden sonra düzenli gebelik kontrollerini sağlamada sıkıntı yaşadınız mı?** | | |
| Evet | 241 | 69,1 |
| Hayır | 108 | 30,9 |
| **Depremden sonra aile ebenize ulaşmada sıkıntı yaşadınız mı?** | | |
| Evet | 200 | 57,3 |
| Hayır | 149 | 42,7 |
| **Depremden sonra takipli olduğunuz kadın doğum uzmanına ulaşmada sıkıntı yaşadınız mı?** | | |
| Evet | 265 | 75,9 |
| Hayır | 84 | 24,1 |
| **Depremden sonra herhangi bir vitamine ulaşımda sıkıntı yaşadınız mı? (Demir, C vit, D vit vb.)** | | |
| Evet | 107 | 30,7 |
| Hayır | 242 | 69,3 |
| **Depremden sonra gebeliğinizle ilgili kan tetkiki yaptırabildiniz mi?** | | |
| Evet | 243 | 69,6 |
| Hayır | 106 | 30,4 |
| **Depremden sonra ultrason muayenesi oldunuz mu?** | | |
| Evet | 328 | 94,0 |
| Hayır | 21 | 6,0 |
| **Depremden sonra tuvalet imkanına ulaşmada sıkıntı yaşadınız mı?** | | |
| Evet | 180 | 51,6 |
| Hayır | 169 | 48,4 |
| **Depremden sonra banyo/duş imkanına ulaşmada sıkıntı yaşadınız mı?** | | |
| Evet | 225 | 64,5 |
| Hayır | 124 | 35,5 |
| **Depremden sonra kişisel bakım/vücut bakımına ulaşmada sıkıntı yaşadınız mı?** | | |
| Evet | 247 | 70,8 |
| Hayır | 102 | 29,2 |
| **Depremden sonra yeterince dinlenebildiğinizi düşünüyor musunuz?** | | |
| Evet | 57 | 16,3 |
| Hayır | 292 | 83,7 |
| **Depremden sonra ailenizin sizin ve bebeğinizin ihtiyacı olan bakım ve desteği sağladığını düşünüyor musunuz?** | | |
| Evet | 196 | 56,2 |
| Hayır | 153 | 43,8 |
| **Depremden sonra sizin ve bebeğinizin ihtiyacını karşılayacak şekilde beslenebildiğinizi düşünüyor musunuz?** | | |
| Evet | 200 | 57,3 |
| Hayır | 149 | 42,7 |

**Tablo 4.** Gebelerin deprem sonrası bazı görüşlerinin puan ortalamalarının karşılaştırılması (n=349)

| Görüşler | Kaygı Düzeyi | |
|---|---|---|
| | Alınabilecek min-max değerler* | Ort ± SS |
| Doğumunuz hakkında hissettiğiniz kaygı düzeyi nedir? | 0- 10 | 6,73 ± 2,87 |
| Doğumdan sonra bebeğinizin bakımı hakkında hissettiğiniz kaygı düzeyi nedir? | 0- 10 | 5,50 ± 3,28 |
| Doğum sonu (lohusalık) dönem hakkında hissettiğiniz kaygı düzeyi nedir? | 0- 10 | 6,01 ± 3,24 |
| Doğumdan sonra korunma yöntemlerine ulaşma hakkında hissettiğiniz kaygı düzeyi nedir? | 0- 10 | 4,38 ± 3,47 |
| Doğumdan sonra ebenize ulaşma hakkında hissettiğiniz kaygı düzeyi nedir? | 0- 10 | 4,37 ± 3,40 |
| Doğumdan sonra doktorunuza ulaşma hakkında hissettiğiniz kaygı düzeyi nedir? | 0- 10 | 4,67 ± 3,40 |

sağlayabildiğini, %57,3'ünün kendisinin ve bebeğinin ihtiyacını karşılayacak şekilde beslenebildiği belirlendi (Tablo 3).

Gebelerin deprem sonrası bazı görüşlerinin puan ortalamalarının karşılaştırılması Tablo 4'te verildi. Buna göre gebelerin doğumları hakkında hissettiği kaygı düzeyinin ortalamasının 6,73 ± 2,87 olduğu, doğumdan sonra bebeklerinin bakımı hakkında hissettiği kaygı düzeyinin ortalamasının 5,50 ± 3,28 olduğu, doğum sonu (lohusalık) dönemleri hakkında hissettiği kaygı düzeyinin ortalamasının 6,01 ± 3,24 olduğu, doğumdan sonra korunma yöntemlerine ulaşma hakkında hissettiği kaygı düzeyinin ortalamasının 4,38 ± 3,47 olduğu, doğumdan sonra aile ebesine ulaşma hakkında hissettiği kaygı düzeyinin ortalamasının 4,37 ±3,40 olduğu ve doğumdan sonra takipli olduğu kadın doğum doktoruna ulaşma hakkında hissettiği kaygı düzeyinin ortalamasının ise 4,67 ± 3,40 olduğu belirlendi (Tablo 4).

## TARTIŞMA

Depremden etkilenen gebelerin prenatal bakım alma durumlarını belirlemek amacıyla yapılan bu çalışmada, gebelerin büyük çoğunluğunun depremden sonra yeterli düzeyde dinlenemedikleri ve birlikte yaşadıkları kişi sayısının arttığı belirlendi (Tablo 2). Gebelerin deprem sonrası yeterli düzeyde dinlenememelerinin nedeni artçı sarsıntılar sonucu kaygı ve strese bağlı uyku düzenlerinin bozulmasından kaynaklanabilir. Ayrıca deprem sonrası evlerin hasar alması ile birlikte gebelerin kalabalık ve yabancı ortamda barınmaları, yeterince dinlenememelerine ve buna bağlı uyku düzenlerinde bozulmaya neden olabilir. Yapılan literatür taramasında da çalışma bulgumuzu destekler nitelikte bazı çalışmalar yer almaktadır. Kahramanmaraş depremini yaşamış gebelerle yapılan bir vaka çalışmasında gebelerin deprem sonrası uyku düzenlerinin bozulduğu, devam eden artçı sarsıntılar nedeniyle kaygı ve korkularının arttığı ortaya konulmuştur (17). Amerika'da orman yangını sonucu evleri yanan ve tahliye edilen gebeler üzerinde yapılan bir çalışmada gebelerin yorgunluk düzeylerinin arttığı ve uyku düzenlerinin bozulduğu sonucuna ulaşılmıştır (21). Kasırga sonrası evlerini kaybeden gebeler üzerinde yapılan başka bir çalışmada ise gebelerin kalabalık ev ortamlarında ikamet ettikleri, yatacak yer sorunu yaşadıkları ve yeterince dinlenemedikleri tespit edilmiştir (22). Benzer şekilde Kanada buz fırtınası sonrasında gebeler üzerinde yapılan çalışmada ise fırtına sonrası elektrik direklerinin hasar almasıyla birlikte gebeler geçici barınma yerlerinde çok sayıda kişiyle bir arada kaldıkları ve soğuk ile mücadele etmekten yeterince dinlenemediklerini ifade etmişlerdir (23). Tüm bu çalışmalar bizim çalışmamızı destekler nitelikte olup, gebeliğin getirdiği fizyolojik etki ve doğal afetler sonucunda gebelerin yeterince dinlenemediklerini ortaya koymaktadır.

Çalışma sonucunda gebelerin düzenli gebelik kontrolü sağlamada ve aile ebesi ile takipli olduğu kadın doğum uzmanına ulaşmada sıkıntı yaşadığı belirlendi (Tablo 3). Doğal afetler sonrasında sağlık hizmetlerine ulaşma durumlarını belirlemek amacıyla yapılan bir çalışmada gebelerin sağlık kuruluşlarına erişimlerinin ortaya konulmuştur (24). COVID-19 salgının gebelerin prenatal bakım alam durumlarına etkisini değerlendirmek amacıyla yapılan çalışmada obstetrik bakıma ulaşma durumları hakkında kadınlara online anket uygulanmıştır. Çalışma sonucunda gebelerin prenatal bakım hizmetlerinin aksadığı, planlanan randevuların iptal edildiği ve bunun sonucunda da sağlık bakım hizmetlerinde sürekliliğin kesintiye uğradığı belirlenmiştir (25). Gebelerin doğum öncesi bakım alma durumu ve COVID-19 pandemisinin etkisini incelemek amacıyla yapılan bir çalışmada benzer şekilde prenatal bakım alma hizmetlerinin aksadığı ortaya konulmuştur (26).

Bir diğer çalışma bulgumuzda gebelerin depremden sonra tuvalet, banyo/duş ve kişisel bakım ile vücut bakımını sağlamada sıkıntı yaşadıkları belirlendi (Tablo 3). Doğal afet sonrasında kadınların erkeklere göre yaşadığı olumsuz durumların değerlendirildiği bir çalışmada kadınların daha fazla mahremiyet sorunu yaşadıkları ve temizlik/hijyen koşullarını sağlamada dezavantajlı oldukları tespit edilmiş, bu kadınların perineal döküntü ile idrar yolu enfeksiyonlarını daha sık yaşadıkları belirlenmiştir (27). Aynı amaçla yapılan başka bir çalışmada da benzer sonuçlara ulaşılmış, depremden etkilenen kadınlar, afet sonrasında tek kullanımlık hijyenik ped bulmada, pedlerini değiştirmek için güvenli alan bulmada, kullandıkları pedleri uzaklaştırma ve temiz su, sabun gibi maddelere ulaşmada zorluk yaşadıklarını ifade etmişlerdir (28). Depremde yaralanan veya aile üyelerini kaybeden kadınlar üzerinde yapılan başka bir çalışmada ise, deprem sonrası kadınlarda genital sistem enfeksiyonlarında ve pelvik ağrıda belirgin şekilde artış olduğu ayrıca kadınların deprem sonrası menstrual siklus düzensizliği yaşadıkları sonucuna ulaşılmıştır (29).

Çalışma sonucunda gebelerin çoğunun maddi kayıp yaşadığı (Tablo 2) ve doğumları hakkında, doğumdan sonra bebek bakımı ile doğum sonu dönemleri hakkında kaygı hissettikleri belirlendi (Tablo 4). Literatürde çalışma bulgumuzu destekler nitelikte afet ve acil durum sonrasında kadınlarda ortaya çıkan psikososyal etkiyi gösteren çalışmalar yer almaktadır. Bangladeş'te doğal afetten etkilenen kadınların afet sonrasında depresyon yaşama durumlarını belirlemek amacıyla yapılan bir çalışmada afet yaşayan kadınlarda depresyon yaşama durumlarında artış olduğu ortaya konulmuştur (30). Katrina kasırgası sırasında gebe olan veya altı ay içinde gebe kalan kadınlar üzerinde yapılan başka bir çalışmada ise gebelerin kaygı ve stres düzeyinin yüksek olduğu sonucuna ulaşılmıştır (31). İran da yapılan bir çalışmada deprem sonrasında emziren kadınların maternal depresyon düzeyinde artış olduğu kanıtlanmış (19), bir diğer çalışmada da gebelerin deprem sonrasında yüksek oranda depresyon ve post travmatik stres bozukluğu yaşadıkları sonucuna ulaşılmıştır (32). Doğum öncesi 1 yıl içerisinde stresli olay yaşayan gebelerle yapılan bir çalışmada gebeler, kendilerini olay sonrasında umutsuz, tükenmiş ve çaresiz hissettiklerini ifade etmişlerdir (33). COVID-19 salgını sırasında doğum yapan kadınlar üzerinde yapılan başka bir çalışmada da kadınların hastalık sürecinin getirdiği belirsizliğe karşı kendilerini kaygılı ve umutsuz hissettikleri belirlenmiştir (34). Tüm bu çalışmalar bizim çalışmamızı destekler niteliktedir.

Bu çalışmanın bazı sınırlılıkları vardır. Bunlardan biri depremden etkilenen gebelerin prenatal bakım alma durumlarının uzun süreli etkisinin değerlendirilememiş

olmasıdır. Aynı zamanda gebelerin doğum ve doğumdan sonraki süreçte yaşadığı sorunlar ele alınamamıştır. Ayrıca çalışmamızda incelenen faktörlerden olan kaygı zaman içinde değişebilir ve depremin yıkıcı etkisinin azalması ile kaygı düzeyinde de azalma olabilir. Bununla birlikte, bu çalışma depremden etkilenen gebelerin prenatal bakım alma durumlarının belirlenmesine yönelik sağlam kanıtlar sunmaktadır.

## SONUÇ

Depremden etkilenen gebelerin prenatal bakım alma durumlarının belirlenmesi amacıyla yapılan çalışmada gebelerin düzenli gebelik kontrollerini sağlamada, aile ebesine ve takipli olduğu kadın doğum uzmanına ulaşmada, tuvalet, banyo, kişisel bakım ve vücut bakımına ulaşmada sıkıntı yaşadığı belirlendi. Aynı şekilde gebelerin deprem sonrası yeterince dinlenemediği, doğumları hakkında, doğum sonu bebek bakımı ve lohusalık dönemi hakkında hissettikleri kaygı düzeyi puan ortalamalarının arttığı belirlendi. Çalışma sonuçları referans alındığında gebeler afet sonrası yardım ve destek alımında öncelikli olmalıdır. Gebelerin ve doğacak bebeklerinin beslenme, barınma, hijyen ihtiyaçlarını karşılamaya yönelik güvenli alanlar konumlandırılmalı ve gebelere gebelik ve doğum sonu dönemi kapsayacak şekilde düzenli maddi gelir sağlanmalıdır. Sağlık kuruluşları gebelik takiplerinin düzenli şekilde yürütülmesini sağlamak için ulaşımın kısıtlı olduğu bölgelerde telesağlık sistemi ile iletişimi sağlamalıdır. Böylelikle gebelerin ve bebeklerin doğum ve doğum sonrası dönemde olumsuz etkilenmesinin önüne geçilmesi sağlanacaktır.

**Yazarların Katkıları:** Fikir/Kavram: M.Ç., E.G.; Tasarım: M.Ç., E.G.; Veri Toplama ve/veya İşleme: M.Ç., E.G.; Analiz ve/veya Yorum: M.Ç., E.G.; Literatür Taraması: M.Ç., E.G.; Makale Yazımı: M.Ç., E.G.; Eleştirel İnceleme: M.Ç., E.G.

## KAYNAKLAR

1. Michel A, Fontenot H. Adequate prenatal care: An integrative review. J Midwifery Womens Health. 2023; 68(2): 233-47.
2. Kilpartick SJ, Papile LA. Guidelines for Perinatal Care. (8th ed). American College of Obstetrics and Gynecology. Washington. D.C; 2017.
3. T.C. Halk Sağlığı Genel Müdürlüğü. [Internet]. Doğum öncesi bakım yönetim rehberi. [Güncellenme Tarihi: 28 Kasım 2018; Son erişim tarihi: 20.12. 2023]. Erişim adresi: https://hsgm.saglik.gov.tr/depo/birimler/Kadin_ve_Ureme_Sagligi_Db/dokumanlar/rehbler/dogum_oncesi_bakim_2020.pdf. 2020.
4. World Health Organization. [Internet]. New guidelines on antenatal care for a positive pregnancy experience. 2016. [Updated: 2016; Cited: 2023 October 02]. Available from: https://www.who.int/news/item/07-11- 2016-new-guidelines-on-antenatal-care-for-apositive-pregnancy-experience.
5. Haruna U, Dandeebo G, Galaa SZ. Improving access and utilization of maternal healthcare services through focused antenatal care in Rural Ghana: A qualitative study. Adv Public Health. 2019; 1-11. https://doi.org/10.1155/2019/9181758.
6. Prasad RD, Arora S, Salve PS, Goli S, James KS, Pallikadavath S, et al. Why there is underutilization of four and more antenatal care services despite the colossal rise in institutional deliveries in Bihar. India. J Soc Econ Dev. 2022; 24(2): 355-78.
7. Uzun Aksoy M, Gürsoy E. Olumlu bir gebelik deneyimi için dünya sağlık örgütü antenatal bakım önerileri. JACSD. 2018; 14: 1-15. https://doi.org/10.17367/JACSD.2018.3.6
8. Taşkın L. Doğum ve kadın sağlığı hemşireliği. 16. Baskı. Ankara: Akademisyen Kitabevi; 2016.
9. United Nations Development Programme. [Internet]. United Nations [UN]. Sustainable Development Goals. [Updated: 2018October 28 ; Cited: 2023 October 20]. Erişim adresi: https://www.undp.org/content/dam/undp/library/corporate/brochure/SDGs_Booklet_Web_En.pdf. 2015.
10. Ilgın HÖ, Karagül D. Afet süreçlerinde kadınlara yönelik toplumsal cinsiyet eşitsizliğinde sivil toplum kuruluşu çalışanlarının deneyimleri: Çanakkale ili örneği. JOEEP. 2022; 7(2): 85-103.
11. Gündüz F. Afetlerde kadın ve toplumsal cinsiyet perspektifi ile çıkarılması gereken dersler (Haiti ve Japonya depremi örneği). IBAD Sosyal Bilimler Dergisi. 2022; 12: 440-60. https://doi.org/10.21733/ibad.1039215.
12. Gökçe İ, Öter EG. Bütünleşik afet yönetim sisteminde afetlerde cinsel sağlık ve üreme sağlığı hizmetleri. ICFAR. 2022; 1: 523-29.
13. Maher MJ. Emergency preparedness in obstetrics: meeting unexpected key challenges. J Perinat Neonatal Nurs. 2019; 33(3): 238-45.
14. Goodyear S. Hundreds of thousands of pregnant women need help in earthquake-torn Türkiye, Syria. CBC. [Internet]. [Updated: 2023 February 20 ; Cited: 2023 February 27]. Available from: https://www.cbc.ca/radio/asithappens/Türkiye-syria-earthquakes-pregnant-1.6754582.
15. Ahmed SK, Khdhir RM. Protecting the health of pregnant women in Türkiye and Syria earthquake-affected areas: Challenges and opportunities. Women's Health. 2023; 19. doi:10.1177/17455057231166281
16. Mesrkanlou HA, Hezaveh SJG, Tahmasebi S, Nikniaz Z, Nikniaz L. The effect of an earthquake experienced during pregnancy on maternal health and birth outcomes. Disaster

Med Public Health Prep. 2023; 17(e157): 1-4. https://doi.org/https://doi.org/10.1017/dmp.2022.132.
17. Kipay SS. Deprem gerçeği ve kadın sağlığı üzerine etkileri. İKÇÜSBFD. 2023; 8(2): 855-60.
18. Çuvadar A, Çamur N. Kahramanmaraş depremi yaşamış gebe kadınların emzirme yaklaşımları: iki vaka sunumu. 1st International Conference on Modern and Advanced Research ICMAR. 2023.
19. MirMohamadaliIe M, Jazani RK, Sohrabizadeh S, Nasrabadi AN. Barriers to breastfeeding in disasters in the context of Iran. Prehosp Disaster Med. 2019; 34(1): 20-4.
20. Harville EW, Beitsch L, Uejio CK, Sherchan S, Lichtveld MY. Assessing the effects of disasters and

their aftermath on pregnancy and infant outcomes: A conceptual model. IJDRR. 2021; 62: 102415. https://doi.org/10.1016/j.ijdrr.2021.102415.
21. Pike A, Mikolas C, Tompkins K, Olson J, Olson DM, Brémault-Phillips S. New life through disaster: a thematic analysis of women's experiences of pregnancy and the 2016 fort mcmurray wildfire. Front Public Health. 2022; 10: 725256.
22. Previdi IL, Welton M, Díaz Rivera J, Watkins DJ, Diaz Z, Torres HR, et al. The impact of natural disasters on maternal health: Hurricanes Irma and María in Puerto Rico. Children. 2022; 9(7): 940.
23. King S, Dancause K, Turcotte-Tremblay AM, Veru, Laplante DP. Using natural disasters to study the effects of prenatal maternal stress on child health and development. Birth Defects Res C Embryo Today. 2012; 96(4): 273-88.
24. Stokenberga A, Escalante C, Gonzalez KD, Espinet X, Becoulet M. The rough road to services and livelihood opportunities in rural haiti and the added ımpact of natural disasters. Policy Research Working Paper. 2023; 1-29.
25. Brislane Á, Larkin F, Jones H, Davenpor MH. Access to and quality of healthcare for pregnant and postpartum women during the covıd-19 pandemic. Front Glob Womens Health. 2021; 2: 628625.
26. Nazik F, Yüksekol ÖD, Baltacı N, Ulucan M. Gebe kadınların doğum öncesi bakım alma durumu ve covid-19 pandemisinin etkisi. Journal of TOGU Health Sciences. 2022; 2(2): 111- 22.
27. Ciampi MC, Gell F, Lasap L, Turvill E. Gender and disaster risk reduction: A training pack. [Internet]. [Updated: 2011; Cited: 2023 February 27]. https://oxfamilibrary.openrepository.com/bitstream/handle/10546/136105/gender-drr-training-pack-040711-en.pdf?sequence=2&isAllowed=y. 2011.
28. Budhathoki SS, Bhattachan M, Castro-Sánchez E, Sagtani RA, Rayamajhi RB, Rai P, et al. "Menstrual hygiene management among women and adolescent girls in the aftermath of the earthquake in Nepal". BMC Women's Health. 2018; 18(1): 1-8.
29. Li XH, Qin L, Hu H, Luo S, Li L, Fan W, et al. Influence of the Wenchuan earthquake on self-reported irregular menstrual cycles in surviving women. Gynecological Endocrinology. 2011; 27(9): 706-10.
30. Mamun MA, Huq N, Papia ZF, Tasfina S, Gozal D. Prevalence of depression among Bangladeshi village women subsequent to a natural disaster: a pilot study. Psychiatry Res. 2019; 276: 124-28.
31. Xiong X, Harville EW, Mattison DR, ElkindHirsch K, Pridjian G, Buekens P. "Hurricane Katrina experience and the risk of post-traumatic stress disorder and depression among pregnant women". Am J Disaster Med. 2010; 5(3): 181-7.
32. Watanabe Z, Iwama N, Nishigori H, Nishigori T, Mizuno S, Sakurai K, et al. Psychological distress during pregnancy in Miyagi after the great east Japan earthquake: The Japan environment and children's study. J Affective Disord. 2016;190: 341-8.
33. Qobadi M, Collier C, Zhang L. The effect of stressful life events on postpartum depression: Findings from the 2009–2011 Mississippi pregnancy risk assessment monitoring system. Matern Child Health J. 2016; 20: 164-72.
34. Pop-Tudose ME, Popescu-Spineni DM, Manolescu LSC, Radu MC, Iancu FC, Armean SM. Psychological profile and mood disturbance of women who gave birth during the COVID-19 pandemic in Romania. Midwifery. 2023; 117: 1-7.

Araştırma Makalesi / Research Article

Sağlık Bilimlerinde Değer / Sağlık Bil Değer
Value in Health Sciences / Value Health Sci
ISSN: 2792-0542 sabd@duzce.edu.tr 2025; 15(2): 244-251
doi: https://dx.doi.org/10.33631/sabd.1577672

# Diş Hekimliği Fakültesi Öğrencilerinde Kas-İskelet Sistemi Hastalıklarının Prevalansı ve İlişkili Risk Faktörlerinin Değerlendirilmesi

Mehmet Alperen ŞAHİN[1], Özge Gizem YENİDÜNYA[1], Tuğba MİSİLLİ[2]

**ÖZ**

**Amaç:** Bu araştırmanın amacı Pamukkale Üniversitesi Diş Hekimliği Fakültesi'nde eğitim gören 4. ve 5.sınıf öğrencilerinde kas-iskelet sistemi semptomlarının yaygınlığını değerlendirmektir.

**Gereç ve Yöntemler:** Bu araştırmada katılımcıların kas-iskelet sistemi problemleri, katılımcı beyanına dayalı dokuz anatomik vücut bölümünü resmeden bir şekil üzerinde son on iki ay, son yedi gün ve anket günü ilgili alana ait semptomların mevcudiyetini araştıran "Genişletilmiş Nordic Kas-İskelet Sistemi Anketi'' ile değerlendirilmiştir. Katılımcıların sosyodemografik özelliklerinin, sağlık durumlarının, kişisel alışkanlıklarının ve çalışma bilgilerinin sorgulanacağı kısımlar ankete dâhil edilmiştir. Verilerin normal dağılımda olup olmadığı "Shapiro Wilk testi" ile belirlenmiş, kategorik değişkenlerin karşılaştırılmasında "Pearson Ki-Kare testi" ve ''Fisher'ın Kesin testi'' kullanılmıştır.

**Bulgular:** Araştırmamıza, yaş ortalamaları 23,11±1,06 yıl olan 112 kadın, 76 erkek toplam 188 öğrenci katıldı. Katılımcıların %54,3'ü 4.sınıf, %45,7'si 5.sınıf öğrencisi olup boy ortalaması 170,93±9,37 cm, vücut ağırlığı ortalaması 66,93±14,92 kg olarak tespit edildi. Katılımcıların %11,2'sinin tanı konulmuş kas-iskelet sistemi rahatsızlığı bulunmakta, %43,1'i düzenli fiziksel aktivite yapmaktadır. Araştırmaya katılan 4. ve 5. sınıf öğrencilerinde vücudun en az bir bölümünde kas-iskelet sistemi rahatsızlığı bulunma oranı %88,8 olarak saptanmıştır. Son on iki ayda en sık ağrı hissedilen vücut bölümleri boyun (%72,5), bel (%62,1) ve omuzlar (%57,1) olarak tespit edilmiştir.

**Sonuç:** Bu araştırmada katılımcılar arasında kas-iskelet sistemi semptomlarının yaygın olduğu, sıklıkla etkilenen vücut bölümlerinin boyun, bel ve omuzlar olduğu tespit edilmiştir.

**Anahtar Kelimeler:** Ağrı; diş hekimliği; kas-iskelet sistemi hastalıkları

## Evaluation of the Prevalence of Musculoskeletal Disorders and Associated Risk Factors among Dental Faculty Students

**ABSTRACT**

**Aim:** The aim of this study is to evaluate the prevalence of musculoskeletal system symptoms among 4th and 5th-year students at Pamukkale University Faculty of Dentistry.

**Material and Methods:** In this study, participants' musculoskeletal problems were assessed using the "Extended Nordic Musculoskeletal Questionnaire," which investigates the presence of symptoms in nine anatomical body regions over the past twelve months, the past seven days, and on the day of the survey. Sections of the questionnaire included questions about participants' sociodemographic characteristics, health status, personal habits, and work information. The normality of the data was determined using the Shapiro-Wilk test, and the comparison of categorical variables was conducted using the Pearson Chi-Square test and Fisher's Exact test.

**Results:** A total of 188 students participated in the study, with an average age of 23.11±1.06 years, including 112 female and 76 male. Among the participants, 54.3% were 4th-year students and 45.7% were 5th-year students. The average height was 170.93±9.37 cm, and the average body weight was 66.93±14.92 kg. 11.2% of the participants had a diagnosed musculoskeletal disorder, and 43.1% engaged in regular physical activity. The prevalence of musculoskeletal disorders in at least one body part among 4th and 5th-year students was 88.8%. The most commonly reported areas of pain in the last twelve months were the neck (72.5%), lower back (62.1%), and shoulders (57.1%).

**Conclusion:** This study found that musculoskeletal symptoms are prevalent among participants, with the body regions most commonly affected being the neck, lower back, and shoulders.

**Keywords**: Dentistry; musculoskeletal diseases; pain.

1 Pamukkale Üniversitesi Diş Hekimliği Fakültesi, Restoratif Diş Tedavisi AD, Denizli, Türkiye
2 Çanakkale Onsekiz Mart Üniversitesi, Diş Hekimliği Fakültesi, Restoratif Diş Tedavisi AD, Çanakkale, Türkiye

Sorumlu Yazar / Corresponding Author Mehmet Alperen ŞAHİN, e-mail: alperensahin9595@gmail.com
Geliş Tarihi / Received: 01.11.2024, Kabul Tarihi / Accepted: 14.03.2025

## GİRİŞ

Diş hekimliği, zihinsel ve fiziksel olarak oldukça dikkatli çalışılması gereken, iş tanımında birçok zorlayıcı ve uzun süreli tedavi prosedürlerini barındıran bir meslektir (1). Bu mesleğin icrası sırasında; uygun olmayan vücut postürü, uzun süreli tekrarlayan hareketler, yetersiz dinlenme ve egzersiz yokluğu sebebiyle meydana gelen yumuşak doku yaralanmaları kas-iskelet sistemi rahatsızlıklarını oluşturabilmektedir (2). Ön kol ve el bileği gibi üst ekstremiteler, üst/alt sırt, boyun ile omuzlar gibi postural kaslar ve kalça, uyluk, diz ve ayak bilekleri gibi alt vücut bölümlerini etkileyebilen kas-iskelet sistemi rahatsızlıkları, önlenemediği ve tedavi edilmediği takdirde ciddi inflamatuar ve dejeneratif rahatsızlıklara dönüşebilmektedir (3). Kas-iskelet sistemi rahatsızlıklarının belirtileri arasında uyuşma, ağrı, karıncalanma, yanma, kasta hissedilen sertlik, kronik yorgunluk, kavrama gücünde azalma, his, hareket ve koordinasyon kaybı yer almaktadır (4). Uzun süreli statik pozisyonda çalışma, öne eğilme ve baş, boyun ile gövdenin tek taraflı tekrarlı rotasyonunu içeren problemli postürler klinik çalışma rutininde yaygın olarak görülmekte olup, nötral postürden saptıkça, bu postürden sorumlu olan kaslardaki iş gören kas grupları daha güçlü hale gelirken antagonistindeki kaslar uzayıp zayıflamakta, böylelikle kas dengesizlikleri oluşabilmektedir. Optimal olmayan koşullarda iş gören kas gruplarındaki hasar görmüş dokular dinlenme dönemlerinde onarılmakta, buna karşın diş hekimliğinde yetersiz dinlenme süreleri sebebiyle hasar oranı onarım oranını aşabilmekte ve potansiyel kas nekrozları görülebilmektedir. Vücut, stres altındaki bölgeyi daha fazla ağrı veya yaralanmadan koruma çabasıyla, postürü koruyabilmek adına kasın başka bir bölümünü daha çok kullanmak zorunda kalabilmekte, kas ikamesi olarak bilinen bu durum kas-iskelet sistemi problemlerine yol açabilmektedir (5,6). Sınırlı bir çalışma alanında tekrarlayan hareketler, uygun olmayan çalışma postürü, titreşimli (salınım üreten) cihazların kullanımı, yetersiz aydınlatma, uzun süren ve dikkat gerektiren tedavi prosedürleri diş hekimlerinin risk faktörleri olarak tanımlanmakta olup, klinisyenler kas-iskelet sistemi rahatsızlıkları sebebi ile iş devamsızlığı (işe gidememe), daha düşük iş kalitesi ile iş memnuniyeti ve hatta erken emeklilik gibi mesleki olumsuzluklara maruz kalabilmektedir (7, 8).

Diş hekimleri üzerinde yapılan çalışmalar (9,10) kas-iskelet sistemi problemlerinin mesleki tecrübe eksikliğine bağlı olarak klinik eğitim dönemlerinin ilk yıllarında başlayabildiğini ve gerekli tedbirler alınmadığında, rahatsızlıkların hekimlerin meslek hayatı boyunca devam edebildiğini göstermektedir. Yeterli klinik tecrübe ve ergonomi bilincine henüz sahip olamayan öğrenciler oral kaviteye daha kolay erişebilme ve daha net bir görüş alanı elde edebilme hedefiyle, uygun olmayan pozisyonlarda uzun süre çalışabilmekte, bu alışkanlıkların da uzun dönemde kas-iskelet sistemi rahatsızlıklarına yol açması kaçınılmaz hale gelebilmektedir. Mevcut literatürler tarandığında, ülkemizde diş hekimliği fakültelerinde eğitim alan öğrencilerde kas-iskelet sistemi rahatsızlıklarını inceleyen az sayıda çalışma (11-13) bulunması konu üzerinde daha fazla araştırma yapılması gerekliliğini ortaya koymaktadır. Bu çalışmanın amacı, Pamukkale Üniversitesi Diş Hekimliği Fakültesi'nde eğitimine devam etmekte olan dördüncü ve beşinci sınıf öğrencilerinde kas-iskelet sistemi rahatsızlıklarının yaygınlığını değerlendirerek sorun ile ilgili farkındalık yaratabilmektir.

## GEREÇ VE YÖNTEMLER

Ankete Pamukkale Üniversitesi Diş Hekimliği Fakültesi 2023-2024 eğitim-öğretim yılı dördüncü ve beşinci sınıf öğrencileri dâhil edilmiş olup, araştırma Helsinki Deklarasyonu'na uygun olarak yürütülmüş ve çalışma hakkındaki bilgilendirici metin katılımcılara ankete başlamadan önce verilmiştir. Araştırma öncesinde Pamukkale Üniversitesi Girişimsel Olmayan Klinik Araştırmalar Etik Kurulu'ndan izin alınmıştır. (Sayı: E-60116787-020-501066, Tarih: 06.03.2024) Katılımcılar çalışmaya gönüllü olarak katılmayı kabul ettiklerinde, kimlik bilgileriyle ilgili herhangi bir kayıt yapılmayacağı ve iki kısımdan oluşan bir veri toplama formu kullanılacağı konusunda bilgilendirme yapılmıştır. Araştırma evrenini Pamukkale Üniversitesi Diş Hekimliği Fakültesi'nde eğitim görmekte olan dördüncü ve beşinci sınıf öğrencileri oluşturdu. Çalışma için örneklem büyüklüğü hesaplanmamış olup evrenin tümüne (n=194) ulaşılması hedeflenmiştir. Anket gününde klinikte bulunmayan öğrenciler araştırmanın dışında bırakıldığında evrenin %96'sına ulaşılmıştır.

Çalışma için ilk olarak "diş hekimliği", "kas-iskelet sistemi" ve "Genişletilmiş Nordic Kas-İskelet Sistemi Anketi" anahtar kelimeleri kullanılarak Türkçe ve İngilizce literatür taraması yapılmış ve daha sonra ilgili kaynaklardan sorular derlenerek anket formu oluşturulmuştur. Formun 18 sorudan oluşan ilk kısmı, katılımcıların özelliklerinin (boy, kilo, yaş, cinsiyet), sağlık durumlarının (tanı konulmuş kas-iskelet sistemi rahatsızlığı bulunup bulunmadığı, sistemik hastalık mevcudiyeti), kişisel alışkanlıklarının (fiziksel aktivite, sigara kullanımı) ve çalışma bilgilerinin (günlük bakılan ortalama hasta sayısı, günlük toplam çalışma saati, çalışma konumu, çalışırken aktif olarak kullanılan el) sorgulanacağı bölümken, ikinci kısım ise kas-iskelet sistemi ile ilgili semptomların Genişletilmiş Nordic Kas-İskelet Sistemi Anketi ile sorgulandığı kısım olmuştur.

Katılımcı beyanına dayalı "Genişletilmiş Nordic Kas-İskelet Sistemi Anketi"; dokuz anatomik vücut bölümünü gösteren bir şekil üzerinde son on iki ay, son yedi gün ve anket günü kas-iskelet sistemiyle ilgili semptomların (ağrı, rahatsızlık, uyuşma) mevcudiyetini araştıran ankettir. Anketin hedefi ağrılı bölgelerin tespit edilerek katılımcıların ağrı sebebiyle izin veya rapor alıp almadığını ve hekime başvurup fizik/medikal tedavi görüp görmediğini sorgulamaktır.

### İstatistiksel Analiz

Elde edilen veriler SPSS 21.0 (IBM-SPSS Inc., Chicago, IL, ABD) yazılımı aracılığıyla değerlendirilmiştir. Tanımlayıcı istatistiklerde sayısal veriler ortalama ve standart sapma, kategorik veriler frekans analizi yapılarak, sonuçlar sayı ve yüzde olarak verilmiştir. Verilerin normal dağılıp dağılmadığı "Shapiro Wilk testi" ile belirlendikten sonra, kategorik değişkenlerin karşılaştırılmasında "Pearson Ki-Kare testi" ve ''Fisher'ın Kesin testi''

kullanılmıştır. İstatistiksel anlamlılık seviyesi p<0,05 olarak kabul edilmiştir.

## BULGULAR

Fakültemizde öğrenim gören 4. ve 5. sınıf öğrencilerindeki kas-iskelet sistemi problemlerinin incelenmesi hedefiyle planlanan araştırmamıza, yaş ortalamaları 23,11±1,06 yıl olan 112 kadın (%59,6), 76 erkek (%40,4) toplam 188 öğrenci katıldı. Katılımcıların %54,3'ü (n=102) 4.sınıf, %45,7'si (n=86) 5.sınıf öğrencisi olup boy ortalaması 170,93±9,37 cm, vücut ağırlığı ortalaması 66,93±14,92 kg ve beden kitle endeksi ortalaması 22,53±3,52 kg/m$^2$ olarak saptandı. Katılımcıların %5,3'ünde (n=10) sistemik hastalık öyküsü, %11,2'sinde (n=21) kas-iskelet sistemi hastalığı ve %9,6'sında (n=18) travma öyküsü mevcutken, %43,1 (n=81) katılımcı düzenli fiziksel aktivite yaptığını belirtmiştir.

**Tablo 1.** Katılımcı özellikleri

| **Özellik** | Ortalama±Standart Sapma |
|---|---|
| **Yaş** | 23,11±1,06 |
| **Boy (cm)** | 170,93±9,37 |
| Kadın | 165,03±6,04 |
| Erkek | 179,62±6,04 |
| **Kilo (kg)** | 66,93±14,92 |
| Kadın | 58,58±10,64 |
| Erkek | 79,22±11,42 |
| **Beden Kitle İndeksi (kg/m$^2$)** | 22,53±3,52 |
| Kadın | 21,26±3,34 |
| Erkek | 24,40±2,90 |
| **Günlük çalışma süresi** | 7,14±1,73 |
| **Günlük hasta sayısı** | 5,53±2,29 |
| | **% (n)** |
| **Sınıf** | |
| 4. sınıf | 54,3 (102) |
| 5. sınıf | 45,7 (86) |
| **Cinsiyet** | |
| Kadın | 59,6 (112) |
| Erkek | 40,4 (76) |
| **Sigara kullanımı** | |
| Evet | 36,2 (68) |
| Hayır | 63,8 (120) |
| **Sistemik hastalık hikayesi** | |
| Evet | 5,3 (10) |
| Hayır | 94,7 (178) |
| **Kas-iskelet sistemi hastalık hikayesi** | |
| Evet | 11,2 (21) |
| Hayır | 88,8 (167) |
| **Tanı almış kas-iskelet sistemi hastalığı** | |
| Servikal diskopati | - |
| Lomber diskopati | - |
| Skolyoz | 81 (17) |
| Seronegatif spondiloartropatiler | - |
| Ganglion kisti | 14,3 (3) |
| Karpal tünel sendromu | - |
| Kubital tünel sendromu | - |
| Aşil tendiniti | 4,8 (1) |
| Dirsek, el, ayak bileğinde kırık | - |
| **Travma öyküsü** | |
| Evet | 9,6 (18) |
| Hayır | 90,4 (170) |
| **Çalışma eli** | |
| Sol | 9,6 (18) |
| Sağ | 90,4 (170) |
| **Çalışma konumu** | |
| Oturarak | 41,5 (78) |
| Ayakta | 1,1 (2) |
| Her ikisi | 57,4 (108) |
| **Düzenli fiziksel aktivite** | |
| Evet | 43,1 (81) |
| Hayır | 56,9 (107) |

Araştırmada katılımcıların günlük çalışma sürelerinin ortalaması 7,14±1,73 saat, günde baktıkları hasta sayısı ortalaması 5,53±2,29 olarak saptanmıştır. Katılımcıların %41,5'inin oturarak, %1,1'inin ayakta, %57,4'ünün her iki pozisyonda çalıştığı ve çalışma sırasında %90,4'ünün sağ elini, %9,6'sının sol elini kullandığı tespit edilmiştir (Tablo 1).

Katılımcıların sınıf, cinsiyet, beden kitle indeksi (kg/m$^2$), sigara kullanımı, sistemik hastalık hikayesi, kas-iskelet sistemi hastalığı hikayesi, travma öyküsü, günlük çalışma süresi, günlük hasta sayısı, çalışma eli, çalışma konumu ve düzenli fiziksel aktivite yapması gibi katılımcı özellikleri ile en az bir vücut bölümünde kas-iskelet sistemi semptomu görülme sıklığı arasında istatistiksel olarak anlamlı bir ilişki bulunamamıştır (p=0,855, p=0,482, p=0,186, p=0,247, p=0,904, p=0,323, p=0,114, p=0,148, p=0,737, p=0,993, p=0,819, p=0,338) (Tablo 2).

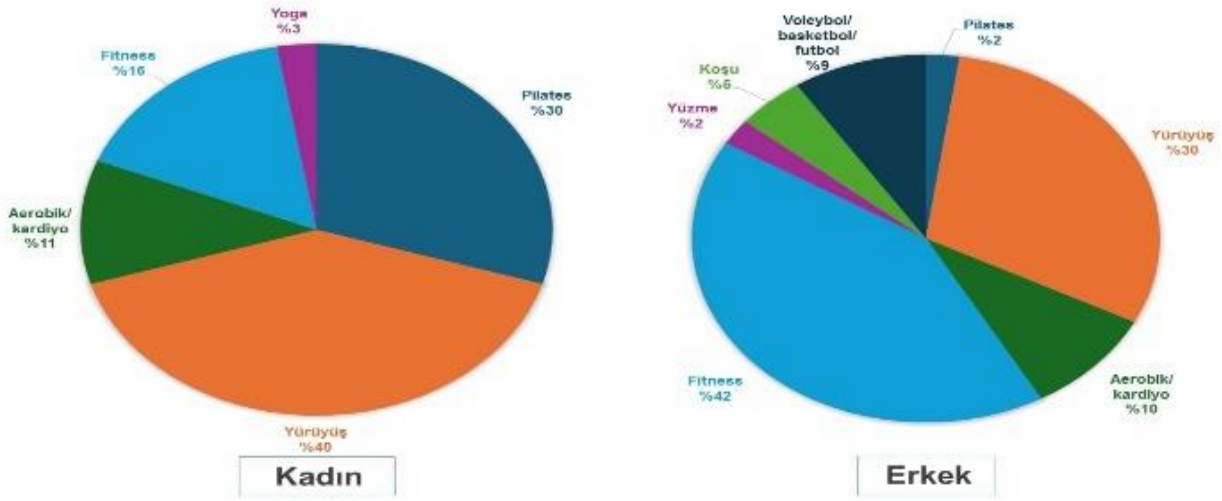
**Tablo 2.** Son 12 ayda herhangi bir vücut bölgesinde kas-iskelet sistemi yakınması görülmüş olma durumuna etkili faktörler

| | | **En az 1 bölgede kas-iskelet sistemi yakınması görülme durumu %(n)** | | **P değeri** |
|---|---|---|---|---|
| **Katılımcıların özellikleri ve çalışma koşulları** | | **Ağrı var** | **Ağrı yok** | |
| **Sınıf** | 4. sınıf | 89,2 (91) | 10,8 (11) | 0,855 |
| | 5. sınıf | 88,4 (76) | 11,6 (10) | |
| **Cinsiyet** | Kadın | 87,5 (98) | 12,5 (14) | 0,482 |
| | Erkek | 90,8 (69) | 9,2 (7) | |
| **Beden Kitle İndeksi (kg/m$^2$)** | Çok zayıf (<16,5) | 66,7 (2) | 33,3 (1) | 0,186 |
| | Zayıf (16,5 – 18,4) | 100 (18) | - (0) | |
| | Normal (18,5– 24,9) | 86,0(104) | 14,0 (17) | |
| | Kilolu (25 – 29,9) | 92,1 (35) | 7,9 (3) | |
| | Obez (≥30) | 100 (8) | - (0) | |
| **Sigara kullanımı** | Evet | 85,3 (58) | 14,7 (10) | 0,247 |
| | Hayır | 90,8(109) | 9,2 (11) | |
| **Sistemik hastalık hikâyesi** | Evet | 90,0 (9) | 10,0 (1) | 0,904 |
| | Hayır | 88,8(158) | 11,2 (20) | |
| **Kas-iskelet sistemi hastalık hikâyesi** | Evet | 95,2 (20) | 4,8 (1) | 0,323 |
| | Hayır | 88,0(147) | 12,0 (20) | |
| **Travma öyküsü** | Evet | 100 (18) | - | 0,114 |
| | Hayır | 87,6(149) | 12,4 (21) | |
| **Günlük çalışma süresi** | ≤ 4 saat | 96,0 (24) | 4 (1) | 0,148 |
| | 5 – 8 saat | 86,6(129) | 13,4 (20) | |
| | > 8 saat | 100(14) | - (0) | |
| **Günlük hasta sayısı** | ≤ 4 | 89,2 (58) | 10,8 (7) | 0,737 |
| | 5 – 8 | 89,5 (94) | 10,5 (11) | |
| | > 8 | 83,3 (15) | 16,7 (3) | |
| **Çalışma eli** | Sol | 88,9 (16) | 11,1 (2) | 0,993 |
| | Sağ | 88,8(151) | 11,2 (19) | |
| **Çalışma konumu** | Oturarak | 89,7 (70) | 10,3 (8) | 0,819 |
| | Ayakta | 100 (2) | - | |
| | Her ikisi de | 88,0 (95) | 12,0 (13) | |
| **Düzenli fiziksel aktivite** | Evet | 91,4 (74) | 8,6 (7) | 0,338 |
| | Hayır | 86,9 (93) | 13,1 (14) | |

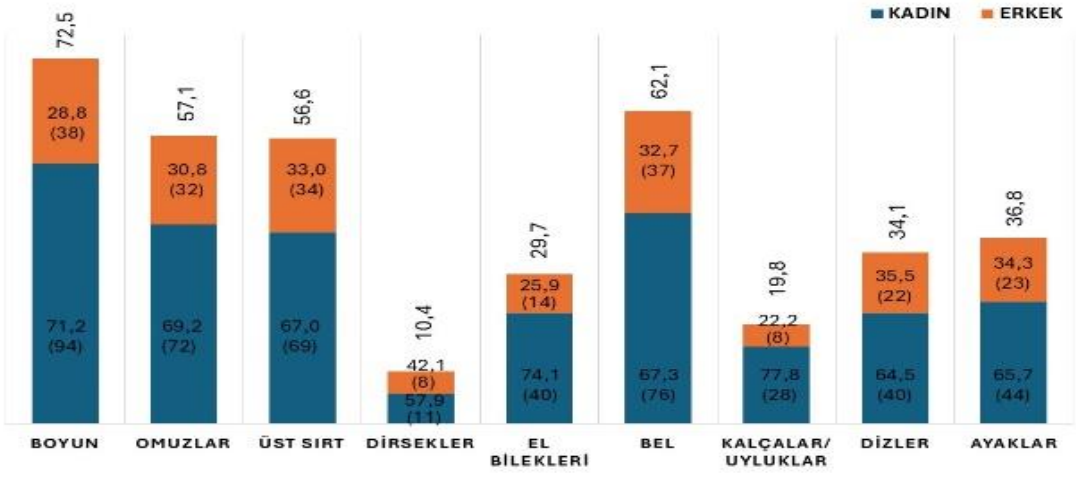
p<0,05 istatistiksel olarak anlamlı fark, Pearson Ki-Kare Testi

Araştırmamızda fiziksel aktivitelerin cinsiyete göre dağılımı incelendiğinde; kadın katılımcıların en yüksek oranda yürüyüş (%40) ve pilates (%30) yanıtlarını verdiği, erkeklerde ise bu sıralamanın fitness (%42) ve yürüyüş (%30) şeklinde olduğu izlenmektedir (Şekil 1).

Genişletilmiş Nordic Kas İskelet Sistemi anketi sonuçlarına göre katılımcıların %88,8'i en az bir vücut bölümünde kas-iskelet sistemi semptomu olduğunu belirtmiş olup, bu rahatsızlıkların en sık hissedildiği bölgelerin %72,5 (n=132) oranıyla boyun, %62,1 (n=113) oranıyla bel ve %57,1 (n=104) oranıyla omuzlar olduğu saptanmıştır (Şekil 2). Son 12 ayda kadın katılımcıların %58 (n=65)'i, erkek katılımcıların %51,3 (n=39)'ü boyun bölgesinde; kadın katılımcıların %49,1 (n=55)'i, erkek katılımcıların %46,1 (n=35)'i bel bölgesinde ve kadın katılımcıların %42,9 (n=48)'u ile erkek katılımcıların %46,1 (n=35)'i omuz bölgesinde ağrı hissettiklerini bildirmişlerdir (Tablo 3). Buna ek olarak Genişletilmiş Nordic Kas İskelet Sistemi Anketi sonuçlarına göre cinsiyet ve ağrı sıklığı değerlendirildiğinde son 12 ayda diz bölgesinde, son 1 ayda diz ve ayak bölgelerinde, anket günü ise boyun, omuz ve ayaklarda erkek katılımcıların kadın katılımcılardan istatistiksel olarak daha sık ağrı semptomu bildirdikleri saptanmıştır (p=0,007, p=0,001, p=0,005, p=0,014, p=0,005, p=0,016).




**Şekil 1.** Fiziksel aktivitelerin cinsiyete göre dağılımı




**Şekil 2.** Vücut bölgelerine göre bildirilen kas-iskelet sistemi rahatsızlığı prevalansı

Kas-iskelet sistemi yakınmaları bölgesel olarak incelendiğinde, boyun bölgesinde şikâyet bildiren katılımcıların %24,2 (n=32)'sinin yaşadıkları semptomların normal işlerini yapmalarına engel olduğu, %16,7 (n=22)'sinin bu rahatsızlık için uzmana göründüğü ve %19,7 (n=26)'sinin semptomları sebebiyle ilaç kullandığı tespit edilmiştir. Kas-iskelet sistemi semptomlarının en sık görüldüğü vücut bölümlerinden biri olan bel bölgesinde ise katılımcıların %29,1 (n=32)'inin bu sorun yüzünden ev veya ev dışındaki işlerini yapamadıkları, %12,7 (n=14)'sinin konu ile ilgili bir uzmana göründüğü, %25,5 (n=28)'inin rahatsızlıkları sebebiyle ilaç kullanırken, %15,5 (n=17)'inin işten veya okuldan izin almak zorunda kaldığı saptanmıştır. Veriler incelendiğinde el bileği bölgesinde sorun yaşadığını bildiren katılımcıların %42,6 (n=23)'lık büyük bir kısmının semptomlar nedeniyle izin almak durumunda kaldıkları belirlenmiştir (Tablo 4).

**Tablo 3.** Genişletilmiş Nordic Kas İskelet Sistemi anketi sonuçlarına göre cinsiyet ve kas iskelet ağrı sıklığı karşılaştırması

| Vücut bölgesi | Son 12 ay ağrı sıklığı % (n) | | P değeri | Son 1 ay ağrı sıklığı % (n) | | P değeri | Anket günü ağrı sıklığı % (n) | | P değeri |
|---|---|---|---|---|---|---|---|---|---|
| | Kadın | Erkek | | Kadın | Erkek | | Kadın | Erkek | |
| **Boyun** | 58,0 (65) | 51,3 (39) | 0,363 | 41,1 (46) | 53,9 (41) | 0,082 | 20,5 (23) | 36,8 (28) | **0,014*** |
| **Omuzlar** | 42,9 (48) | 46,1 (35) | 0,665 | 29,5 (33) | 42,1 (32) | 0,074 | 13,4 (15) | 30,3 (23) | **0,005*** |
| **Üst sırt** | 43,8 (49) | 39,5 (30) | 0,560 | 31,3 (35) | 38,2 (29) | 0,327 | 17,9 (20) | 25,0 (19) | 0,236 |
| **Dirsekler** | 7,1 (8) | 5,3 (4) | 0,423 | 4,5 (5) | 3,9 (3) | 0,585 | 2,7 (3) | 3,9 (3) | 0,465 |
| **El Bilekleri** | 21,4 (24) | 17,1 (13) | 0,464 | 11,6 (13) | 14,5 (11) | 0,563 | 4,5 (5) | 3,9 (3) | 0,585 |
| **Bel** | 49,1 (55) | 46,1 (35) | 0,681 | 33,0 (37) | 42,1 (32) | 0,205 | 16,1 (18) | 17,1 (13) | 0,851 |
| **Kalçalar/Uyluklar** | 9,8 (11) | 15,8 (12) | 0,220 | 6,3 (7) | 14,5 (11) | 0,060 | 2,7 (3) | 5,3 (4) | 0,295 |
| **Dizler** | 17,0 (19) | 34,2 (26) | **0,007*** | 8,0 (9) | 32,9 (25) | **<0,001*** | 6,3 (7) | 11,8 (9) | 0,178 |
| **Ayaklar** | 19,6 (22) | 26,3 (20) | 0,281 | 8,9 (10) | 23,7 (18) | **0,005*** | 4,5 (5) | 14,5 (11) | **0,016*** |

* p<0,05 istatistiksel olarak anlamlı fark, Pearson Ki-Kare Testi

**Tablo 4.** Genişletilmiş Nordic Kas İskelet Sistemi anketi analiz sonuçları

| Kas-iskelet sistemi yakınması olan bölge | Sorun yaşamaya başladığınızda kaç yaşındaydınız? | Bu sorun yüzünden | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Hastaneye yatırıldınız mı? | | Hiç işinizi veya görevinizi değiştirmek zorunda kaldınız mı? | | Son 12 ay süresince | | | | | | | |
| | | | | | | Normal işlerinizi (evde veya ev dışında) yapmanıza engel oldu mu? | | Hiçbir doktora, fizyoterapiste vb. bir uzmana göründünüz mü? | | İlaç aldınız mı? | | İşten veya okuldan izin almak zorunda kaldınız mı? | |
| | Ortalama ±ss | % (n) | | % (n) | | % (n) | | % (n) | | % (n) | | % (n) | |
| | | E | H | E | H | E | H | E | H | E | H | E | H |
| **Boyun** | 19,29±2,59 | 1,5 (2) | 98,5 (130) | 8,3 (11) | 91,7 (121) | 24,2 (32) | 75,8 (100) | 16,7 (22) | 83,3 (110) | 19,7 (26) | 80,3 (106) | 6,1 (8) | 93,9 (124) |
| **Omuzlar** | 19,30±2,66 | 1,9 (2) | 98,1 (102) | 5,8 (6) | 94,2 (98) | 16,3 (17) | 83,7 (87) | 14,4 (15) | 85,6 (89) | 16,3 (17) | 83,7 (87) | 4,8 (5) | 95,2 (99) |
| **Üst sırt** | 19,33±2,46 | - | 100 (103) | 5,8 (6) | 94,2 (97) | 15,5 (16) | 84,5 (87) | 8,7 (9) | 91,3 (94) | 16,5 (17) | 83,5 (86) | 6,8 (7) | 93,2 (96) |
| **Dirsekler** | 17,53±4,55 | 5,3 (1) | 94,7 (18) | - | 100 (19) | 31,6 (6) | 68,4 (13) | 26,3 (5) | 73,7 (14) | 21,1 (4) | 78,9 (15) | 10,5 (2) | 89,5 (17) |
| **El bilekleri** | 19,5±3,35 | 1,9 (1) | 98,1 (53) | 3,7 (2) | 96,3 (52) | 14,8 (8) | 85,2 (46) | 7,4 (4) | 92,6 (50) | 11,1 (6) | 88,9 (48) | 42,6 (23) | 57,4 (31) |
| **Bel** | 19,28±2,54 | 1,8 (2) | 98,2 (108) | 8,2 (9) | 91,8 (101) | 29,1 (32) | 70,9 (78) | 12,7 (14) | 87,3 (96) | 25,5 (28) | 74,5 (82) | 15,5 (17) | 84,5 (93) |
| **Kalçalar/ Uyluklar** | 18,67±3,35 | - | 100 (36) | 8,3 (3) | 91,7 (33) | 22,2 (8) | 77,8 (28) | 19,4 (7) | 80,6 (29) | 27,8 (10) | 72,2 (26) | 13,9 (5) | 86,1 (31) |
| **Dizler** | 18,80±3,88 | - | 100 (62) | 11,3 (7) | 88,7 (55) | 25,8 (16) | 74,2 (46) | 22,6 (14) | 77,4 (48) | 38,7 (24) | 61,3 (38) | 14,5 (9) | 85,5 (53) |
| **Ayaklar** | 19,51±3,39 | - | 100 (66) | 7,6 (5) | 92,4 (61) | 21,2 (14) | 78,8 (52) | 9,1 (6) | 90,9 (60) | 25,8 (17) | 74,2 (49) | 10,6 (7) | 89,4 (59) |

**E:** evet, **H:** hayır

## TARTIŞMA

Diş hekimliği mesleğinin, kas-iskelet sistemi rahatsızlıklarının yüksek oranda görülmesine neden olabilecek çeşitli risk faktörlerini barındırabileceği ve ilk semptomların hekim adaylarının eğitim dönemleri süresince dahi ortaya çıkabileceği bilinmektedir (14, 15). Kas-iskelet sistemi rahatsızlıklarının yaygınlığını inceleyebilmek, bu rahatsızlıklarından en sık etkilenen vücut bölümlerini belirleyerek rahatsızlıklar ile ilişkili faktörleri tanımlayabilmek hedefiyle diş hekimliği fakültesinde klinik eğitimlerine devam etmekte olan 4. ve 5. sınıf öğrencilerinin kas-iskelet sistemi problemlerinin değerlendirildiği bu anket çalışmasında en az bir vücut bölümünde ağrı semptomu belirten katılımcıların oranı %88,8 olarak saptanmıştır. Feng ve ark.'nın(16) Çin'de diş hekimleri arasındaki kas-iskelet sistemi semptomlarının yaygınlığını değerlendirdikleri benzer bir araştırmada kas-iskelet sistemi semptomları gösteren katılımcıların prevalansı %88 olarak tespit edilmiştir. Aboalshamat ve ark.'nın (9) Suudi Arabistan'daki diş hekimleri ve diş hekimliği öğrencilerindeki mesleki rahatsızlıkları inceledikleri çalışmalarında kas-iskelet sistemi semptomları gösteren katılımcıların prevalansı %81,33 iken, Almanya'da yapılmış olan bir diğer güncel araştırmada (17) bu oranın %92,6 olduğu bildirilmiştir. Araştırmaların sonuçlarında görüldüğü üzere kas-iskelet sistemi semptomları diş hekimliği mesleğini icra eden bireylerde oldukça yaygın ve evrensel bir problemdir.

Kas-iskelet sistemindeki semptomların değerlendirilmesi amacıyla kullanılan Nordic Kas İskelet Sistemi Anketi (NKİSA), Türkiye'de çalışan sağlığı üzerinde yapılan birçok araştırmada (11-13) tercih edilmiş olup, NKİSA'nın güvenirlik ve geçerlilik çalışması 2016'da Kahraman ve ark. tarafından gerçekleştirilmiştir (18).

Çalışmamızda son 12 ayda en fazla kas-iskelet sistemi semptomu gösteren vücut bölgesi boyun (%72,5) olarak tespit edilmiştir. Cheikh ve ark.'nın(19) kas-iskelet sistemi hastalıklarının diş hekimleri üzerindeki yaygınlığını inceledikleri araştırmalarında da bizim çalışmamız ile paralellik gösterecek şekilde boyun %70,9'luk bir prevalansla en sık etkilenen vücut bölümü olmuştur (19). Yine benzer şekilde Rickert ve ark. (17), Shetty ve ark. (20) ile Abduljabbar ve ark. (21) sırasıyla %65,1, %64,7 ve %67,9 prevalans oranı ile boyun bölgesini en sık etkilenen vücut bölümü olarak belirlemişlerdir. Diş hekimleri ve diş hekimliği öğrencileri popülasyonlarında boyun bölgesi yakınmaları sıklığı, çalışma pozisyonu ile ilişkilendirilmiş, bireylerin tedavi süresince daha net bir görüş alanı sağlayabilmek hedefiyle omuz abduksiyonu ve boyun fleksiyonu ile karakterize bir duruş sergiledikleri rapor edilmiştir. Boyun ve başın öne doğru devamlı hareketi zamanla omuz ve boyun kaslarında ağrıya, yorgunluğa ve kas kasılmalarına sebep olmaktadır (5). Çalışma süresince sürekli tekrarlayan travmatik pozisyonlar boyun spinal diskleri üzerinde biriken kuvveti arttırarak uzun dönemde kas-iskelet sistemi hastalıklarına yol açabilmektedir (22).

Dünyada en fazla iş gücü kaybına sebep olan meslek rahatsızlıklarından biri kronik bel ağrısı olarak bildirilmekte olup (23), araştırmamızda son 12 ayda yaygın biçimde kas-iskelet sistemi semptomları görülen diğer vücut bölümleri bel (%62,1), omuz (%57,1) ve üst sırt (%56,6) olarak belirlenmiştir.

Hayes ve ark.'nın (24) dental hijyenistler arasındaki kas-iskelet sistemi semptomlarını inceledikleri derlemelerinde, farklı vücut bölgelerindeki kas-iskelet sistemi yakınmalarının frekansları sırasıyla boyunda (%54-%69), bel bölgesinde (%56-%65) ve omuzda (%48-%68) aralığında bildirilmiştir. Soylu ve ark.'nın (13) diş hekimleri üzerinde yapmış olduğu benzer çalışmada da semptomların en fazla boyun (%78,3) ve bel (%56,6) bölgelerinde olduğu rapor edilmiştir. Diş hekimlerinde tedavi sırasında torakal omurların sola doğru eğilmesi ile bel bölgesindeki omurların sağa doğru lateral fleksiyonunun karakteristik bir pozisyon olduğu ve çalışma pozisyonlarından dolayı çalışma sırasındaki bu postür ile bel ağrısı arasında korelasyon tespit edildiği belirtilmektedir (25). Sonuçlar diş hekimlerinin çoğunun boyun ve bel bölgelerinde kas-iskelet sistemi semptomları gösterdiğini ortaya koymaktadır. Araştırmamızda çalışma konumu (oturarak/ ayakta/ her iki pozisyonda) ile kas-iskelet sistemi semptomu görülme sıklığı arasında anlamlı bir ilişki bulunamamıştır.

Kas-iskelet sistemindeki rahatsızlıkların incelendiği çalışmalarda fiziksel aktivitenin öneminden de sıklıkla söz edilmektedir (26). Araştırmalarda fiziksel aktivitelerin fizyolojik, psikolojik ve metabolik faktörleri olumlu biçimde etkileyerek, kas-iskelet sistemi hastalıklarının önlenmesine; bireyin kemik, kas ve eklem sağlığının korunmasına katkıda bulunduğu ifade edilmektedir (5,27,28). Araştırmamızda diş hekimliği fakültesinde klinik eğitim gören öğrencilerin herhangi bir fiziksel aktivite yapma prevalansı %43,1 olarak tespit edilmiştir. Daltaban ve ark. (11) ile Rising ve ark.'nın (29) benzer çalışmalarında fiziksel aktivite prevalansı sırasıyla %21,7 ve %13 olarak bildirilmiştir. Çalışmamızda fiziksel aktivitelerin cinsiyete göre dağılımı incelendiğinde kadın katılımcıların en sık tercih ettiği fiziksel aktivite yürüyüş ve pilatesken, erkeklerde ise bu sıralamanın fitness ve yürüyüş şeklinde olduğu görülmektedir. Buna ek olarak, araştırmamızda düzenli fiziksel aktivite ile kas-iskelet sistemi semptomu bildirme parametreleri arasında istatistiksel olarak anlamlı bir ilişki bulunamamıştır.

Araştırmamızda kas-iskelet sistemi rahatsızlıkları cinsiyet faktörü ile ilişkilendirilerek değerlendirildiğinde; cinsiyet ile semptom bildirme durumu arasında anlamlı bir ilişki tespit edilmiş ve erkeklerde diz bölümündeki semptomların son 12 ayda kadınlardan daha yüksek olduğu saptanmış olup bu sonucun benzer çalışmalar (9,30,31) ile uyumlu olduğu görülmüştür. Buna ek olarak son 1 ayda diz ve ayaklarda, anket günü ise omuz, boyun ve ayaklarda erkeklerin semptomlarının kadınlardan daha yüksek olduğu saptanmıştır. Çalışmamızda kadınlarda boyun, bel, üst sırt, dirsek ve el bileği bölümlerindeki ağrı ve semptomların son 12 ayda erkeklere oranla sayısal olarak yüksek olduğu ancak bu farklılığın istatistiksel olarak anlamlı olmadığı tespit edilmiştir. Literatürler incelendiğinde kadın cinsiyet, kas-iskelet sistemi rahatsızlıkları için bir risk faktörü olarak değerlendirilmektedir (32,33). Diş hekimlerinde kas-iskelet sistemi rahatsızlıklarının değerlendirildiği bazı çalışmalarda, kadınların erkeklerden daha yüksek oranda kas-iskelet sistemi semptomu bildirdiği rapor edilmiş olup, bu durum kadınların düşük kas gücü ve tonusuna, ağrı algısının ve ağrıya karşı hassasiyetlerinin yüksekliğine ve

sağlık sorunlarını erkeklere oranla daha ciddiye alabilmelerine atfedilmiştir (19,34-36).

Diş hekimlerinde kas-iskelet sistemi rahatsızlıklarının değerlendirildiği diğer çalışmalarda yaş, günlük çalışma süresi, günde tedavi edilen hasta sayısı parametrelerinin kas-iskelet sistemi rahatsızlıklarının gelişiminde etkili olduğu bildirilmektedir (12,37). Araştırmamızda katılımcı grubumuz, benzer klinik prosedürler içerisinde eğitim gören ve benzer yaş gruplarındaki diş hekimliği fakültesi öğrencilerinden oluşmakta olup, bu durum çalışmamızın limitasyonlarından biridir. Buna karşın mevcut araştırma sonuçlarımızın, diş hekimliği fakültelerinde öğrenim gören öğrencilerdeki kas-iskelet sistemi semptomlarının yaygınlığı hakkında farkındalık yaratabileceği kanaatindeyiz.

## SONUÇ

Araştırmamız sonucunda diş hekimliği fakültesinde klinik eğitimlerine devam eden 4. ve 5.sınıf öğrencilerinin yüksek oranda kas-iskelet sistemi rahatsızlığı yaşadığı tespit edilmiştir. En çok rahatsızlık bildirilen vücut bölümleri boyun, bel ve omuz olarak belirlenmiştir. Çalışmamızın sonuçları değerlendirildiğinde, meslek hayatlarının henüz başında bulunan diş hekimi adaylarında kas-iskelet sistemi rahatsızlıklarının erken dönemde tespit edilebilmesi ve önlenebilmesi son derece önemlidir. Diş hekimliği öğrencilerine doğru pozisyonlarda çalışabilmeleri için ergonomi eğitimleri verilmesinin ve öğrencilerin koruyucu egzersizler hakkında bilgilendirilmesinin, diş hekimi adaylarının meslek hayatlarının ilerleyen dönemlerini daha konforlu geçirebilmesini sağlayabileceği kanaatindeyiz.

**Yazarların Katkıları:** Fikir/Kavram: Ö.G.Y., M.A.Ş.; Tasarım: M.A.Ş., Ö.G.Y.; Veri Toplama ve/veya İşleme: M.A.Ş.; Analiz ve/veya Yorum: T.M., Ö.G.Y.; Literatür Taraması: M.A.Ş., Ö.G.Y.; Makalenin Yazımı: M.A.Ş., Ö.G.Y., T.M.; Eleştirel İnceleme: Ö.G.Y., T.M.

## KAYNAKLAR

1. Lee C-Y, Wu J-H, Du J-K. Work stress and occupational burnout among dental staff in a medical center. Journal of Dental Sciences. 2019; 14(3): 295-301.
2. Ohlendorf D, Haas Y, Naser A, Haenel J, Maltry L, Holzgreve F, et al. Prevalence of muscular skeletal disorders among qualified dental assistants. International Journal of Environmental Research and Public Health. 2020; 17(10): 3490.
3. Gupta A, Bhat M, Mohammed T, Bansal N, Gupta G. Ergonomics in dentistry. International Journal of Clinical Pediatric Dentistry. 2014; 7(1): 30-4.
4. Jodalli PS, Kurana S, Ragher M, Khed J, Prabhu V. Posturedontics: How does dentistry fit you? Journal of Pharmacy & Bioallied Sciences. 2015; 7(2): 393-7.
5. Hayes MJ, Cockrell D, Smith DR. A systematic review of musculoskeletal disorders among dental professionals. International Journal of Dental Hygiene. 2009; 7(3): 159-65.
6. Sakzewski L, Naser-ud-Din S. Work-related musculoskeletal disorders in dentists and orthodontists: A review of the literature. Work. 2014; 48(1): 37-45.
7. James SL, Abate D, Abate KH, Abay SM, Abbafati C, Abbasi N, et al. Global, regional, and national incidence, prevalence, and years lived with disability for 354 diseases and injuries for 195 countries and territories, 1990–2017: a systematic analysis for the global burden of disease study 2017. The Lancet. 2018; 392(10159): 1789-858.
8. Lietz J, Kozak A, Nienhaus A. Prevalence and occupational risk factors of musculoskeletal diseases and pain among dental professionals in western countries: A systematic literature review and meta-analysis. PloS One. 2018; 13(12): e0208628.
9. Aboalshamat KT. Nordic assessment of occupational disorders among dental students and dentists in saudi arabia. Journal of International Society of Preventive & Community Dentistry. 2020; 10(5): 561-8.
10. Khan SA, Yee Chew K. Effect of working characteristics and taught ergonomics on the prevalence of musculoskeletal disorders amongst dental students. BMC Musculoskeletal Disorders. 2013; 14: 1-8.
11. Daltaban Ö, Durmuş H, Onur M, Eryılmaz YR, Gökal Y, Karahan Y, et al. Diş hekimliği fakültesi öğrencilerinde kas iskelet sistemi problemlerinin değerlendirilmesi. Akdeniz Diş Hekimliği Derg. 2022; 1(2): 48-54.
12. Zorlu I, Gülcan H, Açikgöz B, Ayoğlu FN. Diş hekimlerinde kas-iskelet Sistemi rahatsızlıkları ve etkileyen faktörler. Turkiye Klinikleri Dişhekimligi Bilimleri Derg. 2021; 27(4): 531-8.
13. Soylu M, Altındiş S. Diş hekimlerinin çalışma şartlarının mesleki kas-iskelet sistemi hastalıklarına etkisi. SDÜ Saglik Bilimleri Enstitüsü Derg. 2018; 9(1): 46-52.
14. Corrocher PA, Presoto CD, Campos JA, Garcia PP. The association between restorative pre-clinical activities and musculoskeletal disorders. European Journal of Dental Education. 2014; 18(3): 142-6.
15. Oliveira Dantas FF, de Lima KC. The relationship between physical load and musculoskeletal complaints among brazilian dentists. Applied Ergonomics. 2015; 47: 93-8.
16. Feng B, Liang Q, Wang Y, Andersen LL, Szeto G. Prevalence of work-related musculoskeletal symptoms of the neck and upper extremity among dentists in China. BMJ Open. 2014; 4(12): e006451.
17. Rickert C, Fels U, Gosheger G, Kalisch T, Liem D, Klingebiel S, et al. Prevalence of musculoskeletal diseases of the upper extremity among dental professionals in germany. Risk Manag Healthc Policy. 2021: 14; 3755-66.
18. Kahraman T, Genç A, Göz E. The nordic musculoskeletal questionnaire: cross-cultural adaptation into turkish assessing its psychometric properties. Disability and Rehabilitation. 2016; 38(21): 2153-60.
19. Cheikh Y, Aicha O, Zoubair B, Samira B. Prevalence of musculoskeletal disorders among dentists in casablanca's dental center. Integrative Journal of Medical Sciences. 2020; 7: 7p.

20. Shetty A, Yelapure M, Hegde M, Devadiga D, Bhat R, Reddy U. Prevalence of musculoskeletal pain among dentists in dakshina kannada, karnataka: A cross-sectional study. World Journal of Dentistry. 2021; 12(4): 339-44.
21. Abduljabbar TA. Musculoskeletal disorders among dentists in saudi arabia. Pakistan Oral & Dental Journal. 2008; 28(1): 135-44.
22. Finsen L, Christensen H, Bakke M. Musculoskeletal disorders among dentists and variation in dental work. Applied Ergonomics. 1998; 29(2): 119-25.
23. Van Tulder MW, Koes BW, Bouter LM. Conservative treatment of acute and chronic nonspecific low back pain: a systematic review of randomized controlled trials of the most common interventions. Spine. 1997; 22(18): 2128-56.
24. Hayes MJ, Smith DR, Cockrell D. An international review of musculoskeletal disorders in the dental hygiene profession. International Dental Journal. 2010; 60(5): 343-52.
25. Howarth SJ, Grondin DE, La Delfa NJ, Cox J, Potvin JR. Working position influences the biomechanical demands on the lower back during dental hygiene. Ergonomics. 2016; 59(4): 545-55.
26. Kim B, Yim J. Core stability and hip exercises improve physical function and activity in patients with non-specific low back pain: a randomized controlled trial. The Tohoku Journal of Experimental Medicine. 2020; 251(3): 193-206.
27. Koneru S, Tanikonda R. Role of yoga and physical activity in work-related musculoskeletal disorders among dentists. Journal of International Society of Preventive and Community Dentistry. 2015; 5(3): 199-204.
28. Maillet JP, Millar AM, Burke JM, Maillet MA, Maillet WA, Neish NR. Effect of magnification loupes on dental hygiene student posture. Journal of Dental Education. 2008; 72(1): 33-44.
29. Rising DW, Bennett BC, Hursh K, Plesh O. Reports of body pain in a dental student population. The Journal of the American Dental Association. 2005; 136(1): 81-6.
30. Szymanska J. Disorders of the musculoskeletal system among dentists from the aspect of ergonomics and prophylaxis. Ann Agric Environ Med. 2002; 9(2): 169-73.
31. Farrokhnia T, Rezai M, Vaziri M-H, Vaziri F. Investigating the effect of educational intervention on musculoskeletal disorders in dentists. Middle East Journal of Family Medicine. 2018; 16(2): 307-13.
32. Cımbız A, Uzgören N, Aras Ö, Öztürk S, Elem E, Aksoy CC. Kas iskelet sisteminde ağrıya ait risk faktörlerinin lojistik regresyon analizi ile belirlenmesi: pilot çalışma. Fizyoterapi Rehabilitasyon. 2007; 18(1): 20-7.
33. Ekman A, Andersson A, Hagberg M, Hjelm EW. Gender differences in musculoskeletal health of computer and mouse users in the Swedish workforce. Occupational Medicine. 2000; 50(8): 608-13.
34. Al-Mohrej OA, AlShaalan NS, Al-Bani WM, Masuadi EM, Almodaimegh HS. Prevalence of musculoskeletal pain of the neck, upper extremities and lower back among dental practitioners working in riyadh, saudi arabia: a cross-sectional study. BMJ Open. 2016; 6(6): e011100.
35. Al-Ali K, Hashim R. Occupational health problems of dentists in the united arab emirates. International Dental Journal. 2012; 62(1): 52-6.
36. Alghadir A, Zafar H, Iqbal ZA. Work-related musculoskeletal disorders among dental professionals in saudi arabia. Journal of Physical Therapy Science. 2015; 27(4): 1107-12.
37. Bhagat T, Shrestha A, Agrawal SK, Gautam U. Musculoskeletal complaints and associated factors among dental practitioners of nepal: a nationwide survey. International Journal of Occupational Safety and Ergonomics. 2022; 28(4): 2302-7.

Araştırma Makalesi / Research Article

Sağlık Bilimlerinde Değer / Sağlık Bil Değer
Value in Health Sciences / Value Health Sci
ISSN: 2792-0542 sabd@duzce.edu.tr 2025; 15(2): 252-255
doi: https://dx.doi.org/10.33631/sabd.1617913

# Radiologic Investigation of the Presence of Accessory Transverse Foramen in Individuals Aged 21-60 Years Living in the Western Black Sea Region

Ceyda KAHVECİ[1], İsmail MALKOÇ[2]

**ABSTRACT**

**Aim:** The aim of this study was to radiologically evaluate the occurrence of more than one for. transversarium, called accessory foramen transversarium (ATF), in individuals aged 21-60 years living in the Western Black Sea Region.

**Material and Methods:** Personal information (name, last name and age) of the patients who participated in the study were not shared and confidentiality was taken as a basis. In the study, cervical vertebrae of 200 healthy individuals, 100 females and 100 males aged 21-60 years, were obtained retrospectively by Computed Tomography (CT) through the Hospital Imaging Archiving System (PACS). The for. transversarium of all cervical vertebrae from C1 to C7 were examined on coronal and sagittal plane images brought to orthogonal plane. The presence or absence of variation was examined. The vertebrae with ATF were noted. It was noted whether the ATF was unilateral or bilateral in the vertebra where it was found. If it was unilateral, which side it was on was noted. After all CT images were examined, the data obtained were entered into the Microsoft Excel program. It was analyzed with SPSS 24.0 program.

**Results:** The according to the analysis results, ATF was observed in a total of 95 individuals, 49 males (49%) and 46 females (46%). 18 individuals (18.9%) had right-sided ATF, 46 individuals (48.4%) had left-sided ATF and 31 individuals (32.6%) had bilateral ATF. There was no statistically significant difference between gender and ATF ($p>0.05$). ATF was observed in a total of 121 vertebrae out of 1400 vertebrae examined. C6 was the most common vertebra with ATF in both sexes.

**Conclusion:** We believe that our study will provide guidance for clinicians and radiologists in predicting changes in the structures passing through the foramen (for.) transversarium, interpreting X-ray and CT scans, and determining the more appropriate intervention when surgical intervention is considered.

**Keywords:** Cervical vertebra; transvers foramen; accessory transverse foramen; computed tomography.

## Batı Karadeniz Bölgesinde Yaşayan 21-60 Yaş Arasındaki Bireylerde Aksesuar Foramen Transversarium Varlığının Radyolojik İncelenmesi

**ÖZ**

**Amaç:** Bu çalışmanın amacı Batı Karadeniz Bölgesinde yaşayan 21-60 yaş aralığındaki bireylerde aksesuar foramen transversarium (ATF) olarak adlandırılan birden fazla for. transversarium görülme durumunu radyolojik olarak değerlendirmektir.

**Gereç ve Yöntemler:** Çalışmaya katılacak olan hastaların kişisel bilgileri (ad-soyad ve yaş) paylaşılmayarak gizlilik esas alındı. Çalışmada 21-60 yaş arasındaki 100 kadın ve 100 erkek toplam 200 sağlıklı bireyin servikal vertebraları Bilgisayarlı Tomografi (BT) ile Hastane Görüntüleme Arşivleme Sistemi (PACS) üzerinden geriye dönük elde edildi. Ortogonal plana getirilen coronal ve sagittal düzlem görüntüleri üzerinde C1'den C7'ye kadar bütün servikal vertebraların for. Transversarium'larına bakıldı. Varyasyonun bulunup bulunmadığı incelendi. ATF görülen vertebralar not edildi. ATF'nin bulunduğu vertebrada unilateral mi bilateral mi olduğu kaydedildi. Unilateral ise hangi tarafta olduğu not edildi. Bütün BT görüntüleri incelendikten sonra elde edilen veriler Microsoft Excel programına girildi. SPSS 24.0 programı ile analiz edildi.

**Bulgular:** Analiz sonuçlarına göre 49 erkek (%49), 46 kadın (%46) toplam 95 bireyde ATF gözlendi. 18 birey (%18,9) sağ, 46 birey (%48,4) sol ve 31 bireyde de (%32,6) çift taraflı ATF gözlendi. Cinsiyet ile ATF arasında istatistiksel olarak anlamlı bir fark bulunmadı ($p>0,05$). İncelenen 1400 vertebra içerisinde de toplam 121 vertebra'da ATF gözlendi. İki cinsiyette de en sık ATF görülen vertebra C6 olarak belirlendi.

**Sonuç:** Çalışmamızın foramen (for.) transversarium içerisinden geçen yapılardaki değişikliklerin tahmin edilmesinde, klinisyenler ve radyologlar için röntgen ve BT taramalarının yorumlanmasında ve cerrahi müdahale düşünüldüğünde daha uygun girişimin belirlenebilmesi için yol gösterici olacağını düşünüyoruz.

**Anahtar Kelimeler:** Cervical vertebra; foramen transversarium; aksesuar foramen transversarium; bilgisayarlı tomografi.

1 Duzce University Faculty of Medicine, Graduate student Department of Anatomy, Duzce, Türkiye
2 Duzce University Faculty of Medicine, Department of Anatomy, Duzce, Türkiye

Sorumlu Yazar / Corresponding Author: Ceyda KAHVECİ, e-mail: ceydakahveci36@gmail.com
Geliş Tarihi / Received: 11.01.2025, Kabul Tarihi / Accepted: 13.01.2025

## INTRODUCTION

The human vertebral column is classified as cervical, thoracal, lumbar, sacral and coccygeal. This classification is based on the characteristics of the vertebrae in each group. One of the most important features that distinguishes cervical vertebrae from other vertebrae is the presence of transverse foramen in their transverse process. The vertebral artery and vein and the surrounding sympathetic plexus pass through the transverse foramen. The vertebral artery ascends through the transverse foramen of the sixth cervical vertebra. Only the vertebral vein is present in the transverse foramen of the seventh cervical vertebra (1,2). The transverse foramen may vary in shape and size. Sometimes there may be many of them and sometimes there may be none (3,4). Changes in the course of the vertebral artery are thought to cause variations in the transverse foramen (5,6). In cases of these variations, the course of the vertebral artery may be disrupted. Variations in the number and size of the transverse foramen can lead to pathologic conditions and clinical symptoms such as headache, migraine, and fainting attacks on the vessels and nerves (5,3-8). The variation of the transverse foramen is called accessory transverse foramen (ATF). ATF is the presence of one or more transverse foramen next to the transverse foramen. This condition is not common in the literature and there is no detailed information on the subject (5,9). Depending on the course of the vertebral artery. ATF can be seen unilaterally or bilaterally in any of the cervical vertebrae or in more than one vertebra (5,10). In the literature, studies on this subject were mostly performed on dry bones (3,8,11-14).

The aim of our study is to investigate the ATF variations in Turkish population and to emphasize their importance in terms of clinical surgery in the light of literature information.

## MATERIAL AND METHODS

Written permissions were obtained from Düzce University Clinical Research Ethics Committee and the Chief Physician's Office of Düzce University Research Hospital, where the study was conducted (No: 2023/152, Date: 02.10.2023). Ethical principles were adhered to in accordance with the Declaration of Helsinki (2013). Our study was performed retrospectively on CT images obtained from a total of 200 healthy individuals (100 females and 100 males) admitted to Düzce University Research and Application Hospital between 01.10.2023 and 01.10.2024. The images obtained using a Siemens (model Somatom Definition AS) 128-slice CT device were accessed and analyzed through the Hospital Imaging Archiving System (PACS).

### Statistical Analysis

The for. transversarium of all cervical vertebrae from C1 to C7 were examined on the coronal and sagittal plane images brought to the orthogonal plane. The vertebrae with ATF were noted. It was noted whether the ATF was unilateral or bilateral (Figure 1). If it was unilateral, the side on which it was located was noted. After examining the CT images, the data obtained were entered into the Microsoft Excel program. Data were analyzed with SPSS 26.0. The kurtosis and skewness coefficients were analyzed to determine the conformity of the measurements to normal distribution. The kurtosis and skewness values obtained from the measurements between +3 and -3 are considered sufficient for normal distribution. Chi-square and independent t-test were used in the analyses. The relationship between categorical variables was analyzed by Chi-square test.

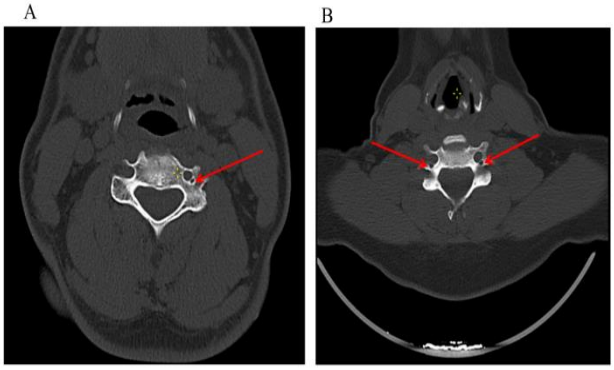



**Figure 1.** A) C5 cervical vertebra example showing unilateral ATF, B) C4 cervical vertebra example showing bilateral ATF

## RESULTS

A total of 1400 cervical vertebrae of 200 individuals were analyzed. Of these, ATF was observed in 95 individuals (47.5%), 49 males (49%) and 46 females (46%) (Table 1). Of these, 18 (18.9%) right, 46 (48.4%) left and 31 (32.6%) bilateral ATF's were observed (Table 2).

**Table 1.** Unilateral and bilateral findings of ATF by gender

| | | Gender | | | X2 | p |
|---|---|---|---|---|---|---|
| | | Male | Female | Total | | |
| | | n (%) | n (%) | n (%) | | |
| Do you have ATF? | None | 51(51) | 54(54) | 105(52.5) | 0.180 | 0.671 |
| | Yes | 49(49) | 46(46) | 95(47.5) | | |

Chi-square test.

**Table 2.** Illustration of the comparison of ATF by side and gender

| | | Gender | | | X2 | p |
|---|---|---|---|---|---|---|
| | | Male | Female | Total | | |
| | | n (%) | n (%) | n (%) | | |
| Side of the vertebra | Left | 25 (51) | 21 (45.7) | 46 (48.4) | 6.428 | **0.040** |
| | Right | 13 (26.5) | 5 (10.9) | 18 (18ç9) | | |
| | Double | 11 (22.4) | 20 (43.5) | 31 (32.6) | | |

Chi-square test.

In our study, ATF was detected in 121 vertebrae, 64 of which were in C6 (Table 3). The vertebra with the highest incidence of ATF was C6 (52.5%). ATF was not detected in the atlas, axis and C3 cervical vertebrae (Table 3).

**Table 3.** Number of ATF's at cervical vertebral levels by gender

| | | Gender | | | | |
|---|---|---|---|---|---|---|
| | | Male | Female | Total | X2 | p |
| | | n (%) | n (%) | n (%) | | |
| ATF seen in vertebral level | C1 | 0(%0) | 0(%0) | 0(%0) | 2,296 | 0,513 |
| | C2 | 0(%0) | 0(%0) | 0(%0) | | |
| | C3 | 0(%0) | 0(%0) | 0(%0) | | |
| | C4 | 11(%16,6) | 6(%10,9) | 17(%14,2) | | |
| | C5 | 18(%27,2) | 18(%32,8) | 36(%29,7) | | |
| | C6 | 35(%53) | 29(%52,7) | 64(%52,8) | | |
| | C7 | 2(%3,02) | 2(%3,6) | 4(%3,3) | | |

Chi-square test.

## DISCUSSION

The vertebral artery is a factor that shapes the formation of transverse foramen. Hadley, Hyyppa et al. stated that changes in the course of the vertebral artery can lead to various variations in the transverse foramen (5,6,15,16). There is a direct proportion between the dimensions of the transverse foramen and the dimensions of the vertebral artery. Changes in this ratio also affect the blood flow in the vertebral artery. Transverse foramen variations can cause changes in the course of the vertebral artery, as well as transverse foramen variations due to changes in the vertebral artery. Sanelli et al. investigated the relationship between vertebral artery and transverse foramen dimensions and reported that changes in the diameter of the transverse foramen showed a significant change in the diameter of the vertebral artery and that the vertebral artery filled 8-85% of the transverse foramen (5).

After passing through the foramen magnum, the a. vertebralis joins to form the a. basilaris. The a. basilaris gives off branches that supply the brain stem, inner ear and cerebellum. Movements of the head affect the amount of blood flowing through the a. vertebralis and therefore the amount of blood flowing through the a. basilaris. In addition, symptoms such as diplopia, dizziness, blurred vision, and sudden falls may be observed with the addition of stimulation of the sympathetic plexus around the arteries due to ATF-related stenosis (5).

Absence of the transverse foramen may indicate the absence of vertebral artery or the presence of arteries traveling along the transverse process but not passing through the transverse foramen. A narrowing of the transverse foramen may also cause narrowing of the vessels passing through it. In addition, a duplication of the transverse foramen may cause duplication of the vertebral artery (5,6,12).

Pretty Rathnakar et al. (2013) examined 140 dried cervical vertebrae of unknown sex and age and found 8 ATF's (5.7%) (12). Akhtar et al (2015) reported 25 (14.36%) ATF's among 174 cervical vertebrae of unknown sex and age in their study to investigate the incidence of ATF's in dried cervical vertebrae in Indian population (20). Degirmenci et al. investigated for. transversarium variations by CT imaging in 127 patients (63 females and 64 males) and observed ATF in 117 (13%) vertebrae out of a total of 889 vertebrae (17). In our study, ATF was detected in 121 (8.64%) vertebrae among 1400 cervical vertebrae of 200 individuals.

Tellioğlu et al. (2018) examined the size and variations of the for. transversarium and the anatomical variations of the a. vertebralis passing through it. They imaged a total of 987 cervical vertebrae of 141 patients aged 18-79 years, 90 males and 51 females. As a result of the study, they found 43 completed and 63 incomplete ATF's (22).

Aydınoğlu et al. (2001) examined 222 dry bones and observed ATF in 47 vertebrae. Of these, 25 were bilateral, 10 on the right side and 12 on the left side. They did not find ATF in atlas (C1) and axis (C2) (9). As a result of the analyses performed in our study, we did not find ATF's in the atlas and axis. This is similar to the study conducted by Aydınoğlu et al.

Çırpan at al.(2018) examined 81 dry cervical vertebrae of unknown age and sex and reported the presence of ATF in 10 cervical vertebrae (12.34%). They reported that 2 of these were bilateral (2.47%) and 8 were unilateral (9.87%). In the literature, the unilateral incidence of ATF is higher than the bilateral incidence (5). In our study, unilateral ATF was found in 76 vertebrae (5.4%) and bilateral ATF in 45 vertebrae (3.2%). This result was consistent with the study of Çırpan et al. and the literature.

Guerra et al. (2017) macroscopically examined for. transversarium mutually on 121 vertebrae and found 21 (17.35%) ATF's. Of these, 14 (66.6%) were unilateral, 8 (54.14%) on the right side and 6 (45.86%) on the left side (18). As a result of the study, they found that the incidence of ATF on the right side was higher than on the left side. In our study, the incidence of ATF was calculated as 46 (48.40%) on the left side and 18 (18.9%) on the right side. Contrary to the study of Guerra et al. we found a higher incidence of ATF on the left side compared to the right side.

Katikireddi et al. (2014) found 3 (3%) ATF's in their study on 100 dried cervical vertebrae. Of these, 2 (2%) were unilateral and 1 (1%) was bilateral (19). This study is insufficient to examine the incidence of ATF.

Chaudhari et al. (2013) macroscopically examined 133 dried cervical vertebrae and observed ATF in 22 vertebrae (23.15%). Of these, 14 (14.73%) were unilateral and 8 (8.42%) were bilateral ATF's. They reported that ATF's were more common in the lower cervical vertebrae (C5 to C7), especially in the 7th cervical vertebra (11). Sharma et al (2010) found unilateral or bilateral ATF's in 16 vertebrae (8%) in a study of 200 dry cervical vertebrae. It was observed that 8 (4%) of these vertebrae were in C6 (21). In our study, the vertebra with the highest incidence of ATF was C6 (52.5%). In contrast to Chaudhari et al. our study was similar to Sharma et al.

In our study, unilateral ATF's were found in 76 vertebrae (5.4%) and bilateral ATF's in 45 vertebrae (3.2%) among 1400 vertebrae of 200 individuals. As a result of the analysis performed in our study, ATF was not found in the atlas and axis. In the literature, the frequency of unilateral ATF is higher than the frequency of bilateral ATF (5). Our study was consistent with the literature.

## CONCLUSION

In conclusion, we think that the presence of ATF may be helpful in diagnosis and treatment due to the involvement of the vessels and sympathetic nerves passing through the

transverse foramen and may also guide radiologists and surgical clinicians in selecting the appropriate intervention when surgical intervention is deemed necessary.

**ACKNOWLEDGEMENT**
I would like to thank Düzce University Department of Radiology for providing me with the data I needed to carry out my study.

**Authors's Contributions:** Idea/Concept: C.K., İ.M.; Design: C.K.; Data Collection and/or Processing: C.K.; Analysis and/or Interpretation: C.K.; Literature Review: C.K.; Writing the Article: C.K., İ.M.; Critical Review: C.K.; İ.M.

**REFERENCES**

1. Nisari M, Ertekin T, Çınar Ş, Özçelik Ö, Al Ö, Ülger H, et al. Foramen Transversarium Varyasyonu. Sağlık Bilimleri Dergisi. 2016; 25 (2): 71-4.
2. Arıncı K, Elhan A. Anatomi 1. Cilt. 5. Baskı. Ankara: Güneş Tıp Kitabevi; 2014.
3. Foramen Soat. Accessory transverse foramina in the cervical spine: incidence, embryological basis, morphology and surgical importance. Turk Neurosurg. 2011; 21(3): 384-7.
4. Das S, Suri R, Kapur V. Double foramen transversaria: an osteological study with clinical implications. Int Med J. 2005; 12(4): 311-3.
5. Yonguç Gn. Aksesuar foramen transversarium. accessory transverse foramen. Pamukkale Med J. 2018; 11(3): 203-7.
6. Taitz C, Nathan H, Arensburg B. Anatomical observations of the foramina transversaria. J Neurol Neurosurg Psychiatry. 1978; 41(2): 170-6.
7. Agrawal D, Mohanty Bb, Sethy S, Parija B, Hazary Sk, Chinara Pk. variations in foramen transversarium: an osteological study in eastern india. Int J Cur Res. 2012; 4: 120-2.
8. Aggarwal B, Gupta M. Variations of foramen transversarium in seventh cervical vertebra. Int J Basic Appl Med Sci. 2014; 4(2): 258-62.
9. Aydınlıoğlu A, Kavaklı A, Yeşilyurt H, Erdem S, Eroğlu C. Foramen transversarium bipartita. Van Tıp Derg. 2001; 8(4): 110-2.
10. Serdar K, Yilmaz Nd, Pusat S, Kural C, Kirik A, Yusuf I. double foramen transversarium variation in ancient byzantine cervical vertebrae: preliminary report of an anthropological study. Turk Neurosurg. 2011; 21(4): 534-8.
11. Chaudhari Ml, Maheria Pb, Bachuwar Sp. Double foramen transversarium in cervical vertebra: morphology and clinical importance. Indian J Basic Appl Med Res. 2013; 8(2): 1084-8.
12. Rathnakar P, Swathi RK. Study of accessory foramen transversarıa in cervical vertebrae. J Health Allied Sci Nu. 2013; 3(4): 97-9.
13. Rekha Bs, Neginhal Dd. Variations in foramen transversarium of atlas vertebra: an osteological study in south indians. Int J Res Health Sci. 2014; 2(1): 224-8.
14. Riew Kd. microscope-assisted anterior cervical de compression and plating techniques for multilevel cervical spondylosis. Oper Tech Orthop. 1998; 8(1): 22-33.
15. Hardley La. Tortuosity and deflection of the vertebral artery. Ajr Am J Roentgenol. 1958; 80: 306-12.
16. Hyyppä Se, Laasonen Em, Halonen V. Erosion of cervical vertebrae caused by elongated and tortuous vertebral arteries. Neuroradiology. 1974; 7(1): 49-51.
17. Değirmenci B, Yılmaz Ö. Variations of transverse foramens of cervical vertebrae: a 3-dimensional multidetector ct study. Turk J Med Sci. 2013; 43(5): 711-7.
18. Guerra Mm, Fuentes Pr, Roa I, Molinet G, Robles F, Roa I. Anatomical variations of the foramen transversarium in cervical vertebrae. Int J Morphol. 2017; 35(2): 719-22.
19. Katikireddi Rs, Setty Sn. A study of double foramen transversarium in dried cervical vertebra. Int J Health Sci Res. 2014; 4(1): 59-61.
20. Akhtar Mj, Madhukar Pk, Rahman S, Kashyap N. A morphometric study of foramen transversarium of dried cervical vertebrae. Int J Res Med Sci. 2015; 3(4): 912-6.
21. Sharma A, Singh K, Gupta V, Stivastava S. Double foramen transversarium in cervical vertebra an osteological study. J Anat Soc India. 2010; 59(2): 229-31.
22. Tellioglu Am, Durum Y, Gok M, Polat Ag, Karaman Cz, Karakas S. Evaluation of morphologic and morphometric characteristic of foramen transversarium on 3-dimensional multidetector computed tomography angiography. Turk Neurosurg. 2018; 28(4): 557-62.

Araştırma Makalesi / Research Article

Sağlık Bilimlerinde Değer / Sağlık Bil Değer
Value in Health Sciences / Value Health Sci
ISSN: 2792-0542 sabd@duzce.edu.tr 2025; 15(2): 256-265
doi: https://dx.doi.org/10.33631/sabd.1432094

# The Predictive Role of Perceived Social Support and Family-Centered Care in the Quality of Life of Parents of Children with Cancer

Aslı AKDENİZ KUDUBEŞ [1], Murat BEKTAŞ [2]

**ABSTRACT**

**Aim:** This study aimed to determine the predictive role of perceived social support and family-centered care in the quality of life of parents who had children with cancer.

**Material and Methods:** This study used a descriptive, methodological, and cross-sectional design. The study data were collected using a Parent Information Form, the Multidimensional Scale of Perceived Social Support, the Family-Centered Care Assessment Scale, and the Caregiver Quality of Life Index-Cancer. Mean scores, percentage calculations, t-test, ANOVA test, and linear regression analysis were used to analyze the study data.

**Results:** A statistically highly significant difference was found between the age, sex, education level, employment status, income status of the parents of the child with cancer, and the age and the duration of hospitalization of the child and the mean perceived social support, family-centered care assessment, and quality of life scale scores. In model 1, perceived social support of parents explained 54.9% of the level of their quality of life. In Model 2, family-centered care assessments of parents explained 54.9% of the level of their quality of life.

**Conclusion:** This study is valuable in that it demonstrating the effect of perceived social support and family-centered care assessments on the quality of life. Nurses should keep in mind that parents who have little perceived social support and cannot access family-centered care may have a low quality of life. Therefore, nursing care plans should also address these variables.

**Keywords:** Perceived social support; family-centered care; quality of life; cancer; parent.

## Sosyal Destek Algısı ve Aile Merkezli Bakımın Kanserli Çocukların Ailelerinin Yaşam Kalitesine Etkisi

**ÖZ**

**Amaç:** Bu çalışmanın amacı, algılanan sosyal destek ve aile merkezli bakımın kanserli çocuğu olan ebeveynlerin yaşam kalitesi üzerindeki yordayıcı rolünü belirlemektir.

**Gereç ve Yöntemler:** Bu çalışmada tanımlayıcı, metodolojik ve kesitsel bir tasarım kullanılmıştır. Araştırmanın verileri Ebeveyn Bilgi Formu, Çok Boyutlu Algılanan Sosyal Destek Ölçeği, Aile Merkezli Bakım Değerlendirme Ölçeği ve Bakım Veren Yaşam Kalitesi İndeksi-Kanser kullanılarak toplanmıştır. Araştırma verilerinin analizinde ortalama puanlar, yüzde hesaplamaları, t-testi, ANOVA testi ve doğrusal regresyon analizi kullanılmıştır.

**Bulgular:** Kanserli çocuğun yaşı, cinsiyeti, eğitim düzeyi, çalışma durumu, anne-babanın gelir durumu ile çocuğun yaşı ve hastanede kalış süresi ile algılanan sosyal destek, aile merkezli bakım değerlendirmesi ve yaşam kalitesi ölçeği puan ortalamaları arasında istatistiksel olarak ileri düzeyde anlamlı farklılık bulunmuştur. Model 1'de ebeveynlerin algılanan sosyal desteği yaşam kalitelerinin %54,9'unu açıklamaktadır. Model 2'de ebeveynlerin aile merkezli bakım değerlendirmeleri onların yaşam kalitesi düzeyinin %54,9'unu açıklamaktadır.

**Sonuç:** Bu çalışma algılanan sosyal destek ve aile merkezli bakım değerlendirmelerinin yaşam kalitesi üzerindeki etkisini ortaya koyması açısından değerlidir. Hemşireler, algılanan sosyal desteği az olan ve aile merkezli bakıma erişemeyen ebeveynlerin yaşam kalitesinin düşük olabileceğini akılda tutmalıdır. Bu nedenle hemşirelik bakım planlarının bu değişkenleri de ele alması gerekir.

**Anahtar Kelimeler:** Algılanan sosyal destek; aile merkezli bakım; yaşam kalitesi; kanser; ebeveyn.

1 Bilecik Şeyh Edebali Universitesi, Sağlık Bilimleri Fakültesi Hemşirelik Bölümü, Çocuk Sağlığı ve Hastalıkları Hemşireliği AD, Bilecik, Türkiye.
2 Dokuz Eylül Üniversitesi Hemşirelik Fakültesi, Çocuk Sağlığı ve Hastalıkları Hemşireliği AD, İzmir, Türkiye

Sorumlu Yazar / Corresponding Author Aslı AKDENİZ KUDUBEŞ, e-mail: asliakdeniz@hotmail.com
Geliş Tarihi / Received: 05.02.2024, Kabul Tarihi / Accepted: 18.03.2025

## INTRODUCTION

Childhood cancers cause children to experience many symptoms depending on both the nature of the disease and the side effects of treatment. All these symptoms restrict physical activity and social life, increase dependence on caregivers, cause psychosocial problems, and affect the quality of life (1). During this process, parents who give care to the child have to cope with many physiological and psychosocial problems (2). Parents both try to cope with the situation they are in and take the responsibility of supporting and giving care of the sick child. During this period, parents need to share their experiences and require perceived social support (2). The family-centered care implemented by pediatric nurses is a significant place in providing the necessary social support. The goals of the family-centered care that the nurse will administer include providing services that parents need and keeping parents connected to social support networks (3).

Perceived social support refers to a person's belief about how well their needs related to social support, such as information, are being met (4). Sharing situations such as childcare, housework, taking care of other children with a person a source of support in chronic diseases such as cancer and evaluating the reactions of individuals about the subject will support family members to develop a perspective. The availability of perceived social support resources is of great importance in cases, such as planning the process of the disease, decision-making about treatment, financial needs, and moral and emotional breakdowns, and it enhances the capacity of family members to cope with the situation (5). In the study conducted by Pietnoczko and Steuden (6) with the parents of 89 children with cancer, a connection was determined between the social support perceived by parents and health problems. Today, it is seen that the standard social examination reports in Turkey include issues related to perceived social support. However, it is said that a model is needed to obtain more systematic information (7).

Family-centered care, which is adopted as one of the basic philosophies of pediatric nursing, sees the family as a constant element of the child's life. The family is at the core of the child's existence and should also be at the center of the hospital care process (8). Family-centered care allows parents to participate in the care of the child and recover the sense of control they have lost by developing a sense of mutual trust through effective communication between parents and healthcare professionals. Also, parents of children with cancer who receive family-centered care state that they perceive this care as social support and that they feel better (9,10). Although family-centered care philosophy is included in health education in Turkey, the number of centers that include family-centered care in institutional policies is unfortunately limited. In addition, the number of centers where family-centered care is applied cannot be reached.

For parents to maintain the chronic disease process in the best way, it is necessary to arrange their relationship with the child and their parent-parent relationship effectively. The support received by parents is important for family members to express themselves (6). Integrating a family-centered approach to care can improve social support perceptions (6). Besides, the provision of family-centered care by nurses in cancer and other chronic diseases is extremely important for increasing the quality of life (6). Through this support, parents create a structure that will help them easily manage the disease. The family-centered work model ensures that parents adapt to everyday life and disease conditions more easily and that their quality of life increases (6).

Quality of life is a multi-factor concept that covers many areas. But according to the generally accepted opinion, quality of life is a concept that should include functional competence, complaints associated with illness and treatment, competence in psychological and social functions (11,12). The quality of life of the parents of children with cancer is highly affected by various factors such as difficulties experienced in the treatment process of the child, frequent hospitalization, worsening of the prognosis, financial difficulties, and lack of social support (13). Perceived social support and family-centered care variables support people to provide this qualification and significantly affect their quality of life. It is noted that perceived social support acts as a buffer in protecting the individual from the harmful effects of stressful life events (14). A cancer diagnosis, especially of a child in a family of people, both increases the need for social support and can reduce access to social support, leading to social stigma. A decrease in perceived social support for parents of children with cancer leads to a reduction in quality of life (14). The benefits of family-centered care, one of the other important variables affecting quality of life, include increased parent self-sufficiency, improved information flow, improved interaction between the family and the professional team, and, as a result, improved parent's quality of life (3,12). Although psychosocial concepts such as social support and quality of life in children with cancer are not the main factors in the positive course of prognosis, they have important effects on the recovery of the child (3). Family-centered care, on the other hand, is an indispensable aspect of pediatric nursing, which includes these two concepts and has positive effects for both the child and the family. In this context, it is very important to study these three concepts together, which are related separately. Identifying the relationship between the three variables will contribute to planning initiatives that will improve the quality of life of parents (12).

The perceived social support, family centered care and quality of life of parents who have children with cancer is a current and important issue in professional nursing (9). In the literature, while there are studies that examine these three important variables separately (13–19), no studies showing the relationship between them have been found. For this reason, there is a need for studies examining the effect of perceived social support and family-centered care on the quality of life of parents of children with cancer.

### Aim

This study was designed to ascertain the predictive contributions of perceived social support and family-centered care to the quality of life among parents of children diagnosed with cancer.

### Research Questions

1. What are the mean scores of parents of children with cancer for perceived social support, family-centered care, and quality of life?

2. Do perceived social support, family-centered care, and quality of life show a difference according to sociodemographic and disease-related characteristics?
3. What is the predictive role of perceived social support and family-centered care in the quality of life of parents of children with cancer?

## MATERIAL AND METHODS

### Aim and Study Design

This study, which used a descriptive and cross-sectional research approach, was conducted at the pediatric oncology-hematology clinic of a prominent university hospital in Turkey between September 22 and November 30, 2020.

### Participants

The study group included individuals who (a) were aged over 18, (b) had a child diagnosed with cancer, (c) had no psychiatric diagnosis and communication problems, and (d) volunteered to participate in the study. The determination of the minimum requisite sample size for the study was conducted through the utilization of GPOWER 3.0 statistical analysis software. The calculated sample size, determined to be 135 subjects, is deemed adequate for conducting linear regression analysis. This calculation was based on consideration of 14 variables, with a significance level set at 0.05, a statistical power of 80%, and a medium effect size of 0.15 (20).

A total of 246 people were evaluated for eligibility. On the other hand, individuals with communication problems (n = 1) and refusing to participate (n = 5) were not included in the study. Therefore, parents of 240 children with cancer were included in the study (Figure 1).

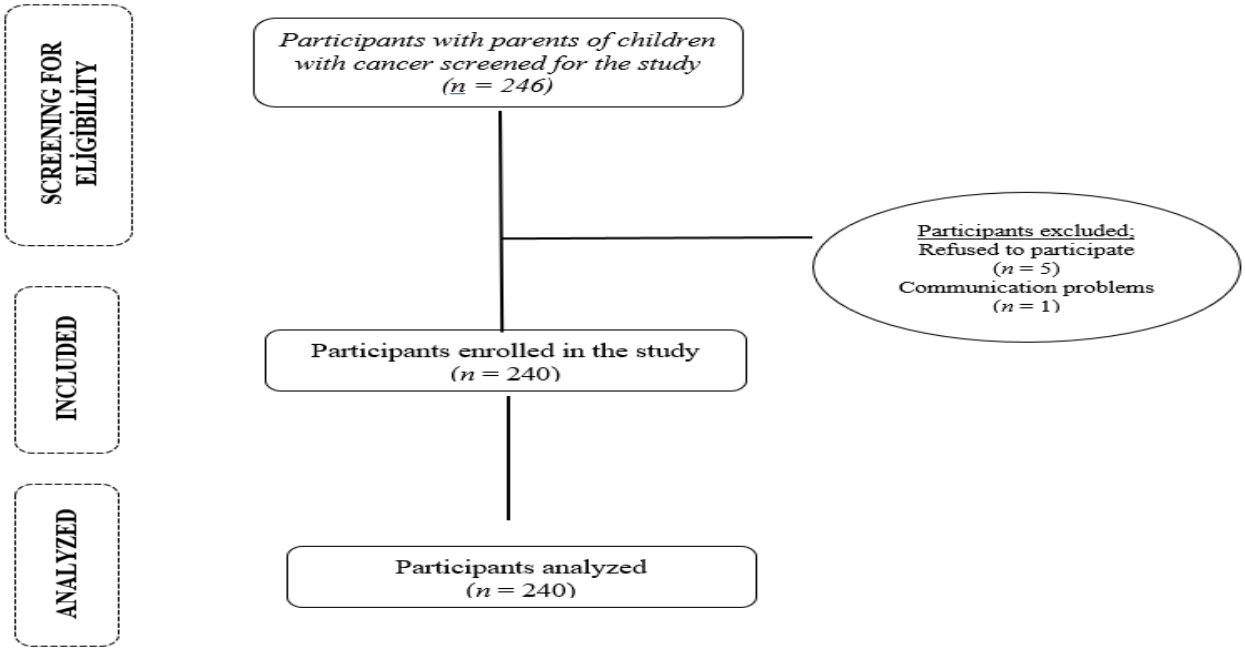



**Figure I.** Participant flow diagram.

### Data Collection Tools

In this study, data were collected using The Parent Information Form, The Multidimensional Scale of Perceived Social Support, The Family-Centered Care Assessment Scale and The Caregiver Quality of Life Index-Cancer.

The Parent Information Form, devised by the researchers and informed by pertinent literature, comprises 12 items. Its objective is to gather data on variables that may influence parents' perceived social support and quality of life. These variables encompass the parent's age, gender, educational and employment status, and income, along with details regarding the child's age, gender, diagnosis, and duration since diagnosis. Additionally, the form captures information on family type, the presence of support-providing individuals, and the frequency of interactions among family members (3,10).

The Multidimensional Scale of Perceived Social Support (MSPSS), developed by Zimet et al. (4), underwent a Turkish validity and reliability study conducted by Eker and Akar (21), with subsequent revisions in 2001 by the same authors. Comprising 12 items, the scale encompasses three subscales, each consisting of 4 items that inquire about the source of support, namely family, friends, and a special person. Responses are recorded on a 7-point Likert-type scale, where higher scores signify elevated perceived social support. The overall internal consistency coefficient of the scale is reported as 0.89 (4,21). In this study, the Cronbach alpha value of the scale was found to be 0.88.

The Family-Centered Care Assessment Scale (FCCAS), developed by Arslan et al. (22), underwent validation and reliability testing in the Turkish context. This five-point Likert-type scale comprises 21 items, rated on a scale of 1 (never) to 5 (always), distributed across three subscales: support, cooperation, and respect. The Cronbach's alpha coefficient for the overall scale is reported as 0.72, and factor loading values range from 0.46 to 0.75. The scale's scoring ranges from 21 to 105, with higher scores indicating an increased parental perception of family-centered care (22). In this study, the Cronbach alpha value of the scale was found to be 0.78.

The Caregiver Quality of Life Index-Cancer (CQOLC), developed by Weitzner et al. in 1999 (23), underwent Turkish validity and reliability assessment by Bektas and Özer (24). This scale is designed to assess the impact of

caregiving on the quality of life and comprises 25 items distributed across four subscales: physical functions, emotional functions, family functions, and social functions. Responses to scale items are recorded on a Likert-type scale ranging from 0 (not at all) to 4 (very much). The overall CQOLC score is derived by summing the scores of the 25 items, with reverse scoring applied to items with negative expressions. The total scale score ranges from 0 to 100, where higher scores indicate better quality of life. The overall internal consistency coefficient for the scale is reported as 0.88, and specific coefficients for the burden, discomfort, positive adaptation, and financial problems subscales are 0.83, 0.79, 0.73, and 0.77, respectively (23,24). In this study, the Cronbach alpha value of the scale was found to be 0.90, and the Cronbach alpha value for the burden, discomfort, positive adaptation, and financial problems subscales are 0.85, 0.80, 0.75, and 0.79, respectively.

**Data Collection Procedure**

Initially, all participants were duly apprised of the study's objectives and were requested to provide informed consent by signing a consent form. Subsequently, the principal researcher acpuired data through in-person interviews employing the parent information form, MSPSS, FCCAS, and CQOLC instruments. The data collection process for each participant consumed approximately 15-20 minutes.

**Ethical Considerations**

Initially, permissions from the owners of the employed measurement scales were obtained through electronic correspondence. Furthermore, institutional approval was secured, as the study garnered endorsement from the Dokuz Eylül University Non-Interventional Clinical Research Ethics Committee (Issue: 5666-GOA, 2020 / 22-01). The principal investigator expounded upon the study's objectives and procured verbal and written informed consent from each participant. Participants were explicitly afforded the option to withdraw from the study at any juncture without the necessity to furnish a justification.

**Statistical Analysis**

The data were analyzed using IBM SPSS Statistics version 23.0 (IBM Corp). Tests of normality, namely the Shapiro-Wilk test, histogram, and normal Q-Q plot, were employed for assessing normal distribution. Categorical variables were presented as frequency and percentage values, while normally distributed characteristics were summarized using mean and standard deviation values. To examine the influence of sociodemographic and disease-related characteristics on MSPSS, FCCAS, and CQOLC scores, T-test and ANOVA tests were conducted. The Bonferroni-corrected Mann-Whitney U test was employed to identify differences in age, educational status, and the age of the child. The predictive capacity of perceived social support and family-centered care assessment on caregivers' quality of life was assessed through linear regression analysis. To examine multicollinearity among perceived social support, family-centered care assessment, and caregivers' quality of life, VIF and tolerance analyses were performed, with inclusion criteria set at VIF < 10, tolerance < 0.2, and condition index < 15 for independent variables (25). Results were interpreted with a 95% confidence interval, and statistical significance was set at $p < 0.05$.

## RESULTS

According to the study findings, a significant proportion of participating parents (55.8%) fell within the 20-29 age group, with a predominant female representation (77.5%). Furthermore, 32.1% of parents reported a high school education, 53.8% were unemployed, 79.2% belonged to nuclear families, and 60% experienced financial strain with income falling short of expenses. Regarding the children involved, 75% were in the 0-5 age bracket, 31.3% were diagnosed with Acute Lymphoblastic Leukemia (ALL) and Acute Myeloid Leukemia (AML), 53.2% received a cancer diagnosis within the last 0-2 months, and 64.2% had hospitalizations lasting more than 7 days. Additionally, 60% of parents received support from their spouses, while 51.2% could only engage with their families once a week during their hospital stay. Statistical analyses showed that parents were homogeneously distributed regarding sociodemographic and disease-related variables ($p>0.05$).

The mean scores obtained by the parents in the study from MSPSS, FCCAS, and CQOLC scales are given in Table 1. A statistically significant difference was observed in the mean scores derived from MSPSS, FCCAS, and CQOLC scales based on various demographic variables, including the age, sex, education level, employment status, income status of parents of children with cancer, the age of the child, and the duration of hospitalization ($p<0.05$). However, no statistically significant difference was found in the mean scores based on the diagnosis and time of diagnosis ($p>0.05$, Table 2). Additionally, a statistically significant difference was noted between family type and the individual providing support in relation to MSPSS and FCCAS mean scores ($p<0.05$). However, no statistically significant difference was observed between these two variables and CQOLC mean scores ($p>0.05$, Table 2).

**Table 1.** Parents' mean scores from MSPSS, FCCAS, and CQOLC (n = 240)

| | Minimum | Maximum | Mean | SD |
|---|---|---|---|---|
| MSPSS | 15.00 | 78.00 | 41.72 | 29.13 |
| MSPSS Family Sub-scale | 5.00 | 26.00 | 13.94 | 9.68 |
| MSPSS Friends Sub-scale | 5.00 | 27.00 | 14.26 | 10.16 |
| MSPSS Significant Other Sub-scale | 5.00 | 25.00 | 13.51 | 9.28 |
| FCCAS | 30.00 | 105.00 | 56.03 | 34.24 |
| FCCAS Support Sub-scale | 14.00 | 50.00 | 26.04 | 16.70 |
| FCCAS Cooperation Sub-scale | 10.00 | 40.00 | 21.47 | 12.96 |
| FCCAS Respect Sub-scale | 5.00 | 15.00 | 8.51 | 4.61 |
| CQOLC | 14.00 | 75.00 | 44.85 | 25.94 |

MSPSS: Multidimensional Scale of Perceived Social Support; FCCAS: Family-Centered Care Assessment Scale; CQOLC: Caregiver Quality of Life Index-Cancer; SD: Standart Deviation

**Table 2.** The effects of parents' sociodemographic and disease-related features on mean MSPSS, FCCAS, and CQOLC scores

| | | MSPSS | FCCAS | CQOLC |
|---|---|---|---|---|
| | | **Mean ± SD** | **Mean ± SD** | **Mean ± SD** |
| **Age (years)** | 20-29 years | 20.99 ± 14.66 | 33.73 ± 14.08 | 32.18 ± 22.22 |
| | 30-39 years | 64.58 ± 23.07 | 81.18 ± 33.16 | 60.63 ± 21.67 |
| | 40-49 years | 75.00 ± 10.36 | 90.67 ± 26.32 | 61.38 ± 19.89 |
| | **Test value** | *F: 225.072* | *F: 142.324* | *F: 51.487* |
| | [a]p | ***p: 0.000*** | ***p: 0.000*** | ***p: 0.000*** |
| **Gender** | Female | 37.32 ± 27.96 | 51.37 ± 32.35 | 42.29 ± 25.74 |
| | Male | 56.85 ± 28.22 | 72.11 ± 35.99 | 53.70 ± 24.86 |
| | **Test value** | *t: -4.508* | *t: -3.811* | *t: -2.945* |
| | [b]p | ***p: 0.000*** | ***p: 0.000*** | ***p:0.004*** |
| **Educational Level** | Primary School | 16.15 ± 4.16 | 15.68 ± 9.89 | 24.57 ± 14.57 |
| | Middle School | 19.01 ± 10.05 | 18.12 ± 10.79 | 33.43 ± 23.06 |
| | High School | 50.24 ± 28.77 | 65.00 ± 36.04 | 50.70 ± 25.88 |
| | Graduate | 73.33 ± 12.81 | 90.49 ± 27.13 | 62.24 ± 19.65 |
| | Postgraduate | - | - | - |
| | **Test value** | *F: 119.423* | *F: 78.842* | *F: 26.895* |
| | [a]p | ***p: 0.000*** | ***p: 0.000*** | ***p: 0.000*** |
| **Working Status** | Yes | *58.48 ± 27.55* | *74.09 ± 35.20* | *53.54 ± 24.50* |
| | No | *27.29 ± 21.87* | *40.50 ± 24.46* | *37.37 ± 24.87* |
| | **Test value** | *t: 9.603* | *t: 8.447* | *t: 5.061* |
| | [b]p | ***p: 0.000*** | ***p: 0.000*** | ***p: 0.000*** |
| **Income Status** | Less than income | *25.82 ± 20.92* | *38.79 ± 22.00* | *35.45 ± 23.95* |
| | Income is equal to expenses | *65.95 ± 22.76* | *81.89 ± 33.09* | *58.95 ± 22.24* |
| | More than income | - | - | - |
| | **Test value** | *F: 193.492* | *F: 146.930* | *F: 58.653* |
| | [a]p | ***p: 0.000*** | ***p: 0.000*** | ***p: 0.000*** |
| **Child's age (years)** | 0-5 years | *32.57 ± 25.95* | *46.20 ± 29.58* | *39.44 ± 25.28* |
| | 6-10 years | *63.72 ± 23.63* | *80.81 ± 32.80* | *60.48 ± 21.84* |
| | 11-18 years | *75.77 ± 8.67* | *91.33 ± 26.19* | *61.85 ± 19.66* |
| | **Test value** | *F: 52.594* | *F: 40.446* | *F: 17.917* |
| | [a]p | ***p: 0.000*** | ***p: 0.000*** | ***p: 0.000*** |
| **Diagnosis of the Child** | Acute Lymphoblastic Leukemia - Acute Myeloid Leukemia | *45.44 ± 30.17* | *58.05 + 34.69* | *45.66 + 26.17* |
| | Central Nervous System Tumor | *36.72 ± 27.68* | *52.30 ± 33.19* | *43.35 ± 26.08* |
| | Solid Tumors | *42.25 ± 28.03* | *57.62 ± 35.35* | *48.20 ± 26.67* |
| | Other Tumors | *42.42 ± 30.07* | *56.71 ± 34.65* | *43.24 ± 25.37* |
| | **Test value** | *F: 1.092* | *F: 0.389* | *F: 0.392* |
| | [a]p | ***p: 0.353*** | ***p: 0.761*** | ***p: 0.759*** |
| **Length of Stay in the Hospital** | Less than 7 days | *63.33 ± 25.07* | *79.17 ± 34.01* | *57.11 ± 23.53* |
| | 7 days and over | *29.64 ± 23.81* | *43.11 ± 26.83* | *38.01 ± 24.74* |
| | **Test value** | *t: 10.160* | *t: 8.468* | *t: 5.919* |
| | [b]p | ***p: 0.000*** | ***p: 0.000*** | ***p: 0.000*** |
| **Child's Diagnosis Time** | 0-2 months | *40.91 ± 29.57* | *56.07 ± 34.48* | *43.36 ± 25.69* |
| | 3-5 months | *40.47 ± 28.15* | *54.25 ± 33.60* | *45.96 ± 26.38* |
| | 6 months and above | *60.75 ± 28.05* | *70.50 ± 36.41* | *51.58 ± 25.51* |
| | **Test value** | *F: 2.741* | *F: 1.209* | *F: .703* |
| | [a]p | ***p: 0.067*** | ***p: 0.300*** | ***p: 0.496*** |
| **Family Type** | Nuclear family | *45.71 ± 29.63* | *60.13 ± 35.34* | *45.65 ± 25.83* |
| | Large family | *26.54 ± 21.32* | *40.46 ± 24.25* | *41.84 ± 26.39* |
| | **Test value** | *t: 5.177* | *t: 4.594* | *t: .913* |
| | [b]p | ***p: 0.000*** | ***p: 0.000*** | ***p: 0.364*** |
| **Get Support Person** | Wife/husband | *35.75 ± 27.33* | *48.38 ± 30.58* | *42.39 ± 25.86* |
| | Family | *50.67 ± 29.58* | *67.52 ± 36.33* | *48.55 ± 25.75* |
| | Friend | - | - | - |
| | Other persons | - | - | - |
| | **Test value** | *F: 16.078* | *F: 19.374* | *F: 3.274* |
| | [a]p | ***p: 0.000*** | ***p: 0.000*** | ***p: 0.072*** |

*[a]ANOVA Test; [b] t Test;*p<0.05; SD: Standard Deviation*

Post hoc analysis using the Bonferroni-corrected Mann-Whitney U test revealed that the observed differences stemmed from the parent's age variable, particularly within the 20-29 age group, the level of education variable, specifically among parents with elementary and middle school education, and the age of the child variable, particularly within the 0-5 age group.

In the multiple regression analysis, a model was established to delineate the impact of perceived social support received by parents of children with cancer on their quality of life. According to Model 1, an increase in perceived social support corresponded to an elevation in the quality of life among parents. The model indicated that parents' perceived social support accounted for 54.7% of their quality of life varience. Notably, the family (β = 0.078), friends (β = 0.293), and other special persons (β = 0.079) subscales of the Multidimensional Scale of Perceived Social Support were identified as significant contributors to parents' quality of life (p > 0.05, Table 3).

**Table 3.** The level by which perceived social support of parents predicted their quality of life (n=240)

| | Caregiver Quality of Life Index-Cancer | | | | | | |
|---|---|---|---|---|---|---|---|
| | Model 1 | | | | | | |
| | Unstandardized Beta | Standard Error | Standardized Beta β | t | p | 95 % Confidence Interval | |
| | | | | | | Lower | Upper |
| **Multidimensional Scale of Perceived Social Support (MSPSS)** | | | | | | | |
| **MSPSS Family Sub-scale** | **0.135** | **0.062** | **0.078** | **2.182** | **0.029** | **0.102** | **0.205** |
| **MSPSS Friends Sub-scale** | **0.362** | **0.047** | **0.293** | **7.653** | **0.000** | **0.286** | **0.398** |
| **MSPSS Significant Other Sub-scale** | **0.187** | **0.080** | **0.079** | **2.330** | **0.020** | **0.176** | **0.209** |
| **R** | **0.739** | | | | | | |
| **$R^2$** | **0.547** | | | | | | |
| **F** | **94.931** | | | | | | |
| **p** | **0.000** | | | | | | |
| **Durbin Watson (1.5–2.5)** | **1.853** | | | | | | |

R: correlation; R2: correlation coefficient (explained variance ratio); F: model statistics; p: level of significance

According to the relationship between variables in multiple regression analysis, the effect of family-centered care assessments of parents of children with cancer on their quality-of-life levels was specified as a model. According to Model 2, increased mean scores of the parents from the family-centered care assessment scale increased the levels of quality of life. In the model, parents' family-centered care assessments explained 54.9% of the levels of quality of life. It was found that the quality-of-life level of the parents was significantly affected by the support (β = 0.261) and cooperation subscales (β = 0.078) of the family-centered care assessment scale. It was found that the quality-of-life level of the parents was not statistically significantly affected by the respect subscale of the family-centered care assessment scale (p>0.05, Table 4).

**Table 4.** The level by which family-centered care assessment of the parents predicted their quality of life (n=240)

| | Caregiver Quality of Life Index-Cancer | | | | | | |
|---|---|---|---|---|---|---|---|
| | Model 2 | | | | | | |
| | Unstandardized Beta | Standart Error | Standardized Beta β | t | p | 95 % Confidence Interval | |
| | | | | | | Lower | Upper |
| **Family-Centered Care Assessment Scale (FCCAS)** | | | | | | | |
| **FCCAS Support Sub-scale** | **0.404** | **0.049** | **0.261** | **8.289** | **0.000** | **0.398** | **0.463** |
| **FCCAS Cooperation Sub-scale** | **0.135** | **0.062** | **0.078** | **2.182** | **0.028** | **0.128** | **0.158** |
| **FCCAS Respect Sub-scale** | **-0.004** | **0.45** | **-0.002** | **-0.079** | **0.937** | **-0.016** | **-0.002** |
| **R** | **0.741** | | | | | | |
| **$R^2$** | **0.549** | | | | | | |
| **F** | **95.948** | | | | | | |
| **p** | **0.000** | | | | | | |
| **Durbin Watson (1.5–2.5)** | **2.383** | | | | | | |

R: correlation; $R^2$: correlation coefficient (explained variance ratio); F: model statistics; p: level of significance

## DISCUSSION

Childhood cancers are a health problem that causes disturbing symptom burden, decreases the quality of life, restricts both children and their parents throughout the entire illness, where family-centered care and perceived social support are important. Parents of children with cancer face many major challenges during this process (26). Considering the current literature, although the quality of life, perceived social support, and family-centered care in parents of children with cancer have been investigated as separate variables (13,15,16), as far as we know, this is the first study to examine the three variables together. This study unveiled statistically significant disparities in the mean scores of perceived social supports, family-centered care assessment, and quality of life scale across diverse demographic variables. These factors

encompassed the age, gender, educational attainment, employment status, and income level of parents with children diagnosed with cancer, as well as the age and duration of hospitalization of the affected child.

Turkish society has a family union that includes several generations living together, and extended parents are quite common. Therefore, parents' social support systems are well developed in Turkey (27). However, the mean perceived social support scale scores were found to be low, and this was thought to have stemmed from the fact that 79.2% of the participants had a nuclear family and that the social support decreased due to the long duration of chronic diseases such as cancer (41.72 + 29.13) (28,29). The chronic disease has a course that requires a long treatment and care process and causes an increased need for social support and decreased quality of life (28). Although the social support systems of individuals are strong in this period, this support may decrease over time due to the long process (28). Moreover, data for this study were gathered amid the backdrop of the COVID-19 pandemic, a contextual factor that may have exerted an influence on the observed outcomes. The COVID-19 pandemic has evolved into a multifaceted phenomenon, detrimentally impacting children grappling with chronic conditions such as cancer, along with their parents, both in terms of physical well-being and psychosocial dimensions (30,31). Due to the COVID-19 pandemic, parents had to restrict their social gatherings to protect against infection, face-to-face social relations had to be canceled, and parents were unable to request support from relatives when they needed help, all of which may have caused the perceived social support scale scores to be low. Considering the study results in the literature, the reasons for the low social support scores of the parents of children with cancer may be due to such differences (31). During the Covid-19 pandemic period in Turkey, some hospitals were completely dedicated to hematology-oncology patients, but the limited number of these hospitals may have reduced the perceived level of social support by limiting children and families from receiving family-centered care.

Family-centered care, which is one of the basic building blocks of pediatric nursing, also has an important place in the care of children with cancer and their parents (22). However, it is thought that the reasons for the low mean scores of the family-centered care assessment scale (56.03 + 34.24) of the participants may have been influenced by many factors. Among them, health professionals' busy working hours and the provision of care to a large number of patients may have come to the fore. In the literature, in the study of Boztepe and Kerimoğlu Yıldız (32), the most common obstacles faced by nurses when providing family-centered care were the intensive work pace and time management problems. Besides, the COVID-19 pandemic process may have increased the workload of healthcare professionals. Apart from this, it is thought that during the COVID-19 pandemic process, there may be problems in maintaining family-centered care due to reasons, such as the decrease in interpersonal interaction and the limitation of the time spent in patient rooms (33). According to the literature, parents attach importance to the time spent with nurses and the communication techniques employed when evaluating family-centered care (33). It is thought that reducing the time spent with patients and their families in order to reduce the risk of transmission during the Covid-19 period may have affected this situation. The low family-centered care assessment scale scores of the parents participating in the study may have been due to such differences.

The quality of life of caregivers of individuals diagnosed with cancer can be affected by many factors such as prognosis, survival rate, side effects of treatment, level of social support, quality of care, communication, family-centered care, stage of the disease, and type of treatment. Studies focus on the quality of life of parents as much as children with cancer (34,35). Nevertheless, it is thought that the mean scores of the participants from the quality of life scale may be low (44.85 + 25.94) due to reasons, such as the long duration of cancer treatment, the importance that people attach to their children, little social support, and dealing with many physical and psychosocial problems. Studies in the literature emphasize that many variables, including increased symptom burden of children, low perceived social support, and restricted social lives of parents, are effective in reducing the quality of life (11,29). The low quality of life scale scores of the parents participating in the study may have also been impacted by these differences.

Similar to previous study, it was determined in our study that factors, including the parents' age, gender, education level, employment and income status, age of the child, and the length of hospitalization, affected parents perceived social support, family-centered care assessment, and quality of life (34). The increased mean age of the parents, male gender, high education level, high income level, having a job, the increased mean age of the child, and shorter hospitalization period caused parents to get high scores from the perceived social support, family-centered care, and quality of life scales. The review of the literature indicated that the effect of the sociodemographic characteristics of the parents on the three main variables of the study was examined separately by several studies. Sociodemographic characteristics of parents such as age, number of children, gender, employment and educational status affect the meaning they give to social support and their coping mechanisms (5,9,36,37). Previous studies were also found to document these findings.

Upon scrutinizing the findings through the lens of the models devised in our study, Model 1 demonstrated a positive correlation, revealing that an elevation in the perceived social support among parents of children with cancer was associated with an improvement in their quality of life. One study corroborates the beneficial impact of social support on parents, underscoring a positive association with the child's level of adaptation to the disease process (6). Coping skills, social support, and symptoms and functionality of the child affect the parent’s quality of life (11,29). While the cancer diagnosis and treatment of the child increases the parents' need for social support, having a child with cancer can lead to social stigma and reduce access to social support especially when it is needed most (5). It has been stated in the literature that perceived support from family, friends or a special person has a positive relationship with the quality of life of people (11). The literature supports the finding in model 1. In this study, it was determined that the mean subscale scores of

the perceived social support scale were significantly effective in predicting the effect on the quality of life ($p < 0.05$).

According to the findings in terms of the models we created in our study, Model 2 showed that increased mean scores of parents from the family-centered care assessment scale increased their level of quality of life. The purpose of family-centered care includes healthcare professionals' provision of support to the child and the parents, collaboration with the child and the parents and informing them and increasing the quality of life of the child and parents by reducing the problems related to the disease and treatment (10). Family-centered care includes basic elements, such as respect, sharing information, family involvement in care, and cooperation with the family (3). Studies conducted to evaluate the contribution of family-centered care to parents have shown that family-centered care increases collaboration and communication between parents and nurses, reduces parental anxiety and depression levels, shortens the hospitalization period, and improves the parents' quality of life (38–40).Therefore, in various studies, it has been determined that parents are aware of the benefits of family-centered care and want to be involved in the care process of the child in the hospital (40). In a study conducted with the parents of children with cancer investigating the effect of family-centered care on the care burden and quality of life of the parents, it was found that family-centered care reduced the care burden of parents and increased their quality of life (10). The findings in the literature were found to align with and support the outcomes observed in Model 2. Specifically, our study revealed that the mean scores of the support and cooperation subscale within the family-centered care assessment scale significantly influenced the prediction of their impact on the quality of life ($p < 0.05$). Conversely, the respect subscale exhibited no significant effect ($p > 0.05$). This discrepancy is conjectured to stem from the gravity of the cancer diagnosis, whereby parents, engrossed in prolonging their child's life, may prioritize support and cooperation over considerations of respect in their interactions with healthcare professionals.

**Limitations**

Notwithstanding several commendable aspects of this study, certain limitations warrant consideration. Firstly, the utilization of a convenience sample introduces a potential constraint, impacting the generalizability of the study findings. Secondly, the data collection occurred amid the backdrop of the COVID-19 pandemic, constituting a contextual factor that may have influenced the results. Thirdly, the inclusion of parents of children diagnosed with hematologic and oncologic cancer presents a limitation, as the specific diagnosis of the child represents a notable variable that can influence the family's quality of life. Future studies are encouraged to address this limitation by strategic planning and consideration of the diverse impact of different diagnoses on family outcomes. The final limitation is that the time the child is diagnosed with cancer, a factor that affects the parent's quality of life and perception of social support, has been overlooked. Future studies may be recommended to plan studies that include parents of children diagnosed with cancer at different stages.

## CONCLUSION

This study is valuable in that it demonstrates the effect of perceived social support and family-centered care assessments on the quality of life. In this study, it was determined that various demographic variables such as age, gender, education level, employment status, income status of parents of children with cancer, age of the child and length of hospital stay affected the mean scores obtained from MSPSS, FCCAS and CQOLC scales. The trajectory of childhood cancer significantly impacts the quality of life for parents. This study is pivotal in elucidating the impact of perceived social support and family-centered care assessment on the quality of life among parents with children afflicted by cancer. Even in instances where cancer treatment attains success, the restoration of an everday life can entail a protracted and arduous process. Empowering parents to navigate this post-treatment phase with positive outcomes is imperative. Enhanced parental empowerment, crucial for an improved quality of life, can be achieved through augmenting perceived social support and implementing family-centered care initiatives. It is incumbent upon nurses to proactively engage in interventions that underscore their expanded roles. These interventions encompass the promotion of family-centered care practices, provision of social support, cultivation of coping skills, and sustained involvement with parents throughout the entirety of the cancer care continuum.

In light of the findings from this study, it is imperative for nurses to be cognizant of the potential impacts of perceived social support and family-centered care on the quality of life. When assessing the quality of life in clinical practice, nurses should systematically consider both perceived social support and family-centered care. Notably, nurses should be attentive to the fact that parents experiencing limited social support and facing challenges in accessing family-centered care may exhibit a diminished quality of life. Consequently, nursing care plans should incorporate considerations for these variables. Regular training programs focusing on the family-centered care approach in pediatric oncology clinics are essential. Furthermore, the routine implementation of family-centered care in clinics, along with its institutional adoption as a policy, is recommended. Consideration should be given to organizing hospital facilities to cater to the specific needs of parents and children, including designated spaces such as training rooms and interview rooms. Future research endeavors should explore the relationship between perceived social support, family-centered care, and quality of life in diverse populations to garner a more comprehensive understanding of these dynamics.

**Authors' Contributions:** Idea/Concept: A.A.K.; Design: A.A.K.; Data Collection and/or Processing: A.A.K.; Analysis and/or Interpretation: A.A.K.; Literature Review: A.A.K.; Writing the Article: A.A.K., M.B.; Critical Review: A.A.K., M.B.

## REFERENCES

1. Linder, Hooke MC. Symptoms in children receiving treatment for cancer—Part II: Pain, sadness, and symptom clusters. Journal of Pediatric Oncology Nursing. SAGE Publications Inc.; 2019; 36(4): 262-79. https://doi.org/10.1177/104345421984957

2. Tan R, Koh S, Wong ME, Rui M, Shorey S. Caregiver stress, coping strategies, and support needs of mothers caring for their children who are undergoing active cancer treatments. SAGE PublicationsSage CA: Los Angeles, CA; 2019; 29(7): 460-8. https://doi.org/10.1177/1054773819888099
3. Kokorelias KM, Gignac MAM, Naglie G, Cameron JI. Towards a universal model of family centered care: A scoping review. BMC Health Serv Res. 2019; 19(1): 1-11. https://doi.org/10.1186/s12913-019-4394-5
4. Zimet GD, Powell SS, Farley GK, Werkman S, Berkoff KA. Psychometric characteristics of the Multidimensional Scale of Perceived Social Support. J Pers Assess. Lawrence Erlbaum Associates; 1990; 55(3–4): 610-7. https://doi.org/10.1080/00223891.1990.9674095
5. Stephanie J, Hilário M. Social support perceived by family and caregivers of children with cancer. International Journal of Pediatrics. 2019; 7: 29. https://doi.org/10.12974/2311-8687.2019.07.4
6. Pietnoczko M, Steuden S. The need for social support and the health condition of parents of children with cancer. Palliative Medicine in Practice. Via Medica; 2020; 14(3): 156-74. https://doi.org/10.5603/PMPI.2020.0014
7. Beyza S, Alyüz A. Sosyal desteğin birey yaşamında önemi ve sosyal hizmet. Journal of Education in Muslim Societies and Communities. 2020; 4(1): 115-34.
8. Hill C, Knafl KA, Santacroce SJ. Family-centered care from the perspective of parents of children cared for in a pediatric ıntensive care unit: An integrative review. Journal of Pediatric Nursing. 2018; 41: 22-33. https://doi.org/10.1016/j.pedn.2017.11.00
9. Mooney-Doyle K, dos Santos MR, Woodgate RL. Family-centered care in pediatric oncology. Pediatric Oncology Nursing: Defining Care Through Science. 2020; 7-19. https://doi.org/10.1007/978-3-030-25804-7_2
10. Deribe L, Girma E, Lindström N, Gidey A, Teferra S, Addissie A. Association of family-centered care with psychological distress among caregivers of children with cancer at a tertiary-level hospital in Ethiopia: Cross-Sectional study. JMIR Cancer. 2024; 10(1): e54715. https://doi.org/10.2196/54715
11. Toledano-Toledano F, Moral de la Rubia J, Nabors LA, Domínguez-Guedea MT, Salinas Escudero G, Rocha Pérez E, et al. Predictors of quality of life among parents of children with chronic diseases: A cross-sectional study. Healthcare. 2020; 8(4): 456. https://doi.org/10.3390/healthcare8040456
12. Modanloo S, Rohani C, Shirinabadi Farahani A, Vasli P, Pourhosseingholi A. General family functioning as a predictor of quality of life in parents of children with cancer. Journal of Pediatric Nursing. 2019; 44: e2–8. https://doi.org/10.1016/j.pedn.2018.08.013
13. Kudubes AA, Bektas M, Ugur O. Symptom frequency of children with cancer and parent quality of life in Turkey. Asian Pacific Journal of Cancer Prevention. 2014; 15(8): 3487-93.
14. Cassidy T, McLaughlin M. Caring for a child with cancer: The role of attachment, self-compassion and social support. Child Care in Practice. 2024; 30(3): 305-17. https://doi.org/10.1080/13575279.2021.1920369
15. Witt WP, Litzelman K, Wisk LE, Spear HA, Catrine K, Levin N, et al. Stress-mediated quality of life outcomes in parents of childhood cancer and brain tumor survivors: A case-control study. Quality of Life Research. 2010; 19(7): 995-1005. https://doi.org/10.1007/s11136-010-9666-9
16. Wong M, Ratner J, Gladstone KA, Davtyan A, Koopman C. Children's perceived social support after a parent is diagnosed with cancer. J Clin Psychol Med Settings. 2010; 17(2): 77-86. https://doi.org/10.1007/s10880-010-9187-2
17. Boyden JY, Hill DL, Carroll KW, Morrison WE, Miller VA, Feudtner C. The association of perceived social support with anxiety over time in parents of children with serious illnesses. J Palliat Med. 2020; 23(4): 527-34. https://doi.org/10.1089/jpm.2019.0387.
18. Ozdemir Koyu H, Tas Arslan F. The effect of physical and psychosocial symptoms on caregiver burden of parents of children with cancer. Eur J Cancer Care. 2021; 30(6): e13513. https://doi.org/10.1111/ECC.13513
19. Lam W, Leung DYP, Li SF, Yi YZ, Wang HX, Zhou L, et al. Parental stress as the mediator between symptom burden and the quality of life of chinese children with cancer. Cancer Nurs. 2022; 45(5): E775-81. https://doi.org/10.1097/NCC.0000000000001032
20. Faul F, Erdfelder E, Buchner A, Lang AG. Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. Behav Res Methods. 2009; 41(4): 1149-60. https://doi.org/10.3758/BRM.41.4.1149/METRICS
21. Eker D, Akar H. Cok boyutlu algılanan sosyal destek olceginin gozden gecirilmis formunun faktor yapisi, gecerlik ve guvenirligi. Turk Psikiyatri Derg. 2001; 12: 17-25.
22. Arslan FT, Geckil E, Aldem M, Celen R. The family-centered care assessment scale: development and psychometric evaluation in a Turkish Sample. Journal of Pediatric Nursing. 2019; 48: e35-41. https://doi.org/10.1016/j.pedn.2019.06.001
23. Weitzner MA, Jacobsen PB, Wagner H, Friedland J, Cox C. The Caregiver Quality of Life Index-Cancer (CQOLC) scale: Development and validation of an instrument to measure quality of life of the family caregiver of patients with cancer. Quality of Life Research. 1999; 8(1–2): 55-63. https://doi.org/10.1023/A:1026407010614
24. Bektas HA, Ozer ZC. Reliability and validity of the caregiver quality of life index-cancer (CQOLC) scale in Turkish cancer caregivers. J Clin Nurs. 2009; 18(21): 3003-12. https://doi.org/10.1111/j.1365-2702.2009.02915.x
25. Cattaneo MD, Titiunik R, Vazquez-Bare G. Power calculations for regression-discontinuity designs. The Stata Journal: Promoting communications on

statistics and Stata. DPC Nederland; 2019; 19(1): 210-45. https://doi.org/10.1177/1536867X19830919
26. Bhakta N, Force LM, Allemani C, Atun R, Bray F, Coleman MP, et al. Childhood cancer burden: a review of global estimates. Lancet Oncol. 2019; 20(1): e42–53. https://doi.org/10.1016/S1470-2045(18)30761-7
27. Zabriskie RB, Aslan N, Williamson M. Turkish family life: A study of family leisure, family functioning, and family satisfaction. J Leis Res. 2018; 49(1): 8-27. https://doi.org/10.1080/00222216.2018.1425049
28. Schneider-Matyka D, Libersbach E, Szkup M, Stanisławska M, Starczewska M, Grochans E. The assessment of social support provided for and stress-coping strategies adopted by parents of chronically ill children. Nursing Problems. 2018; 26(2): 164-70. https://doi.org/10.5114/ppiel.2018.78875
29. Nursyamsiyah N. Social support of parents of children with Leukemia. Belitung Nurs J. Belitung Nursing Journal. 2019; 5(4): 155-61. https://doi.org/10.33546/bnj.792
30. Kotecha RS. Challenges posed by COVID-19 to children with cancer. Lancet Oncol. 2020; 21(5): e235. https://doi.org/10.1016/S1470-2045(20)30205-9
31. Nerli RB, Adarsh S, Manas S, Shridhar G. COVID-19 pandemic: A challenge to a child with cancer. Pediatr Blood Cancer. 2020; 67(9): 1-2. https://doi.org/10.1002/pbc.28512
32. Boztepe H, Kerimoğlu Yıldız G. Nurses perceptions of barriers to implementing family-centered care in a pediatric setting: A qualitative study. Journal for Specialists in Pediatric Nursing. 2017; 22(2): e12175. https://doi.org/10.1111/jspn.12175
33. Almasri NA, An M, Palisano RJ. Parents' perception of receiving family-centered care for their children with physical disabilities: A Meta-Analysis. Phys Occup Ther Pediatr. 2018; 38(4): 427-43. https://doi.org/10.1080/01942638.2017.1337664
34. Bürger Lazar M, Musek J. Well-being in parents of children with cancer: The impact of parental personality, coping, and the child's quality of life. Scand J Psychol. 2020; 61(5): 652-62. https://doi.org/10.1111/sjop.12653
35. Vercasson C, Auquier P, Michel G, Bertrand Y, Ansoborlo S, Tabone M, et al. Quality of life in parents of childhood leukemia survivors. A French childhood cancer survivor study for leukemia study. Pediatr Blood Cancer. 2020; 67(10). https://doi.org/10.1002/pbc.28419
36. Ilic V, Nikitovic M, Maric G, Jovanovic A, Paripovic L, Bokun J, et al. Assessment of health-related quality of life among parents of children with solid tumors in Serbia. Supportive Care in Cancer. 2020; 28(11): 5109-15. https://doi.org/10.1007/s00520-020-05348-6
37. Rensen N, Steur LM, Schepers SA, Merks JH, Moll AC, Kaspers GJ, et al. Gender-specific differences in parental health-related quality of life in childhood cancer. Pediatr Blood Cancer. 2019; 66(7): e27728. https://doi.org/10.1002/pbc.27728
38. Krishnamurthy, Sarin R. Quality of life of Indian children with cancer: Measuring what matters. Cancer Research, Statistics, and Treatment. 2020; 3(3): 566. https://doi.org/10.4103/CRST.CRST_275_20
39. Lo HHM. Quality of life among adolescents in Hong Kong: General and gender-specific effects of self-efficacy and mindfulness: A special issue on quality of life in Chinese societies in applied research in quality of life. Appl Res Qual Life. 2021; 1-24. https://doi.org/10.1007/s11482-021-09914-w
40. Salvador Á, Crespo C, Barros L. The benefits of family-centered care for parental self-efficacy and psychological well-being in parents of children with cancer. J Child Fam Stud. 2019; 28(7): 1926-36. https://doi.org/10.1007/s10826-019-01418-4

Araştırma Makalesi / Research Article

Sağlık Bilimlerinde Değer / Sağlık Bil Değer
Value in Health Sciences / Value Health Sci
ISSN: 2792-0542 sabd@duzce.edu.tr 2025; 15(2): 266-274
doi: https://dx.doi.org/10.33631/sabd.1616453

# The Effect of Mother's Voice, Music Voice and White Noise Methods on Pain and Physical Parameters during Venipuncture in Newborn: A Randomized Controlled Study

Fetiye KURNAZ[1], Dilek KONUK ŞENER[2]

**ABSTRACT**

**Aim:** The study was conducted to determine the effect of recorded mother's voice, music voice and white noise methods during the venipuncture procedure on pain level and physiological parameters in newborns.

**Material and Methods:** The study was a randomized controlled trial. The sample of the study consist of 80 newborns (recorded mother's voice group=20, music voice group=20, white noise=20, control group=20), according to the result of the power analysis. During the venipuncture process, the newborns in the experimental group were listened to the recorded mother's voice, music voice and white noise, while the newborns in the control group were only given routine venipuncture.

**Results:** When the research results were evaluated, it was determined that the pain levels of the newborns in the recorded mother's voice, music voice and white noise groups were significantly lower during and after the procedure compared to the control group ($p<0.05$). Pain levels of the recorded mother's voice group were significantly lower than those of the music voice and white noise ($p<0.05$). When the physiological parameter results were evaluated, it was determined that the most positive result in respiration values were in the white noise group ($p<0.05$).

**Conclusion:** It was observed that mother's voice, music voice and white noise methods are effective in reducing pain and regulating physiological parameter values during venipuncture in newborns. In line with these results, it is recommended that neonatal healthcare professionals use mother's voice, music sound, and white noise methods as non-pharmacological techniques.

**Keywords:** Mother's voice; music voice; newborn; pain; white noise.

# Yenidoğanlara Venöz Kan Alma Girişimi Sırasında Dinletilen Anne Sesi, Müzik Sesi ve Beyaz Gürültünün Ağrı Düzeyi ve Fizyolojik Parametrelere Etkisi: Randomize Kontrollü Çalışma

**ÖZ**

**Amaç:** Araştırma, yenidoğanlara venöz kan alma girişimi sırasında dinletilen anne sesi, müzik sesi ve beyaz gürültü yöntemlerinin ağrı düzeyi ve fizyolojik parametrelere etkisini belirlemek amacı ile yapılmıştır.

**Gereç ve Yöntemler:** Araştırma randomize kontrollü deneysel çalışmadır. Araştırmanın örneklemini yapılan güç analizi sonucuna göre 80 yenidoğan (anne sesi grubu=20, müzik sesi grubu=20, beyaz gürültü=20, kontrol grubu=20) oluşturmuştur. Girişim grubundaki yenidoğanlara kan alma işlemi sırasında kayıtlı anne sesi, müzik sesi ve beyaz gürültü dinletilirken, kontrol grubundaki yenidoğanlara sadece rutin kan alma işlemi gerçekleştirilmiştir.

**Bulgular:** Araştırma sonuçları değerlendirildiğinde, kayıtlı anne sesi, müzik sesi ve beyaz gürültü gruplarındaki yenidoğanların işlem sırasında ve sonrasındaki ağrı düzeylerinin kontrol grubuna göre anlamlı derecede düşük olduğu belirlenmiştir ($p<0,05$). Anne sesi grubunun ağrı düzeyi, müzik sesi ve beyaz gürültü grubuna göre anlamlı derecede düşük bulunmuştur ($p<0,05$). Fizyolojik parametre sonuçları değerlendirildiğinde, solunum değerlerinde en olumlu sonucun beyaz gürültü grubunda olduğu belirlenmiştir ($p<0,05$).

**Sonuç:** Yenidoğanlarda kan alma girişimi sırasında oluşan ağrıyı azaltmada ve fizyolojik parametre değerlerini düzenlemede anne sesi, müzik sesi ve beyaz gürültü yöntemlerinin etkili olduğu görülmüştür. Bu sonuçlar doğrultusunda, yenidoğan sağlık çalışanlarının anne sesi, müzik sesi ve beyaz gürültüyü farmakolojik olmayan yöntemler olarak kullanması önerilmektedir.

**Anahtar Kelimeler:** Anne sesi; müzik sesi; yenidoğan; ağrı; beyaz gürültü.

1 World Bank Family Health Center, Duzce, Türkiye
2 Duzce University Faculty of Health Sciences, Department of Pediatric Nursing, Duzce, Türkiye.
Sorumlu Yazar / Corresponding Author: Dilek KONUK ŞENER, e-mail: dilekkonuk@duzce.edu.tr
Geliş Tarihi / Received: 09.01.2025, Kabul Tarihi / Accepted: 18.03.2025

## INTRODUCTION

Pain is among the most common symptoms during various medical interventions, especially in newborns and children (1-3). Newborns are exposed to various invasive procedures for diagnosis and treatment in neonatal intensive care units (NICU) (1,4). It was reported that newborns in the NICU were exposed to an average of 7.5-17.3 painful procedures per day. The most common procedures were heel lance, suctioning, venipuncture and insertion of peripheral venous catheter (4).

Newborns are vulnerable to neurodevelopmental changes from painful stimuli. Because the nervous system of the newborn is immature and undergoes significant developmental changes (5). Excess and long-term unrelieved pain can cause physiological, metabolic and psychological problems in the short and long term (5,6). Therefore, pain management of newborns is very important during invasive procedures (1,6).

Pharmacologic, non-pharmacologic or both methods are used in neonatal pain management (7-9). Non-pharmacological methods have benefits such as low cost, no side effects and increased the effects of analgesics or reduced the amount of their use (2,9,10). Studies report that non-pharmacological methods used during painful procedures, such as venipuncture, are very effective in relieving pain in newborns (1,3,7-9). Examples of non-pharmacological methods applied in newborns include kangaroo care, massage, swaddling, nonnutritive sucking, sweet solutions, breast feeding, fetal position, comforting, touching, aromatherapy, white noise, music sound, lullaby singing, mother and father's voice (3,10,11). Among these methods, auditory stimulants are highly effective as a cognitive strategy to reduce neonatal pain (7).

It is accepted that the fetus perceives sounds and reacts from the 26-28th week of gestational age (1,11). The fetus can recognize, perceive and respond to the mother's voice at 32 weeks of gestation (1,12). In recent years, there have been studies that the mother's voice is a benign stimulus that can stabilize the physiological state of the newborn, reduce the level of pain, improve the quality of sleep, accelerate the feeding process, and promote its growth and development (1,12-14). Other effective newborn sounds include white noise and music voice (3,8,9,11,15). White noise is likened to the sound in the mother’s womb because it is a continuously monotonous sound in the form of a hum (11). It was reported that white noise has a sedative effect, reduces pain and anxiety and also promotes growth and development of newborns (9,11). Since music has the power to trigger physiological responses, it causes a feeling of relaxation, increasing comfort, and reducing the perception of pain and anxiety (3,8,11,15).

In recent years, studies (1,7,8,9,11-15) have demonstrated the effectiveness of mother's voice, music voice and white noise in relieving pain in newborns. However, there are no comparative studies in the literature that provide data as to which one of the three methods is more effective on pain and physical parameters. Accordingly, this study was conducted to determine the effect of recorded mother's voice, music voice and white noise methods during the venipuncture procedure on pain level and physiological parameters in newborns.

## MATERIAL AND METHODS

### Study design

The study was conducted as a randomized controlled trial with a parallel design.

### Participants and Setting

The population consisted of newborns who were admitted and treated in the Neonatal Intensive Care Unit of two university hospitals in Turkey. The sample was calculated with the Gpower 3.1 package program. The minimum number of newborns to be included per group was determined to be 17 newborns in each, with an effect size of 0.8, significance level of 0.05, and a power of 0.90. Considering possible drop-outs during the study, it was decided to include 20 newborns in each group. The study sample consisted of a total of 80 newborns who met the inclusion criteria. The inclusion criteria for the newborns were determined as being gestational aged between 37-41 weeks, birth weight of 2500 g and above, having no congenital or neurologic impairment; having no hearing loss or problem with ABR hearing test; being stable status of health, and undergoing venipuncture only once. The parents of the newborns gave written consent to participate in the study, as well.

### Randomization

The newborns who participated in the study were divided into four groups by randomization method. Randomization was done by simple lottery method. While forming the groups, the parents of the newborns drew cards, and the newborns were randomly assigned to one of the study groups. A total of four-color cards (red, blue, yellow and green) were used during the draw lots. Red, blue, yellow and green cards (20 each) were placed in an invisible bag. The newborn with a red card was placed in the recorded mother's voice group, the newborn with a blue card was placed in the white noise group, the newborn with a yellow card was placed in the music voice group, and the newborn with a green card was placed in the control group. A CONSORT 2010 flow diagram of the study is shown in Figure 1.

### Data collection instruments

Introductory Information Form

The introductory information form was developed by the researchers after a literature review (11,16). This form consists of questions about family and baby, including the newborn's date of birth, gestational week, gender, physical measurements, age and educational status of the parents.

Neonatal Infant Pain Scale

The Newborn Infant Pain Scale (NIPS) was developed by Lawrence et al in 1993 (17). Turkish validity and reliability were conducted by Akdovan and Yıldırım in 1999 (18). It is a scale that assesses the behavioral responses of preterm and term newborns to pain during interventional procedures. The six behavioural responses in the NIPS pain scale are facial expression, crying, arm and leg movements, alertness and breathing pattern. While two separate scores (0-1) are given for behaviors other than crying, three separate scores (0-1-2) are given

for crying. The total score ranges from 0 to 7, the higher the score, the more severe the pain. In the evaluation, 0-2 points indicate no pain; 3-4 points indicate mild, moderate pain, >4 points indicate severe pain (17,18).

Cronbach's alpha coefficient of NIPS was reported by Lawrence et al. (1993) as 0.95 before the procedure, 0.87 during the procedure and 0.88 after the procedure (17). Akdovan and Yıldırım (1999) found Cronbach's alpha coefficient between 0.83-0.86 (18). In this study, the Cronbach alpha coefficient of the scale was 0.91 before the procedure, 0.86 during the procedure and 0.81 after the procedure.

Physical Parameter Evaluation Form

This form was developed by the researchers as a result of the literature review (19,20). The form includes criteria to evaluate the physiological parameters of the newborn (oxygen saturation, pulse, temperature) before, during and after the procedure.

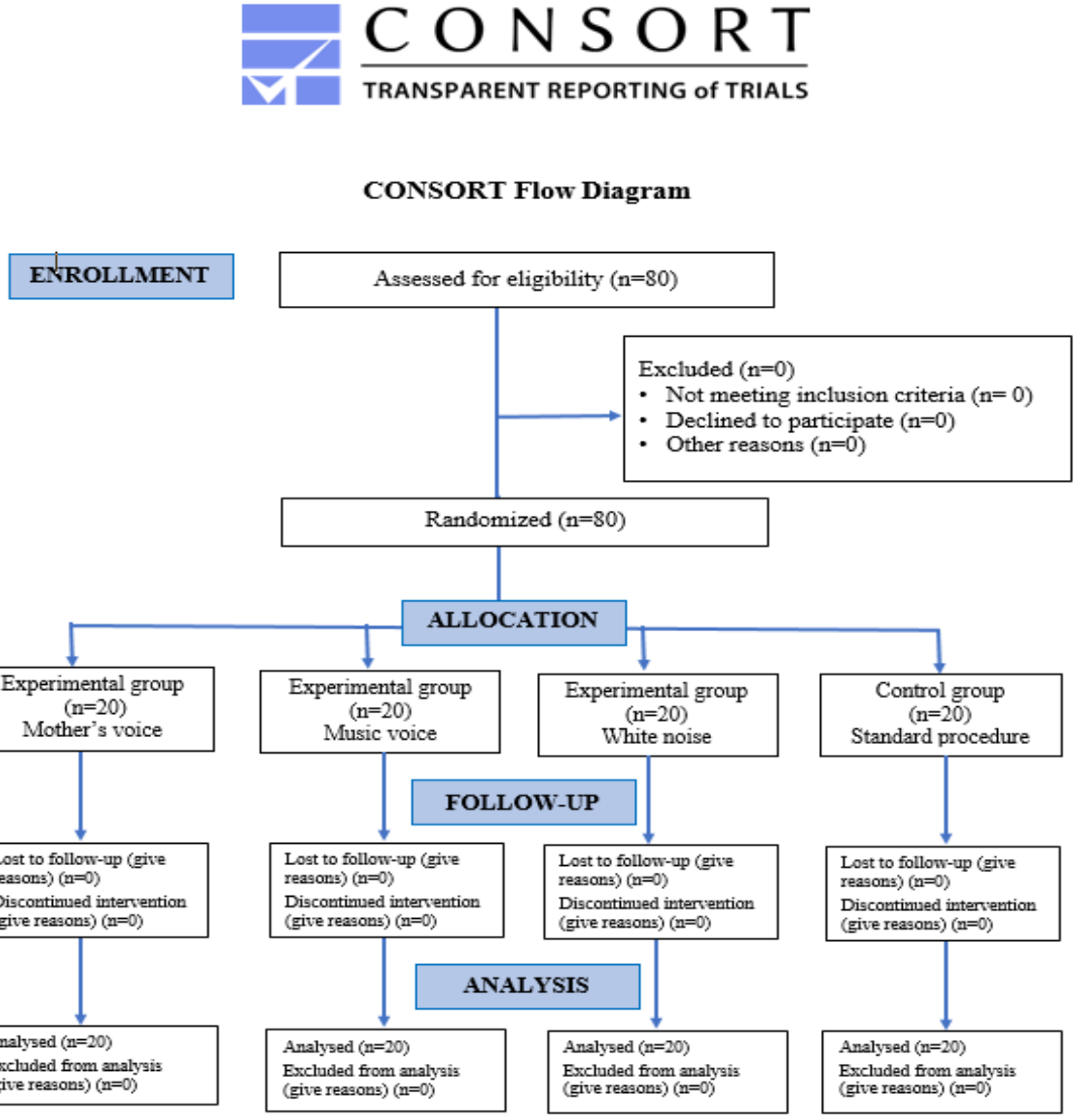



**Figure 1.** Consort flow diagram

**Data Collection**

During the data collection, the parents of the newborns who were admitted to the Neonatal Intensive Care Unit and met the inclusion criteria were informed about the study and provided their verbal and written consent. The researcher completed the "Introductory Information Form," by conducting face-to-face interviews with the parents of the newborns. Weight, height, head and chest circumference of the newborn were measured and recorded in the Introductory Information Form. The estimated time to complete the data collection tools was 15–20 min.

In the recorded mother's voice group, each newborn's own mother's voice was recorded on a voice recorder. In the music voice group, 'Mozart for Babies, Baby Music for Sleeping, Baby Songs' music was recorded on a voice recorder. The voice recorder with the mother's voice, music voice and white noise were played 50 cm away from

the newborn. The sound level for each newborn was determined as 55 decibels.

**Procedure**

Pain and physiological parameters of newborns were evaluated three times. The first evaluation was performed before the venipuncture procedure, the second evaluation was performed during the venipuncture procedure and the third evaluation was performed after the completion of the venipuncture procedure. Interventions of newborns were performed in the incubator.

In each of the four groups, pain level and physical parameter values of the newborns were measured and recorded before venipuncture procedure. After the first evaluation, the experimental groups newborn was allowed to listen to the mother's voice, music voice and white noise for two minutes (appropriate for their group). Experienced neonatal nurse performed the blood draw procedure in newborns. The venipuncture procedure was performed with needle number 21. The mother's voice, music and white noise continued to play during the procedure and until two minutes after the end of the procedure. The newborn in the control group received standard venipuncture procedures. The newborns in the control group were subjected to routine venipuncture procedures without any practice.

**Statistical Analysis**

The analyses of this study were conducted using the IBM SPSS Statistics 17 package program. Descriptive statistics of the continuous variables included in the study are expressed in mean, standard deviation, minimum, and maximum values, and descriptive statistics of categorical variables are expressed in frequency and percentage. When examining the differences between the groups, the Chi-Square test was used when examining the relationships between two independent categorical variables. Kolmogorov-Smirnov and Shapiro-Wilk's tests were used to determine whether the variables were normally distributed. When analyzing the intergroup differences, non-parametric Mann-Whitney U and Kruskal-Wallis-H tests were run in cases where the variables were not normally distributed. If significant differences were found in the Kruskal-Wallis-H test, the Post-Hoc Multiple Comparison Test was run to determine the groups between which a difference was obtained. When examining the differences between two dependent variables, the non-parametric Wilcoxon Test was run in cases where the variables were not normally distributed. When examining the differences between more than two dependent variables, the non-parametric Friedman's Two-Way ANOVA was run in cases where the variables were not normally distributed. The significance level was set at 0.05 (p-value) in statistical analyses.

**Ethical Considerations**

Written approval was obtained from the Non-Interventional Health Research Ethics Committee of a University to conduct the study (Decision No. 2017/141). Prior to the study, written permission was obtained from two university hospitals where the interventions would be performed. Since the answers should have been voluntarily given in all research for which data were gathered, the researcher attached importance to the

voluntary participation of the parents of the newborns included in the study. Furthermore, after the parents of the newborns were informed about the purpose of the study and the purposes for which the collected data would be used, they gave their consent (informed consent principle) verbally and in writing. The researcher followed the "principle of confidentiality" by explaining to the participants that their personal data would not be disclosed to others. Nurses and physicians working in the neonatal intensive care unit were informed about the purpose of the study and the data collection method.

## RESULTS

**Comparison of descriptive characteristics of newborns and parents**

When the descriptive characteristics of the newborns were compared in terms of the groups in Table 1, no statistically significant difference was found between the groups in terms of the variables of gender, gestational age, weight, height, chest circumference and head circumference measurements ($p>0.05$), and they had homogeneous characteristics.

When the descriptive characteristics of the parents were compared in terms of the groups in Table 2, no statistically significant difference was found between the groups in terms of the variables of age and educational level ($p>0.05$), and they had homogeneous characteristics.

**Comparison of pain values of newborns**

When the mean scores of the NIPS used to assess the pain levels that the newborns were analyzed in Table 3, it was determined that there was no statistically significant difference between the experimental and control groups in terms of NIPS scores before the procedure ($p>0.05$), while there was a statistically significant difference in terms of NIPS scores during and after the procedure ($p=0.001$, Table 3). Accordingly, it was found that the mean NIPS scores of newborns in the control group during and after the procedure were significantly higher than the scores of newborns in all experimental groups. Moreover, it was found that the NIPS scores of the newborns in the recorded mother's voice group during the procedure (3.80±1.47) were significantly lower than the scores of the newborns in the music voice group (4.45±1.61), white noise group (4.65±1.87), and the control group (6.05±0.83). It was observed that the similar relationship between the groups continued after the procedure. It was found that the NIPS scores of the newborns in the recorded mother's voice group after the procedure (1.00±0.97) were significantly lower than the scores of the newborns in the music voice group (1.35±1.18), white noise group (2.35±2.08), and the control group (3.35±2.08).

**Comparison of physiological parameter values of newborns**

When the physical parameter values of the newborn included in the study were compared in Table 4, no statistically significant difference was found between the groups for the variable "heart rate, SPO2 and temperature" ($p>0.05$).

**Table 1.** Comparison of descriptive characteristics of the newborns in terms of the groups

| | Mother's Voice (n=20) | | Music Voice (n=20) | | White Noise (n=20) | | Control (n=20) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Mean** | **SD** | **Mean** | **SD** | **Mean** | **SD** | **Mean** | **SD** | **H** | **p** |
| Gestation age (weeks) | 37.70 | 1.42 | 37.60 | 1.43 | 37.8 | 1.54 | 37.65 | 1.67 | 1.102 | 0.777 |
| Weight (g) | 2971.50 | 327.85 | 3104.00 | 533.04 | 3204.00 | 520.25 | 3074.25 | 461.16 | 1.398 | 0.706 |
| Height (cm) | 47.70 | 2.25 | 47.40 | 4.32 | 49.15 | 2.66 | 48.05 | 3.17 | 2.992 | 0.393 |
| Head circumference (cm) | 33.90 | 0.97 | 33.35 | 2.23 | 34.55 | 1.55 | 33.40 | 1.93 | 4.451 | 0.217 |
| Chest circumference (cm) | 32.35 | 1.09 | 31.65 | 2.37 | 32.60 | 1.47 | 31.6 | 1.88 | 4.401 | 0.221 |
| | **n** | **%** | **n** | **%** | **n** | **%** | **n** | **%** | **χ2** | **p** |
| **Gender** | | | | | | | | | | |
| Female | 7 | 35.0 | 9 | 45.0 | 8 | 40.0 | 8 | 40.0 | 0.417 | 0.937 |
| Male | 13 | 65.0 | 11 | 55.0 | 12 | 60.0 | 12 | 60.0 | | |

H: Kruskal-Wallis-H test, χ2: Chi-Square test, SD: Standard deviation

**Table 2.** Comparison of descriptive characteristics of the parents in terms of the group

| | Mother's Voice (n=20) | | Music Voice (n=20) | | White Noise (n=20) | | Control (n=20) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Mean** | **SD** | **Mean** | **SD** | **Mean** | **SD** | **Mean** | **SD** | **H** | **p** |
| **Mother's Age** | 36.65 | 3.79 | 28.85 | 4.70 | 31.65 | 5.80 | 28.75 | 4.24 | 4.552 | 0.208 |
| **Father's Age** | 32.60 | 5.54 | 32.70 | 5.06 | 33.40 | 5.92 | 32.75 | 5.95 | 0.291 | 0.962 |
| | **n** | **%** | **n** | **%** | **n** | **%** | **n** | **%** | **χ2** | **p** |
| **Mother's Education** | | | | | | | | | | |
| Illiterate | 1 | 5.0 | 1 | 5.0 | 0 | 0 | 0 | 0 | | |
| Primary School | 2 | 10.0 | 3 | 15.0 | 7 | 35.0 | 2 | 10.0 | - | 0.299 |
| Middle School | 4 | 20.0 | 3 | 15.0 | 4 | 20.0 | 4 | 20.0 | | |
| High School | 7 | 35.0 | 10 | 50.0 | 5 | 25.0 | 4 | 20.0 | | |
| University | 6 | 30.0 | 3 | 15.0 | 4 | 0,0 | 9 | 45.0 | | |
| Master’s degree | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5.0 | | |
| **Father's Education** | | | | | | | | | | |
| Illiterate | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Primary School | 4 | 20.0 | 6 | 30.0 | 5 | 25.0 | 4 | 20.0 | | |
| Middle School | 6 | 30.0 | 4 | 20.0 | 4 | 20.0 | 3 | 15.0 | - | 0.939 |
| High School | 7 | 35.0 | 5 | 25.0 | 6 | 30.0 | 5 | 25.0 | | |
| University | 3 | 15.0 | 5 | 25.0 | 5 | 25.0 | 7 | 35.0 | | |
| Master’s degree | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5.0 | | |

H: Kruskal-Wallis-H test, χ2: Chi-Square test, SD: Standard deviation

Although there was no statistically significant difference, it was observed that the heart rate and SPO2 values of the newborns in the experimental group were positively affected during and after the procedure compared to the control group. Furthermore, when the values of “respiration” were examined in the table, the respiration mean scores of the newborn in the white noise group during the procedure were significantly lower than those of the newborn in the recorded mother's voice, music voice and control groups ($p<0.05$).

**Table 3.** Comparison of NIPS scores according to groups and processing time

| | **Mother's Voice (n=20)** | | **Music Voice (n=20)** | | **White Noise (n=20)** | | **Control (n=20)** | | **H** | **p** | **Difference** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Mean** | **SD** | **Mean** | **SD** | **Mean** | **SD** | **Mean** | **SD** | | | |
| **NIPS** | | | | | | | | | | | |
| Before procedure | 0.35 | 0.93 | 1.30 | 1.78 | 1.15 | 1.76 | 1.30 | 2.03 | 7.271 | 0.064 | - |
| During procedure | 3.80 | 1.47 | 4.45 | 1.61 | 4.65 | 1.87 | 6.05 | 0.83 | 16.501 | **0.001** | **1-2<br>1-3<br>2-4** |
| After procedure | 1.00 | 0.97 | 1.35 | 1.18 | 2.35 | 2.08 | 3.35 | 2.08 | 20.323 | **0.001** | **1-2<br>2-4<br>3-4** |
| | F=32.648<br>**p=0.001<br>Difference<br>1-2<br>1-3<br>2-3** | | F=23.028<br>**p=0.001<br>Difference<br>1-2<br>2-3** | | F=25.794<br>**p=0.001<br>Difference<br>1-2<br>1-3<br>2-3** | | F=29.360<br>**p=0.001<br>Difference<br>1-2<br>1-3<br>2-3** | | | | |

H: Kruskal-Wallis-H test, F=Friedman test

**Table 4.** Comparison of physical parameter values according to groups and processing time

| | **Mother'sVoice (n=20)** | | **Music Voice (n=20)** | | **White Noise (n=20)** | | **Control (n=20)** | | **H** | **p** | **Difference** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Mean** | **SD** | **Mean** | **SD** | **Mean** | **SD** | **Mean** | **SD** | | | |
| **Heart rate** | | | | | | | | | | | |
| Before procedure | 132.45 | 23.50 | 137.00 | 26.82 | 143.80 | 20.01 | 136.30 | 18.46 | 4.737 | 0.192 | - |
| During procedure | 159.05 | 19.39 | 158.60 | 39.75 | 160.50 | 29.14 | 165.95 | 32.15 | 1.333 | 0.721 | - |
| After procedure | 150.40 | 18.53 | 147.85 | 24.15 | 157.05 | 27.17 | 150.05 | 32.78 | 2.961 | 0.398 | - |
| | **F=15.601<br>p=0.001<br>Difference<br>1-2<br>2-3** | | **F=15.367<br>p=0.001<br>Difference<br>1-2** | | **F=15.474<br>p=0.001<br>Difference<br>1-2<br>1-3** | | **F=9.564<br>p=0.008<br>Difference<br>1-2<br>2-3** | | | | |
| **Respiration** | | | | | | | | | | | |
| Before procedure | 47.45 | 3.27 | 44.00 | 3.93 | 43.75 | 4.79 | 43.80 | 6.49 | 8.784 | 0.032 | **1-4<br>3-4** |
| During procedure | 52.80 | 4.97 | 51.10 | 5.01 | 47.80 | 3.52 | 51.50 | 6.08 | 10.042 | **0.018** | **1-3<br>3-4** |
| After procedure | 47.00 | 4.77 | 47.25 | 6.44 | 48.10 | 4.76 | 50.70 | 5.78 | 4.86 | **0.182** | - |
| | F=19.948<br>**p=0.001<br>Difference<br>1-2<br>2-3** | | F=16.633<br>**p=0.001<br>Difference<br>1-2** | | F=20.757<br>**p=0.001<br>Difference<br>1-2<br>1-3** | | F=22.712<br>**p=0.001<br>Difference<br>1-2<br>1-3** | | | | |
| **SPO2** | | | | | | | | | | | |
| Before procedure | 98.90 | 10.685 | 96.05 | 5.44 | 96.90 | 5.15 | 96.10 | 3.92 | 11.274 | **0.010** | **1-4<br>2-4** |
| During procedure | 97.00 | 3.91 | 95.00 | 6.80 | 95.80 | 4.62 | 93.80 | 9.35 | 2.145 | 0.543 | - |
| After procedure | 98.20 | 2.42 | 97.45 | 2.39 | 96.25 | 4.31 | 95.05 | 5.84 | 2.207 | 0.581 | - |
| | F=4.508<br>p=0.105<br>Difference<br>- | | F=0.636<br>p=0.727<br>Difference<br>- | | F=3.915<br>p=0.141<br>Difference<br>- | | F=2.545<br>p=0.281<br>Difference<br>- | | | | |
| **Temperature** | | | | | | | | | | | |
| Before procedure | 37.05 | 0.10 | 36.96 | 0.41 | 37.13 | 0.46 | 37.00 | 0.48 | 1.259 | 0.739 | - |
| During procedure | 37.00 | 0.11 | 37.05 | 0.33 | 37.07 | 0.47 | 36.95 | 0.36 | 1.278 | 0.734 | - |
| After procedure | 36.99 | 0.11 | 36.95 | 0.52 | 37.09 | 0.53 | 36.96 | 0.46 | 1.727 | 0.621 | - |
| | F=4.933<br>p=0.085<br>Difference<br>- | | F=0.655<br>p=0.721<br>Difference<br>- | | F=1.303<br>p=0.521<br>Difference<br>- | | F=0.471<br>p=0.791<br>Difference<br>- | | | | |

H: Kruskal-Wallis-H test, F=Friedman test

## DISCUSSION

In this study, it was aimed to determine the effect of recorded mother's voice, music voice and white noise methods during the venipuncture procedure on pain level and physiological parameters in newborns. Newborns respond to pain in three ways: physiologically, hormonally and behaviorally (21,22). The response of newborns to pain intensity is not quantitative data. Therefore, physiological and behavioral responses are most commonly considered in pain assessment (22,23). Physiological changes include heart rate, respiratory rate, blood pressure, oxygen saturation and body temperature. Behavioral changes include facial expressions, crying, gross motoric movements, behavioral and functional changes. These reactions to pain may differ from one newborn to another. The gestational age, gender, and physical measurements significantly affect the perception of and response to pain in newborns (11,22). In addition, the similarity of the characteristics of the parents in the groups reduces bias and increases the reliability of the study. When the descriptive characteristics of the newborns and their parents in the experimental and control groups were analyzed, no statistically significant difference was found between the groups ($p>0.05$) (Table 1, Table 2). This shows that the newborn and parents in the experimental and control groups had similar descriptive characteristics, which increased the reliability of the research by reducing bias. The similarity of the groups according to these variables, which have the potential to alter newborn's perception of pain and response levels, is important as it shows the effect of experimental and control groups on newborn's pain level and physiological parameters. In this study, homogeneity was ensured between the groups and the results of the research were not affected. Likewise, a review of the literature shows that the groups showed a similar distribution in terms of the descriptive characteristics of the groups and the descriptive characteristics of their parents in other similar experimental studies that were conducted to assess newborn's pain (1,7,11,20,24).

When the pain level of newborns before the procedure was examined in the study, there was no statistically significant difference between the groups in terms of NIPS scores and the groups were homogeneous ($p>0.05$, Table 3). Similarity of characteristics between groups increases the reliability of the study and reduces bias. In the study, when the pain levels of newborns were compared during and after the venipuncture procedure; it was determined that the pain level of newborns in the recorded mother's voice group was lower than the music voice, white noise and the control group, and the difference between them was found to be statistically significant ($p<0.05$, Table 3). These results show that newborns in the recorded mother's voice group experienced less pain than newborns in the music voice, white noise and control groups and that the mother's voice method was more effective in relieving pain. This situation may be explained by the fact that the mother-infant relationship begins in the prenatal period. It is known that the mother's voice with a thin tone is perceived more clearly in fetal life and is familiar to newborns after birth. It is thought that listening to this familiar sound to the newborn relaxes the baby, establishes a sense of trust, and reduces stress, thus reducing the effect of the pain produced by the venipuncture. When the literature is reviewed, other studies report similar results. Chen et al., (1) it was determined that the mean pain score of the mother's voice group was significantly lower than the routine care groups and concluded that mother's voice reduced pain caused by venipuncture in newborns. In the study of meta-analysis Ding et al., (13) it was found that mothers' voice could reduce pain levels during and until 10 min after painful procedures compared with routine care. In other studies, it was determined that the mother's voice newborns listened to during painful procedures decreased the pain level (12,25,26). The mother's voice was effective on pain level in other studies which support the result of this study.

When other findings in the study were examined, it was determined that the respiration values of the newborns in the white noise group were positively affected during the procedure ($p<0.05$). This can be explained by the fact that when the newborn hears the familiar sounds of intrauterine life, this relaxes the baby and has positive effects on respiratory values. When similar studies in the literature were examined, it was determined that the respiration rate of newborns who listened to the white noise was positively affected. In the study of meta-analysis Ye et al., (9) it was found that white noise could reduce respiratory values in painful procedures compared with routine care. In other studies, it was determined that the white noise newborns listened to during painful procedures had a positive effect on their respiratory values (20,24,27).

The advantages of this study are the use of a randomized controlled trial design and that it is the first study to compare three different methods (recorded mother's voice, music voice and white noise) during venipuncture procedure in newborns. However, this study has some limitations. Since the research was conducted with newborns, it cannot be generalized to children in other stages of development.

## CONCLUSION

The results of the present study showed that recorded mother's voice, music voice and white noise methods applied to newborns during venipuncture procedures lowered pain levels and positively affected physical parameter values. Moreover, recorded mother's voice used as a non-pharmacological technique was a more effective method than music voice and white noise in reducing pain levels. Furthermore, it was determined that the most positive result in respiration values was in the white noise group.

Based on these results, it is recommended to include recorded mother's voice, music voice and white noise methods into nursing practices and care in order to lower the level of pain that develop during venipuncture procedures and to positively affect the physiological parameters of newborns. For an effective pain management in newborns, healthcare professionals should be trained, and the training should be repeated at certain times.

**ACKNOWLEDGEMENTS**
This study was accepted as a master's thesis in Department of Nursing of Duzce University Graduate Education Institute.

**Authors's Contributions:** Idea/Concept: F.K., D.K.Ş.; Design: F.K., D.K.Ş.; Data Collection and/or Processing: F.K.; Analysis and/or Interpretation: F.K., D.K.Ş.; Literature Review: F.K., D.K.Ş.; Writing the Article: D.K.Ş.; Critical Review: D.K.Ş.

**REFERENCES**

1. Chen Y, Li Y, Sun J, Han D, Feng S, Zhang X. The effect of maternal voice on venipuncture induced pain in neonates: a randomized study. Pain Manag Nurs. 2021; 22(5): 668-73. https://doi.org/10.1016/j.pmn.2021.01.002
2. Kudubeş AA, Bektaş İ, Bektaş M. Nursing role in children pain management. J Educ Res Nurs. 2021; 18(1): 107-13. https://doi.org/10.5152/jern.2021.91489
3. Viana TRF, Melo GMD, Cardoso MV LML, Almeida PCD, Oliveira LMD, Santos DADS. Pain in full term newborns submitted to music and swaddling during venipunctures. Rev Rene. 2020; 21(1): 1-8. https://doi.org/10.15253/2175-6783.202 02143904
4. Cruz MD, Fernandes AM, Oliveira CR. Epidemiology of painful procedures performed in neonates: a systematic review of observational studies. European Journal of Pain. 2016; 20(4): 489-98. https://doi.org/10.1002/ejp.757
5. Williams MD, Lascelles BDX. Early neonatal pain—a review of clinical and experimental implications on painful conditions later in life. Frontiers in pediatrics. 2020; 8(30): 1-18. https://doi.org/10.3389/fped.2020.00030
6. Salekin MS, Mouton PR, Zamzmi G, Patel R, Goldgof D, Kneusel M, et al. Future roles of artificial intelligence in early pain management of newborns. Paediatric and Neonatal Pain. 2021; 3(3): 134-45. https://doi.org/10.1002/pne2.12060.
7. Midilli TS, Ergin E. The effect of white noise and Brahms' lullaby on pain in infants during intravenous blood draw: a randomized controlled study. Alternative Therapies in Health and Medicine. 2023;6(11):1-8.
8. Pacheco A, Fernandes R, Marques G. The pain control in newborns and infants using music: Scoping review. Journal of Neonatal Nursing. 2024; 30: 200-4. https://doi.org/10.1016/j.jnn.2023.11.001
9. Ye X, Chen JQ, Zhu LL, Chui LB, Xu HZ. Intervention strategies for white noise alleviating procedural pain in newborns: A systematic review. J Clin Nurs. 2023; 32: 4265-82. https://doi.org/10.1111/jocn.16601
10. Shen Q, Huang Z, Leng H, Luo X, Zheng X. Efficacy and safety of non-pharmacological interventions for neonatal pain: An overview of systematic reviews. BMJ Open. 2022; 12(9): e062296. https://doi.org/10.1136/ bmjopen -2022-062296
11. Pekyigit A, Açıkgöz A. Effects of white noise and facilitated tucking during heel stick sampling on the pain response of healthy term newborns: A randomized controlled study. Journal of Pediatric Research. 2023; 10(1): 43-54. https://doi.org/10.4274/jpr.galenos.2022. 67799
12. Jin L, Zhang J, Yang X, Rong H. Maternal voice reduces procedural pain in neonates: A meta-analysis of randomized controlled trials. Medicine, 2023; 102(12): e33060. https://doi.org/10.1097/ MD.0000000000033060
13. Ding S, Huang X, Li X, Shen Y, Yang L. Effects of maternal voice on painful procedures in preterm and full-term infants: A systematic review and meta-analysis. Nursing in Critical Care. 2023; 28(3): 454-64. https://doi.org/10.1111/nicc.128 11
14. Lin CW, Liu HM, Liu CY, Chu YH, Wang ST, Chen, CW. Effects of parents' voice on reducing heel puncture pain in high-risk newborns: A randomized controlled trial. Nursing in Critical Care. 2024; 29(3): 521-31.
15. Papatzikis E, Agapaki M, Selvan RN, Hanson-Abromeit D, Gold C, Epstein S, Lok WV, Barda E, Pandey, V. Music medicine and music therapy in neonatal care: a scoping review of passive music listening research applications and findings on infant development and medical practice. BMC Pediatrics. 2024; 24(1): 829. https://doi.org/10.1186/s12887-024-05275-z
16. Çantaş Ayar A, Kahriman İ, Küçük Alemdar D, Özoran Y. Effect of using white noise, embracing and facilitated tucking on pain during heel lance blood sampling in newborns. Early Child Development and Care. 2023; 193(4): 547-58.
17. Lawrence J, Alcock D, McGrath P, Kay J, MacMurray SB, Dulberg C. The development of a tool to assess neonatal pain. Neonatal Network. 1993; 12(6): 59-66.
18. Akdovan T, Yıldırım Z. Assessment of pain in healthy neonates, investigation of the effects of pacifying and holding in the arms. Perinatal J. 1999; 7(2): 107.
19. İmseytoğlu D, Yıldız S. Music therapy in neonatal intensive care unit. Florence Nightingale Journal of Nursing. 2012; 20(2): 160-5.
20. Karakoç A, Türker F. Effects of white noise and holding on pain perception in newborns. Pain Management Nursing. 2014; 15(4): 864-70.
21. Eriksson M, Campbell Yeo M. Assessment of pain in newborn infants. Seminars in Fetal and Neonatal Medicine. 2019; 24(4): 101003. https://doi.org/10.1016/j.siny.2019.04.003.
22. Fitri SYR, Lusmilasari L, Juffrie M, Rakhmawati W. Pain in neonates: a concept analysis. Anesthesiology and Pain Medicine. 2019; 9(4): e92455. https://doi.org/10.5812/aapm.92455
23. Büyükgönenç L, Törüner EK. Pain and Nursing Management in Childhood. In: Pediatric Nursing. Ed. Conk, Z., Başbakkal, Z., Yılmaz, H.B, Bolışık, B. (pp. 893-911). Ankara: Akademisyen Publishing, 2018.
24. Kucukoglu S, Aytekin A, Celebioglu A, Celebi A, Caner I, Maden R. Effect of white noise in relieving vaccination pain in premature infants. Pain Management Nursing: Official Journal of the American Society of Pain Management Nurses.

2016; 17(6): 392-400. https://doi.org/10.1016/j.pmn.2016.08.006
25. Chen Y, Zhou L, Tan Y. The effect of maternal voice and non-nutritional sucking on repeated procedural pain of heel prick in neonates: a quasi-experimental study. BMC Pediatrics. 2024; 24(1): 256. https://doi.org/10.1186/s12887-024-047 38-7
26. Yu WC, Chiang MC, Lin KC, Chang CC, Lin KH, Chen CW. Effects of maternal voice on pain and mother–Infant bonding in premature infants in Taiwan: A randomized controlled trial. Journal of Pediatric Nursing. 2022; 63: e136-e142. https://doi.org/10.1016/j.pedn.2021.09.022
27. Ju M. Effectiveness of white noise intervention for relieving pain levels in neonatal heel blood collection. International Journal of Nursing, 2019; 24: 4186-7. https://doi.org/10.3760/cma.j.issn.167 3-4351.2019.24.045

Araştırma Makalesi / Research Article

Sağlık Bilimlerinde Değer / Sağlık Bil Değer
Value in Health Sciences / Value Health Sci
ISSN: 2792-0542 sabd@duzce.edu.tr 2025; 15(2): 275-281
doi: https://dx.doi.org/10.33631/sabd.1563535

# COVID-19 Pandemi Sürecinde Sağlıkta Şiddet: Beyaz Kod Verileri ile Retrospektif Bir Değerlendirme

Sibel GÜLEN[1], Tayfun ORMANKAYA[1]

**ÖZ**

**Amaç:** Bu çalışmada, Türkiye'nin batısında yer alan bir ilde il geneli beyaz kod bildirimlerinin incelenerek sağlık çalışanlarına yönelik şiddetin boyutlarının belirlenmesi ve COVID-19 pandemisinin şiddet üzerindeki etkisini değerlendirmek amaçlanmıştır.

**Gereç ve Yöntemler:** Retrospektif olarak yürütülen araştırmada 283 adet beyaz kod bildirimi pandemi öncesi ve sonrası gerçekleşme durumlarına göre değerlendirilmiştir. Çalışmaya Beyaz Kod İl Koordinatörlüğü sisteminde 11/03/2018 ve 11/03/2022 tarihleri arasında kayıtlı başvuruların tamamı dahil edilmiştir. Tanımlayıcı veriler yüzde ve frekans olarak hesaplanmış ve kategorik değişkenler arası ilişkiler ki-kare testi ile incelenmiştir. Sağlık çalışanlarına yönelik 283 bildirimden %51,95'i pandemi öncesi %48,05'i pandemi sürecinde gerçekleşmiştir

**Bulgular:** Pandemi öncesi ve sonrası süreç bazında farkları değerlendirmek üzere yapılan ki-kare analizinde şiddet uygulayan kişilerin özelliği (hasta/hasta yakını) ve kurum bazında istatistiksel olarak anlamlı fark olduğu bulunurken ($p<0,05$); şiddete maruz kalan cinsiyeti, saat, yer, şiddet türü, meslek, şiddet uygulayan cinsiyetinde istatistiksel olarak anlamlı fark olmadığı saptanmıştır.

**Sonuç:** Pandemi süreci, sağlık çalışanlarına yönelik şiddet profilini etkilemiş ve özellikle şiddeti gerçekleştiren kişilerin özellikleri ile kurumlar arasında farklılıklar yaratmıştır. Politika yapıcılar ve hastane yöneticilerinin, şiddet olaylarının önlenmesi amacıyla gerekli güvenlik önlemleri ve destek programlarını hayata geçirmesi gerekmektedir. Hastaların ve hasta yakınlarının şiddet davranışları ve kurum bazındaki farklılıkların ileri araştırmalar yapılarak incelenmesi kritik öneme sahiptir.

**Anahtar Kelimeler:** Beyaz kod; şiddet; pandemi; COVID-19; sağlık çalışanı.

## COVID-19 Pandemic: A Retrospective Evaluation with Code White Data

**ABSTRACT**

**Aim:** In this study, it was aimed to determine the extent of violence experienced by examining province-based white code notifications and to evaluate the impact of the pandemic on white code notification data by comparing the data before and after the pandemic.

**Material and Methods:** In the retrospective study, 283 white code notifications were evaluated according to their occurrence before and after the pandemic. All applications registered in the White Code Provincial Coordinatorship system between 11/03/2018 and 11/03/2022 were included in the study. Descriptive data were calculated as percentage and frequency, and the relationships between categorical variables were analysed by chi-square test. Of the 283 notifications to healthcare professionals, 51.95% occurred before the pandemic and 48.05% during the pandemic.

**Results:** In the chi-square analysis performed to evaluate the differences on the basis of the process before and after the pandemic, it was found that there was a statistically significant difference in the characteristics of the perpetrators of violence (patient / patient relatives) and the institution ($p<0.05$), while there was no statistically significant difference in the gender, time, place, type of violence, profession, and gender of the perpetrator.

**Conclusion:** The pandemic process has affected the profile of violence against healthcare workers and created differences between institutions, especially in the characteristics of the perpetrators of violence. Policy makers and hospital managers need to implement the necessary security measures and support programs to prevent violent incidents. It is critical to examine the violent behaviors of patients and their relatives and institutional differences through further research.

**Keywords:** Code White; violence; pandemic; COVID-19; healthcare worker

1 Düzce İl Sağlık Müdürlüğü Düzce, Türkiye

Sorumlu Yazar / Corresponding Author Sibel GÜLEN, e-mail: sibelgulen4@hotmail.com
Geliş Tarihi / Received: 08.10.2024, Kabul Tarihi / Accepted: 25.03.2025

## GİRİŞ

Sağlık çalışanlarına yönelik şiddet, günden güne artarak devam eden küresel bir sorun olarak birçok ülkede ciddi bir endişe kaynağı oluşturmaktadır (1). Sağlık çalışanlarının %8 ila %38'inin kariyerleri sırasında fiziksel şiddet deneyimlediği, bunun yanı sıra çok daha fazlasının tehditlere veya sözlü saldırılara maruz kaldığı bildirilmektedir (2). Türkiye'de yapılan bir çalışmada katılımcıların %60,5'inin meslek hayatları boyunca en az bir defa şiddet mağduru oldukları belirtilmektedir (3). Sağlık çalışanlarına yönelik şiddet sonucu ölümler veya yaşamı tehdit eden yaralanmalar, iş ilgisinin azalması, iş memnuniyetsizliği, elde tutmada azalma, artan izin süreleri, depresyon, travma sonrası stres bozukluğu, etik değerlerde düşüş gibi çok ciddi etkiler ortaya çıkabilmektedir (4). Sağlık hizmetlerinin sürekliliği için uygun sayıda insan kaynağının varlığı kadar, sağlık çalışanlarının sağlığının korunması ve güvenlik koşullarının sağlanması da önemlidir (5).

Sağlık çalışanları tüm zorlu durumlarda olduğu gibi Koronavirüs hastalığı (COVID-19) müdahalesinde de ön saflarda yer alarak kendilerini hastalık, yaralanma ve hatta ölüm riskiyle karşı karşıya bırakan mesleki tehlikelere maruz kalmıştır. Bu süreçte "patojene maruz kalma, uzun çalışma saatleri, psikolojik sıkıntı, yorgunluk, mesleki tükenmişlik, damgalanma ve fiziksel ve psikolojik şiddet" en yaygın risk faktörleri arasında yer almaktadır (6,7). Pandemi öncesinde sağlık çalışanları için büyük bir mesleki risk oluşturan şiddetin, pandemi döneminde de sağlık hizmetlerine ve sağlık çalışanlarına önemli zararlar vermeye devam ettiği dikkat çekmektedir (8). Yapılan bir meta analiz çalışmasında COVID-19 pandemisi sırasında sağlık çalışanlarına karşı şiddetin toplam yaygınlığı %47, fiziksel ve psikolojik şiddet prevalansı sırasıyla %17 ve %44 olarak bildirilmektedir (9). Küresel olarak sağlık çalışanlarına yönelik şiddette endişe verici bir artışa vurgu yapılırken "sağlık çalışanlarına güvensizlik, komplo teorilerine inanç, hastanelerin sınırlı alan nedeniyle COVID-19 hastalarını kabul etmeyi reddetmesi, COVID-19 hastane politikaları ve COVID-19 hastalarının ölümü" pandemi döneminde en sık görülen nedenler arasında yer almaktadır (10).

Wang ve arkadaşlarının (11) Çinli sağlık çalışanları arasında gerçekleştirdiği bir çalışmada, şiddete maruz kalan sağlık çalışanlarının ruh sağlıklarının olumsuz etkilendiği bildirilmektedir. Çalışma, COVID-19 pandemisi bağlamında sağlık çalışanları için daha destekleyici ve güvenli bir çalışma ortamı oluşturulmasının gerekliliğine vurgu yapmaktadır (11). Sağlık çalışanları COVİD-19 salgını sırasında yaptıkları çalışmalardan dolayı birçok ülkede kahraman olarak kutlanmış ancak bununla birlikte sağlık personelinin karşı karşıya kaldığı şiddet hikayeleri de manşetlere taşınmıştır (12). Dünya genelinde Meksika, Mısır, Hindistan, Filipinler, Rusya gibi daha pek çok ülkeden şiddet eylemleri bildirildiği görülmektedir (8). Türkiye'de de bu döneme ait sağlık çalışanlarına yönelik şiddet haberleri bulunmaktadır (13).

Sağlık hizmetleri hastaların ve toplumların sağlığının korunması, eski haline getirilmesi ve sürdürülmesinde kilit bir rol oynamaktadır. İyi eğitimli, motive olmuş ve desteklenen bir sağlık iş gücü sağlık sisteminin temel taşını oluşturmaktadır. Sağlık çalışanları, genellikle kendi sağlıklarını ve bazen de hayatlarını riske atarken, hastalıkları kontrol altına almak ve hayat kurtarmak için verilen günlük savaşın ön saflarında yer almaktadır (14). COVID-19 gibi pandemi dönemlerinde sağlık hizmeti sağlayıcılarının korunması başarılı bir küresel yanıt sağlamak için her zamankinden daha fazla kritik öneme sahiptir (15). Bu nedenle sağlık çalışanlarının sağlık ve güvenliğini sağlamak amacıyla ulusal İş Sağlığı ve Güvenliği (İSG) mevzuatının yanı sıra sağlık sektörünün özel ihtiyaçlarına uygun politikaların hayata geçirilmesi gerekmektedir. COVID-19 pandemisi, sağlık çalışanlarının korunmasının önemini vurgularken aynı zamanda onların iş güvenliği ile sağlığının öncelikli bir konu olarak ele alınması gerektiğini ortaya koymaktadır (14).

Şiddete yönelik sorunun kapsamını tam olarak anlamak, saldırıları önlemek ve bunlara yanıt vermek için müdahaleler tasarlamak amacıyla, COVID-19 pandemisi de dahil olmak üzere, tüm ülkelerde sağlık çalışanlarına yönelik saldırıların sıklığı ve türleri hakkında veri toplanması gerektiği vurgulanmaktadır (12). Türkiye'de literatüre baktığımızda COVID-19 döneminde sağlık çalışanlarına şiddete yönelik sınırlı sayıda araştırma olduğu dikkat çekmektedir (16-22). Sağlık çalışanlarına yönelik şiddetin her koşulda kabul edilemez olması, pandemi döneminde bu tür şiddetin artarak devam etmesi, sorunların kökenine inme ve çözümleri burada arama gereğini ortaya koymaktadır (8). Bu çalışmanın amacı il bazında beyaz kod bildirimlerinin incelenerek yaşanan şiddetin boyutlarının belirlenmesi ve pandemi öncesi ve sonrası veriler kıyaslanarak beyaz kod bildirim verileri üzerinden pandeminin şiddet üzerindeki etkisini değerlendirmektir.

## GEREÇ VE YÖNTEMLER

Bu retrospektif araştırmada 11/03/2018-11/03/2022 tarihleri arasında Türkiye'nin batısında bir ilde "İl Sağlık Müdürlüğü Beyaz Kod İl Koordinatörlüğü" ne yapılan beyaz kod başvuruları incelenmiştir. Sistemde beşi entegre ilçe hastanesi olmak üzere yedi kamu hastanesi, bir üniversite hastanesi, bir Ağız ve Diş Sağlığı Merkezi, 112 istasyonları, Toplum Sağlığı Merkezleri ve Aile Sağlığı Merkezlerine ait veriler bulunmaktadır. COVID-19 hastalığının pandemi olarak kabul edildiği tarih olarak bildirilen 11.03.2020 tarihi baz alınarak pandemi başlangıcından iki yıl öncesi ve iki yıl sonrası (11.03.2018-11.03.2022) verileri ele alınmıştır. 11.03.2018 ve 11.03.2020 tarih aralığı pandemi öncesi, 12.03.2020 ve 11.03.2022 tarih aralığı pandemi sonrası olarak ele alınmıştır. Araştırmanın örneklemi, %95 güç, 0,30 etki büyüklüğü ve 0,05 anlamlılık düzeyi temel alınarak G*Power 3.1 istatistiksel analiz yazılımı ile hesaplanmıştır. Minimum katılımcı sayısı 207 olarak belirlenmiştir. Çalışmaya Beyaz Kod İl Koordinatörlüğü sisteminde ilgili dönemde kayıtlı başvuruların tamamı (283 başvuru) dahil edilmiştir. Çalışma için öncelikle "Türkiye Cumhuriyeti Sağlık Bakanlığı Bilimsel Araştırma Platformu"' ndan onay alınmıştır (Araştırma No: 2022-03- 24T14_07_57). Ardından İl Sağlık Müdürlüğü kurum izni ve ilgili üniversitenin etik kurulundan onay (2022/59) alınarak çalışmaya başlanmıştır. Araştırma ve yayın etiğine uygun hareket

edilmiştir. Verilerin toplanması amacıyla araştırmacılar tarafından "olayın tarihi, saati, maruz kalan sağlık çalışanın cinsiyeti, görevi, olayın gerçekleştiği kurum ve birim, şiddetin türü, şiddet uygulayan cinsiyeti, özelliği (hasta-hasta yakını), pandemi öncesi ve sonrası gerçekleşme" durum bilgilerinin yer aldığı bir form oluşturulmuştur. İl Koordinatörlüğü beyaz kod sisteminde kayıtlı bilgiler araştırmacılar tarafından oluşturulan bu forma aktarılmıştır.

**İstatistiksel Analiz**

Araştırmadan elde edilen veriler bilgisayar ortamında "IBM SPSS 20.0 program" ile değerlendirilmiştir. Tanımlayıcı veriler yüzde ve frekans olarak hesaplanmış ve kategorik değişkenler arası ilişkiler Ki-kare testi ile incelenmiştir. İstatistiksel anlamlılık düzey p=0,05 olarak belirlenmiştir. Çoklu karşılaştırmalar sonucunda istatistiksel olarak anlamlı bulunan değişkenlerin ikili karşılaştırmalarında yapılan Ki-kare testinde hata riskini kontrol altına almak amacıyla Bonferroni düzeltmesi uygulanmış ve p değeri 0,01 olarak belirlenmiştir (Tablo 2).

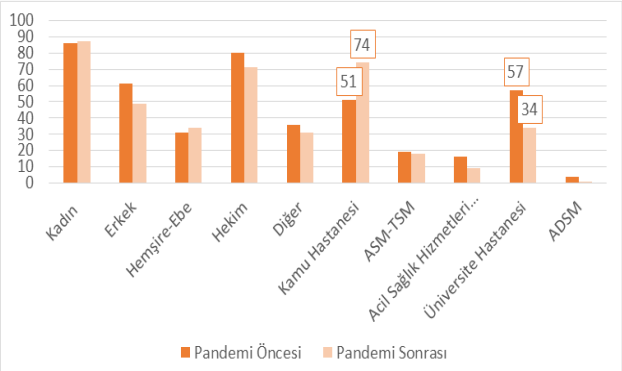
## BULGULAR

Pandeminin başlangıcından iki yıl öncesi ve iki yıl sonrası verilerin değerlendirildiği dört yılı kapsayan bu çalışmada sağlık çalışanlarına yönelik 283 adet şiddet gerçekleştiği görülmektedir. Bunların %51,95'i pandemi öncesi tarihte %48,05'i pandemi sürecinde gerçekleşmiştir. Şiddete maruz kalan sağlık çalışanlarının %61,13'ü kadın olup erkeklerden daha fazla şiddete maruz kaldıkları tespit edilmiştir (Tablo 1, Şekil 1).

**Tablo 1.** Sağlık çalışanlarının şiddete uğrama durumlarının pandemi ile ilişkisinin değerlendirilmesi

| | **Pandemi Öncesi** (n= 147) | **Pandemi Sonrası** (n=136 ) | **Total** (n=283) | **p** |
|---|---|---|---|---|
| **Kurum** | | | | |
| Kamu Hastanesi | 51 (%18,02)[a] | 74 (%26,14)[b] | 125 (%44,16) | |
| ASM + TSM | 19 (%6,71) | 18 (%6,36) | 37 (%13,07) | |
| 112 Acil Sağlık Hizm. | 16 (%5,65) | 9 (%3,18) | 25 (%8,83) | **0,009** |
| Üniversite Hastanesi | 57 (%20,14)[a] | 34 (%12,01)[b] | 91 (%32,15) | |
| ADSM | 4 (%1,41) | 1 (%0,35) | 5 (%1,76) | |
| **Meslek** | | | | |
| Hemşire-Ebe | 31 (%10,95) | 34 (%12,01) | 65 (%22,96) | |
| Hekim | 80 (%28,26) | 71 (%25,08) | 151 (%53,34) | 0,733 |
| Diğer | 36 (%12,72) | 31 (%10,95) | 67 (%23,67) | |
| **Şiddet Türü** | | | | |
| Sözel | 115 (%40,63) | 102 (%36,04) | 217 (%76,67) | 0,521 |
| Fiziksel + Fiziksel/Sözel | 32 (%11,30) | 34 (%12,01) | 66 (%23,32) | |
| **Mağdur Cinsiyet** | | | | |
| Kadın | 86 (%30,38) | 87 (%30,74) | 173 (%61,13) | 0,346 |
| Erkek | 61 (%21,55) | 49 (%17,31) | 110 (%38,86) | |
| **Saat** | | | | |
| Mesai İçi | 99 (%34,98) | 87 (%30,74) | 186 (%65,72) | 0,550 |
| Mesai Dışı | 48 (%16,96) | 49 (%17,31) | 97 (%34,27) | |
| **Yer** | | | | |
| Poliklinik | 47 (%16,60) | 42 (%14,84) | 89 (%31,44) | |
| Acil | 38 (%13,42) | 49 (%17,31) | 87 (%30,74) | |
| Olay yeri | 15 (%5,30) | 9 (%3,18) | 24 (%8,48) | 0,127 |
| Diğer | 21 (%7,42) | 23 (%8,12) | 44 (%15,54) | |
| Klinik | 26 (%9,18) | 13 (%4,59) | 39 (%13,77) | |
| **Şiddet Uygulayan Özellik** | | | | |
| Hasta | 56 (%19,78)[a] | 74 (%26,14)[b] | 130 (%45,93) | **0,006** |
| Hasta Yakını | 91 (%32,15)[a] | 62 (%21,90)[b] | 153 (%54,06) | |
| **Şiddet Uygulayan Cinsiyet** | | | | |
| Kadın | 44 (%15,54) | 32 (%11,30) | 76 (%26,85) | 0,225 |
| Erkek | 103 (%36,39) | 104 (%36,74) | 207 (%73,14) | |

[a-b]Pandemi öncesi ve sonrasında farklı harfe sahip değişkenler arasında fark vardır.
ASM: Aile Sağlığı Merkezi, TSM: Toplum Sağlığı Merkezi, ADSM: Ağız ve Diş Sağlığı Merkezi
Diğer (Yer): Tetkik-Görüntüleme/kanser tarama/SABİM/enjeksiyon odası/idare/güvenlik/efor odası/telefon/evde sağlık
Diğer(Meslek): Sekreter/yönetici/güvenlik/labaratuar-radyoloji teknisyeni/sürekli işçi/şoför/sağlık memuru

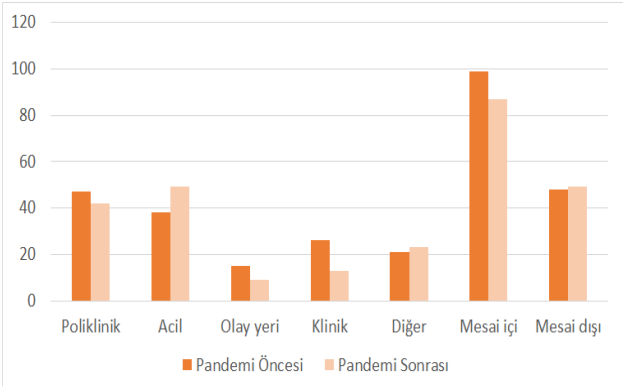



**Şekil 1.** Şiddette maruz kalanların meslek, cinsiyet ve kurum dağılımı

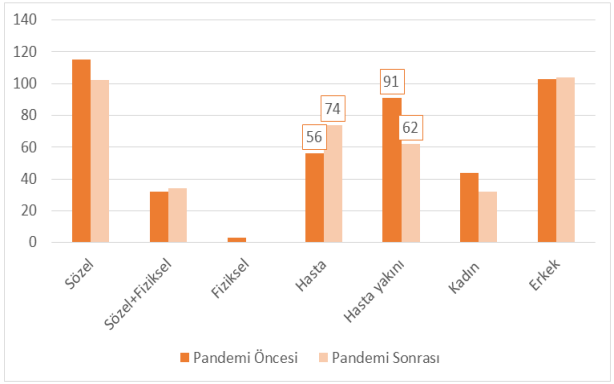
Şiddet en fazla %30,74 olarak acil serviste, %44,16 kamu hastanelerinde, %65,72 mesai içi saatlerde ve %53,34 olarak hekimlere yönelik gerçekleşmiştir (Tablo 1, Şekil 1, Şekil 2).

Şiddet uygulayan kişilerin özelliklerine bakıldığında yarıdan fazlası (%54,06) hasta yakınları ve erkekler (%73,14) tarafından gerçekleştirilirken, çoğunlukla sözel şiddet uygulandığı görülmektedir (Tablo 1, Şekil 3)

Pandemi öncesi ve sonrası süreç bazında farkları değerlendirmek üzere yapılan ki-kare testinde şiddeti uygulayan kişilerin özelliği (p=0,006) ve kurum bazında (p=0,009) istatistiksel olarak anlamlı fark olduğu bulunurken, cinsiyet, saat, yer, şiddet türü, meslek, şiddet uygulayan cinsiyeti istatistiksel olarak anlamlı fark olmadığı bulunmuştur (Tablo 1). Kurum bazında yapılan ikili karşılaştırmalarda kamu ve üniversite hastanesinde istatistiksel olarak anlamlı fark olduğu bulunmuştur (p=0,002) (Tablo 2).




**Şekil 2.** Şiddettin gerçekleştiği alan ve zamanı




**Şekil 3**. Şiddet uygulayan özelliği, cinsiyeti ve şiddet türü

**Tablo 2.** Sağlık çalışanlarının şiddete uğrama durumlarının pandemi ile ilişkisinin kurum bazında karşılaştırılması

| | Pandemi Öncesi | Pandemi Sonrası | Total | p |
|---|---|---|---|---|
| Kurum | | | | |
| Kamu Hastanesi | 51 (%23,61) | 74 (%34,25) | 125 (%57,86) | **0,002** |
| Üniversite Hastanesi | 57 (%26,38) | 34 (%15,74) | 91 (%42,12) | |
| Kamu Hastanesi | 51 (%31,48) | 74 (%45,67) | 125 (%77,16) | 0,343 |
| ASM-TSM | 19 (%11,72) | 18 (%11,11) | 37 (%22,83) | |
| Kamu Hastanesi | 51 (%34,00) | 74 (%49,33) | 125 (%83,33) | 0,056 |
| 112 Acil Sağlık Hizmetleri | 16 (%10,66) | 9 (%6,00) | 25 (%16,66) | |
| Üniversite Hastanesi | 57 (%44,53) | 34 (%26,56) | 91 (%71,09) | 0,327 |
| ASM-TSM | 19 (%14,84) | 18 (%14,06) | 37 (%28,90) | |
| Üniversite Hastanesi | 57 (%49,13) | 34 (%29,31) | 91 (%78,44) | 1,000 |
| 112 Acil Sağlık Hizmetleri | 16 (%13,79) | 9 (7,75) | 25 (%21,56) | |

ASM: Aile Sağlığı Merkezi, TSM: Toplum Sağlığı Merkezi

## TARTIŞMA

Bu çalışmada, il bazında beyaz kod bildirimleri incelenerek pandemi döneminde yaşanan şiddetin boyutlarının belirlenmesi ve pandemi öncesi ve sonrası veriler kıyaslanarak pandeminin beyaz kod bildirimleri üzerindeki etkisini değerlendirmek amaçlanmıştır.

Literatür incelendiğinde Türkiye'de sağlık çalışanlarına yönelik şiddete pandemi sürecinin etkisinin beyaz kod çağrı sistemi verileri incelenerek değerlendirildiği iki çalışmaya rastlanmıştır. Esen ve Uysal (22) çalışmasında "1 Ocak- 31 Ekim 2019 ve 1 Ocak- 31 Ekim 2020" tarihleri arasındaki verileri değerlendirirken Aygün ve

Metin (17) ise çalışmasında "01.03.2019 ile 31.03.2021" tarihlerini kapsayan zaman dilimini incelemiştir. Söz konusu çalışmalar eğitim araştırma hastaneleri verileri kapsamında gerçekleştirilmiştir (17,22). Bu çalışma il bazında tüm bildirimlerin incelenerek pandemi sürecinde sağlık çalışanlarına yönelik şiddetin değerlendirildiği ilk çalışmadır.

Sağlık çalışanlarına şiddetin pandeminin iki yıl öncesi ve iki yıl sonrası baz alınarak değerlendirildiği bu çalışmada pandemi öncesi gerçekleşen şiddet olayının daha fazla olduğu bulunmuştur. Aygün ve Metin (17) de çalışma sonucunda pandemi sürecinde bildirim sayılarında azalma olduğunu bildirmişlerdir (17). Ramzi ve arkadaşları (9) çalışmasında COVID-19 pandemisi sırasında sağlık çalışanlarına karşı şiddetin oldukça yaygın olduğu ve sağlık profesyonellerinde fiziksel ve psikolojik sorunlara yol açarak verilen bakımın kalitesini etkileyebileceğine dikkat çekmiştir. Aynı çalışmada 17.207 sağlık çalışanının dahil olduğu 17 çalışmanın analizi sonucu şiddetin toplam yaygınlığı %47 olarak tahmin edilmiştir (9). Hemşirelerle yapılan bir çalışmada COVID-19 hastalarına bakım sağlayan hemşirelerin bu hastalara bakmayan hemşirelere göre daha fazla fiziksel şiddet ve sözel taciz yaşadığı bildirilmiştir (23). Hemşirelerle yürütülen başka bir çalışmada hemşirelerin COVID-19 pandemisi sırasında fiziksel, sözel şiddet ve cinsel tacize maruz kalma durumlarının pandemi öncesine göre azaldığı ortaya konmuştur (21). Pandemi döneminde yapılan başka bir çalışmada sağlık personeline karşı pandemi öncesine göre olumlu yönde gelişen bir bakış açısı olduğunu ifade eden katılımcıların yanında değişiklik olmadığını ifade eden katılımcılar da yer almıştır (18). 112 çalışanlarına yönelik yapılan bir çalışmada ise Pandemi sırasında aciliyeti olmayan durumlarda normalden daha fazla şiddetle karşılaşıldığı bildirilmiştir (19). Hekimlere yönelik yapılan bir çalışmada ise hekimlerin yaklaşık yarısı pandemi öncesinde ve pandemi döneminde herhangi bir şiddet olayı yaşadığını ifade ederken pandemi öncesi şiddete uğrayan hekimlerin oranı %40,5 iken pandemi döneminde ise %49,1 olarak bulunmuştur (16). Hekimlerin yer aldığı başka bir çalışmada katılımcıların tamamına yakını salgının başlangıcından itibaren şiddetin arttığını ve COVID-19'un işyerindeki gerginliği artırarak hastalar ve sağlık hizmeti sağlayıcıları için riskleri daha da artırdığına dikkat çekilmiştir (24). Bu çalışma sonucunda pandemi öncesi ve sonrasında şiddet sayıları neredeyse birbirine yakındır. Pandemi sürecinin şiddet üzerinde artışa neden olmadığı ancak aynı şekilde devam ettiği söylenebilir.

Bu çalışmada pandemi öncesi hasta yakınları tarafından daha fazla şiddet uygulanırken pandemi sonrası hastalar tarafından uygulanan şiddetin arttığı bulunmuştur.

Pandemi döneminden önce yapılan çalışmalarda hastalar tarafından (25,26) şiddetin daha fazla uygulandığını bildiren çalışmaların yanında hasta yakınları tarafından (27,28) daha fazla uygulandığını bildiren çalışmalarda bulunmaktadır. Esen ve Uysal (22) 2019 ve 2020 yıllarını karşılaştırdığı çalışmada pandemi öncesi ve sonrası her iki dönemde de hastalar tarafından uygulanan şiddetin daha yüksek oranda olduğunu bildirirken, Yılar Erkek ve Gökçek (20) pandemi döneminde yaptıkları çalışmada hasta yakınlarının oranının daha fazla olduğunu tespit etmiştir. Benzer şekilde Ghareeb COVID-19 salgını sırasında Güney Ürdün'de hasta yakınları (29) ve Bağdat'ta yürütülen çalışmada da hasta yakınlarının daha fazla olduğu bildirilmiştir (24). Bu çalışma sonucuna göre pandemi sürecinde hasta yakınlarına göre hastalar tarafından sağlık çalışanlarına yönelik şiddetin artmasının nedeni, hastaların yaşadığı bilinmezlik, bireysel stres, tedavi sürecindeki gecikmeler ve sosyal destek eksikliğinin onları daha fazla öfkelendirmiş ve sağlık çalışanlarına karşı daha fazla agresyon göstermelerine neden olmuş olabilir. Ayrıca, hasta yakınlarına yönelik kısıtlamalarla ilgili alınan kararların, oranlar üzerinde etkili olmuş olabileceği düşünülmektedir.

Kamu hastanelerinde pandemi öncesine göre pandemi sonrası artış tespit edilirken üniversite hastanesinde pandemi sonrası azalma tespit edilmiştir. Pandemi öncesi dönemde Tokat il genelini kapsayan çalışmada şiddet olaylarının çoğunun hastanelerde gerçekleştiği (25), Kırklareli il geneli de en çok hastanelerde gerçekleştiği görülmektedir (30). Sağlık Bakanlığı Türkiye genelinin incelendiği çalışmada da şiddet olaylarının yarısından fazlasının (%53,32) kamu hastanelerinde gerçekleştiği görülmektedir (31). Yıldız (32) tarafından Ankara'da yapılan çalışmada üniversite ve kamu hastanelerinde yaklaşık sonuçlar bildirilmiştir (32). Pandemi döneminde tüm kurum türlerini kapsayan bir çalışmaya ulaşılamamış olunması nedeniyle bu çalışma verileri ile literatür karşılaştırması yapılamamıştır. Pandemi öncesi ve sonrası sağlık çalışanlarına yönelik şiddet olaylarının değişiklik göstermesi çeşitli faktörlerden kaynaklanabilir. Pandemi sonrası kamu hastanelerinde sağlık çalışanlarına yönelik şiddetin artmasının nedeni, bu hastanelerde yaşanan yoğunluk, kaynak sıkıntıları ve stresin artması olabilir. Pandemi sonrası üniversite hastanelerinde sağlık çalışanlarına yönelik şiddetin azalmasının nedeni, üniversite hastanelerinde genellikle daha uzmanlaşmış hizmet gerektiren ve daha az yoğunluk yaşanan hasta gruplarının olması olabilir. Sağlık hizmetlerinin farklı türdeki hastanelerde nasıl sunulduğu ve bu süreçlerin sağlık çalışanlarına yönelik şiddet üzerindeki etkileri açısından daha derinlemesine incelenmesi gerekmektedir. Bu farklılıkları daha iyi anlayarak, her hastane türüne özgü önlemler geliştirilebilir.

Beyaz Kod İl Koordinatörlüğünde özel hastane verileri olmadığından sadece üniversite ve kamu sağlık kurumları incelenmiştir. Kayıt sisteminde tüm başvuruların yaşına dair bilgi olmadığından çalışma değişkeni olarak alınamamıştır. Ayrıca çalışmaya sadece Sağlık Bakanlığı tarafından oluşturulan sistemde yer alan değişkenler dahil edilmiştir.

## SONUÇ

COVID-19 pandemisinin, sağlık çalışanlarına yönelik şiddete etkisinin incelendiği bu retrospektif araştırmada 11/03/2018-11/03/2022 tarihleri arasında Türkiye'nin batısında yer alan bir ilde İl Sağlık Müdürlüğü Beyaz Kod İl Koordinatörlüğü'ne yapılan beyaz kod başvuruları incelenmiştir. Yapılan araştırma sonucunda kamu hastanelerinde pandemi öncesine göre pandemi sonrası artış tespit edilirken üniversite hastanesinde pandemi sonrası azalma tespit edilmiştir. Ayrıca pandemi öncesi dönemde şiddet uygulayan kişilerin profili incelendiğinde ise bu dönemde hasta yakınlarından gelen şiddet vakaları

çoğunlukta iken pandemi döneminde şiddet uygulayan kişiler çoğunlukla hastaların kendileri olmuştur.

Gelecekteki araştırmaların, pandemi sürecinin sağlık hizmetleri üzerindeki uzun vadeli etkilerini daha ayrıntılı bir şekilde incelemesi gerekmektedir. Özellikle hastaların ve hasta yakınlarının şiddet davranışları arasındaki dönüşümün daha derinlemesine ele alınması, bu alanda yapılacak çalışmaların kapsamını genişletecektir. Ayrıca kurum bazında farklılıklar derinlemesine ele alınmalıdır. Şiddet vakalarının azaltılabilmesi için sağlık çalışanlarına yönelik eğitim programlarının güçlendirilmesi, empati, iletişim becerileri ve kriz yönetimi konularında daha fazla kaynak ayrılması önerilmektedir. Bu çalışmadan elde edilen bulgular pandemi öncesi ve sonrası dönemde hastane içindeki şiddet vakalarının artış ve azalma oranları, sağlık hizmetleri yönetimi ve politika geliştirme açısından önemli bir veri kaynağı oluşturmaktadır. Politika yapıcılar ve hastane yöneticilerinin, şiddet olaylarının önlenmesi amacıyla gerekli güvenlik önlemleri ve destek programlarını hayata geçirmesi kritik önem taşımaktadır. Sonuç olarak, bu çalışmanın bulguları, sağlık hizmetleri sunumunda şiddetle mücadele etmek için daha sistematik ve kapsamlı bir yaklaşım geliştirilmesine olanak tanımaktadır.

**Yazarların Katkıları:** Fikir/Kavram: S.G.; Tasarım, S.G.; Veri Toplama: S.G., T.O.; Analiz ve/veya Yorum, S.G., T.O.; Literatür Taraması: S G.; Makalenin Yazımı: S.G.; Eleştirel İnceleme: S.G., T.O.

## KAYNAKLAR

1. Liu J, Gan Y, Jiang H, Li L, Dwyer R, Lu K, et al. Prevalence of workplace violence against healthcare workers: a systematic review and meta-analysis. Occupational Environmental Medicine. 2019; 76: 927-37.
2. International Labour Organization [Internet]. Framework guidelines for addressing workplace violence in the health sector: The Training Manual. Geneva: ILO 2005 [Updated: 2005; Cited: 02.08.2024]. Available from: https://www.ilo.org/sites/default/files/wcmsp5/groups/public/@ed_protect/@protrav/@safework/documents/instructionalmaterial/wcms_108542.pdf.
3. Uğurlu H, Şantaş F. Sağlıkta şiddete ilişkin bir çalışma. Hacettepe Sağlık İdaresi Derg. 2023; 26(2): 305-34.
4. Vento S, Cainelli F, Vallone A. Violence against healthcare workers: A worldwide phenomenon with serious consequences. Frontiers Public Health, 2020; 8: 570459.
5. Betancourt-Sánchez LC, Ochoa-Gelvez EO, Velásquez-Bernal CC, Rozo-Silva YA, Quiroga-Vargas DA. Occupational health in the framework of the COVID-19 pandemic: a scoping review. Revista De Salud Publica. 2020; 22 (3): 381-8.
6. World Health Organization [Internet]. Coronavirus disease (COVID-19) outbreak: rights, roles and responsibilities of health workers, including key considerations for occupational safety and health: interim guidance. WHO 19 March 2020 [Updated: 2020; Cited: 02.08.2024]. Available from: https://iris.who.int/handle/10665/331510.
7. International Labour Organization & World Health Organization [Internet]. COVID-19: Occupational health and safety for health workers. WHO and ILO 2 February 2021 [Updated: 2021; Cited: 02.08.2024]. Available from: https://www.who.int/publications/i/item/WHO-2019-nCoV-HCW_advice-2021-1.
8. Oğan H. Covid-19 pandemisi altıncı ay değerlendirme raporu, Pandemi ortamında sağlıkta şiddet, Türk Tabipleri Birliği, 2020; 355-68.
9. Ramzi ZS, Fatah PW, Dalvandi A. Prevalence of workplace violence against healthcare workers during the COVID-19 pandemic: a systematic review and meta-analysis. Frontiers Psychology. 2022; 30;13:896156.
10. Bhatti OA, Rauf H, Aziz N, Martins RS, Khan JA. Violence against healthcare workers during the COVID-19 pandemic: a review of ıncidents from a lower-middle-ıncome country. Ann Glob Health. 2021; 87(1): 41.
11. Wang W, Lu L, Kelifa MM, Yu Y, He A, Cao N, et al. Mental health problems in Chinese healthcare workers exposed to workplace violence during the COVID-19 outbreak: A cross-sectional study using propensity score matching analysis. Risk Management and Healthcare Policy. 2020; 3(13): 2827-33.
12. McKay D, Heisler M, Mishori R, Catton H, Kloiber O. Attacks against healthcare personel must stop, especially as theworld fights COVID-19. The Lancet. 2020; 395(6): 1743-45.
13. Yıldırım İE, Sezgin D. Pandemide sağlık çalışanlarına şiddet. Iğdır International Socıal Scıences Congress; 2021; Iğdır. April 14-15.
14. International Labour Organization & World Health Organization [Internet]. Caring for those who care: National Programmes for Occupational Health for Health Workers. WHO and ILO 2020 [Updated: 2020; Cited: 02.08.2024]. Available from: https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---sector/documents/publication/wcms_824090.pdf.
15. World Health Organization [Internet]. Attacks on health care in the context of COVID-19. WHO 30 July 2020 [Updated: 2020; Cited: 02.08.2024]. Available from: https://www.who.int/news-room/feature-stories/detail/attacks-on-health-care-in-the-context-of-covid-19.
16. Gökce A, Boz G, Özer A, Ozdemir F. Assessment of violence directed at resident physicians working in a university hospital during COVID-19 pandemic. Gevher Nesibe Journal of Medical & Health Sciences. 2023; 8(1): 172-80.
17. Aygün H, Metin S. Sağlık çalışanlarına yönelik şiddetin pandemi ile ilişkisi. Anatolian Journal of Emergency Medicine. 2022; 5(1): 7-12.
18. Eyitmiş M, Sezer F. COVID-19 döneminde sağlık personeline yönelik hasta-hasta yakınlarının uyguladığı şiddet değişti mi? Nitel bir çalışma. Cumhuriyet Üniversitesi İktisadi ve İdari Bilimler Dergisi. 2022; 23(1): 244-68.
19. Ekşi A, Gümüşsoy S, Utanır Altay S, Kirazlı G. (2022). Effect of the COVID-19 pandemic on violence against

pre-hospital emergency health workers. Work. 2022; 1-6.
20. Yılar Erkek Z, Gökçek S. Pandemi sürecinde sağlık çalışanlarının şiddet eğiliminin incelenmesi. TOGÜ Sağlık Bilimleri Dergisi. 2022; 2(3): 260-74.
21. Özkan Şat S, Akbaş P, Yaman Sözbir Ş. Nurses' exposure to violence and their professional commitment during the COVID-19 pandemic. Journal of Clinical Nursing. 2021; 30(13-14): 2036-47.
22. Esen H, Uysal ŞA. COVİD-19 pandemi sürecinde sağlık kurumlarında beyaz kod uygulamasının incelenmesi: Antalya Eğitim ve Araştırma Hastanesi Örneği. Göbeklitepe Sağlık Bilimleri Dergisi. 2020; 3(3): 7-22.
23. Byon HD, Sagherian K, Kim Y, Lipscomb J, Crandall M, Steege L. Nurses' experience with type II workplace violence and underreporting during the COVID-19 pandemic. Workplace Health & Safety. 2021; 3: 21650799211031233.
24. Lafta R, Qusay N, Mary M, Burnham G. Violence against doctors in Iraq during the time of COVID-19. PLoS ONE. 2021; 16(8): e0254401.
25. Gülpınar S, Bulut YE, Çıtıl R. Tokat ilinde 2012-2014 yılları arasında beyaz kod kaynaklı açılan dosyaların retrospektif değerlendirilmesi. Turkish Journal of Family Medicine and Primary Care. 2019; 13(2): 142-50.
26. Avcı N, Arslan MK, Timlioğlu Sİ, Tay S, Meriç K, Ertenü M, ve ark. 2012-2015 yılları arasında Haydarpaşa Numune Eğitim ve Araştırma hastanesindeki beyaz kod bildirimleri. Sağlık Akademisyenleri Derg. 2015; *2*(4): 211-14.
27. Devebakan N. Sağlık kurumlarında işyeri şiddeti ve Dokuz Eylül Üniversitesi Uygulama ve Araştırma Hastanesi'nde beyaz kod başvurularının değerlendirilmesi. Süleyman Demirel Üniversitesi İktisadi ve İdari Bilimler Fakültesi Derg. 2018; 23(2): 383-99.
28. Mutlu H, Bahadır Yılmaz E, Yüksel A. Bir Eğitim ve Araştırma Hastanesinde yaşanan şiddete ilişkin beyaz kod verilerinin retrospektif olarak değerlendirilmesi: Kesitsel bir çalışma. Turkiye Klinikleri J Foren Sci Leg Med. 2021; 18(3): 197-204.
29. Ghareeb NS, El-Shafei DA, Eladl AM. Workplace violence among healthcare workers during COVID-19 pandemic in a jordanian governmental hospital: the tip of the iceberg. Environmental Science and Pollution Research. 2021; 28: 61441-49.
30. Güven O, Kurt BF. Sağlıkta şiddetin beyaz kod verileri ile değerlendirilmesi: Kırklareli ili örneği. Karya Journal of Health Science. 2023; 4(1): 47-50.
31. Torun N. Şiddete yönelik beyaz kod verilerin değerlendirilmesi. Çukurova Medical Journal. 2020; 45(3): 977-84.
32. Yıldız MS. Türkiye'de sağlık çalışanlarına yönelik şiddet: Ankara ilinde araştırma. Hacettepe Sağlık İdaresi Derg. 2019; 22(1): 135-56.

Araştırma Makalesi / Research Article

Sağlık Bilimlerinde Değer / Sağlık Bil Değer
Value in Health Sciences / Value Health Sci
ISSN: 2792-0542 sabd@duzce.edu.tr 2025; 15(2): 282-287
doi: https://dx.doi.org/10.33631/sabd.1597277

# Supine and Prone Positions in Percutaneous Nephrolithotomy: Exploring Their Roles in Operative Efficiency and Patient Comfort

Dursun BABA [1], İsmail Eyüp DILEK [1], Emre EDIZ [1], Burak AYVACIK [1], Yusuf ŞENOĞLU [2], Arda Taşkın TAŞKIRAN [1] Ahmet Yıldırım BALIK [1], Ekrem BAŞARAN [1], Muhammet Ali KAYIKÇI [1]

**ABSTRACT**

**Aim:** This study aimed to compare the effects of supine and prone positions during percutaneous nephrolithotomy (PCNL) on operative characteristics, patient out-comes and postoperative quality of recovery.

**Material and Methods:** A retrospective analysis was conducted on 78 patients who underwent PCNL for renal stones ≥2 cm at a single center between December 2022 and August 2024. Patients were divided into two groups: 41 treated in the mini-PCNL (mPCNL) supine position and 37 in the standart PCNL (sPCNL) prone position. Demographic data, operative time, hospital stay duration, complication rates, postoperative pain and analgesic requirements and quality of recovery scores (QoR) were compared. Treatment efficacy was assessed based on residual stone presence at 2 months postoperatively, with <2 mm considered stone-free.

**Results:** Operative and access times were significantly shorter in the supine group and these patients had a reduced hospital stay. Quality of recovery improvement was more pronounced in the supine group with lower postoperative pain and analgesic requirements. Additionally, supine-positioned patients had a lower rate of residual stones compared to the prone group, suggesting enhanced treatment efficacy.

**Conclusion:** The supine position in mPCNL offers advantages over the prone position in terms of operative efficiency, patient comfort and postoperative quality of recovery. Given these benefits the supine position may be a preferable choice for PCNL procedures. Further multicenter studies are recommended to validate these findings across broader patient populations.

**Keywords:** Percutaneous nephrolithotomy; supine position; prone position; quality of life; quality of recovery; renal stone; postoperative outcomes.

## Perkütan Nefrolitotomide Supine ve Prone Pozisyonları: Operasyon Etkinliği ve Hasta Konforundaki Rolleri

**ÖZ**

**Amaç:** Bu çalışma, perkütan nefrolitotomi (PCNL) sırasında supine ve prone pozisyonlarının operasyon özellikleri, hasta sonuçları ve postoperatif iyileşme kalitesi üzerindeki etkilerini karşılaştırmayı hedeflemiştir.

**Gereç ve Yöntemler:** Aralık 2022 ile Ağustos 2024 tarihleri arasında tek bir merkezde renal taş (>2 cm) nedeniyle PCNL uygulanan 78 hastanın retrospektif analizi yapılmıştır. Hastalar, mini-PCNL (mPCNL) supine pozisyonunda tedavi edilen 41 hasta ve standart PCNL (sPCNL) prone pozisyonunda tedavi edilen 37 hasta olmak üzere iki gruba ayrılmıştır. Demografik veriler, operasyon süresi, hastanede yatış süresi, komplikasyon oranları, postoperatif ağrı ve analjezik gereksinimi ile iyileşme kalitesi skorları (QoR) karşılaştırılmıştır. Tedavi etkinliği, ameliyat sonrası 2. ayda taşsızlık (<2 mm rezidü taş) oranı üzerinden değerlendirilmiştir.

**Bulgular:** Operasyon ve akses süreleri supine grubunda anlamlı olarak daha kısa bulunmuş ve bu grup hastalarında hastanede yatış süresi daha kısa olmuştur. Supine grubunda iyileşme kalitesinde daha belirgin bir iyileşme gözlenmiş, postoperatif ağrı ve analjezik gereksinimleri daha az olmuştur. Ayrıca, supine pozisyonda tedavi edilen hastalarda rezidü taş oranı prone grubuna kıyasla daha düşük bulunmuş ve bu durum tedavi etkinliğinin artmış olduğunu göstermektedir.

**Sonuç:** mPCNL'de supine pozisyonu, operatif verimlilik, hasta konforu ve postoperatif yaşam kalitesi açısından prone pozisyonuna göre avantajlar sunmaktadır. Bu faydalar göz önünde bulundurulduğunda, PCNL prosedürleri için supine pozisyonu tercih edilebilir bir seçenek olabilir. Daha geniş hasta popülasyonlarında bu bulguların doğrulanması için çok merkezli çalışmalar önerilmektedir.

**Anahtar Kelimeler:** Perkütan nefrolitotomi; supine pozisyon; pronepozisyon; yaşam kalitesi; iyileşme kalitesi; renal taş; postoperatif sonuçlar.

1 Duzce University, Faculty of Medicine, Department of Urology, Duzce, Türkiye
2 Marmara University, Faculty of Medicine, Department of Urology, İstanbul, Türkiye.
Sorumlu Yazar / Corresponding Author: İsmail Eyüp Dilek, e-mail: iseydilek@gmail.com
Geliş Tarihi / Received: 10.12.2024, Kabul Tarihi / Accepted: 17.04.2025

## INTRODUCTION

Percutaneous nephrolithotomy (PCNL) has been a reliable surgical option for the treatment of large kidney stones for many years with high success rates and low risk of complications (1,2). Although PCNL performed in the prone position provides wide surgical access, it has certain limitations in terms of patient positioning and anesthesia management. Therefore, in recent years, there has been a growing interest in the supine position and its advantages, such as easier access to the patient by the anesthesia team and easier management of patient ventilation, have attracted attention (3,4).

Supine PCNL, first introduced into clinical practice by Valdivia and colleagues in 1998, has been described as a technique that improves operative ergonomics for surgeons and anesthesiologists (5). The modified supine position, known as Galdakao-modified supine Valdivia (GMSV), also allows endoscopic combined intrarenal surgery (ECIRS) to be performed during the operation and has become a preferred option for surgeons, especially in complex cases (6,7). However, there is limited data on the effects of prone and supine positions on patient comfort, operative time, complication rates and postoperative quality of life (8).

The existing literature suggests that the supine position shortens the operation time compared to the prone position and reduces the risk of position related injury by eliminating the need for position change (9). However, there is no comprehensive and clear data on which position contributes more positively to patient quality of life. In this study, we aimed to compare the supine and prone positions used in PCNL operations in terms of patient comfort, treatment efficacy and safety and to examine the effects of both positions on postoperative quality of recovery. The results obtained are expected to provide important information that will guide clinical practice in position selection.

## MATERIAL AND METHODS

This study was conducted retrospectively using the data of 78 patients who underwent percutaneous nephrolithotomy between December 2022 and August 2024 in the Department of Urology, Düzce Faculty of Medicine. Grouping was performed based on the type of surgery. Sample size was calculation performed using G*Power software to determine the minimum number of patients required for statistical significance. Based on a power (1-β) of 80%, an effect size of 0.5, and a significance level (α) of 0.05, the minimum required sample size was calculated as 54 patients (18). However, to increase the robustness of the findings and account for potential dropouts, a total of 78 patients were included in the study.

The study was conducted in accordance with the Declaration of Helsinki and approval was obtained from Düzce University Clinical Research Ethics Committee. (Decision Num-ber:2024/161 Date:19/08/2024) The data of all patients were evaluated in compliance with confidentiality principles and personal information was protected and anonymized.

### Operative Method

### Supine mPCNL

The operation was performed under general anesthesia. After anesthesia, retrograde pyelography was performed by placing a 6 fr ureter catheter into the side where the operation would be performed through cystoscopy in lithotomy position. The ureter catheter was fixed to the urethral catheter placed in the bladder. On the side of the patient to be operated on, a line was drawn with a surgical pen from the patient's posterior axillary line, the 12th rib line, and the upper iliac bone area to the back. The kidney was accessed from the area between these three lines. Then, the patients were placed in the GMSV position. In this position, as described, the patient's ipsilateral lower extremity was brought into extension while the contralateral extremity was brought into abduction and flexion.

A silicone pad was placed under the lower part of the area to be accessed, and this area was raised approximately 25-30 degrees. The arm on the same side was fixed to the thoracic cage and a pillow was placed underneath to cross the thoracic cage. Retrograde pyelography was performed to determine the renal calyx to be accessed. An 18 gauge diamond-tipped aspiration needle was preferred for renal access. After access was obtained, a 12 fr and 17 fr dilator were placed over the guide wire inserted into the calyxand a 17.5 metal sheath was placed, followed by entry into the collecting system with a 12 fr nephroscope (Karl Storz). Laser lithotripsy was performed on the stones using Holmium Junior Fx laser lithotripter (8–10 Hz, 1500–2000 J). After confirming with fluoroscopy that no stone fragments remained, the collecting system and ureter transition were checked with antegrade pyelography. The procedure was completed by placing a 4.8 f 26 cm double J ureteral stent in the patients.

### Prone sPCNL

The operation was performed under general anesthesia. After anesthesia, retrograde pyelography was performed by placing a 6fr ureter catheter on the side where the operation would be performed through cystoscopy in lithotomy position. The ureter catheter was fixed to the urethral catheter placed in the bladder.

Then the patient was placed in the prone position. When the patient was placed in the prone position, silicone pillows were placed on the chest area, both side areas and the soles of the feet. The entry area and genital regions of all patients were painted with antiseptics, sterile drapes were provided and the tip of the 6 fr ureteral catheter was sent from the urethra. Then, the contrast agent given in the 6 fr ureter catheter was used for retrograde pyelography and the appropriate calyx was determined accordingly. An 18 gauge diamond-tipped aspiration needle was preferred for renal access. After the entry, dilation was performed up to 28-30 fr using Amplatz dilators (Microvasive/Boston Scientific, Natick, MA) over the guide wire placed in the calyx and entry was made into the collecting system with a 26 fr nephroscope (Karl Storz). Pneumatic lithotripsy was performed on the stones. After confirming that no stone fragments remained with fluoroscopy the collecting system and ureter transition were checked with antegrade pyelography. The procedure was completed by placing a 12 fr nephrostomy catheter in the patients.

### Parameters Evaluated

Parameters such as preoperative and postoperative patient quality of recovery index, operation time, percutaneous access time, hospitalization time, complication rates, post-operative pain and analgesic requirement, catheter

requirement, perioperative hemoglobin loss, blood transfusion requirement and treatment efficacy were compared between the groups. Treatment efficacy was evaluated by measuring the residual stone size with Computed Tomography at the 2nd month postoperatively; stones above 2 mm were considered clinically significant residual stones, while stones below 2 mm were considered stone-free

In the primary outcome measures of our study, QoR score and stone-free status were evaluated. Other parameters were considered in the secondary outcome measures. Among these parameters, the S.T.O.N.E. nephrolithometry scoring system was used to determine stone disease severity (10,11).

**Statistical Analysis**

Data were analyzed using IBM SPSS Statistics v22. Skewness and Kurtosis tests were used for normality analysis. Independent t-test was used for normally distributed continuous variables, while Mann-Whitney U test was used otherwise. For parametric variables, mean and standard deviation were reported, whereas for non-parametric variables, median, minimum, and maximum values were provided in tables and text. Chi-square test was used for categorical variables. All results were evaluated at a 95% confidence interval, and $p<0.05$ was considered the significance level.

## RESULTS

A total of 78 patients underwent percutaneous nephrolithotomy in either supine or prone positions, allowing for a comprehensive comparison of demographic characteristics, stone properties, perioperative and postoperative outcomes and quality of recovery measures. In comparing the supine and prone groups, statistically significant differences were found in operative time, access time and hospital stay duration. Patients in the supine group had a shorter median operative time (51 (30-130) minutes) compared to those in the prone group (90 (60-180) minutes, $p <0.001$). Similarly, access time was shorter in the supine group (supine group: 3.29 ± 2.55 minutes, prone group: 4.86 ± 2.11 minutes, $p=0.004$). Patients in the supine position also experienced a shorter hospital stay (4 (3-5) days) compared to the prone group (5 (3-14) days, $p <0.001$) (Table 1).

**Table 1**. Patient demographics and operative characteristics

| Characteristics | Supine (n=41) | Prone (n=37) | Total (n=78) | p |
|---|---|---|---|---|
| Age (years) (Mean±SD) | 47.43 ± 14.44 | 48.35 ± 17.40 | 47.88 ± 15.82 | 0.80 |
| Male/Female | 26/15 | 16/21 | 42/36 | 0.074 |
| Operative Time (min) (Median, (min-max) | 51 (30-130) | 90 (60-180) | 63.5 (30-180) | ***<0.001*** |
| Access Time (min) (Mean±SD) | 3.29 ± 2.55 | 4.86 ± 2.11 | 4.04 ± 2.47 | ***0.004*** |
| Hospital Stay (days) (Median,min-max) | 4 (3-5) | 5 (3-14) | 5 (3-14) | ***<0.001*** |

No statistically significant differences were found between groups regarding laterality, stone size or number of stones. However, stone density was greater in the supine group (1117.44 ± 279.2) compared to the prone group (917.51 ± 303.65), with a p-value of 0.03. When S.T.O.N.E. score was analyzed, no significant difference was observed between both groups, p value 0.41 (Table 2).

**Table 2.** Stone characteristics

| Characteristics | Supine (n=41) | Prone (n=37) | Total (n=78) | p |
|---|---|---|---|---|
| Laterality (Right/Left) | 20/21 (%49/%51) | 23/14 (%62/%38) | 43/35 (%55/%45) | 0.235 |
| Stone Size (mm) (Mean±SD) | 24.8 ± 5.87 | 26.02 ± 4.4 | 25.38 ± 5.22 | 0.31 |
| Number of Stones (Mean±SD) | 1.41 ± 0.63 | 1.49 ± 0.8 | 1.45 ± 0.71 | 0.66 |
| Stone Density (Hounsfield Unit) (Mean±SD) | 1117.44 ± 279.2 | 917.51 ± 303.65 | 1022 ± 306.1 | **0.03** |
| S.T.O.N.E. nephrolithometry score (Mean±SD) | 9.2±1.44 | 8.92±1.50 | 9.06±1.46 | 0.41 |

In the chi-square test performed for calyx access, a statistically significant difference was observed between the supine and prone groups (p-value 0.045). Therefore, a post hoc analysis of the chi-square test was conducted, and adjusted residual values between-1.96 and +1.96 were considered insignificant. Upper calyx access was found to be statistically significantly higher in the supine group. These findings provide important insights into evaluating the effects of different positions for each category (Table 3).

**Table 3.** Access location

| Access Location (n) | Supine (n=41) | Prone (n=37) | Total (n=78) | p |
|---|---|---|---|---|
| Upper Calyx | 18 (72%) | 7 (28 %) | 25 (100 %) | ***0.045*** |
| -Upper calyx udjested residual | ***2,4***[a] | ***-2,4***[a] | | |
| Middle Calyx | 14 (48,3%) | 15 (51,7%) | 29 (100 %) | |
| -Middle calyx udjested residual | -0,6 | 0,6 | | |
| Lower Calyx | 9 (37,5%) | 15 (62,5%) | 24 (100 %) | |
| -Middle calyx udjested residual | -1,8 | 1,8 | | |

Table 3: Statistically significant difference was observed between the supine and prone groups in the chi-square test (p-value: 0.045). Therefore, a post hoc analysis of the chi-square test was performed, and adjusted residual values between -1.96 and +1.96 were considered non-significant. The significant values were indicated in ***bold italics***

The supine group had a statistically significantly lower hemoglobin drop (0.4 (-0.4-2.4) g/dL) compared to the prone group (0.8 (-1.4-3.7) g/dL, $p = 0.026$). The need for narcotic analgesics postoperatively was also lower in the supine group, with only 5 (%12.1) (patients requiring it versus 15 (%40.5) in the prone group ($p = 0.004$). Additionally, the presence of residual stones greater than 2 mm was significantly lower in the supine group (3 patients, %7.3) compared to the prone group (9 patients, %24.3, $p = 0.038$) (Table 4).

**Table 4.** Perioperative and postoperative outcomes

| Characteristics | Supine (n = 41) | Prone (n = 37) | Total (n = 78) | p |
|---|---|---|---|---|
| Hemoglobin Loss (g/dL) (Median, min-max) | 0.4 (-0.4-2.4) | 0.8 (-1.4-3.7) | 0.4 (-1.4-3.7) | **0.026** |
| Transfusion Requirement (n) | 3 (%7.3) | 22 (% 5.4) | 5 (%6.4) | 0.89 |
| Complications (n) | 6 (%14.6) | 4 (%10.8) | 10(%12.8) | 0.73 |
| Narcotic Analgesic Requirement (n) | 5 (%12.1) | 15 (%40.5) | 20 (%25.6) | **0.004** |
| Residual Stone Presence (>2 mm, n) | 3 (%7.3) | 9 (%24.3) | 12 (%15.3) | **0.038** |

Quality of recovery (QoR) scores improved statistically significantly postoperatively in both groups; however, the improvement was more pronounced in the supine group. The mean increase in QoR scores in the supine group was +62.76 ± 40.01, whereas the prone group showed an increase of +17.43 ± 28.92 ($p < 0.001$). This suggests that the supine position may provide a better quality of recovery outcome for patients postoperatively (Table 5).

**Table 5.** Quality of recovery (QoR) scores

| Characteristics | Supine (n=41) | Prone (n=37) | Total (n=78) | p |
|---|---|---|---|---|
| Preoperative QoR Score (Mean±SD) | 65.32 ± 32.03 | 92.27 ± 21.13 | 78.1 ± 30.42 | **<0.001** |
| Postoperative QoR Score (Mean±SD) | 128.07 ± 16 | 109.7 ± 23.13 | 119.36 ± 21.64 | **<0.001** |
| QoR Score Change (Mean±SD) | +62.76 ± 40.01 | +17.43 ± 28.92 | 41.26 ± 41.73 | **<0.001** |

## DISCUSSION

Percutaneous nephrolithotomy has gained wide acceptance as a minimally invasive method for the treatment of large kidney stones (12). Traditionally performed in the prone position, PCNL provides a wide surgical access, but presents some limitations in terms of anesthesia access difficulties and patient comfort (13,14). In recent years, the supine position has emerged as an alternative to these limitations and offers advantages in terms of anesthesia management and patient ventilation. In this study, the effects of supine and prone positions on operative characteristics, patient outcomes and quality of life were evaluated, and it was found that the supine position provided significant advantages (15,16).

The shorter operation time in PCNL procedures performed in the supine position indicates that this position is a more practical and faster option in surgical practice. The absence of the need for a change of position and the ability of the patient to remain fixed in a single position is considered to be a factor that optimizes the operation time, especially in obese patients or patients with restricted mobility. In addition, shorter hospitalization time in the supine position is an important finding supporting patient comfort and rapid postoperative recovery (5,17,18).

In the literature, it is known that pelvically located stones and stones with low density decrease the operation time (19,20). The patients in our study had 5 pelvic stones each supine and prone. It was observed that the stone location was not statistically different between the two groups. In addition, although stone densities are statistically lower in the prone method, the supine method seems more advantageous according to the results of our study. This may be due to better accessibility to the stone, lithotripsy angle and stone manipulation in the supine method.

Also, supine mPCNL is a safe and effective method in the treatment of pediatric kidney stones and its important advantage is that it provides easier access, especially from the lower calyx to the upper calyx (21).

There are studies in the literature that investigate the quality of life after percutaneous kidney stone treatment by trying to develop various standard criteria and investigating the success of surgery as well as morbidity and complication rates (22). In studies evaluating the quality of life in kidney stone treatment, it is known that double-J stents placed after the procedure seriously disturb patients. Therefore, informing patients about stent irritation before the procedure is important (23). In our study, the observed improvement in recovery associated with double-J stents may be attributed to comprehensive patient education regarding stent management or the inherently higher intensity of pain associated with stone disease itself. Postoperative quality of life assessments show that the supine position improves patient satisfaction. A significant improvement in patients' quality of life was observed in operations performed in this position, which accelerated the return to daily life after the operation (24). The improvement in quality of life scores reflect the direct contribution of the supine position to patient comfort. At the same time, less narcotic analgesia was required in the supine position, indicating that this position also offers an advantage in terms of postoperative pain management (25).

In terms of treatment efficacy, the lower residual stone rate in the supine position demonstrates the potential of this position to improve stone-free rates. It is known that the S.T.O.N.E score is used to predict stone free rates. In our study, there was no difference between the stone scores between the groups. However, the stone free rate was higher in the supine group. This finding suggests that the supine position may be a more effective option for complete stone removal. This position may improve patient outcomes, especially in the treatment of more complex and larger stones (26).

In the literature, different complication rates during surgery have been reported based on the accessed calyces. Upper calyx access provides easier entry to the renal pelvis and UPJ, facilitating improved stone clearance, particularly for branched stones, but carries a higher risk of thoracic complications. In contrast, lower calyx access poses a lower complication risk but can make it challenging to reach adjacent calyces or the UPJ, potentially increasing the risk of torque and kidney injury (27,28). In our study, a statistically significant higher rate of upper calyx access was observed in the supine group compared to the prone group. Although studies have reported higher complication rates for upper calyx access, no such difference was observed in our study. Therefore, we can suggest that the supine method may be preferred for upper calyx access (29).

This study has some limitations. Due to its retrospective nature, there may be limitations such as missing data and incomplete records. The single-center nature of the study limits the generalizability of the results. In addition, there

are small differences in characteristics such as stone density, size and location between the groups; this may affect the results. Another limitation of our study is that although general anesthesia was performed in both patient groups, perioperative monitorized findings of the patients were not evaluated. Future multicenter and prospective studies will increase the accuracy and generalizability of the findings.

## CONCLUSIONS

This study demonstrates that the supine position offers significant advantages in terms of operative time, patient comfort, quality of recovery and treatment efficacy in PCNL procedures. The short operative time, rapid recovery and low pain level provided by the supine position have the potential to increase patient satisfaction. In clinical practice, the supine position should be considered as an effective option to improve patient outcomes in PCNL procedures. Multicenter studies with large patient populations will contribute to confirm these findings on a larger scale.

**Authors's Contribution:** Idea/Concept: D.B., M.A.K.; Design: D.B., İ.E.D., E.E., M.A.K., A.Y.B.; Data Collection and/or Processing: İ.E.D., E.E., B.A.; Literature Review: Y.Ş., E.B.; Analysis and/or Interpretation: İ.E.D., A.T.T.; Writing the Article:D.B., M.A.K.; Critical Review: D.B., M.A.K.,Y.Ş.

## REFERENCES

1. Zhao Z, Fan J, Liu Y, de la Rosette J, Zeng G. Percutaneous nephrolithotomy: position, position, position!. Urolithiasis. 2018; 46(1): 79-86.
2. Knoll T, Daels F, Desai J, Hoznek A, Knudsen B, Montanari E, et al. Percutaneous nephrolithotomy: technique. World J Urol. 2017; 35(9): 1361-8.
3. Farkouh Aa, Park K, Buell MI, Mack N, De Guzman C, Clark T, et al. Prone vs supine percutaneous nephrolithotomy: does position affect renal pelvic pressures? Urolithiasis. 2024; 52(1): 66.
4. Marchini GS, Berto FCG, Vicentini FC, Shan CJ, Srougi M, Mazzucchi E. Preoperative planning with noncontrast computed tomography in the prone and supine position for percutaneous nephrolithotomy: a practical overview. Journal of endourology. 2015; 29(1): 6-12.
5. Sofer M, Tavdi E, Levi O, Mintz I, Bar-Yosef Y, Sidi A, et al. Implementation of supine percutaneous nephrolithotomy: a novel position for an old operation. Central European journal of urology. 2017; 70(1): 60.
6. Cracco CM, Scoffone CM. ECIRS (Endoscopic Combined Intrarenal Surgery) in the Galdakao-modified supine Valdivia position: a new life for percutaneous surgery? World journal of urology. 2011; 29: 821-7.
7. Scoffone CM, Cracco CM. Invited review: the tale of ECIRS (Endoscopic Combined IntraRenal Surgery) in the Galdakao-modified supine Valdivia position. Urolithiasis. 2018; 46(1): 115-23.
8. Phoophiboon V, Owattanapanich N, Owattanapanich W, Schellenberg M. Effects of prone positioning on ARDS outcomes of trauma and surgical patients: a systematic review and meta-analysis. BMC pulmonary medicine. 2023;23(1):504.
9. Kwee MM, Ho Y-H, Rozen WM. The prone position during surgery and its complications: a systematic review and evidence-based guidelines. International surgery. 2015; 100(2): 292-303.
10. Okhunov Z, Friedlander JI, George AK, Duty BD, Moreira DM, Srinivasan AK, et al. STONE nephrolithometry: novel surgical classification system for kidney calculi. Urology. 2013; 81(6): 1154-60.
11. Selvi O, Azizoğlu M, Temel G, Tulgar S, Chitneni A, Çınar EN, et al. Translation and validation of the Turkish version of the quality of postoperative recovery score QoR-15: A multi-centred cohort study. Turkish Journal of Anaesthesiology and Reanimation. 2022; 50(6): 443.
12. Ferakis N, Stavropoulos M. Mini percutaneous nephrolithotomy in the treatment of renal and upper ureteral stones: Lessons learned from a review of the literature. Urology annals. 2015; 7(2): 141-8.
13. Karaolides T, Moraitis K, Bach C, Masood J, Buchholz N. Positions for percutaneous nephrolithotomy: Thirty-five years of evolution. Arab Journal of Urology. 2012; 10(3): 307-16.
14. Kumar P, Bach C, Kachrilas S, Papatsoris AG, Buchholz N, Masood J. Supine percutaneous nephrolithotomy (PCNL):'in vogue'but in which position? BJU international. 2012; 110(11c): E1018-E21.
15. Giusti G, Pavia MP, Rico L, Proietti S. Percutaneous nephrolithotomy: which position? Supine position! European Urology Open Science. 2022; 35: 1-3.
16. Tsaturyan A, Vrettos T, Liourdi D, Lattarulo M, Liatsikos E, Kallidonis P. Position-related anesthesiologic considerations and surgical outcomes of prone percutaneous nephrolithotomy: a review of the current literature. Minerva Urology and Nephrology. 2022; 74(6): 695-702.
17. Zanaty F, Mousa A, Elgharabawy M, Elshazly M, Sultan S. A prospective, randomized comparison of standard prone position versus flank-free modified supine position in percutaneous nephrolithotomy: A single-center initial experience. Urology Annals. 2022; 14(2): 172-6.
18. Kucukyangoz M, Gucuk A. Which position is more advantageous for percutaneous nephrolithotomy: supine or prone? Urolithiasis. 2023; 51(1): 102.
19. Valdivia JG, Scarpa RM, Duvdevani M, Gross AJ, Nadler RB, Nutahara K, et al. Supine versus prone position during percutaneous nephrolithotomy: a report from the clinical research office of the endourological society percutaneous nephrolithotomy global study. Journal of endourology. 2011; 25(10): 1619-25.
20. Erbin A, Ozdemir H, Sahan M, Savun M, Cubuk A, Yazici O, et al. Comparison of supine and prone miniaturized percutaneous nephrolithotomy in the treatment of lower pole, middle pole and renal pelvic stones: A matched pair analysis. International braz j urol. 2019; 45: 956-64.
21. Eryılmaz R, Ertas K, Aslan R, Sevim M, Keles MF, Taken K. Comparison of supine–prone percutaneous

nephrolithotomy methods in the treatment of kidney stones in pediatric patients: prospective randomized study. Urolithiasis. 2024; 52(1): 73.
22. Mazzon G, Choong S, Pavan N, Zeng G, Wu W, Durutovic O, et al. Introducing trifecta for percutaneous nephrolithotomies: a proposal for standard reporting outcomes after treatment for renal stones. Minerva Urology and Nephrology. 2021; 74(3): 351-9.
23. De Bayser H, Neuville P, Etienne J, Paparel P, Badet L, Abid N. Quality of life of patients treated for kidney stones 10–20 mm in diameter in terms of the type of operation performed: A qualitative study. Progrès en Urologie. 2023; 33(2): 88-95.
24. Hazır B, Çak HT, Saruhan K, Tekgül S, Doğan HS. Factors affecting the postoperative quality of life and psychological well-being in pediatric urology patients. Journal of Pediatric Urology. 2023; 19(4): 435. e1-. e8.
25. Qi Y, Kong H, Xing H, Zhang Z, Chen Y, Qi S. A randomized controlled study of ureteral stent extraction string on patient's quality of life and stent-related complications after percutaneous nephrolithotomy in the prone position. Urolithiasis. 2023; 51(1): 79.
26. Birowo P, Tendi W, Widyahening IS, Rasyid N, Atmoko W. Supine versus prone position in percutaneous nephrolithotomy: a systematic review and meta-analysis. F1000Research. 2020; 9: 231.
27. Assimos D, Krambeck A, Miller NL, Monga M, Murad MH, Nelson CP, et al. Surgical management of stones: American urological association/endourological society guideline, PART I. The Journal of urology. 2016; 196(4): 1153-60.
28. Kucukyangoz M, Gucuk A. What should the optimal access site be for percutaneous treatment of anterior lower pole calyx stones? World Journal of Urology. 2024; 42(1): 176.
29. Oner S, Akgul AK, Demirbas M, Onen E, Aydos M, Erdogan A. Upper pole access is safe and effective for pediatric percutaneous nephrolithotomy. Journal of pediatric urology. 2018; 14(2): 183. e1-. e8.

Araştırma Makalesi / Research Article

Sağlık Bilimlerinde Değer / Sağlık Bil Değer
Value in Health Sciences / Value Health Sci
ISSN: 2792-0542 sabd@duzce.edu.tr 2025; 15(2): 288-293
doi: https://dx.doi.org/10.33631/sabd.1558324

# Prevalence and Sociodemographic Distribution of *Helicobacter pylori* Positivity in Türkiye: A Retrospective Analysis between 2018-2023 and Impact of COVID-19 Measures

İsmail Selçuk AYGAR[1], Sevinç KARABULUT[1], Kemal TEKİN[1]

**ABSTRACT**

**Aim:** Helicobacter pylori is a gram-negative, multi-flagellated bacterium that resides in the gastric mucosa and is a significant cause of chronic antral gastritis, peptic ulcers, gastric lymphoma, and adenocarcinoma. Its prevalence is inversely related to socioeconomic development, with higher rates in developing countries. The bacterium is believed to spread primarily through fecal-oral and oral-oral routes, with an estimated global infection rate of around 50%.

**Material and Methods:** This study retrospectively examined the presence of H. pylori antigen in stool samples from 40784 patients admitted to our hospital between 2018 and 2023. The tests were performed using MICROCULT (Biotech, China) kits and the results were analysed according to age, sex and geographical regions.

**Results:** The overall positivity rate was found to be 14.47%. Female had a higher positivity rate (16.73%) compared to male (11.64%). The positivity rate was 6.46% in children and 16.77% in adults. The highest regional positivity was observed in the Southeastern Anatolia region (25.71%), while the lowest was in the Black Sea region (11.95%). In Ankara, Altındağ district had the highest positivity rate (17.09%), while Etimesgut had the lowest (8.79%).

**Conclusion:** The study highlights a decline in H. pylori prevalence in recent years, though higher rates persist in less developed regions, underscoring the need for improved infrastructure, hygiene, and targeted screening and treatment strategies.

**Keywords:** *Helicobacter pylori*; prevalence; diagnosis; COVID-19.

## Türkiye'de Helicobacter pylori Pozitifliğinin Prevalansı ve Sosyodemografik Dağılımı: 2018-2023 Yılları Arasında Retrospektif Bir Analiz ve COVID-19 Tedbirlerinin Etkisi

**ÖZ**

**Amaç:** Helicobacter pylori, mide mukozasında yaşayan gram-negatif, çok kamçılı bir bakteridir ve kronik antral gastrit, peptik ülser, mide lenfoması ve mide adenokarsinomu gibi ciddi mide hastalıklarının oluşumuna katkıda bulunur. Bu bakterinin dünya genelindeki yaygınlığı ülkelerin gelişmişlik düzeyiyle ters orantılı olup, düşük sosyoekonomik koşullarda daha sık görülmektedir. Yayılma yolları kesin olarak bilinmemekle birlikte, fekal-oral ve oral-oral yollarla bulaştığı düşünülmektedir. Küresel enfeksiyon oranı %50 civarındadır.

**Gereç ve Yöntemler:** Bu çalışmada, 2018-2023 yılları arasında hastanemize başvuran 40784 hastadan alınan dışkı örneklerindeki H. pylori antijen varlığı retrospektif olarak incelenmiştir. Testler, MICROCULT (Biotech, China) kitleri kullanılarak gerçekleştirilmiş ve sonuçlar yaş, cinsiyet ve coğrafi bölgelere göre analiz edilmiştir.

**Bulgular:** Sonuçlara göre genel H. pylori pozitiflik oranı %14,47 olarak tespit edilmiştir. Kadınlarda (%16,73) pozitiflik oranı erkeklere (%11,64) göre daha yüksek bulunmuştur. Ayrıca çocuklarda pozitiflik oranı %6,46, yetişkinlerde ise %16,77 olarak kaydedilmiştir. Bölgesel analizde Güneydoğu Anadolu Bölgesi %25,71 ile en yüksek pozitiflik oranına sahipken, Karadeniz Bölgesi %11,95 ile en düşük orana sahip olmuştur. Ankara ilçelerinde Altındağ %17,09 ile en yüksek orana sahipken, Etimesgut %8,79 ile en düşük oranı göstermiştir.

**Sonuç:** Son yıllarda H. pylori prevalansında düşüş gözlenmiştir, ancak özellikle düşük sosyoekonomik bölgelerde enfeksiyon oranları yüksek seyretmektedir. Çalışma, altyapı, hijyen ve yaşam standartlarındaki iyileştirmelerin enfeksiyon oranlarını azaltmada önemli bir rol oynadığını göstermektedir. Ayrıca, kadınlarda ve yaş ilerledikçe pozitiflik oranlarının arttığı tespit edilmiştir. H. pylori'nin yaygınlığının azaltılması için yeni tanı ve tedavi stratejilerinin geliştirilmesine ihtiyaç duyulmaktadır.

**Anahtar Kelimeler:** *Helicobacter pylori*; prevalans; tanı; COVID-19.

1 Ankara Gülhane Health Research Center, University of Health Sciences, Ankara, Türkiye

Sorumlu Yazar / Corresponding Author: İsmail Selçuk AYGAR, e-mail: drisa1986@hotmail.com

## INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is *Helicobacter pylori* is a gram-negative, multi-flagellated bacterium that appears as a spiral in tissue and as a bacillus or coccobacillus when grown in culture. It is biochemically, catalase, oxidase and urease are positive. It is one of the most common chronic pathogens around the world. Its prevalence is inversely proportional to the development levels of countries and varies between 18.9% and 87.7% globally (1). According to data published in 2017, this rate is 82.5% (2). Subsequently, another study conducted in 2020 showed that this rate was 75.7% (3).

*H. pylori* can only survive in the epithelial cells of the stomach that can secrete mucus. It is one of the causes of chronic antral gastritis and has also been shown to be associated with the pathogenesis of peptic ulcer, mucosa-associated lymphoid tissue (MALT) lymphoma seen in the gastric lymphoid tissue, and gastric adenocarcinoma (4-7). In 1994, the World Health Organization (WHO) stated that this bacterium is involved in the formation of gastric cancer. Since it was reported that it is an etiological agent of gastric cancer, all studies have focused on H. pylori (8). Subsequent studies have shown that *H. pylori* can cause not only diseases locally limited to the stomach, but also systemic diseases such as arthritis, anemia, atherosclerosis, and systemic diseases including Parkinson's and Alzheimer's (9,10).

Although the mode of transmission of *H. pylori* is not fully known, it is thought to be transmitted via fecal-oral and oral-oral routes, and it is estimated that almost 50% of the world's population is infected (11,12,13).

Invasive and non-invasive methods are available for diagnosis. While biopsy samples taken invasively by gastroscopy are examined with methods such as culture, histopathological microscopy and polymerase chain reaction (PCR), the presence of bacteria can be investigated without the need for an invasive intervention such as the stool antigen test, which is more commonly used microbiologically today, or the urea breath test, which can be applied in nuclear medicine clinics (11,14).

Today, in the diagnosis of *H. pylori* in microbiology laboratories, *H. pylori* stool antigen (HpSa) tests, which have high specificity and sensitivity, do not require invasive sampling, are safe, fast, inexpensive and reproducible, are mostly used (8,15). The sensitivity of the tests is approximately 96%. They are monoclonal antibody-based antigen tests and work on the principle of the immunochromatographic method (15,16). Especially in people with dyspepsia whose symptoms are not severe and who do not have a history of nonsteroidal anti-inflammatory drug use, non-invasive tests such as stool antigen detection tests should be used instead of gastroscopy for diagnosis and treatment follow-up, and there are studies that recommend this (17).

In the present study, the data concerning the stool sample results sent to our laboratory from patients who had applied to various clinics of our hospital with dyspeptic complaints to investigate the presence of *H. pylori* antigen were examined retrospectively. The objective of the present study is threefold: first, to determine the frequency of *H. pylori* positivity; second, to establish the distribution of positivity rates according to the sociodemographic status of the patients; and third, to present the current *H. pylori* prevalence in the context of the most recent six years of data in our country and province.

## MATERIAL AND METHODS

Results of stool samples from 40784 patients who applied to our hospital from different parts of Türkiye between January 2018 and December 2023 were included in the study. In duplicate sample requests, only the first sample result of the patient is taken into account. Test results of sociodemographic data for each patients, such as age and gender, were also examined retrospectively. Incoming stool samples were analyzed using with the *H.pylori* Antigen Rapid Test (MICROCULT, Biotech, China) cassette test, which detects the presence of *H. pylori* antigen. The test was conducted in accordance with the manufacturer's recommendations. After the incoming sample was mixed vigorously with 50 mg of extraction buffer, 50µL of the resulting mixture was placed into the sample well. After the 10-minute incubation period was completed, color change in the test area indicated a positive result, while no change indicated a negative result. The control of the test is indicated by a colored control line on the kit. The specificity and sensitivity of the test were reported as 98.4% and >98.8%.

Patients were divided into two groups: children aged 0-17, adults aged 18 and over, and patients were classified by gender as male or female. The positivity rates in these groups were evaluated statistically. Moreover, while some of the patients who submitted applications to our hospital resided in disparate regions of our nation, they were referred to our hospital from their respective provinces because our hospital is a tertiary health center. By classifying all patients according to the provinces and districts they live in, we sought to ascertain the distribution of the *H. pylori* positivity rate by regions in Türkiye and by districts in Ankara.

This research was approved by the Scientific Research Ethics Committee of our hospital (Decision No: 2023/369).

### Statistical Analyses

Descriptive statistics are given as number (n) and percentage (%). Statistical analysis of the data was performed using the Chi-Square test, with a 95% confidence interval and a statistical significance limit of $p<0.05$.

## RESULTS

Stool samples from 40,784 patients admitted to our hospital were tested in the medical microbiology laboratory. 18,072 (44.31%) of the patients were male and 22,712 (55.69%) were female. The average age of the patients was calculated as 44 (±19.18) years. 5,903 (14.47%) of the samples were found to be positive. The average age of patients with positive sample results was 45.08 (±16.97), while the average age of those with negative samples was 43.84 (±19.10). Considering all patient groups, the positivity rate in the female (16.73%) population was statistically significantly higher than that in the male (11.64%) population ($p<0.001$). Positivity rates by gender are shown in Figure 1.

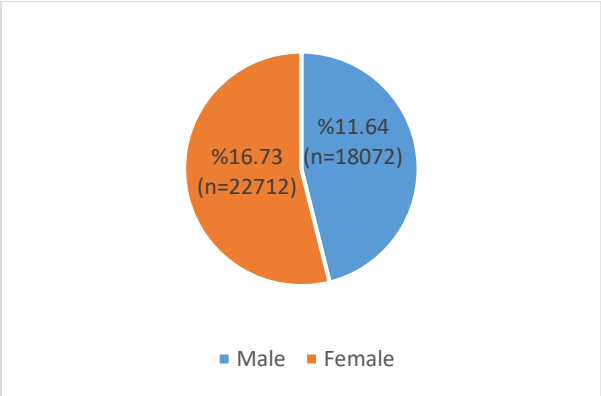



**Figure 1.** Positivity rate by gender

Considering all age groups, the positivity rate in female (16.73% (n=22712)) was statistically significantly higher than male (11.64% (n= 18072)) (p<0.001). In the adult age group, the positivity rate of female (19.74% (n= 17468)) was statistically significantly higher than that of male (13.09% (n=14234)) (p<0.001). In this age group, the average age of positive patients was 43.63, while the average age of negative patients was 43.64. However, in the pediatric age group, the positivity rates of female (6.6% (n= 5224)) and male (6.28% (n=3883)) were close to each other and there was no statistically significant difference (p>0.05). Within this pediatric population, the average age was 10.96 years among positive cases and 11.62 years among negative ones.

According to age groups, patients are divided into two groups: children (0–17 years) and adults (≥18 years), and the positivity rates in the child and adult groups are summarized in Figure 2.

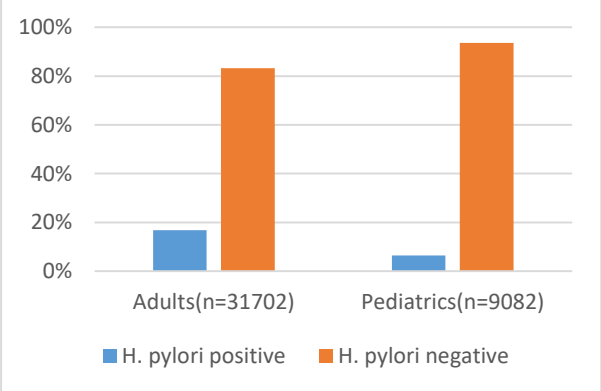



**Figure 2.** Positivity rates according to patient age groups

While the positivity rate in the adult age group is 16.77%, this rate is 6.46% in the childhood age group and this difference is statistically significant (p<0.05).

When the positivity rates of the patients whose samples were sent for *H. pylori* antigen positivity investigation were examined according to the provinces they lived in, the first three highest provinces were determined to be Bitlis (32.35%), Şanlıurfa (30%) and Kars (29.17%). When the positivity rates by region were examined, the Southeastern Anatolia Region had the highest rate with 25.71%, while the Black Sea Region was found to have the lowest rate with 11.95%, and this difference was statistically significant (p < 0.001). Based on the test results of the patients admitted to our hospital, the distribution of *H. pylori* positivity rates by province and region in Türkiye is summarized in Table 1 (Table 1).

**Table 1.** Distribution of *H. pylori* positivity rates in Türkiye by region

| Region | Number (n) | Percentage (%) | *p* value |
|---|---|---|---|
| Central Anatolia | 36806 | 14.16 | *p*<0.05 |
| Black Sea | 770 | 11.95 | |
| Marmara | 926 | 18.03 | |
| Aegean | 522 | 17.43 | |
| Mediterranean | 514 | 17.90 | |
| Eastern Anatolia | 787 | 16.90 | |
| Southeastern Anatolia | 459 | 25.71 | |

In addition, when the positivity rates were evaluated according to the districts where the patients lived in Ankara, it was determined that the highest district was Altındağ (17.09%) and the lowest district was Etimesgut (8.79%), and this difference was statistically significant (p < 0.001). Positivity rates by Ankara's districts are summarized in Figure 3.

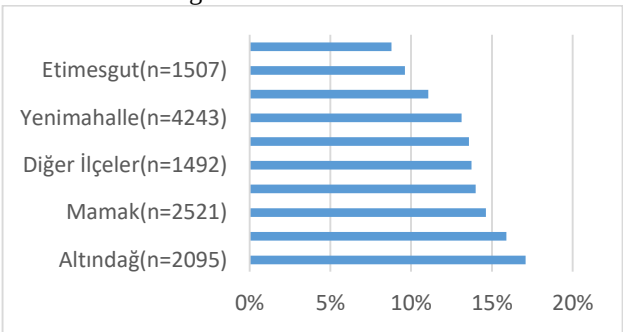



**Figure 3.** Positivity rates of Ankara districts (p < 0.001)

Other Districts: Akyurt, Ayaş, Bala, Beypazarı, Çamlıdere, Çubuk, Elmadağ, Güdül, Haymana, Kahramankazan, Kalecik, Kızılcahamam, Polatlı, Şereflikoçhisar, Evren, Nallıhan. These districts are located within the provincial borders of Ankara and are peripheral districts.

The change in *H. pylori* positivity rates over the years is divided into three as general, adult and child positivity rates. While an upward trend was observed in the rates for all three groups in 2021 and 2022, they decreased to the lowest rates in six years in 2023. While the change in general and adult positivity rates over the years was statistically significant (p<0.001), it was not statistically significant for child positivity rates (p>0.05). This course over the years is summarized in Figure 4.

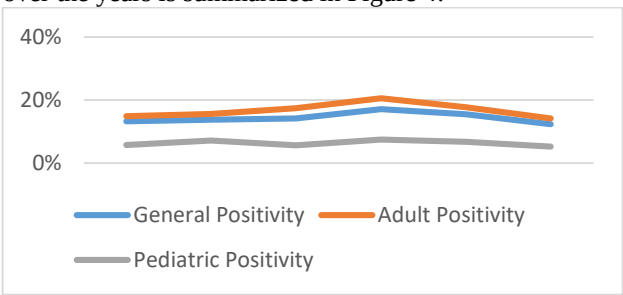



**Figure 4.** Change in *H. pylori* positivity rates over the years according to patient groups

While H. pylori positivity showed a slight increasing trend in the general population from the beginning of 2018 (13.22%) to 2019 (13.71%), by 2020, it started to decrease

in the pediatric patient group (2019; 7.21%, 2020; 5.60%), while in the adult group (2019;%) 15.62, 2020; 17.36%), the increasing trend continued to increase. In 2021, an increase was seen in all groups (2020; 14.17%, 2021; 17.06%), and a sharp decreasing trend was entered towards 2023 (2021; 17.06%, 2023; 12.36%).

## DISCUSSION

The prevalence of *H. pylori* can reach up to 90% in developing countries (18). *H. pylori* is endemic in these countries, including Türkiye, due to inappropriate use of tap water, crowded living conditions, poor hygiene, poor sanitation and the low socioeconomic status of the citizens. Humans are usually infected by bacteria in childhood, and its prevalence increases with age (11).

Tests used for the diagnosis of *H. pylori* can be divided into invasive and non-invasive tests. While invasive tests are performed on biopsy material obtained through endoscopy, they are expensive and difficult to implement. In developing countries, non-invasive tests are preferred as diagnostic tests to investigate the presence of *H. pylori* infection. These tests are monoclonal antibody-based antigen tests and both stool and serum samples be used. In our country, cassette tests are mostly used to detect stool *H. pylori* antigen, based on the principle of the immunochromatographic method. These tests are cheaper than the other non-invasive test, the Urea Breath Test, and are also suitable for use in small health centers. Moreover, studies have shown that the specificity and sensitivity of immunochromatographic cassette tests were found to be quite high compared to the gold standard test method (19,20). In a meta-analysis study comparing the results of 48 studies on cassette tests, the specificity and sensitivity were respectively; calculated between 94-98% and 95-98%. The specificity and sensitivity of the test we used in our study were stated by the manufacturer as 98.4% and >98.8%.

Although it varies within a wide range, in a meta-analysis study conducted with studies published from 62 countries, the global prevalence of *H. pylori* was found to be 48.5%, and in another meta-analysis study including 73 countries, it was found to be 44.3% (1,21). In a study conducted in European countries the study showed that the prevalence of *H. pylori* varied between 11% and 84% (22). It is noteworthy that the prevalence of *H. pylori* varied greatly in the different regions examined in these studies (1,21,22).

Although it varies between societies and age groups, the prevalence of *H. pylori* is lower in developed countries and societies. In addition, it has been shown that the prevalence reaches up to 70% in developing countries due to low socioeconomic conditions, unhealthy nutrition, poor infrastructure and hygiene conditions (23).

Recent studies on the prevalence of *H. pylori* in our country have reported that this rate varies between 8.9-41%. The prevalence of Helicobacter pylori varies between geographical regions and patient age groups. Moreover, recent years have seen a decline in the prevalence of the bacterium (24, 25). In our study, the prevalence between 2018-2023. It was determined as 14.47%. In two comprehensive studies conducted in our country; While 82.5% *H. pylori* positivity was detected in 2013, it was calculated as 75.7% in the study conducted in 2017(2,26). In the study conducted in 2017, the distribution of *H. pylori* prevalence by regions was 88.7% in the Southeastern Anatolia region, 83.8% in the Eastern Anatolia region, and 85.6% in the Mediterranean region. It was reported as 80.9% in the Central Anatolia region, 66.7% in the Black Sea region, 68.5% in the Aegean region and 71.8% in the Marmara region (2). In our study, the distribution by region is 25.71% in the Southeastern Anatolia region, 16.90% in the Eastern Anatolia region, 17.90% in the Mediterranean region, and 14.16% in the Central Anatolia region. It was determined as 14.16%, 11.95% in the Black Sea region, 17.43% in the Aegean region and 18.03% in the Marmara region ($p<0.05$). In our study, the city with the highest prevalence was determined to be Bitlis with 32.35%. In addition, in our study, patients living in Ankara were divided into groups according to districts, and it was determined that the highest prevalence was observed in Altındağ (17.09%) and the lowest prevalence was observed in Etimesgut (8.79%). While Altındağ is one of the oldest settlements in Ankara and has negative factors such as infrastructure problems and migration, Etimesgut is a district that has been under construction in the last 20 years, has no infrastructure problems and has a relatively higher socioeconomic level. Considering the situation of the regions throughout the country and the districts in Ankara specifically, these data; It supports that the prevalence of *H. pylori* is inversely proportional to the level of development.

While the prevalence of *H. pylori* was stated as 68% in a 2007 study conducted in Ankara, this rate was calculated as 14.29% in our study (27). When the positivity rates are examined according to the years in our study, it is seen that the period between 2020 and 2022 coincides with the COVID-19 pandemic. Various measures have been taken in our country during the COVID-19 pandemic, such as lockdown and the use of masks (28). This is particularly pertinent given that H. pylori is transmitted through the fecal-oral route, and the increase in cases observed between 2020-2021 can be attributed to the lockdown measures implemented during this period. We think it is due to the increase in contamination. With the end of the lockdown measures, it is seen that the prevalence of *H. pylori* has decreased between 2021 and 2023. Although there was an increase due to the effect of pandemic measures, the statistically significant decrease in its prevalence in 2018 (13.22%) and 2023 (12.36%) supports the fact that *H. pylori* positivity has decreased over the years ($p < 0.05$).

There are studies showing that there is no statistically significant difference in H. pylori positivity between male and female when all age groups are considered together (21). There are also studies that show a significant difference between gender groups (29). While some studies found high positivity rates in male, it is higher in female than male. The majority of studies show that *H. pylori* positivity is detected (24,25). In our study, *H. pylori* is statistically significantly higher in female (16.64%, 19.77%) than in male (11.73%, 13.09%) in all age groups and in the adult age group. It was found to be positive ($p<0.05$). In the child age group, no statistically significant difference was detected between the female (6.60%) and male (6.28%) groups ($p>0.05$).

It is thought that *H. pylori* is acquired in childhood and remains positive as long as it is not treated (30). The higher rate of *H. pylori* positivity in adults than in children is explained by the increased risk of exposure to the agent with age (22). In our study, there was a statistically significant increase with age. Higher *H. pylori* positivity rates were found in the adult (16.77%) age group than in the child (6.46%) age group ($p<0.05$).

In our study, 40,784 patient samples were examined between 2018 and 2023. This number is the highest sample group conducted in our country to date and is one of the strengths of our study. The present study is subject to certain limitations. Firstly, it was conducted in a single centre, which restricts the generalisability of the results. Secondly, it was not possible to compare the results with those obtained from other tests that screen for H. pylori antigen positivity.

## CONCLUSION

As a result, the prevalence of *H. pylori* was found to be lower in our study compared to studies conducted in recent years, and it was observed that it increased with age and was detected more frequently in female gender in the general population evaluation. When we compare our data with previous studies conducted in our country and Ankara; Although the decline in recent years is pleasing, the increase observed in districts such as Altındağ and Pursaklar in Ankara and in the Southeastern Anatolia region of our country shows that we have much more to do. Given the inverse correlation between the prevalence of *H. pylori* and the level of development, it is evident that significant improvements are required in several domains, including infrastructure, hygiene conditions, and socioeconomic conditions, within our nation. Furthermore, given the fact that *H. pylori* is a primary cause of dyspeptic complaints, there is an urgent need to develop new *H. pylori* diagnosis, screening and treatment strategies.

**Authors's Contributions:** Idea/Concept: İ.S.A.; Design: İ.S.A.; Data Collection and/or Processing: İ.S.A.; Analysis and/or Interpretation: İ.S.A.; Literature Review: İ.S.A., S.K., K.K.; Writing the Article: İ.S.A., S.K., K.K.; Critical Review: İ.S.A., S. K., K.K.

## REFERENCES

1. Hooi JKY, Lai WY, Ng WK, Michael M. Y. Suen, F.E. Underwood, D Tanyingoh, et al. Global prevalence of Helicobacter pylori infection: Systematic review and meta-analysis. Gastroenterology 2017; 153(2): 420-9. https://doi.org/10.1053/j.gastro.2017.04.022
2. Bor S, Kitapcioglu G, Kasap E. Prevalence of gastroesophageal reflux disease in a country with a high occurrence of Helicobacter pylori. World J Gastroenterol 2017; 23(3): 525-32. https://doi.org/10.3748/wjg.v23.i3.525
3. Kaplan M, Tanoglu A, Duzenli T, A.N. Tozun. Helicobacter pylori treatment in Türkiye: Current status and rational treatment options. Nor th Clin Istanb 2020; 7(1): 87-94. https://doi.org/ 10.14744/nci.2019.62558
4. Elmer W. Koneman Çeviri A. Başustaoğlu, A.D. Helicobacter cinsi. Us Color Atlas and Textbook of Diagnostic Microbiology. Türkçe 7. Baskı 2017: 442-3
5. Bofinger J.J, Fekete T, Samuel R. Bacterial peritonitis caused by Kingella kingea.J. Clin Microbiol 2007; (9): 3118-20. https://doi.org/10.1128/JCM.00878-07
6. Christensen H, Bisgaard M, Angen O, J.E. Olsen. Final classification of Biagaard taxon 9 Actinobacillus arthritidis sp, nov and recognition of a novel genomospecies for eguine strains of Actinobacillus lignicressi. Int J SystEvol Microbiol 2002; 52(Pt 4): 1239-46. https://doi.org/10.1099/00207713-52-4-1239
7. Elliot SP. Rat bite fever and Streptobacillus moniloformis. Clin Microbiol Rev 2007; 20(1): 13-22. https://doi.org/10.1128/cmr.00016-06
8. IARC Helicobacter pylori Working Group. Helicobacter Pylori Eradication as a Strategy for Preventing Gasric Cancer. Lyon, France: International Agency for Research on Cancer (IARC Working Group reports, no.8); 2014.)
9. Malfertheiner P, Selgrad M, Bornschein J. Helicobacter pylori: clinical management. Curr Opin Gastroenterol 2012; 28(6):608-14. https://doi.org/10.1097/MOG.0b013e32835918a7
10. Georgopoulos SD, Papastergiou V, Karatapanis S. Current options for the treatment of Helicobacter pylori. Expert Opin Pharmacother 2013; (2): 211-23. https://doi.org/10.1517/14656566.2013.763926
11. Lawson AJ. Helicobacter. In: Jorgensen JH, Landry ML, Warnock DW (Eds.) Manual of Clinical Microbiology. Washington DC: ASM Press, 2011: 900-15. https://doi.org/10.1128/9781555816728.ch54
12. Lehours P, Yilmaz O. Epidemiology of Helicobacter pylori infection. Helicobacter. 2007; 12(1): 1-3 https://doi.org/10.1111/j.1523-5378.2007.00541.x
13. Kayali S, Manfredi M, Gaiani F, Bianchi L, Bizzarri B, Leandro G, et al. Helicobacter pylori, transmission routes and recurrence of infection: state of the art. Acta Biomed. 2018; 89(8): 72-6. https://doi.org/10.23750/abm.v89i8-S.7947
14. Megraud F, Lehours P. Helicobacter pylori detection and antibiotic susceptibility testing. Clin Microbiol Rev. 2007; 20(2): 280-322. https://doi.org/10.1128/cmr.00033-06
15. Shimoyama T. Stool antigen tests for the management of Helicobacter pylori infection. World J Gastroenterol. 2013; 19(45): 8188-91. https://doi.org/10.3748/wjg.v19.i45.8188
16. Malfertheiner P, Megraud F, O'Morain CA, J P Gisbert, E J Kuipers, A T Axon, et al. Management of Helicobacter pylori infection-the Maastricht V/Florence Consensus Report. Gut. 2017(1): 6-30. https://doi.org/10.1136/gutjnl-2016-312288
17. McColl K. Sould Non-invasive Helicobacter pylori testing replase endoscopy in investigation of dyspepsia: Helicobacter. 2000; 5(1): 11-5. https://doi.org/10.1046/j.1523-5378.2000.0050S1011.x
18. M.A. Al-Moagel, D.G. Evans, M.E. Abdulghani, E. Adam, D.J. Evans Jr., H.M. Malaty, et al. Prevalence of Helicobacter Pylori (formerly Campylobacter) infection in Saudi Arabia, and comparison of those with and without upper gastrointestinal symptoms, Am. J. Gastroenterol. 1990; 85(8): 944-8.

19. Tünger Ö. Helicobacter pylori infeksiyonları. Infeks Derg. 2008; 22(2): 107-15.
20. Özdemir M, Baykan M. Dispeptik hastalarda H. pylori infeksiyonu tanısında H. pylori gaita antijeninin tanı değerlerinin incelenmesi. Genel Tıp Derg. 2005; 15(2): 65-70.
21. Zamani M, Ebrahimtabar F, Zamani V, W. H. Miller, R. Alizadeh-Navaei, J. Shokri-Shirvani, et al. Systematic review with meta-analysis: the worldwide prevalence of Helicobacter pylori infection. Aliment Pharmacol Ther. 2018; 47(7): 868-76. https://doi.org/10.1111/apt.14561
22. Venneman K, Huybrechts I, Gunter MJ, Vandendaele L, Herrero R, Van Herck K. The epidemiology of Helicobacter pylori infection in Europe and the impact of lifestyle on its natural evolution toward stomach cancer after infection: a systematic review. Helicobacter. 2018; 23(3): e12483. https://doi.org/10.1111/hel.12483
23. Tkachenko MA, Zhannat NZ, Erman LV, Elena L Blashenkova, Sergey V Isachenko, Olga B Isachenko, et al. Dramatic changes in the prevalence of Helicobacter pylori infection during childhood: a 10-year follow-up study in Russia. J Pediatr Gastroenterol Nutr. 2007; 45(4): 428- 32. https://doi.org/10.1097/MPG.0b013e318064589f
24. Bahçeci İ, Yıldız İE. İlimizde Helicobacter pylori sıklığının değerlendirmesi: yedi yıllık çalışma. Turk J Clin Lab. 2021; 12(3): 260-4. https://doi.org/10.18663/tjcl.954009
25. Sakman A, Bayram Y, Parlak M, Güdücüoğlu H. Aile sağlığı merkezine başvuran hastalarda Helicobacter pylori sıklığı. TJFMPC. 2021; 15(3): 418-23. https://doi.org/10.21763/tjfmpc.813379
26. Ozaydın N, Turkyılmaz SA, Cali S. Prevalence and risk factors of Helicobacter pylori in Türkiye: a nationallyrepresentative, cross-sectional, screening with the 13C-urea breath test. BMC Public Health. 2013; 13: 1215. https://doi.org/10.1186/1471-2458-13-1215
27. Türkölmez S, Cayir D, Aydoğan F, Korkmaz M. The relationship of the Helicobacter pylori positively with age, sex, and ABO/rhesus blood groups in patients with gastrointestinal complaints in Türkiye. Helicobacter. 2007; 12(3): 244-50. https://doi.org/10.1111/j.1523-5378.2007.00500.x
28. Demirbilek Y, Pehlivantürk G, Özgüler ZÖ, Alp Meşe E. COVID-19 outbreak control, example of ministry of health of Türkiye. Turk J Med Sci. 2020; 50(9): 489-94. https://doi.org/10.3906/sag-2004-187
29. Ibrahim A, Morais S, Ferro A, Lunet N, Peleteiro B. Sex-differences in the prevalence of Helicobacter pylori infection in pediatric and adult populations: systematic review and meta-analysis of 244 studies. Dig Liver Dis. 2017; 49(7): 742-9. https://doi.org/10.1016/j.dld.2017.03.019
30. Nagy P, Johansson S, Molloy-Bland M. Systematic review of time trends in the prevalence of Helicobacter pylori infection in China and the USA. Gut Pathog. 2016; 8: 8. https://doi.org/10.1186/s13099-016-0091-7

Araştırma Makalesi / Research Article

Sağlık Bilimlerinde Değer / Sağlık Bil Değer
Value in Health Sciences / Value Health Sci
ISSN: 2792-0542 sabd@duzce.edu.tr 2025; 15(2): 294-299
doi: https://dx.doi.org/10.33631/sabd.1594627

# Sağlık Alanındaki Üniversite Öğrencilerinin Uyuz Hastalığı Geçirmiş Olma Durumları ve Risk Faktörlerinin Belirlenmesi

Fatma CEVAHİR[1,2], Canan BİRİMOĞLU OKUYAN[3], Aslan YÜREKLİ[4], Mustafa ALTINDİŞ[5]

## ÖZ

**Amaç:** Bu çalışmanın amacı, sağlık alanında eğitim gören üniversite öğrencilerinin uyuz hastalığı geçirmiş olma durumlarını belirlemek ve bu duruma etki edebilecek olası risk faktörlerini incelemektir.

**Gereç ve Yöntemler:** Bu tanımlayıcı çalışma, üniversitenin Sağlık Bilimleri Fakültesi (Hemşirelik, Fizyoterapi ve Rehabilitasyon, Sağlık Yönetimi) ile Sağlık Hizmetleri Meslek Yüksekokulu (İlk ve Acil Yardım, Fizyoterapi, Sağlık Kurumları Yönetimi, Sağlık Turizmi Yönetimi, Tıbbi Laboratuvar Teknikleri) öğrencileri (n=517) ile çevrimiçi anket yöntemi kullanılarak gerçekleştirilmiştir. Veriler, katılımcıların demografik özellikleri, hijyen uygulamaları ve enfeksiyon geçmişlerine ilişkin sorular aracılığıyla toplanmıştır. Normal dağılıma uyan verilerin analizi IBM SPSS 26.0 programı kullanılarak analiz edilmiştir. Anlamlılık düzeyi α=0,05 olarak alınmıştır.

**Bulgular:** Çalışmaya katılan öğrencilerin ortalama yaşı 20,77 ± 2,46 yıl olup, %81,60'ı kadındır. Öğrencilerin %45,00'ı birinci sınıf öğrencisi, %65,70'i devlet yurtlarında ikamet etmektedir. Katılımcıların büyük çoğunluğu (%91,70), daha önce uyuz hastalığı hakkında eğitim almadığını, %72,90'ı ise hijyen eğitimi almadığını belirtmiştir. Bununla birlikte, %59,70'i uyuz hastalığı konusunda eğitim veya seminer almak istediğini ifade etmiştir. Çalışma grubundaki uyuz prevalansı %7,20 olarak belirlenmiş, ayrıca çalışmaya katılan öğrencilerin %6,60'sı yalnızca bir kez bu hastalığı geçirdiğini bildirmiştir. Uyuz geçiren öğrencilerin %5,80'inin hastalığı taşıyan biriyle doğrudan temas ettiği belirlenmiştir. Bu bireylerin tahriş yaşadığı ve korunmasız temas maruziyetine sahip olduğu tespit edilmiştir. Öğrencilerin %25,60'ı, el hijyenine uyumun az olmasının sebebini lavabo veya monte edilmiş antiseptik solüsyonlara ulaşımın zor veya yetersiz olmasından kaynaklandığını vurgulamıştır.

**Sonuç:** Bulgularımıza göre, öğrencilerin önemli bir kısmı hijyen ve uyuz hastalığı konularında kendilerini yetersiz hissetmekte ve bu konuda eğitim alma isteği duymaktadır.

**Anahtar Kelimeler:** Uyuz; üniversite öğrencileri; parazit; hijyen; enfeksiyon.

# Determination of Scabies Experience and Risk Factors among University Students in the Field of Health

## ABSTRACT

**Aim:** The aim of this study is to determine the experience of scabies among university students studying in the field of health and to examine the possible risk factors that may influence this condition.

**Material and Methods:** This descriptive study was conducted using an online survey method with students from the Faculty of Health Sciences (Nursing, Physiotherapy and Rehabilitation, Health Management) and the Vocational School of Health Services (First and Emergency Aid, Physiotherapy, Health Institutions Management, Health Tourism Management, Medical Laboratory Techniques) at the university (n=517). Data were collected through questions regarding the participants' demographic characteristics, hygiene practices, and history of infection. The analysis of data conforming to a normal distribution was performed using the IBM SPSS 26.0 software. The significance level is taken as α = 0.05.

**Results:** The average age of the students who participated in the study was 20.77 ± 2.46 years, with 81.60% being female. Among the students, 45.00% were first-year students, and 65.70% resided in state dormitories. The majority of participants (91.70%) stated that they had not received prior education on scabies, and more than half (72.90%) reported that they had not received hygiene education. However, 59.70% of the students expressed a desire to attend training or seminars on scabies.

1 Sakarya Uygulamalı Bilimler Üniversitesi, Tıbbi Hizmetler ve Teknikler Bölümü, Sakarya, Türkiye
2 Erciyes Üniversitesi, Sağlık Bilimleri Enstitüsü, Klinik Bakteriyoloji ve Enfeksiyon Hastalıkları AD, Hastane Enfeksiyonlarını Önleme Doktora Programı, Kayseri, Türkiye
3 Sakarya Üniversitesi, Sağlık Bilimleri Fakültesi, Halk Sağlığı Hemşireliği, Sakarya, Türkiye
4 Sağlık Bilimleri Üniversitesi, Ankara Gülhane Sağlık Uygulama ve Araştırma Merkezi, Deri ve Zührevi Hastalıkları AD, Ankara, Türkiye
5 Sakarya Üniversitesi, Tıp Fakültesi, Tıbbi Mikrobiyoloji AD, Tıbbi Viroloji BD, Sakarya, Türkiye

Sorumlu Yazar / Corresponding Author Fatma CEVAHİR, e-mail: fatmacevahir@subu.edu.tr
Geliş Tarihi / Received: 01.12.2024, Kabul Tarihi / Accepted: 17.04.2025

The prevalence of scabies in the cohort was 7.20%, and 6.60% of the students reported having contracted the disease only once. It was determined that 5.80% of the students with scabies had direct contact with an infected individual. These individuals experienced irritation and were exposed to unprotected contact. The primary reason for low compliance with hand hygiene, as emphasized by 25.60% of the students, was the difficulty or inadequacy of access to sinks or mounted antiseptic solutions.

**Conclusion:** Our findings indicate that a substantial number of students feel inadequate in terms of their hygiene and scabies knowledge and express a strong desire to receive training on this topic**.**

**Keywords:** Scabies; university students; parasite; hygiene; infection.

## GİRİŞ

*Sarcoptes scabiei* akarının neden olduğu bulaşıcı bir cilt hastalığı olan uyuz, toplumda, özellikle üniversite gibi kurumsal ortamlarda önemli bir halk sağlığı sorunu olmaya devam ediyor. Üniversite öğrencileri arasında uyuz yaygınlığı, sosyal bağlantı ve yaşam koşulları gibi çeşitli faktörlerden etkilenen çok yönlü bir sorundur. Ancak üniversite öğrencileriyle ilgili veriler sınırlı olduğundan, bu grupta uyuz hastalığının yaygınlığı ile risk faktörlerinin belirlenmesi etkili koruyucu sağlık stratejilerinin geliştirilmesi açısından kritik öneme sahiptir.

Uyuzun görülme sıklığı gelişmiş ülkelerde son yıllarda azalmış olsa da eğitim kurumları da dahil olmak üzere birçok ortam/kurumda salgınlar meydana gelerek dünya çapında yaygın bir cilt rahatsızlığı olmaya devam etmektedir (1).

Uyuz, gelişmekte olan ülkelerde genç yetişkinler arasında önemli yaygınlığa sahip, küresel olarak yaygın paraziter bir cilt hastalığıdır (2). İspanya'da salgınların eğitim ortamlarında yaygın olması, üniversitelerin bu enfeksiyonların olası kaynağı olabileceğini düşündürmektedir (3). Almanya'da, özellikle 15-24 yaş arası ergenler ve genç yetişkinler arasında, 2009'dan 2018'e kadar uyuz teşhislerinde önemli bir artış gözlemlenmiştir. Bu yükseliş uyuzun hızlı yayıldığını göstermektedir (2). Üniversite öğrencileri arasında uyuzun yaygınlığına ilişkin veriler sınırlı olmakla birlikte, üniversite popülasyonlarında yapılan diğer cilt hastalıkları araştırmaları, bu hastalıkların öğrencilerin yaşam kalitesi üzerinde önemli bir etkisi olduğunu göstermektedir (4). Uyuz, özellikle tropikal ve subtropikal bölgelerde yaygın olup, üniversite yurtları gibi yakın temasın yoğun olduğu büyük toplulukları sıklıkla etkilemektedir (5). Ayrıca cilt nemi, pH ve sıcaklık cilt akarlarının yoğunluğunu etkileyebilir (6) ancak bu faktörler Erzincan Üniversitesi'nde yürütülen bir çalışmada akar yaygınlığını istatistiksel olarak etkilemede anlamlı bulunmamıştır (6). Üniversite öğrencileri gibi genç nüfusun hareketliliğinin ve sosyal etkileşimlerinin yüksek olması önleme çalışmalarını zorlaştırdığından hedefli kontrol önlemlerinin uygulanması önemlidir (2). Ayrıca etkili önleme ve kontrol stratejileri bu faktörleri ele almalı, kişisel hijyeni vurgulamalı ve yaşam alanlarındaki aşırı kalabalığı azaltmalıdır. Üniversite öğrencileri arasında uyuz hastalığının yaygınlığına ilişkin resmi kayıtlar daha az olsa da gençler ve kurumsal ortamlarda gözlenen eğilimler önemli bir risk olduğunu göstermektedir. Bu popülasyonda uyuz hastalığı probleminin çözülmesi, gelişmiş tanı yöntemlerinin kullanımı, etkili tedavi prosedürlerinin uygulanması, çeşitli eğitim ve etkinliklerle farkındalığın artırılması ve sıkı enfeksiyon kontrol ve önleme programlarının uygulanması ile mümkündür.

Bu çalışmada sağlık alanındaki üniversite öğrencileri arasında uyuz hastalığının yaygınlığı ve risk faktörlerinin belirlenmesi amaçlanmıştır.

## GEREÇ VE YÖNTEMLER

### Araştırmanın Türü

Bu araştırma, tanımlayıcı türde yapılmıştır.

### Araştırmanın Evren ve Örneklemi

Tanımlayıcı türde yapılan bu çalışmanın evrenini bir üniversitenin Sağlık Bilimleri Fakültesi (Hemşirelik, Sağlık Yönetimi ve Fizyoterapi ve Rehabilitasyon bölümü) ve Sağlık Hizmetleri Meslek Yüksekokulu (İlk ve Acil Yardım, Tıbbi Laboratuvar Teknikleri, Fizyoterapi, Sağlık Kurumları İşletmeciliği ve Sağlık Turizmi İşletmeciliği programı) öğrencileri oluşturmuştur. Çalışmada tüm evrene ulaşmayı amaçladığımızdan dolayı herhangi bir örneklem tipi kullanılmamıştır ve araştırma, çalışmaya katılmayı kabul eden ve araştırma kriterlerine uyan 516 öğrenciyle sonlandırılmıştır (n=516).

Araştırmaya dahil edilme kriterleri

-İlgili üniversitede Sağlık Bilimleri Fakültesi ve Sağlık Hizmetleri Meslek Yüksekokuluna kayıtlı öğrenci olmak

-Türkçe bilmek ve araştırmaya katılmaya gönüllü olmak,

### Veri Toplama Araçları

Veriler, öğrencilerin kişisel özellikleri ve uyuz hastalığı ve bulaşma yolları hakkındaki bilgi düzeylerini değerlendirmeyi amaçlayan soruları içeren online bir anket formu (6,9,10,12) kullanılarak toplanmıştır.

### Verileri Toplama Araçlarının Uygulanması

Veriler 2023-2024 eğitim-öğretim bahar dönemi süreci içerisinde veriler öz bildirim yoluyla toplanmış olup veriler online bir form aracılığıyla sınıf grubuyla paylaşılmıştır.

### Araştırmanın Etik Boyutu

Araştırmanın yapılabilmesi için üniversiteden girişimsel olmayan klinik araştırmalar etik kurul izni (E-71522473-050.04-330213-10/2024 sayılı) ve araştırmanın yapıldığı üniversiteden kurum izni, öğrencilerin araştırmaya katılımı için bilgilendirilmiş gönüllü onamları alınmıştır.

### İstatistiksel Analiz

Araştırma verileri, IBM SPSS 26.0 programı kullanılarak analiz edilmiştir. Tanımlayıcı istatistikler n (%) olarak verilmiş; değişkenlerin normal dağılıma uyup uymadığı Kolmogorov-Smirnov testi ile incelenmiştir. Normal dağılım gösteren değişkenler ortalama ± standart sapma ile, kategorik değişkenler ise Ki-kare ($\chi^2$) testi kullanılarak analiz edilmiştir. İstatistiksel anlamlılık değeri $p \leq 0,05$ olarak kabul edilmiştir.

## BULGULAR

Öğrencilerin 421 (%81,60)'i kadın, 95 (%18,40)'i erkekti ve yaş ortalaması 20,77±2,46 idi. Sosyodemografik ve tanıtıcı özelliklerinin dağılımı Tablo 1'de yer almaktadır.

**Tablo 1.** Öğrencilerin sosyodemografik ve tanıtıcı özelliklerinin dağılımı

| | Ortalama±SS | |
|---|---|---|
| **Yaş (Ortalama±SS)** | 20,77±2,46 | |
| | **n** | **%** |
| **Cinsiyet** | | |
| Kadın | 421 | 81,6 |
| Erkek | 95 | 18,4 |
| **Bölüm / Program** | | |
| Hemşirelik | 130 | 25,2 |
| Fizyoterapi ve Rehabilitasyon | 131 | 25,4 |
| Sağlık Yönetimi | 76 | 14,7 |
| İlk ve Acil Yardım | 45 | 8,7 |
| Sağlık Kurumları İşletmeciliği | 31 | 6,0 |
| Tıbbi Laboratuvar Teknikleri | 48 | 9,3 |
| Sağlık Turizmi İşletmeciliği | 35 | 6,8 |
| Fizyoterapi | 20 | 3,9 |
| **Bireyin Yaşadığı Yer** | | |
| Ailesiyle | 118 | 22,9 |
| Devlet Yurdu | 339 | 65,7 |
| Öğrenci Evi | 40 | 7,8 |
| Özel Yurt | 19 | 3,7 |
| **Ailede veya Yurtta Yaşanılan Kişi Sayısı** | | |
| 1-4 Kişi | 172 | 33,3 |
| 5-8 Kişi | 326 | 63,2 |
| 9 ve Üzeri Kişi | 18 | 3,5 |
| **Toplam** | **516** | **100** |

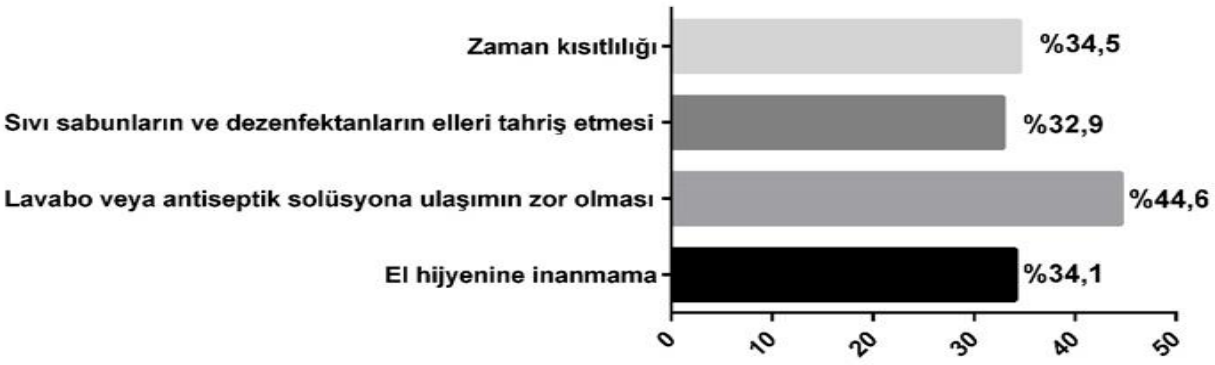
Çalışmanın sonuçlarına göre çalışmaya katılan öğrencilerin %91,70'inin uyuz hastalığı konusunda daha önce eğitim almadığı, %42,60'ının ise uyuz hastalığının kişisel eşyalarla temas yoluyla bulaştığına inandığı belirlenmiştir. Öğrencilerin yarısından fazlası (%59,70) uyuz hastalığı konusunda eğitim veya seminer almak istediğini belirtirken, %54,30'ü uyuz hastalığı hakkındaki bilgilerini 2 ile 3 arasında derecelendirmiş, %72,90'ı ise hijyen konusunda eğitim veya seminer almamıştır. Öğrencilerin yarısından fazlasının (%61,8) haftada 3-4 kez banyo yaptığı, %87,4'ünün kendini kirli hissettiğinde ellerini yıkadığı, çoğunluğunun (%85,70) kişisel eşyalarını paylaşmadığı, kişisel eşyalarını paylaşanların (%14,30) ise çoğunlukla kıyafet paylaştığı (%35,10) belirlenmiştir (Tablo 2).

Araştırmada öğrencilerin %93,40'ının daha önce hiç uyuz hastalığı geçirmediği, uyuz hastalığı geçirenlerin %7,20'sinin bir kez uyuz geçirdiği, %28,80'inin tedavi gördüğü, %21,30'unun daha önceki dönemde uyuz hastası bir hastayla temas etmediği, %20'sinin daha önceki dönemde çevresinde kaşınan bir arkadaş/aile üyesi olmadığı, %21,50'sinin daha önceki dönemde kaşınan bir kişiyle eldivensiz temas etmediği ve şu anda kaşıntısının olmadığı (%96,90) belirlenmiştir (Tablo 3). Çalışmaya katılan öğrencilerin %44,90'ı el hijyenine uyumun düşük olmasının lavabo veya monte edilmiş antiseptik solüsyonlara ulaşımın zor veya yetersiz olması nedeniyle olduğunu ifade etti (Şekil 1).

**Tablo 2.** Öğrencilerin hijyen ve Skabiyes (uyuz hastalığı) konusunda eğitimsel ve kişisel hijyen uygulamalarının dağılımı

| | **n** | **%** |
|---|---|---|
| **Daha Önce Skabiyes ile İlgili Eğitim Alma Durumu** | | |
| Evet | 43 | 8,3 |
| Hayır | 473 | 91,7 |
| **Öğrencilerin Skabiyesin Bulaş Yolu Düşünceleri** | | |
| Kan Yoluyla Bulaşır | 13 | 2,5 |
| Kısa Süreli Temasla Bulaşır | 118 | 22,9 |
| Solunum Yoluyla Bulaşır | 8 | 1,6 |
| Temas Edilen Eşyalarla Bulaşır | 220 | 42,6 |
| Uzun Süreli Temasla Bulaşır | 157 | 30,4 |
| **Skabiyes ile İlgili Eğitim/Seminer Almayı İsteme Durumu** | | |
| Evet | 308 | 59,7 |
| Hayır | 208 | 40,3 |
| **Skabiyes ile İlgili Bilgi Düzeyi Puanlaması** | | |
| 0-1 | 164 | 31,8 |
| 2-3 | 280 | 54,3 |
| 4-5 | 72 | 14,0 |
| **Hijyen ile İlgili Eğitim (Ders/Sertifika) Alma Durumu** | | |
| Aldım | 140 | 27,1 |
| Almadım | 376 | 72,9 |
| **Haftada Yapılan Banyo Sayısı** | | |
| 1-2 | 77 | 14,9 |
| 3-4 | 319 | 61,8 |
| 5 ve Üzeri | 120 | 23,3 |
| **El Hijyeni Sağlanan Durumlar**** | | |
| Yemek Öncesi | 346 | 67,1 |
| Yemek Sonrası | 367 | 71,1 |
| Tuvalet Öncesi | 175 | 33,9 |
| Tuvalet Sonrası | 239 | 46,3 |
| Kendimi Her Kirli Hissettiğimde | 451 | 87,4 |
| Dışarıdan Gelir Gelmez | 354 | 68,6 |
| Diğer | 87 | 16,9 |
| **Kişisel Eşyalarını Ortak Kullanma Durumu** | | |
| Evet | 74 | 14,3 |
| Hayır | 442 | 85,7 |
| **Kullanılan Ortak Eşyalar*** | | |
| Tarak / Toka | 8 | 10,8 |
| Havlu | 6 | 8,1 |
| Makyaj Malzemesi | 16 | 21,6 |
| Kıyafet | 26 | 35,1 |
| Mutfak Eşyası (Bardak, Tabak vb.) | 5 | 6,8 |
| Elektronik Eşyalar (Bilgisayar, Kulaklık, Saç Kurutma Makinası vb.) | 4 | 5,4 |
| Diğer | 9 | 12,9 |
| **Toplam** | **516** | **100** |

*Bu soruyu cevaplayanlar üzerinden analiz yapılmıştır.
** Birden fazla seçenek işaretlenmiştir.




**Şekil 1.** Öğrencilere göre el hijyeni uyumunun az olmasının nedenleri

**Tablo 3.** Öğrencilerin Skabiyes (uyuz hastalığı) geçirme durumlarının dağılımı

| | n | % |
|---|---|---|
| **Daha Önce Skabiyes Geçirme Durumu*** | | |
| Geçirdim | 34 | 6,6 |
| Geçirmedim | 482 | 93,4 |
| **Skabiyes Geçirme Sayısı*** | | |
| 1 | 37 | 7,2 |
| 2 | 6 | 1,2 |
| 3 ve Üzeri | 5 | 1,0 |
| **Geçirilen Skabiyeslerde Tedavi Alma Durumu*** | | |
| Evet | 32 | 28,8 |
| Hayır | 79 | 71,2 |
| **Geçirilen Dönemde Skabiyesli Hasta ile Temas Durumu *** | | |
| Evet | 30 | 5,8 |
| Hayır | 110 | 21,3 |
| **Geçirilen Dönemde Etrafında Kaşınan Bir Arkadaş/Aile Üyesi Olma Durumu*** | | |
| Evet | 38 | 7,4 |
| Hayır | 103 | 20,0 |
| **Geçirilen Dönemde Kaşıntılı Biri ile Eldivensiz Temas*** | | |
| Evet | 30 | 5,8 |
| Hayır | 111 | 21,5 |
| **Mevcut Kaşıntı Durumu*** | | |
| Evet | 16 | 3,1 |
| Hayır | 500 | 96.9 |
| **Toplam** | **516** | **100** |

*Bu soruya cevap verenler üzerinden değerlendirme yapılmıştır.

Tablo 4'te, özel yurtta kalan, uyuz ile ilgili eğitim alan, uyuz hakkındaki bilgi düzeyini 4-5 olarak puanlayan ve kişisel eşyalarını ortak kullanan öğrencilerin uyuz geçirme oranlarının daha yüksek olduğu belirlenmiştir (sırasıyla; p=0,006; p=0,004; p=0,001; p=0,040). Ailede veya yurtta yaşayan kişi sayısı ile haftada yapılan banyo sayısı arasında uyuz hastalığı geçirme ile anlamlı bir ilişki saptanmamıştır (sırasıyla; p=0,147; p=0,999) (Tablo 4).

**Tablo 4.** Öğrencilerin Skabiyes (uyuz hastalığı) geçirme durumlarının belirli özelliklere göre dağılımı

| | Daha Önce Skabiyes Geçirme Durumu | | | | | | |
|---|---|---|---|---|---|---|---|
| | Geçirmiş | | Geçirmemiş | | Toplam | | İstatistiksel Analiz |
| | n | % | n | % | n | % | |
| **Bireyin Yaşadığı Yer** | | | | | | | |
| **Ailesiyle** | 7 | 5,9 | 111 | 94,1 | 118 | 100 | $X^2$=12,521 *P*=0,006 |
| **Devlet Yurdu** | 20 | 5,9 | 319 | 94,1 | 339 | 100 | |
| **Öğrenci Evi** | 2 | 5,0 | 38 | 95,0 | 40 | 100 | |
| **Özel Yurt** | 5 | 26,3 | 14 | 73,7 | 19 | 100 | |
| **Ailede veya Yurtta Yaşanılan Kişi Sayısı** | | | | | | | |
| **1-4 Kişi** | 13 | 7,6 | 159 | 92,4 | 172 | 100 | $X^2$=3,836 *P*=0,147 |
| **5-8 Kişi** | 18 | 5,5 | 308 | 94,5 | 326 | 100 | |
| **9 ve Üzeri Kişi** | 3 | 16,7 | 15 | 83,3 | 18 | 100 | |
| **Daha Önce Skabiyes ile İlgili Eğitim Alma Durumu** | | | | | | | |
| **Evet** | 8 | 18,6 | 35 | 81,4 | 43 | 100 | $X^2$=11,003 *P*=0,004 |
| **Hayır** | 26 | 5,5 | 447 | 94,5 | 473 | 100 | |
| **Skabiyes ile İlgili Bilgi Düzeyi Puanlaması** | | | | | | | |
| **0-1** | 4 | 2,4 | 160 | 97,6 | 164 | 100 | $X^2$=46,654 *P*=0,001 |
| **2-3** | 12 | 4,3 | 268 | 95,7 | 280 | 100 | |
| **4-5** | 18 | 25,0 | 54 | 75,0 | 72 | 100 | |
| **Haftada Yapılan Banyo Sayısı** | | | | | | | |
| **1-2** | 5 | 6,5 | 72 | 93,5 | 77 | 100 | $X^2$=,002 *P*=0,999 |
| **3-4** | 21 | 6,6 | 298 | 93,4 | 319 | 100 | |
| **5 ve üzeri** | 8 | 6,7 | 112 | 93,3 | 120 | 100 | |
| **Kişisel Eşyalarını Ortak Kullanma Durumu** | | | | | | | |
| **Evet** | 9 | 12,2 | 65 | 87,8 | 74 | 100 | $X^2$=4,359 *P*=0,040 |
| **Hayır** | 25 | 5,7 | 417 | 94,4 | 442 | 100 | |

## TARTIŞMA

Üniversite öğrencileri arasında uyuzun görülme sıklığı, sosyal etkileşimler ve yaşam koşulları da dahil olmak üzere çeşitli değişkenlerden etkilenen çok yönlü bir halk sağlığı sorunudur. Bunun yanı sıra uyuz hastalığı sıklıkla yoksul ülkelerle ilişkilendirilirken, gelişmiş ülkelerdeki eğitim kurumlarında görülen salgınlar, akademik ortamlardaki önemini de vurgulamaktadır. Ayrıca araştırmalarımız sonucunda bu konuda yapılan bilimsel çalışmaların oldukça kısıtlı olduğu kanaatine varılmıştır. Bu nedenle bu araştırmada, sağlık alanında eğitim gören üniversite öğrencilerinde uyuz hastalığının yaygınlığı ve risk faktörlerinin belirlenmesi amaçlanmıştır. Bu doğrultuda, öğrencilerin uyuz hastalığı konusundaki bilgi düzeylerini ve eğitim gereksinimlerini değerlendirmek de çalışmamızın önemli bir bileşeni olmuştur.

Çalışmamızda, öğrencilerin %91,70'inin uyuz hastalığı konusunda eğitim almadığı, %59,70'inin ise eğitim veya seminer almak istediği belirlenmiştir. Ayrıca, %54,3'ünün uyuz hakkındaki bilgilerini 2-3 arasında derecelendirmiştir (Tablo 2). Benzer şekilde, Çin'de yapılan bir araştırmada, 132 hemşirelik öğrencisinin %82,60'ının uyuz hakkında yeterli bilgiye sahip olmadığı tespit edilmiştir (7). Yılmaz ve Alan (2024) tarafından yürütülen bir diğer çalışma da, öğrencilerin bilgi kaynağı olarak öncelikle internete güvendiğini ve akademik literatürle sınırlı etkileşimde bulunduğunu, bunun da uyuz konusunda daha fazla resmi eğitime ihtiyaç duyulduğunu ortaya koyduğunu vurgulamaktadır. Ayrıca, hemşirelik ve yaşlı bakımı öğrencilerinin uyuz lezyonlarını tanıma konusunda düşük farkındalık seviyelerine sahip olduğu belirlenmiştir (8). Bu bulgular, sağlık alanında eğitim gören öğrenciler için uyuz hastalığına yönelik farkındalığı artıracak eğitim programlarının geliştirilmesinin önemini ortaya koymaktadır.

Tablo 4'te özel yurtta kalan öğrencilerin diğer ortamlarda kalan öğrencilere göre daha fazla uyuz geçirdiğini göstermiştir. Özel yurtlar gibi ortak yaşam ortamlarındaki uyuz salgınları, hijyen uygulamaları, çevre koşulları ve tanınmayan vakaların varlığı gibi çeşitli faktörlerden etkilenebilmektedir. Ayrıca yetersiz kişisel hijyen, uyuzun görülme sıklığını artırabilir. Yapılan araştırmalar, uyuz vakalarının yurtlardaki yetersiz hijyen koşullarının olduğu ortamlarda daha yaygın olduğunu göstermektedir. Literatürde yapılan bir araştırma, kişisel temizliğin yetersiz olmasının uyuz riskini artırdığını bildirmektedir (9). Endonezya'nın Pekanbaru şehrinde yapılan bir araştırma, kıyafet ve havluların temizliği ile ortam sanitasyonunun uyuz salgınlarıyla bağlantılı olduğunu göstermiştir (10). Hijyen ve doğrudan temas sıklıkla birincil odak noktası olsa da çarşaf benzeri paylaşılan eşyaların dolaylı bulaşmada salgınlara neden olabileceği ve bu yüzden uyuz hastalığının bulaşmasının önlenmesi için özellikle yurtlarda sıkı hijyen protokollerinin uygulanması gerekmektedir (11). Ayrıca, yurtlarda verilen hizmetlerinin kalitesinin yetkili kurum ve kuruluşlar tarafından denetiminin sağlanması, okullarda üniversite öncesi ve sonrası hijyen, temizlik ve enfeksiyon kontrolüne yönelik önlemleri içeren dersler verilmesi gerektiği düşünülmektedir (12,13).

Araştırmamızda uyuz ile ilgili bilgi düzeyini 4-5 olarak puanlayan öğrencilerin uyuz geçirdiği belirlenmiştir. Uyuz hakkında kendi kendine değerlendirilen bilgi düzeyleri ile hastalığın gerçek insidansı arasındaki ilişki karmaşık olup kişisel hijyen, çevresel koşullar ve sosyal etkileşimler gibi çeşitli faktörlerden etkilenebilir. Uyuz hakkındaki bilgilerini yüksek (4) olarak puanlayan ve yine de hastalığa yakalanan öğrenciler, bilgi ile etkili önleyici uygulamalar arasında bir boşluğu yansıtıyor olabilir. Bu durum, yalnızca farkındalık ve bilincin değil, aynı zamanda önleyici tedbirlerin uygulanmasının da önemini vurgulamaktadır. Ayrıca uyuz hastalığı hakkındaki bilgi düzeyi çok önemli olsa da uyuz salgınlarının önlenmesi için etkili hijyen ve enfeksiyon kontrol önlemleri birlikte uygulamalıdır. Bu konuda bilgi düzeyi yüksek bireyler arasında uyuzun yaygınlığının devam etmesi, bilginin gerçek anlamda uygulanması ve sosyal davranışların değiştirilmesinin etkili hastalık önleme ve kontrol yönetimi için hayati önem taşıdığını göstermektedir. Diğer taraftan bu öğrencilerin uyuz hastalığını deneyimleyerek ve konu hakkında ek araştırmalar yaparak öğrencilere bilgi düzeylerinin yüksek olduğunu düşündürebilir.

Araştırmamıza göre kişisel eşyalarını ortak kullanan öğrencilerin uyuz hastalığı geçirdiği belirlenmiştir. Öğrenciler arasında kişisel eşyaların paylaşılması, *Sarcoptes scabiei* akarının neden olduğu bulaşıcı paraziter bir cilt hastalık olan uyuz riskini artırabilir ve bu risk, kişisel hijyenin tehlikeye atıldığı ve yakın temasın yaygın olduğu ortamlarda özellikle belirgindir (14). Kişisel eşyaların paylaşılması sonucunda uyuz hastalığının yayılması kolaylaşmaktadır. Bu nedenle kişisel hijyen ve sanitasyonun iyileştirilmesi, paylaşımın yaygın olduğu ortamlarda bile uyuz riskini önemli ölçüde azaltabilir.

## SONUÇ

Sonuç olarak, araştırmamızda özel yurtta kalan, uyuz ile ilgili eğitim aldığını belirten, uyuz ile ilgili bilgi düzeyini 4-5 olarak puanlayan ve kişisel eşyalarını ortak kullanan öğrencilerin uyuz hastalığı geçirdiği belirlenmiştir. Uyuz hastalığı genellikle gelir düzeyi düşük olan nüfusları etkileyen bir hastalık olarak kabul edilirken, gelişmiş ülkelerdeki salgınlar, özellikle eğitim kurumları içinde, önemli halk sağlığı sorunlarına neden olduğu görülmektedir. Üniversitelerde uyuz hastalığı ile mücadelenin, hızlı tanı ve tedavi yöntemlerinin kullanılması, özellikle yurtlarda sıkı enfeksiyon kontrol önlemleri ve hijyen protokolleri hazırlanıp sistemli bir şekilde uygulanması, yaşam alanlarının düzenli olarak temizlik/dezenfeksiyonunun sağlanması, toplumun her kesiminin bilgi düzeyi ve farkındalığının artırılması için kurumlararası multidisipliner bir yaklaşımla düzenlenecek kapsamlı halk sağlığı eğitimleriyle ile mümkün olacağı düşünülmektedir. Ayrıca bireylerin üniversite öncesindeki öğretim programlarına enfeksiyon hastalıklarının önemi, temizlik ve hijyen konularında kapsamlı bir şekilde teorik ve uygulamalı dersler eklenmelidir. Üniversite öğrencilerinde ise mesleki uzmanlık alanına bakılmaksızın yine hijyene yönelik eğitimler verilmesi önemli bir yaklaşım olacaktır. Sağlık alanlarında eğitim alan öğrencilerin daha da spesifik olarak, hijyen, temizlik, el hijyeni, dezenfeksiyon, sterilizasyon, sanitasyon ve enfeksiyon kontrolü konularında uygulamalı olarak dersler verilmesi önemlidir. Sağlık profesyonelleri ve teknikeri adaylarının hijyen farkındalığının artırılması, sağlık hizmetlerinin gelişimine katkı sağlayacaktır.

**Yazarların Katkıları:** Fikir/Kavram: F.C., CBO.; Tasarım: F.C., CBO.; Veri Toplama ve/veya İşleme: F.C., CBO.; Analiz ve/veya Yorum: F.C., CBO., A.Y., M.A.; Literatür Taraması: F.C., CBO., A.Y., M.A.; Makale Yazımı: F.C., CBO., A.Y., M.A.; Eleştirel İnceleme: F.C., CBO., A.Y., M.A.

**KAYNAKLAR**

1. Hay RJ, Steer AC, Chosidow O, Currie BJ. Scabies: a suitable case for a global control initiative. Curr Opin Infect Dis. 2013; 26(2): 107-9.
2. Reichert F, Schulz M, Mertens E, Lachmann R, Aebischer A. Reemergence of scabies driven by adolescents and young adults, Germany, 2009-2018. Emerg Infect Dis. 2021; 27(6): 1693-6.
3. Redondo-Bravo L, Fernandez-Martinez B, Gomez-Barroso D, Gherasim A, Garcia-Gomez M, Benito A, et al. Scabies in Spain? A comprehensive epidemiological picture. PLoS One. 2021; 16(11): e0258780.
4. Shen M, Xiao Y, Su J, Zhao S, Li J, Tao J, et al. Prevalence and patient-reported outcomes of noncommunicable skin diseases among college students in China. JAAD Int. 2020; 1(1): 23-30.
5. Abinew Y. Knowledge, attitude, and prevention practice towards scabies among Haramaya University health and medical science students, Harar, Ethiopia 2022. J Health Stat Rep. 2024; 1: 1-6.
6. Zeytun E, Tilki E, Doğan S, Mumcuoğlu KY. The effect of skin moisture, pH, and temperature on the density of Demodex folliculorum and Demodex brevis (Acari: Demodicidae) in students and staff of the Erzincan University, Turkey. Int J Dermatol. 2017; 56(7): 762-6.
7. Liu N, Bai Y, Li XH, Zhang Y. Scabies knowledge among undergraduate nursing students in China: A questionnaire survey. Clin Cosmet Investig Dermatol. 2022; 15: 133-8.
8. Yılmaz S, Alan N. Investigation of scabies awareness of nursing and elderly care students. Sürekli Tıp Eğitimi Derg. 2024; 33(3): 180-8.
9. Sianturi I, Sungkar S. The relationship between hygienic practices and scabies infestation in a Boarding School in East Jakarta. eJKI. 2014; 2(2): 58728.
10. Carolyne T RN, Lubis NL, Nurmaini N. (2021). Relationship between knowledge, clothing cleanliness, towel cleanliness and environmental sanitation with scabies ıncidents at the Pekanbaru City Child Special Development Institute (LPKA) in 2019. BIRCI-Journal. 2021; 4: 122-30.
11. Jungbauer FH, Veenstra-Kyuchukova YK, Koeze J, KruijtSpanjer MR, Kardaun SH. Management of nosocomial scabies, an outbreak of occupational disease. Am J Ind Med. 2015; 58(5): 577-82.
12. Aslan R. Evaluation of hygiene and cleaning habits of health technician candidates. J Adv Res Health Sci. 2021; 4(2): 31-42.
13. Müftüoğlu M, Müftüoğlu Gİ. Yükseköğrenim kız öğrenci yurtlarının hizmet kalitesinin ölçümü ve algılanan hizmet kalitesi: uşak ili örneği. İzmir Kâtip Çelebi Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi. 2019; 2(1): 96-105.
14. Nanda FD, Murti B, Dharmawan R. Path analysis on factors associated with the risk of scabies among students at Darussalam Islamic Boarding School, Blokagung, Banyuwangi, Indonesia. J Epidemiol Public Health. 2016; 1(1): 18-26.

Araştırma Makalesi / Research Article

Sağlık Bilimlerinde Değer / Sağlık Bil Değer
Value in Health Sciences / Value Health Sci
ISSN: 2792-0542 sabd@duzce.edu.tr 2025; 15(2): 300-304
doi: https://dx.doi.org/10.33631/sabd.1636785

# Does Loss of Appetite in Acute Appendicitis Indicate an Empty Stomach?

İbrahim Feyyaz NALDEMIR [1], Mehmet Ali ÖZEL [1], Sinem KANTARCIOĞLU COŞKUN [2], Kudret SELKI [3], Mustafa BOĞAN [3]

**ABSTRACT**

**Aim:** Loss of appetite (anorexia) is a prevalent symptom in patients with acute appendicitis. In these cases, it can be hypothesized that the stomach is empty, and the gallbladder is contracted due to loss of appetite. In this study, we aimed to investigate gastric fullness and gallbladder status in patients with acute appendicitis. We investigated whether these parameters can be indirectly supported by imaging findings of anorexia and to what extent they are significant in terms of aspiration risk in emergency surgery planning.

**Material and Methods:** CT images of patients with acute appendicitis and the control group were evaluated for gastric fullness and gallbladder appearance.

**Results:** A total of 266 patients were included in the study. A hundred and thirty-nine patients (52.3%) were diagnosed with acute appendicitis, while 127 patients (47.7%) were classified as the control group. The proportion of patients with an empty stomach was statistically significantly higher in patients with acute appendicitis compared to the control group ($p<0.001$). Gastric filling grade 3 (high-risk solid gastric content for aspiration) was in 23% (n=32) of the cases with acute appendicitis.

**Conclusion:** Gastric fullness and gallbladder contraction are straightforward findings on CT that can provide indirect evidence in suspected acute appendicitis cases. Although anorexia is a key symptom, over half of patients continue oral intake irregularly, leaving up to one-fifth at high risk for aspiration during emergency surgery. Therefore, preoperative starvation protocols should not rely solely on the presence of anorexia.

**Keywords:** Acute appendicitis; anorexia; gastric fullness; risk of aspiration.

## Akut Apandisitte İştahsızlık Midenin Boş Olduğunu Gösterir mi?

**ÖZ**

**Amaç:** İştahsızlık (anoreksi), akut apandisitli hastalarda yaygın görülen bir semptomdur. Bu hastalarda iştahsızlık nedeniyle mide içeriğinin boş, safra kesesinin ise kontrakte olduğu öne sürülebilir. Bu çalışmada akut apandisitli hastalarda mide doluluğu ve safra kesesi durumu incelenmiştir. Bu parametrelerin, anoreksinin görüntüleme bulgularıyla dolaylı olarak desteklenip desteklenemeyeceği ve acil cerrahi planlamasında aspirasyon riski açısından ne derece anlamlı olduğu araştırılmıştır.

**Gereç ve Yöntemler:** Akut apandisit tanısı alan hastalar ile kontrol grubuna ait BT görüntüleri, mide doluluğu ve safra kesesi görünümü açısından değerlendirilmiştir.

**Bulgular:** Toplamda 266 hasta çalışmaya dahil edilmiştir. Hastaların 139'u (%52,3) akut apandisit tanısı almışken, 127'si (%47,7) kontrol grubu olarak sınıflandırılmıştır. Mide içeriği boş olan hastaların oranı, akut apandisitli hastalarda kontrol grubuna kıyasla istatistiksel olarak anlamlı derecede daha yüksekti ($p<0,001$). Akut apandisit vakalarının %23'ünde (n=32) mide doluluk derecesi 3 (aspirasyon için yüksek risk taşıyan katı mide içeriği) olarak değerlendirilmiştir.

**Sonuç:** Mide doluluğu ve safra kesesi kontraksiyonu, akut apandisitten şüphelenilen vakalarda dolaylı kanıt sağlayabilecek, BT ile kolaylıkla değerlendirilebilen bulgulardır. Anoreksi, akut apandisitin önemli bir semptomu olmasına rağmen, hastaların yarısından fazlası düzensiz de olsa oral alıma devam etmekte ve bu durum olası bir acil operasyonda hastaların beşte birini aspirasyon riski altında bırakmaktadır. Bu nedenle, preoperatif açlık protokollerinde yalnızca anoreksinin varlığına güvenmek uygun değildir.

**Anahtar Kelimeler:** Akut apandisit; anoreksi; mide doluluğu; aspirasyon riski.

1 Düzce University, Faculty of Medicine, Radiology Department, Duzce, Turkiye
2 Düzce University, Faculty of Medicine, Surgical Pathology Department, Duzce, Turkiye
3 Düzce University, Faculty of Medicine, Emergency Department, Duzce, Turkiye

Sorumlu Yazar / Corresponding Author İbrahim Feyyaz NALDEMİR, e-mail: dr.ifnaldemir@gmail.com
Geliş Tarihi / Received: 05.02.2024, Kabul Tarihi / Accepted: 18.03.2025

## INTRODUCTION

Acute appendicitis is one of the most common causes of acute abdomen, and its lifetime prevalence has been reported to be as high as 7% (1,2). Early diagnosis is very important before the rupture of the appendix, and many morbidities and even mortality can be prevented with rapid intervention (3). As the time between diagnosis and surgery increases, the risk of complications such as peritonitis, perforation abscess, and sepsis increases. However, the diagnosis of acute appendicitis is often challenging, as clinical, laboratory, and radiological findings may be non-specific (4,5). The main imaging method in radiological diagnosis is ultrasonography, and it is very specific to visualize the appendix and measure the outer diameter or wall thickness. However, in cases where the appendix cannot be visualized on ultrasound, indirect imaging findings can be used for diagnosis (6).

Loss of appetite is one of the first symptoms of acute appendicitis (7). Theoretically, the stomach is not expected to be full in patients with acute appendicitis. However, different levels of gastric fullness can be detected in patients with acute appendicitis, especially in children. A stomach full of solid contents may increase the risk of aspiration during emergency surgical treatment (8,9).

This study aimed to evaluate gastric filling status in patients with acute appendicitis and to compare it with healthy controls.

## MATERIAL AND METHODS

### Patient Selection

Patients who were admitted to the emergency department of our hospital with abdominal pain between March 2018 and December 2021 and underwent abdominal CT examinations were included in the study. These patients were analyzed in two groups.

*Acute appendicitis group*: The patients who were diagnosed with acute appendicitis on CT and this diagnosis was confirmed histopathologically.

*Control group:* Patients not diagnosed with acute appendicitis on CT examination.

Patients with a history of previous abdominal operations were excluded. Patient categorization was performed by an emergency specialist based on medical records, radiology, and pathology reports. Demographic data of all patients (age, sex) were also obtained from medical records.

### Ethics Approval

This retrospective study was approved by the Institutional Review Board (Ethics Committee Approval No: 2021/123) and conducted in accordance with the principles of the Declaration of Helsinki Informed consent was obtained from each participant included in the study group.

### Radiological Evaluation

CT examinations were performed using a 128-slice multi-detector spiral CT scanner (Siemens Somatom Definition AS +, Siemens AG, Erlangen, Germany). CTs of all participants were accessed using a dedicated PACS workstation (Sectra IDS 7; Linkmping Sweden). Radiological images were evaluated by two attending radiologists independently, blinded to clinical findings and diagnostic categorization, with 8 years (I.F.N.) and 11 years (M.A.O) of experience in abdominal radiology, respectively.

In the acute appendicitis group, CT images were magnified by 200% and the appendix and periappendiceal region were evaluated. Appendix diameter, appendix wall thickness, and presence of appendicolith in the lumen were noted. In the control group, CT images were also examined for different intra-abdominal pathologies, and possible preliminary diagnoses were recorded.

The gastric filling was classified on a 3-point scale; grade 1 (empty stomach), grade 2 (filled with liquid), and grade 3 (filled with solid food) (figure1). The appearance of the gallbladder was classified into two categories normal and contracted (figure 2).

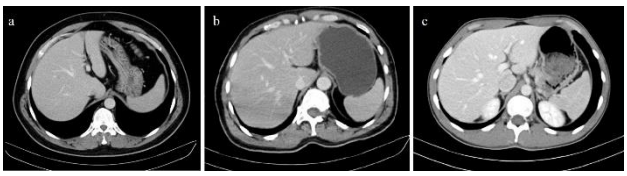



**Figure 1**. Evaluation of gastric fullness with CT images; a. no solid food or liquid contents in the stomach, b. only liquid content in the stomach, c. stomach full of solid food.

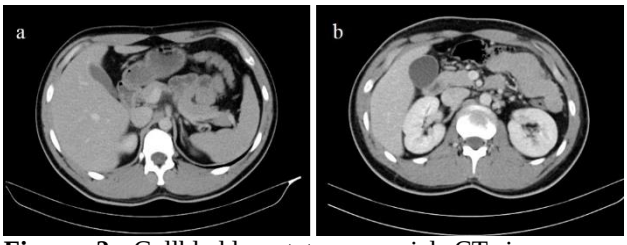



**Figure 2.** Gallbladder state on axial CT images; a. contracted, b. non-contracted

### Statistical Analysis

Statistical analyses were performed using SPSS version 21.0 software (SPSS Inc., Chicago IL, USA). The minimum required sample size for the study was determined through a power analysis, as the total population size was not precisely known for proportional data. Based on an effect size of 0.5, an alpha error level of 0.05, and a confidence level of 0.95, the minimum sample size was calculated to be 255. Mean, standard deviation, number, and percentage values were used for descriptive variables, median and interquartile range values were used for data showing non-parametric distribution. Whether the numerical variables showed normal distribution or not was evaluated with the Kolmogorov-Smirnov test. Pearson's chi-square test was used to examine whether there was a relationship between two or more qualitative variables. Statistical significance was set at $p < 0.05$.

## RESULTS

Two hundred sixty-six patients, who met the inclusion criteria, were included in the study. 65% (n=173) of patients were men. According to the CT evaluation, 139 patients (52.3%) were diagnosed with acute appendicitis, while 127 patients (47.7%) were classified as the control group. 6.5% (n=9) of the patients diagnosed with acute appendicitis were children. The mean age of patients diagnosed with acute appendicitis was 39.3±16.9 years and the mean appendix diameter was 10.1±1.7 mm in this group. The most common CT diagnoses of the patients in the control group were CT examination within normal

limits, urolithiasis, and malignancy, respectively. Detailed socio-demographic characteristics for each group are shown in Table 1. CT diagnoses of the patients in the control group are depicted in Table 2.

**Table 1.** Socio-demographic characteristics and appendix diameter of the groups

| | Acute appendicitis (n=139) | Control (n=127) |
|---|---|---|
| Age (mean ± SD) | 39.3±16.9 | 54.4±20.4 |
| Gender (M/F) | 104/35 | 69/58 |
| Appendix diameter (mean ± SD) (mm) | 10.1±1.7 | 3.8±0.8 |

**Table 2.** Abdominal CT diagnoses of patients in the control group

| Diagnosis | n | % |
|---|---|---|
| Normal CT abdomen | 35 | 27.56 |
| Urolithiazis | 26 | 20.47 |
| Malignancy | 11 | 8.66 |
| Abdominal lymphadenopathy | 6 | 4.72 |
| Cholecystitis (acute/chronic) | 6 | 4.72 |
| Mesenteric panniculitis | 6 | 4.72 |
| PID | 4 | 3.15 |
| Bladder wall thickening | 4 | 3.15 |
| Acute pyelonephritis | 3 | 2.36 |
| Traumatic solid organ injury | 3 | 2.36 |
| Pneumonia | 3 | 2.36 |
| Gastroenteritis | 3 | 2.36 |
| Ovarian cyst | 2 | 1.57 |
| Acute pancreatitis | 1 | 0.79 |
| Choledocholithiasis | 1 | 0.79 |
| PSC | 1 | 0.79 |
| Chronic liver disease | 1 | 0.79 |
| Portal vein thrombosis | 1 | 0.79 |
| Liver hydatid cyst | 1 | 0.79 |
| Splenic infarction | 1 | 0.79 |
| Small bowel obstruction | 1 | 0.79 |
| Mesenteric ischemia | 1 | 0.79 |
| Pneumatosis intestinalis | 1 | 0.79 |
| Omental infarction | 1 | 0.79 |
| Inguinal hernia | 1 | 0.79 |
| Umblical hernia | 1 | 0.79 |
| Polycystic kidney disease | 1 | 0.79 |
| Endometrioma | 1 | 0.79 |

PID; Pelvic inflammatory disease, PSC; Primary Sclerosing Cholangitis)

The stomach was evaluated as empty in 115 of the patients in the study group (grade 1). 69.6% of these patients (n=80) were in the patient group. The rate of those with an empty stomach was statistically significantly higher in patients with acute appendicitis compared to the control group (p<0.001). The gastric filling grade 3 was in 23% (n=32) of the cases with acute appendicitis. The gastric filling status in patients with acute appendicitis and the control group is depicted in Table 3. On the other hand, there was no significant difference in terms of gastric fullness between the groups with appendiceal diameters larger and smaller than 9 mm (Table 4).

**Table 3.** Comparison of gastric filling status in patients with and without acute appendicitis

| | | Acute appendicitis | |
|---|---|---|---|
| | | Absent (n=127) | Present (n=139) |
| Gastric filing grade | 1 (n,%) | 35 (27.5) | 80 (57.6) |
| | 2 (n,%) | 19 (14.9) | 27 (19.4) |
| | 3 (n,%) | 73 (57.6) | 32 (23) |
| p-value (Chi-square) | | | <0.001* |

**Table 4.** Gastric filling status according to appendix diameter in cases with acute appendicitis

| | | Appendix diameter | | | p |
|---|---|---|---|---|---|
| | | ≤9 mm (n=55) | >9 mm (n=74) | Total | |
| Gastric filing grade | 1 (n,%) | 29(36.3) | 41 (63.7) | 80 | |
| | 2 (n,%) | 10 (37) | 17 (63) | 27 | |
| | 3 (n,%) | 16 (50) | 16 (50) | 32 | |
| p-value (Chi-square) | | | | | **0.365** |

*P value < 0.05—statistically significant

The gallbladder contracted in 58.3% (n=74) of the patients with acute appendicitis, and the rate of patients with contracted gallbladder was statistically significantly higher in patients with acute appendicitis compared to the control group (p<0.001) (Table 5).

**Table 5.** Comparison of the appearance of the gallbladder between groups

| | | Gallbladder | | Total | p |
|---|---|---|---|---|---|
| | | Contracted | Normal | | |
| Acute appendicitis | Absent | 74 (58,3%) | 53 (41,7%) | 127 | <0.001* |
| | Present | 37 (26,6%) | 102 (73,4%) | 139 | |

**P* value < 0.05—statistically significant

## DISCUSSION

In this study, we aimed to investigate whether gastric filling status and gallbladder appearances were different in patients with acute appendicitis compared to the control group and the potential importance of these imaging findings in clinical use.

According to our findings, the rate of those with an empty stomach and those with contracted gallbladder in patients with acute appendicitis were statistically significantly higher when compared to the control group. Loss of appetite and vomiting are very common symptoms in acute appendicitis cases. Therefore, it can be expected that the stomach and gallbladder appearances of these patients will be compatible with the fasting state (10,11). Our findings show that this can be objectively demonstrated on CT examination and both stomach and gallbladder are empty in most cases, consistent with the clinical symptoms mentioned.

The first-line radiological imaging modality used in the diagnosis of acute appendicitis is ultrasonography. Ultrasonographic diagnosis is based on visualizing the appendix and measuring its maximum outer diameter. In cases where ultrasonography is not diagnostic, the diagnosis can be made by CT examination. However, CT is not generally used in children and pregnant women because of the risk of ionizing radiation and may not be available in the emergency room (12,13). Indirect imaging findings are used for diagnosis in cases with suspected acute appendicitis where the appendix cannot be visualized on ultrasonography. These are findings such as peritoneal fat hypertrophy, hypokinesia in the digestive loops, and pain caused by compression on the right iliac fossa. When these three findings are evaluated together, it has been reported that the sensitivity of the indirect findings reaches 83.9% and the specificity reaches 85.7% (6,12). In our study, the rate of patients with an empty stomach was statistically significantly higher in patients with acute appendicitis. Moreover, the rate of contracted gallbladder was significantly higher in patients with acute appendicitis compared to the control group. Therefore, although these imaging findings were evaluated with CT in our study, they can also be evaluated with USG in clinical practice and can be used as indirect supportive findings for the diagnosis of acute appendicitis.

Radiological evaluation of gastric fullness in suspected cases of acute appendicitis can be used for preoperative evaluation in terms of the risk of pulmonary aspiration in cases with a confirmed diagnosis, as well as its diagnostic contribution potential. Point-of-care ultrasound performed in patients who will undergo emergency surgery under general anesthesia can predict the risk of pulmonary aspiration by evaluating gastric volume and content. Studies conducted in adult patients with acute appendicitis report that gastric contents, which pose a significant risk of aspiration, are present in a small proportion of patients (8,9). In contrast, children with acute appendicitis have conventionally been considered to have gastric contents associated with an increased risk of pulmonary aspiration. In a study conducted by Evain et al., high-risk solid gastric content for aspiration was found in 13% of children with acute appendicitis (14). Solid-component gastric content is a high-risk situation for aspiration (15). The threshold for gastric volume with solid nutrients for aspiration risk remains controversial. Clinical data strongly suggest that gastric fluid volumes of up to 1-1.5 ml/kg (approximately 100 ml for an average adult) are normal and safe in fasting individuals (16). The minimum gastric fluid volume to induce passive regurgitation of gastric contents and therefore pulmonary aspiration is accepted as 200 mL (17). In our study, grade 3 (solid-high risk) gastric content was found in 23% (n=32) of cases with acute appendicitis, and %6.5 of them were pediatric patients. This means a high risk of aspiration alone in an unplanned operation for one-fifth of patients. This difference may be due to the characteristics of the patient population or the difference in radiological examination modality. The point that should be emphasized here is that gastric contents with a high risk for pulmonary aspiration can be detected in a significant proportion of patients undergoing general anesthesia for acute appendicitis. Computed tomography can also be used as an alternative to ultrasonography in the pre-operative period for this purpose.

Our study has several limitations. The first of these is the retrospective design of the study. The second limitation of our study is that we could not collect data on the appetite status of the acute appendicitis and control group because of the retrospective design of the study. Finally, there is no postoperative data on patients operated for acute appendicitis and the potential relationship between gastric fullness and complications has not been directly evaluated.

## CONCLUSION

Gastric fullness and contraction of the gallbladder are easy-to-evaluate findings that can be used to obtain indirect information in cases with suspected acute appendicitis. Despite loss of appetite, which is an important symptom of acute appendicitis, up to two-thirds of patients (n=80, 57.6%) had an empty stomach. This can be explained by the fact that they continue to take oral intake, albeit irregularly, since they are not prompted by hunger. Also, it is not appropriate to use anorexia instead of pre-op starvation. CT is the gold standard for the diagnosis of acute appendicitis and can be used to evaluate the risk of pre-op aspiration. In patients with acute appendicitis, despite anorexia, one-fifth of patients have a high risk of aspiration in a possible emergency operation.

**Authors's Contributions:** Idea/Concept: I.F.N, M.B.; Design: I.F.N.; Data Collection and/or Processing: I.F.N, M.A.Ö; Analysis and/or Interpretation: K.S; Literature Review: I.F.N,; Writing the Article: I.F.N, M.B.; Critical Review: K.S, S.K.C.

## REFERENCES

1. Pittman-Waller VA, Myers JG, Stewart RM, Dent DL, Page CP, Gray GA, et al. Appendicitis: why so complicated? Analysis of 5755 consecutive appendectomies. Am Surg. 2000; 66(6): 548-54.
2. Ferris M, Quan S, Kaplan BS, Molodecky N, Ball CG, Chernoff GW, et al. The global incidence of appendicitis: a systematic review of population-based studies. Ann Surg. 2017; 266(2): 237-41.
3. Buckley RG, Distefan J, Gubler KD, Slymen D. The risk of appendiceal rupture based on hospital admission source. Acad Emerg Med. 1999; 6(6): 596-601.
4. Lane MJ, Mindelzun RE. Appendicitis and its mimickers. Semin Ultrasound, CT MRI. 1999; 20(2): 77-85.
5. Di Saverio S, Podda M, De Simone B, Ceresoli M, Augustin G, Gori A, et al. Diagnosis and treatment of acute appendicitis: 2020 update of the WSES Jerusalem guidelines. World J Emerg Surg. 2020; 15(1): 27.
6. Kouame N, N'Goan-Domoua AM, N'dri KJ, Konan AN, Yao-Bathaix MF, N'gbesso RD, et al. The diagnostic value of indirect ultrasound signs during acute adult appendicitis. Diagn Interv Imaging. 2012; 93(3): 24-8.
7. Malkomes P, Edmaier F, Liese J, Reinisch-Liese A, El Youzouri H, Schreckenbach T, et al. DIALAPP: a prospective validation of a new diagnostic algorithm

for acute appendicitis. Langenbeck's Arch Surg. 2021; 406(1): 141-52.
8. Kimura Y, Yamauchi M, Inoue H, Kimura S, Yamakage M, Aimono M, et al. Risk factors for gastric distension in patients with acute appendicitis: a retrospective cohort study. J Anesth. 2012; 26(4): 574-8.
9. Hasanin A, Abdelmottaleb A, Elhadi H, Arafa AS, Mostafa M. Evaluation of gastric residual volume using ultrasound in fasting patients with uncomplicated appendicitis scheduled for appendectomy. Anaesth Crit Care Pain Med. 2021; 40(3): 100869.
10. Andersson REB. Meta-analysis of the clinical and laboratory diagnosis of appendicitis. Br J Surg. 2004; 91(1): 28-37.
11. Kalliakmanis V, Pikoulis E, Karavokyros IG, Felekouras E, Morfaki P, Haralambopoulou G, et al. Acute appendicitis: the reliability of diagnosis by clinical assessment alone. Scand J Surg. 2005; 94(3): 201-6.
12. Smith MP, Katz DS, Lalani T, Carucci LR, Cash BD, Kim DH, et al. ACR appropriateness criteria® right lower quadrant pain—suspected appendicitis. Ultrasound Q. 2015; 31(2): 373-87.
13. Mostbeck G, Adam EJ, Nielsen MB, Claudon M, Clevert D, Nicolau C, et al. How to diagnose acute appendicitis: ultrasound first. Insights Imaging. 2016; 7(2): 255-63.
14. Evain J-N, Allain T, Dilworth K, Rabattu PY, Mortamet G, Desgranges FP, et al. Ultrasound assessment of gastric contents in children before general anaesthesia for acute appendicitis. Anaesthesia. 2022; 77(6): 668-73.
15. Perlas A, Arzola C, Van de Putte P. Point-of-care gastric ultrasound and aspiration risk assessment: a narrative review. Can J Anaesth. 2018; 65(4): 437-48.
16. Perlas A, Van de Putte P, Van Houwe P, Chan VWS. I-AIM framework for point-of-care gastric ultrasound. Br J Anaesth. 2016; 116(1): 7-11.
17. Gültekin Y, Kılıç Ö, Özçelik Z, Toprak ŞS, Bayram R, Arun O. Can gastric volume be accurately estimated by ultrasound? Turkish J Anaesthesiol Reanim. 2022; 50(3): 194-200.

Araştırma Makalesi / Research Article

Sağlık Bilimlerinde Değer / Sağlık Bil Değer
Value in Health Sciences / Value Health Sci
ISSN: 2792-0542 sabd@duzce.edu.tr 2025; 15(2): 305-314
doi: https://dx.doi.org/10.33631/sabd.1603725

# Comparison of Treatment Approaches of Endodontists and General Dentists to Patients Presenting Pain During or After Root Canal Treatment

İrem EREN[1], Emre BAYRAM[2], Huda Melike BAYRAM[2]

**ABSTRACT**

**Aim:** The aim of this study is to investigate, through a survey, the differences between physicians' approaches to patients who apply to dentistry clinics with pain due to endodontic reasons.

**Material and Methods:** The survey prepared for dentists working as general dentists and in the field of endodontics throughout Türkiye was organized via Google Forms and sent to the participants by e-mail. Volunteer dentists who agreed to participate in the study were included in the sample. A total of 203 dentists, including 56 endodontists and 147 general dentists, participated in survey. The survey was designed in two parts. The first part consisted of personal information such as age, gender and education level. The second part aimed to identify different approach protocols during endodontic treatment practices of dentists. Endodontists' and dentists' methods of following current issues, single-session or multi-session preferences, and treatment approaches to patients presenting with pain were evaluated.

**Results:** Statistically significant differences were found between endodontists' and dentists' methods of following current issues; single-session or multi-session preferences, and treatment approaches to patients presenting with pain ($p<0.05$).

**Conclusion:** During treatment of pulpal and periapical infections, behavior and attitude of treating dentist are closely related to the level of expertise. In addition, different clinical scenarios also affect these behaviors. Additionally, the results of the current study showed that both endodontists and general dentists prescribe antibiotics at high rates.

**Keywords:** Antibiotics; pain; root canal treatment.

## Kanal Tedavisi Sırasında ve Sonrasında Ağrısı Olan Hastalarda Endodontist ve Genel Diş Hekimlerinin Tedavi Yaklaşımlarının Karşılaştırılması

**ÖZ**

**Amaç:** Bu çalışmanın amacı endodontik nedenlerden dolayı ağrı şikayetiyle diş hekimliği kliniklerine başvuran hastalara hekimlerin yaklaşımları arasındaki farklılıkları anket yoluyla araştırmaktır.

**Gereç ve Yöntemler:** Türkiye genelinde genel diş hekimliği yapan ve endodonti alanında çalışan diş hekimlerine yönelik hazırlanan anket, Google Formlar aracılığıyla düzenlenerek katılımcılara e-posta yoluyla gönderildi. Araştırmaya katılmayı kabul eden gönüllü diş hekimleri örneklem kapsamına alındı. Ankete 56'sı endodonti uzmanı, 147'si genel diş hekimi olmak üzere toplam 203 diş hekimi katıldı. Anket iki bölüm halinde tasarlandı. Birinci bölümde yaş, cinsiyet, eğitim düzeyi gibi kişisel bilgiler yer almaktadır. İkinci bölümde ise diş hekimlerinin endodontik tedavi uygulamalarına yaklaşım protokolleri arasındaki farklılıkların belirlenmesi amaçlandı. Endodontist ve genel diş hekimlerinin güncel konuları takip etme yöntemleri, tek seans veya çoklu seans tercihleri ve ağrı şikayetiyle başvuran hastalara yönelik tedavi yaklaşımları değerlendirildi.

**Bulgular:** Endodontist ve genel diş hekimlerinin güncel konuları takip etme yöntemleri, tek seans veya çoklu seans tercihleri ve ağrı şikayetiyle başvuran hastalara yönelik tedavi yaklaşımları arasında istatistiksel olarak anlamlı farklılıklar bulundu ($p<0,05$).

**Sonuç:** Pulpal ve periapikal enfeksiyonların tedavisi sırasında tedaviyi yapan diş hekiminin davranış ve tutumu uzmanlık düzeyi ile yakından ilişkilidir. Ayrıca farklı klinik senaryolar da bu davranışları etkilemektedir. Ek olarak, mevcut çalışmanın sonuçları hem endodontistlerin hem de genel diş hekimlerinin yüksek oranda antibiyotik reçete ettiğini göstermiştir.

**Anahtar Kelimeler:** Ağrı; antibiyotikler; kök kanal tedavisi.

1 Canakkale Onsekiz Mart University, Faculty of Dentistry, Department of Endodontics, Çanakkale, Türkiye
2 Gaziosmanpasa University, Faculty of Dentistry, Department of Endodontics, Tokat, Türkiye

Sorumlu Yazar / Corresponding Author: İrem EREN, e-mail: iremuzman_85@hotmail.com
Geliş Tarihi / Received: 18.12.2024, Kabul Tarihi / Accepted: 06.05.2025

## INTRODUCTION

Even when endodontic treatment is performed to acceptable standards, the emergence of mild to moderate postoperative pain is not an uncommon occurrence. Some factors, such as preoperative pain and retreatment, can contribute to the development of postoperative pain (1). Significant variations can exist in decision-making within and among dentists during the endodontic treatment process (2). The complexity of treatment procedures and various treatment alternatives introduces diversity in the selection of appropriate treatment (3). It has been demonstrated that decision-making depends on encountered technical issues, clinicians' clinical experience, confidence, and education (4). A study found a significant difference between the approaches of endodontists and general dentists regarding the treatment of post-endodontic pain and swelling. While endodontists prefer a standard protocol, which obviously indicates that complete instrumentation of root canals is the ideal treatment plan as a standard protocol in all endodontic emergency conditions, involving complete instrumentation or re-instrumentation of the canal (5), general dentists have a lower preference for this standard protocol (6). The prescription of antibiotics should follow the preferred protocol, but it has been noted that there is insufficient knowledge about antibiotic prescription protocols among all dentists (7). This lack of knowledge is reported to be lower among endodontists than general dentists (6). In cases of severe pain between sessions, most endodontists recommend re-instrumentation of the canal and prescribing analgesics, while general dentists have a lower preference for these actions (6).

Significant differences have also been noted between endodontists and general dentists regarding the selection of intracanal medicaments. Endodontists mostly use them in cases of pulp necrosis and fluctuant swellings, whereas general dentists use them in cases of severe pain and swelling between sessions (6). Pain that may occur during or after endodontic procedures is undesirable for both patients and clinicians. It is anticipated that there may be differences in clinicans' approaches to a patient having pain.

Therefore, this study aimed to determine how general dentists and endodontists approach patients presenting with endodontic pain and to identify under what circumstances general dentists feel the need to refer to an endodontist. Additionally, it was whether the general dentists and endodontists approach the patients with endodontic pain differently. A survey was designed for these purposes. The hypothesis of the study is that there is no difference in approaches regarding post- and intra-treatment pain between endodontists and general dentists.

## MATERIAL AND METHODS

The research protocol was conducted in accordance with the principles of the Declaration of Helsinki and was approved by the Tokat Gaziosmanpaşa University Clinical Research Ethics Committee on February 18, 2021, with protocol number 83116987-214. This survey study was designed to evaluate the differences in the approaches of general dentists or endodontists in Türkiye who work in the field of endodontics and treat patients with endodontic pain. The data collection tool used in this study was a questionnaire prepared by the researchers (Table 1). The survey, conducted throughout Türkiye, was organized using Google Forms and sent to participants via email, targeting dentists working in the field of endodontics or as general dentists. Volunteer dentists who agreed to participate were included in the sample. The sample size was calculated based on previous similar studies and the number of dentists who participated in these studies (6-10). The questionnaire was designed in two parts. The first part consisted of personal information such as age, gender, and education level. The second part aimed to identify the approaches of endodontists and general dentists to patients with pain during endodontic treatment.

### Statistical Analysis

In calculating the sample size for the study, Power (Test Power) was set at a minimum of 80%, and Type-1 error was set at 5%. Descriptive statistics, expressed as number (n) and percentage (%), were used for each variable. "Chi-square test" and "Fisher's exact test" were employed to determine the relationship between categorical variables. When significant differences were found, post-hoc pairwise comparisons were conducted using Bonferroni-adjusted z-tests to determine which specific groups differed significantly from each other, with adjusted p-values reported. Multiple Correspondence Analysis was conducted to examine the relationship between categorical variables. Years of professional experience were categorized into three groups (0-5 years, 6-10 years, and >10 years) to examine differences in treatment approaches based on distinct career stages, following similar categorizations used in previous studies (6-10). A significance level of $p < 0.05$ was adopted for calculations, and the SPSS (IBM SPSS for Windows, ver.26) statistical software package was used for analysis.

## RESULTS

A total of 203 dentists participated in this survey study, including 56 endodontists, 147 general dentists. To perform the statistical analysis of the obtained data, two groups were formed: the first group consisted of endodontists, and the second group included general dentists. The attitude approaches of these two groups to patients with pain during endodontic treatment were statistically compared.

Table 2 provides the general distribution (descriptive statistics) of the demographic characteristics of the participants. It is observed that the majority of the participating dentists (123 (60.59%) were female. Similarly, most dentists (139 (68.47%)) had 0-5 years of experience, and the majority (109 (53.69%)) worked in private clinics.

Table 3 presents the relationship and distribution between the "Area of expertise" and "Personal information" of the dentists. When examined, it is seen that all endodontists (56 (100.00%)) answered "yes" to the question "Do you follow current developments in the field of Endodontics?". In contrast, 115 (78.23%) of general dentists answered "yes," and a statistically significant relationship was observed between these responses and the "Area of expertise" ($p<0.05$).

**Table 1.** Survey questions

| | |
|---|---|
| **1.** What is your gender?<br>a) Male b) Female | **2.** How many years of work experience do you have?<br>a) 0-5 years b) 5-10 years c)>10 years |
| **3.** Where do you work?<br>a) Private b) Public institution c) University hospital | **4.** What is your specialization?<br>a) I am an endodontist b) I am a general dentist c) I am a specialist in another field |
| **5.** Do you follow the recent developments in the field of endodontics?<br>a) Yes b) No | **6.** If yes, what methods do you prefer for this?<br>a) I follow current articles.<br>b) I listen to recommendations from companies.<br>c) I follow through social media.<br>d) I attend seminars. |
| **7.** How many patients, on average, do you perform root canal treatment on per day?<br>a) 0 b) 1-3 c) 3-5 d) >5 | **8.** What is the success rate of your treatments?<br>a) 0-10% b) 10-25% c) 25-50% d) 50-75% e) 75-100% |
| **9.** When performing routine treatments, do you prefer single-session or multiple-session treatment?<br>**a) Single session b) Multiple sessions c) No preference** | **10.** What are your reasons for choosing multiple-session treatments?<br>a) To apply medicament<br>b) Because sessions are prolonged<br>c) Due to financial reasons<br>d) To catch details missed in the first session<br>e) To resolve complications arising in the first session |
| **11.** A patient with irreversible pulpitis receives single-session treatment. The patient returns with pain and/or swelling three days after treatment. What is your approach?<br>a) Prescribe pain relievers and antibiotics.<br>b) Remove the existing canal, call the patient back in 2-3 days.<br>c) Remove the existing canal, extend the preparation, call the patient back in 2-3 days.<br>d) Remove the existing canal, extend the preparation, apply medicament to the canal.<br>e) Extract the tooth. | **12.** You are performing multiple-session treatment for a patient with irreversible pulpitis. The patient returns with pain and/or swelling three days after the first session. What is your approach?<br>a) Prescribe pain relievers and antibiotics.<br>b) Open the canal, perform irrigation, and close it.<br>c) If medicament was used, clean it from the canals, schedule a new appointment in 2-3 days.<br>d) If medicament was used, clean it from the canals, extend the preparation, and apply medicament again.<br>e) Extract the tooth. |
| **13.** A patient with acute/chronic apical periodontitis receives single-session treatment. The patient returns with pain and/or swelling three days after treatment. What is your approach?<br>a) Prescribe pain relievers and antibiotics.<br>b) Remove the existing canal, call the patient back in 2-3 days.<br>c) Remove the existing canal, extend the preparation, call the patient back in 2-3 days.<br>d) Remove the existing canal, extend the preparation, apply medicament to the canal.<br>**e) Extract the tooth.** | **14.** You are performing multiple-session treatment for a patient with acute/chronic apical periodontitis. The patient returns with pain and/or swelling three days after the first session. What is your approach?<br>a) Prescribe pain relievers and antibiotics.<br>b) If medicament was used, clean it from the canals, schedule a new appointment in 2 days.<br>c) If medicament was used, clean it from the canals, extend the preparation.<br>d) If medicament was used, clean it from the canals, extend the preparation, and apply medicament again.<br>e) Refer to an endodontist.<br>f) Extract the tooth. |
| **15.** Patients returning with pain, which group do you think they belong to the most?<br>a) Treatments finished in a single session<br>b) Between sessions in previously untreated teeth with multiple sessions<br>c) After completion of treatment in previously untreated teeth with multiple sessions<br>d) Between sessions in retreated teeth<br>e) After completion of treatment in retreated teeth | **16.** When a patient returns with pain, what is the first thing that comes to your mind as the cause of pain related to treatment procedures?<br>a) Debris, irrigation solution, or canal filling material overflowing from the canal<br>b) Presence of residual pulp in the canal<br>c) Inadequate filling<br>d) Inadequacy in the restoration over the canal treatment<br>e) Undiscovered canal |
| **17.** When a patient, whose treatment you completed 1 month ago, comes to your clinic with pain in the relevant tooth, what is your approach?<br>a) Remove the existing canal, perform retreatment.<br>b) Prescribe pain relievers and antibiotics to the patient.<br>c) Refer/send for apical resection.<br>d) Refer to an endodontist.<br>e) Extract the tooth. | **18.** When a patient, whose treatment you completed 1 year ago, comes to your clinic with pain in the relevant tooth, what is your approach?<br>a) Remove the existing canal, perform retreatment.<br>b) Prescribe pain relievers and antibiotics to the patient.<br>c) Refer/send for apical resection.<br>d) Refer to an endodontist.<br>e) Extract the tooth. |

**Table 2.** General descriptive statistics of demographic measurements of participating physicians in the study

| | | Endodontist | | General Dentist | | Total |
|---|---|---|---|---|---|---|
| | | n | % | n | % | % |
| Gender | Male | 22 | 39.29 | 58 | 39.46 | 39.41 |
| | Female | 34 | 60.71 | 89 | 60.54 | 60.59 |
| | **Total** | **56** | **100.00** | **147** | **100.00** | **100.00** |
| Years of Experience | 0-5 years | 28 | 50.00 | 111 | 75.51 | 68.47 |
| | 6-10 years | 16 | 28.57 | 22 | 14.97 | 18.72 |
| | 10+ years | 12 | 21.43 | 14 | 9.52 | 12.81 |
| | **Total** | **56** | **100.00** | **147** | **100.00** | **100.00** |
| Workplace | Public Institution | 8 | 14.28 | 38 | 25.85 | 22.66 |
| | Private | 10 | 17.86 | 99 | 67.35 | 53.69 |
| | University Hosp. | 38 | 67.86 | 10 | 6.80 | 23.65 |
| | **Total** | **56** | **100.00** | **147** | **100.00** | **100.00** |

Similarly, a statistically significant relationship was observed between the answers to the question "If you follow current developments in the field of Endodontics, what methods do you prefer?" and the "Area of expertise" (p=0.001). Post-hoc tests revealed that endodontists were significantly more likely to follow current articles (64.29% vs. 6.12%, p<0.001), while general dentists significantly preferred social media (54.42% vs. 21.43%, p<0.001) and attended seminars (25.17% vs. 14.29%, p<0.05) to stay updated. Furthermore, a statistically significant relationship was observed between the answers to the question "How many patients, on average, do you perform root canal treatment on per day?" and the "Area of expertise" (p<0.05). Post-hoc analysis showed that endodontists performed root canal treatment on an average of 4 or more patients per day (82.14% vs. 36.05%, p<0.001), whereas the majority of general dentists mostly treated three or fewer patients (60.55% vs. 17.86%, p<0.001). A statistically significant relationship was observed between the answers to the question "When performing routine endodontic treatment, do you prefer single-visit or multiple-visit treatment?" and the "Area of expertise" (p<0.05). Endodontists tended to prefer single-visit endodontic treatment (28 (50.00%)) significantly more than general dentists (32.65%, p=0.028), while general dentists tended to prefer multiple-visit treatment (59.19% vs. 28.57%, p=0.016). When choosing multiple-visit endodontic treatment, it was observed that in all groups, the most common reason cited by dentists was to apply medicament. However, no statistically significant relationship was observed between the answers to other questions given by the participating dentists and the area of expertise (p>0.05). Table 4 provides the relationship and distribution between the area of expertise and treatment approaches of the dentists. When examined, it was seen that most general dentists preferred prescribing analgesics and antibiotics when a patient with irreversible pulpitis returns to the clinic after three days of single-visit treatment with pain and/or swelling, most general dentists preferred prescribing analgesics and (79 (53.75%)). Post-hoc comparisons revealed significant differences in treatment approaches, as endodontists preferred extracting and enlarging the canal and giving a new appointment (32.14% vs. 10.20%, p=0.006), while general dentists preferred this along with sending medicament into the canal (30.60% vs. 0.00%, p<0.001). Similarly, a statistically significant relationship was observed between the answers to the question "In which group do patients who return to you due to pain belong more often?" and the "Area of expertise" (p<0.05).

Post-hoc analysis showed that endodontists most frequently (22 (39.29%)) mentioned pain between sessions in teeth where retreatment was performed compared to general dentists (30.61%, p=0.044), while general dentists most commonly (51 (34.69%)) mentioned pain between sessions in teeth where multiple sessions of root canal treatments were performed (vs. 25.00% for endodontists, p=0.039) and, to a lesser extent, between sessions in retreated teeth (45 (30.61%)) unlike endodontists. Additionally, a statistically significant relationship was observed between the answers to the question "When your patient comes to you with pain, what is the first thing that comes to your mind as the cause of pain related to treatment procedures?" and the "Area of expertise" (p<0.05). The majority of endodontists (38 (67.86%)) believed that pain could be caused by debris, irrigation solution, or canal filling material overflowing from the canal significantly more than general dentists (30.61%, p<0.001).

**Table 3.** Relationship and distribution between "area of expertise" and "personal information" of physicians

| | | Endodontist | | General Dentist | | *p-value |
|---|---|---|---|---|---|---|
| | | n | % | n | % | |
| Follow current developments in the field of endodontics? | Yes | 56 | 100.00 | 115 | 78.23 | ***0.019*** |
| | No | 0 | 0.00 | 32 | 21.77 | |
| | **Total** | **56** | **100.00** | **147** | **100.00** | |
| If yes, what methods do you prefer for this? | Read current articles | 36 | 64.29[1] | 9 | 6.12[1] | ***0.001 ([1,2] <0.001, [3] =0.042 according to Bonferroni correction)*** |
| | Attend seminars | 8 | 14.28[2] | 37 | 25.17[2] | |
| | Follow on social media | 12 | 21.43[3] | 80 | 54.42[3] | |
| | No response | 0 | 0.00 | 21 | 14.29 | |
| | **Total** | **56** | **100.00** | **147** | **100.00** | |
| On average, how many patients do you perform root canal treatment on per day? | 0 | 0 | 0.00 | 5 | 3.40 | ***0.001 ([4,5] <0.001, according to Bonferroni correction)*** |
| | 1-3 | 10 | 17.86[4] | 89 | 60.55[4] | |
| | 4-5 | 22 | 39.28[5] | 40 | 27.21[5] | |
| | >5 | 24 | 42.86[5] | 13 | 8.84[5] | |
| | **Total** | **56** | **100.00** | **147** | **100.00** | |
| What is the success rate of your treatments according to you? | 0-10% | 0 | 0.00 | 2 | 1.36 | *0.182* |
| | 25,0-50% | 0 | 0.00 | 5 | 3.40 | |
| | 50,0-75% | 8 | 14.29 | 56 | 38.10 | |
| | 75,0-100% | 48 | 85.71 | 84 | 57.14 | |
| | **Total** | **56** | **100.00** | **147** | **100.00** | |
| In routine endodontic treatment, do you prefer single-session or multiple-session treatment? | Multiple Sessions | 16 | 28.57[6] | 87 | 59.19[6] | ***0.021 ([6] =0.016, [7] =0.028 according to Bonferroni correction)*** |
| | Single Session | 28 | 50.00[7] | 48 | 32.65[7] | |
| | No preference | 12 | 21.43 | 12 | 8.16 | |
| | **Total** | **56** | **100.00** | **147** | **100.00** | |
| What are the reasons for multiple-session treatment? | To catch details missed in the first session | 2 | 3.57 | 30 | 20.41 | *0.280* |
| | To resolve complications in the first session | 14 | 25.00 | 27 | 18.38 | |
| | To apply medicaments | 26 | 46.43 | 45 | 30.61 | |
| | Because sessions are long | 10 | 17.86 | 31 | 21.09 | |
| | No response | 4 | 7.14 | 14 | 9.51 | |
| | **Total** | **56** | **100.0** | **147** | **100.0** | |

*Significance levels according to the Chi-square test res

In contrast, the majority of general dentists (55 (37.41%)) believed it could be due to undetected canals significantly more than endodontists (21.43%, p=0.023). The answers to the question "When a patient who had treatment done by you one month ago and completed the treatment comes to your clinic with pain, what is your approach?" showed a statistically significant relationship with the "Area of expertise" (p<0.05). After Bonferroni correction, endodontists preferred retreatment in this situation (28 (50.00%)), while general dentists preferred it at a rate of 64 (43.54%), though this specific difference was not statistically significant (p=0.147). Notably, general dentists were more likely to refer to an endodontist (15.65% vs. 0.00%, p=0.002) in this situation. In addition, endodontists and general dentists stated that they would most commonly prescribe analgesics and antibiotics at rates of 20 (35.71%) and 50 (34.01%), respectively, with no significant difference (p=0.351).

**Table 4.** Relationship and distribution between "area of expertise" and "treatment approaches"

| | | Endodontist | | General Dentist | | *p-value |
|---|---|---|---|---|---|---|
| | | n | % | n | % | |
| You treated a patient with irreversible pulpitis with single-session treatment. The patient returned 3 days later with pain and/or swelling. What is your approach? | Prescribe pain relievers and antibiotics | 34 | 60.72 | 79 | 53.75 | ***0.004 ([1] =0.006, [2] <0.001 according to Bonferroni correction)*** |
| | Remove the canal, call back in 2-3 days | 4 | 7.14 | 8 | 5.44 | |
| | Remove the canal, expand preparation, call back in 2-3 days | 18 | 32.14[1] | 15 | 10.20[1] | |
| | Remove the canal, expand preparation, apply medicament to the canal | 0 | 0.00[2] | 45 | 30.61[2] | |
| | **Total** | **56** | **100.00** | **147** | **100.00** | |
| You are applying multiple-session treatment to a patient with irreversible pulpitis. The patient returned with pain and/or swelling 3 days after the first session. What is your approach? | Prescribe pain relievers and antibiotics | 6 | 10.72 | 26 | 17.69 | *0.385* |
| | Open the canal, perform irrigation, and close | 6 | 10.72 | 36 | 24.49 | |
| | If medicament was used, clean it from the canals, schedule an appointment in 2-3 days | 26 | 46.42 | 41 | 27.89 | |
| | If medicament was used, clean it from the canals, expand preparation, reapply medicament | 18 | 32.14 | 44 | 27.93 | |
| | **Total** | **56** | **100.00** | **147** | **100.00** | |
| You performed single-session treatment on a tooth with acute/chronic apical periodontitis. The patient returned 3 days later with pain and/or swelling. What is your approach? | Extract the tooth | 0 | 0.00 | 3 | 2.04 | *0.301* |
| | Prescribe pain relievers and antibiotics | 24 | 42.86 | 82 | 55.78 | |
| | Remove the canal, call back in 2-3 days | 4 | 7.14 | 9 | 6.12 | |
| | Remove the canal, expand preparation, call back in 2-3 days | 18 | 31.14 | 19 | 12.93 | |
| | Remove the canal, expand preparation, apply medicament to the canal | 10 | 17.86 | 34 | 23.13 | |
| | **Total** | **56** | **100.00** | **147** | **100.00** | |
| You are applying multiple-session treatment to a tooth with acute/chronic apical periodontitis. The patient returned with pain and/or swelling 3 days after the first session. What is your approach? | Refer to an endodontist | 0 | 0.00 | 8 | 5.44 | *0.111* |
| | Prescribe pain relievers and antibiotics | 6 | 10.71 | 33 | 22.45 | |
| | If medicament was used, clean it from the canals, schedule an appointment in 2 days | 8 | 14.29 | 36 | 24.49 | |
| | If medicament was used, clean it from the canals, expand preparation, reapply medicament | 26 | 46.43 | 51 | 34.69 | |
| | If medicament was used, clean it from the canals, expand preparation | 16 | 28.57 | 19 | 12.93 | |
| | **Total** | **56** | **100.00** | **147** | **100.00** | |
| Patients returning due to pain, which group do they mostly belong to according to you? | Between sessions in teeth with no previous root canal treatment but treated with multiple sessions | 14 | 25.00[3] | 51 | 34.69[3] | ***0.006 ([3] =0.039, [4] =0.044 according to Bonferroni correction)*** |
| | After completion of treatment in teeth with no previous root canal treatment but treated with multiple sessions | 0 | 0.00 | 11 | 7.48 | |
| | Between sessions in retreated teeth | 22 | 39.29[4] | 45 | 30.61[4] | |
| | After completion of treatment in retreated teeth | 6 | 10.71 | 3 | 2.05 | |
| | Single-session completed treatments | 14 | 25.00 | 37 | 25.17 | |
| | **Total** | **56** | **100.00** | **147** | **100.00** | |
| When a patient comes to you with pain, what is the first thing that comes to your mind as the cause of pain related to treatment procedures? | Undetected canal | 12 | 21.43[5] | 55 | 37.41[5] | ***0.031 ([5] =0.023, [6] <0.001 according to Bonferroni correction)*** |
| | Inadequacy of restoration on top of root canal treatment | 2 | 3.57 | 7 | 4.75 | |
| | Presence of pulp remnants in the canal | 2 | 3.57 | 28 | 19.07 | |
| | Overflow of debris, irrigation solution, or canal filling materials from the canal | 38 | 67.86[6] | 45 | 30.61[6] | |
| | Insufficient filling | 2 | 3.57 | 12 | 8.16 | |
| | **Total** | **56** | **100.00** | **147** | **100.00** | |
| A patient who had treatment done 1 month ago and finished came to your clinic with pain in the relevant tooth. What is your approach? | Refer for apical resection | 8 | 14.29 | 5 | 3.40 | ***0.030 ([7] =0.002 according to Bonferroni correction)*** |
| | Extract the tooth | 0 | 0.00 | 5 | 3.40 | |
| | Refer to an endodontist | 0 | 0.00[7] | 23 | 15.65[7] | |
| | Prescribe pain relievers and antibiotics | 20 | 35.71 | 50 | 34.01 | |
| | Remove the canal, perform retreatment | 28 | 50.00 | 64 | 43.54 | |
| | **Total** | **56** | **100.00** | **147** | **100.00** | |
| A patient who had treatment done 1 year ago and finished came to your clinic with pain in the relevant tooth. What is your approach? | Refer for apical resection | 10 | 17.86[8] | 4 | 2.72[8] | ***0.002 ([8] =0.003, [9] <0.001, [0]=0.004 according to Bonferroni correction)*** |
| | Extract the tooth | 2 | 3.57 | 15 | 10.21 | |
| | Refer to an endodontist | 0 | 0.00[9] | 33 | 22.45[9] | |
| | Prescribe pain relievers and antibiotics | 0 | 0.00 | 12 | 8.16 | |
| | Remove the canal, perform retreatment | 44 | 78.57[0] | 83 | 56.46[0] | |
| | **Total** | **56** | **100.00** | **147** | **100.00** | |

*Significance levels according to the Chi-square test result

Finally, a statistically significant relationship was observed between the answers to the question "When a patient who had treatment done by you one year ago and completed the treatment comes to your clinic with pain, what is your approach?" and the "Area of expertise" ($p<0.05$). Post-hoc tests revealed that general dentists, unlike endodontists, did not prefer apical resection (2.72% vs. 17.86%, $p=0.003$) but instead mostly referred the patient to an endodontist (33 (22.45%) vs. 0.00%, $p<0.001$). Most endodontists (44 (78.57%)) and general dentists (83 (56.46%)) most commonly preferred retreatment, with endodontists significantly more likely to choose this option ($p=0.004$). Since the participating dentists were evaluated in three different groups as endodontists, general dentists, and specialists from other departments, the compatibility of the answers given by dentists in both groups to the questions was evaluated using multiple correspondence analysis (Figure 1). It was observed that there was no compatibility between the answers of endodontists (1st quadrant) and general dentists.

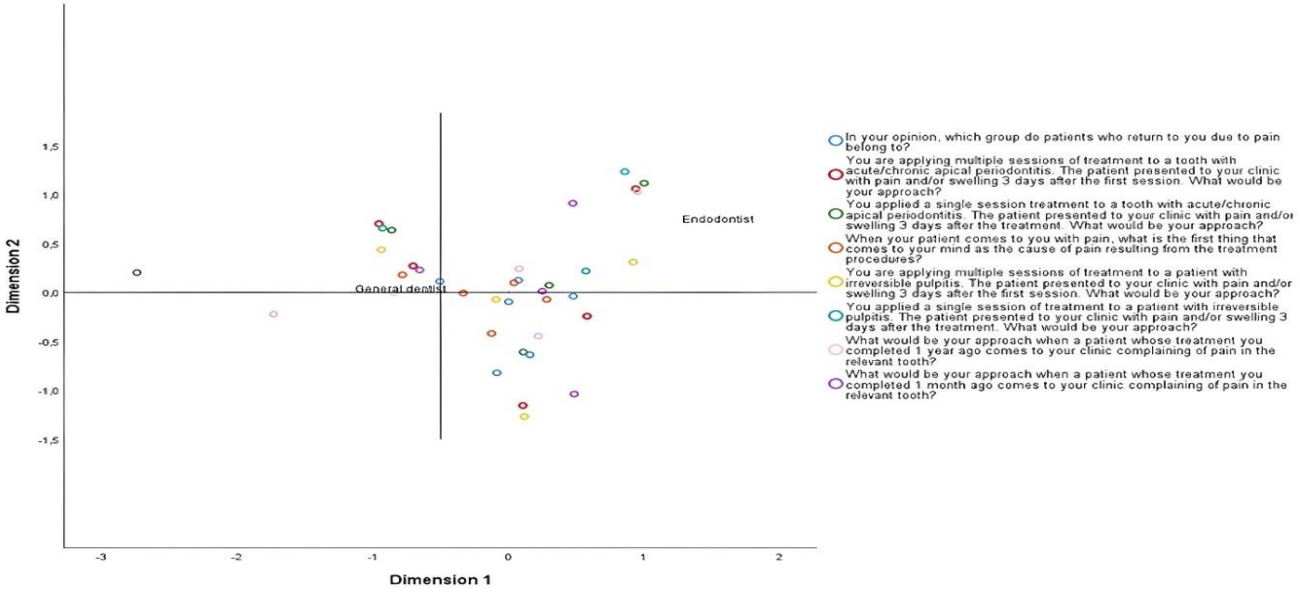



**Figure 1.** The compatibility of the answers given by dentists are shown by multiple correspondence analysis of the participating dentists in both groups as endodontists and general dentists

## DISCUSSION

This study investigates the differences or similarities in the treatment approaches for patients presenting with pain among endodontists and general dentists through a survey. It is observed that general dentists play an important role in the provision of dental services in Türkiye, especially in private clinics (8). Despite the increasing number of graduating dentists each year in Türkiye, the insufficient number of endodontists has led to root canal treatment mainly being provided by general dentists (8). A specialization thesis conducted in 2019 found that approximately 97.2% of general dentists performed root canal treatments, with around 32.6% treating more than 20 cases per month (9). Similarly, Pertek Hatipoğlu et al. reported in their 2020 study that general dentists had a 96.45% rate of performing endodontic treatments, with an average of 3.25 cases treated per day (10). Consistent with these findings, our study indicates that the majority of general dentists work in private clinics, while endodontists are more commonly found in university hospitals. Moreover, we determined that approximately 96.6% of general dentists perform root canal treatments, treating at least one case daily. However, when evaluating the success rates of root canal treatments, we found that endodontists had a success rate of 75% or higher, with a rate of 85.7%, whereas general dentists had a success rate of 57.1% for the same criteria. This result suggests that the success rates of general dentists performing root canal treatments might be lower. However, it's essential to consider that the study is based on self-reported data and may not fully reflect the actual outcomes.

The role of social media in dentistry has become increasingly significant, mirroring its importance in people's lives. For various purposes such as advertising, marketing, patient communication, and education, dentists actively use social media (11). Studies have shown that dentists use social media to share their ideas and information to enhance their knowledge (11,12). In our study, a statistically significant difference was found using of social media as a method for following innovations in endodontics between endodontists and general dentists. Endodontists tend to follow current developments more through articles, while general dentists prefer social media to acquire up-to-date information. This difference could be attributed to the fact that endodontists in our study are more frequently associated with university positions, whereas general dentists are predominantly from private practice.

The fundamental difference between single-visit and multiple-visit root canal treatments lies in the use of intracanal medicament between sessions (13). A meta-analysis by Almeida et al. in 2017, covering 17 randomized clinical trials, demonstrated no significant difference in the healing of periapical tissues between single-visit and multiple-visit root canal treatments (14).

However, they reported that postoperative pain after single-visit root canal treatment was less, suggesting the logical adoption of single-visit root canal treatment, particularly in public oral health centers. In our study, approximately half of the endodontists preferred single-visit root canal treatment, while more than half of the general dentists favored multiple-visit root canal treatment. Kengel et al. reported that endodontists tend to have a more conservative approach in treatment planning, are more familiar with current endodontic literature, and perceive the difficulty level in the planning stage as lower than that of other dentists (15). As mentioned earlier, the majority of endodontists in our study work in university hospitals, which provide public health services. Therefore, factors such as patient volume and limited time allocated per patient might influence the preference for single-visit root canal treatment among endodontists, given their expertise and the potential for higher postoperative patient comfort. In contrast, the majority of general dentists included in our study work in private clinics, which may provide them with more flexibility in session durations and the ability to allocate more than one session for a patient. Additionally, some researchers have suggested that the use of intracanal medicament may be advantageous, especially in controlling microbial activity in the root canal system of non-vital teeth (16,17). Examining the results of our study, it is apparent that the most significant factor influencing the preference for multiple-visit root canal treatment among endodontists is the application of intracanal medicament. On the other hand, general dentists consider not only intracanal medicament but also shortening session durations and the ability to capture missed details in the first session as important factors in choosing multiple-visit root canal treatment. In conclusion, the preference for single-visit or multiple-visit root canal treatment is influenced not only by the knowledge and skills of the treating dentist but also by the time and working conditions they can allocate to the patient.

If pain or swelling occurs due to inflammation or infection originating from the pulp or periapical tissues during or after root canal treatment, this condition is classified as an emergency (18). The standard treatment method for such emergency cases involves expanding the preparation to provide drainage through the root canals, removing necrotic pulp remnants, or controlling pain (19). In cases of flare-up accompanied by pain and swelling, it is also recommended to prescribe analgesics and apply intracanal medicaments (19). In a survey conducted by Bidar et al. in 2015, including 120 general dentists and 32 endodontists, it was reported that over 75% of endodontists and less than 50% of general dentists preferred not to re-prepare the canal when encountering flare-up cases (6). In contrast to this study, our research prepared questions regarding when and under which initial indications flare-up cases occurred. We observed that the behavior of the participating dentists changed based on the initial indication, whether the treatment was performed in a single or multiple sessions, and the status of treatment completion. In cases of flare-up occurring three days after applying single-session root canal treatment to patients with irreversible pulpitis or acute/chronic apical periodontitis, endodontists mostly prescribed antibiotics and analgesics and less frequently performed re-preparation. Conversely, for cases of irreversible pulpitis, they did not prefer intracanal medicament, while for cases of acute/chronic apical periodontitis, they opted for medicament. General dentists, in similar situations, mostly prescribed antibiotics and analgesics, but unlike endodontists, approximately one-third chose re-preparation followed by intracanal medicament for flare-up cases following irreversible pulpitis. In cases of multiple-session treatment, endodontists mostly preferred to empty the canal and schedule a new appointment rather than prescribing antibiotics, whereas general dentists followed a similar approach but more frequently opted for irrigation only. Additionally, evaluation of the responses regarding when patients returned with pain in both groups showed that in cases of multiple-session treatments, patients often returned between sessions. Therefore, it is assumed that the behaviors and attitudes of the participating dentists reflected the situations they encountered more frequently. Furthermore, it was noted that dentists in both groups generally preferred re-preparation and subsequent intracanal medicament more for flare-up cases in multiple-session treatments compared to single-session treatments. This preference might be because these treatment methods are seen as more easily applicable options in an ongoing treatment process. Additionally, the fact that dentists in both groups did not have a preference for prescribing antibiotics alongside analgesics, even though this is not part of the standard treatment protocol, is noteworthy (19). Previous studies have reported higher rates of antibiotic prescriptions internationally for Türkiye (20,21) and Iran (7). In our study, general dentists tended to prescribe antibiotics at a similar or higher rate in various cases. However, cases requiring antibiotic use should involve common and severe endodontic infections, such as cellulitis, or situations suggesting systemic infection spread (22). Moreover, most endodontic diseases can be treated without antibiotics through chemo-mechanical canal debridement, appropriate pain control, medicament therapy, and, if necessary, drainage with incision (23,24). Therefore, considering these aspects, the results of our study suggest that antibiotic prescriptions may be more frequent than necessary.

Retreatment is a necessary treatment method for previously performed and unsuccessful root canal treatments. Additionally, in cases where periapical abscess has developed and coronal access cannot be provided for retreatment, apical resection is required (25). The results of the current study indicated that the dentists included in the study considered the time elapsed since the completion of treatment as a criterion when evaluating the failure of root canal treatment. In cases where patients returned with pain one year after treatment completion, endodontists planned retreatment in 78.5% of cases and apical resection in 17.9%. Additionally, 3.6% mentioned they prefer tooth extraction. However, when the treatment was completed one month ago, endodontists' behavior changed, and in such cases, approximately one-third preferred prescribing antibiotics and analgesics. In contrast, general dentists mentioned preferring apical resection in only 2.7% and retreatment in 56.5% of cases. It was also noteworthy that general dentists also had a tendency to consider prescribing antibiotics, with approximately one-third mentioning this preference. Despite the preference for

antibiotics in failed root canal treatments by dentists, it is not appropriate to prescribe them unless there is a systemic symptom in the standard treatment protocol (19). In this regard, it is considered necessary to provide more intensive education on limiting antibiotic use in both undergraduate and postgraduate dental education.

## CONCLUSION

In conclusion, the behavior and attitude of the dentist performing the intervention during the treatment of pulpal and periapical infections are closely related to the level of expertise. Additionally, different clinical scenarios affect these behaviors. Whether the pain occurs during or after the treatment, the time until the pain occurs after the treatment, the level of education and knowledge of the physician affect both the success level of the physicians and the attitude they display towards the patient who presents with pain. The results of the current study provide evidence that both endodontists and general dentists prescribe antibiotics at high rates. It is necessary to improve the knowledge of dentists on root canal treatment standard protocols, antibiotics, and indications for antibiotic use through updated guidelines and undergraduate and postgraduate dental education.

**Authors's Contributions:** Idea/Concept: E.B., M.B.; Design: İ.E., E.B., M.B.; Data Collection and/or Processing: İ.E., E.B., M.B.; Analysis and/or Interpretation: İ.E., E.B.; Literature Review: İ.E., E.B.; Writing the Article: İ.E.; Critical Review: İ.E., E.B., M.B.

## REFERENCES

1. Siqueira JF Jr, Rôças IN, Favieri A, Machado AG, Gahyva SM, Oliveira JC, et al. Incidence of postoperative pain after intracanal procedures based on an antimicrobial strategy. J Endod. 2002; 28(6): 457-60.
2. McCaul LK, McHugh S, Saunders WP. The influence of specialty training and experience on decision making in endodontic diagnosis and treatment planning. Int Endod J. 2001; 34(8): 594-606.
3. Huumonen S, Kvist T, Gröndahl K, Molander A. Diagnostic value of computed tomography in re-treatment of root fillings in maxillary molars. Int Endod J. 2006; 39(10): 827-33.
4. Reit C, Gröndahl HG. Endodontic decision-making under uncertainty: a decision analytic approach to management of periapical lesions in endodontically treated teeth. Endod Dent Traumatol. 1987; 3(1): 15-20.
5. O. A. Peters and C. I. Peters, "Cleaning and Shaping of the Root Canal System," in Pathways of The Pulp, Tenth Edit., K. M. Hargreaves, S. Cohen, and L. H. Berman, Eds. St.Louis: Elsevier Inc., 2011, pp. 283-349.
6. Bidar M, Gharechahi M, Soleimani T, Eslami N. A Survey over the Dentists' and Endodontists' Approaches towards the Management of Endodontic Emergencies in Mashhad, Iran. Iran Endod J. 2015; 10(4): 256-62.
7. Nabavizadeh MR, Sahebi S, Nadian I. Antibiotic prescription for endodontic treatment: general dentist knowledge + practice in shiraz. Iran Endod J. 2011; 6(2): 54-9.
8. Unal GC, Kaya BU, Tac AG, Kececi AD. Survey of attitudes, materials and methods preferred in root canal therapy by general dental practice in Türkiye: Part 1. Eur J Dent. 2012; 6(4): 376.
9. Didem A. Türkiye'de diş hekimlerinin endodontik tedavi yaklaşımlarının değerlendirilmesi [Uzmanlık Tezi]: İstanbul Üniversitesi; 2019.
10. Pertek Hatipoğlu F, Hatipoğlu Ömer, Arıcıoğlu B. Türk dişhekimlerinin endodontik tedavi prosedürlerindeki yaklaşımlarının incelenmesi. 2020; 11: 54-64.
11. Ghandhi D, Bodani N, Lal A, Maqsood A, Ahmed N, Basha S, et al. Evaluation of social media usage by dental dentists of pakistan for professional purposes - a cross-sectional study. Clin Cosmet Investig Dent. 2022; 14: 245-52.
12. Rajeh MT, Aboalshamat KT, Nassar AA, Sembawa SN, Al Hebshi SA, Badri MK. Insights on using social media in dental education: a cross-sectional study in Saudi Arabia. Open Dent J. 2020; 14(1): 717-23.
13. Siqueira JF Jr, Lopes HP, Elias CN. Obturação dos canais radiculares. In: Lopes HP, Siqueira JF Jr, editors. Endodontia: biologia e técnica. 3th ed. Rio de Janeiro: Guanabara Koogan;2010. p. 641-670.
14. Almeida DO, Chaves SCL, Souza RA, Soares FF. Outcome of single- vs multiple-visit endodontic therapy of nonvital teeth: a meta-analysis. J Contemp Dent Pract 2017; 18(4): 330-6.
15. Kengel BM, Altunbaş D, Akpınar KE. Diş hekimlerinin periapikal radyografiler ve konik ışınlı bilgisayarlı tomografi (cbct) görüntülerine göre uygulayacakları endodontik tedavi seçeneklerinin karşılaştırılması. Ata Diş Hek Fak Derg. 2021; 31(4): 491-9.
16. Sjögren U, Figdor D, Persson S, Sundqvist G. Influence of infection at the time of root filling on the outcome of endodontic treatment of teeth with apical periodontitis. Int Endod J 1997; 30(5): 297-306.
17. Sjögren U, Hagglund B, Sundqvist G, Wing K. Factors affecting the long-term results of endodontic treatment. J Endod 1990; 16(10): 498-504.
18. Dorn SO, Moodnik RM, Feldman MJ, Borden BG. Treatment of the endodontic emergency: a report based on a questionnaire--part I. J Endod. 1977; 3(3): 94-100.
19. Cohen S, Hargreaves KM. Pathways of the pulp. 10 ed. St Louis: Mosby; 2011.
20. Kandemir S, Ergül N. Grievances in cases using antibiotics due to orodental problems and assessment of the need for antibiotics. Int Dent J. 2000; 50(2): 73-7.
21. Deniz-Sungur D, Aksel H, Karaismailoglu E, Sayin TC. The prescribing of antibiotics for endodontic infections by dentists in Türkiye: a comprehensive survey. Int Endod J. 2020; 53(12): 1715-27.
22. American Association of Endodontists Position Statement 2017, Segura-Egea et al. 2017a,b, European Society of Endodontology 2018.
23. Keenan JV, Farman AG, Fedorowicz Z, Newton JT. A Cochrane systematic review finds no evidence to

support the use of antibiotics for pain relief in irreversible pulpitis. J Endod. 2006; 32(2): 87-92.
24. Cope AL, Francis N, Wood F, Chestnutt IG. Systemic antibiotics for symptomatic apical periodontitis and acute apical abscess in adults. Cochrane Database Syst Rev. 2018; 9(9): CD010136.
25. Song M, Chung W, Lee SJ, Kim E. Long-term outcome of the cases classified as successes based on short-term follow-up in endodontic microsurgery. J Endod. 2012; 38(9): 1192-6.

Derleme / Review

Sağlık Bilimlerinde Değer / Sağlık Bil Değer
Value in Health Sciences / Value Health Sci
ISSN: 2792-0542 sabd@duzce.edu.tr 2025; 15(2): 315-320
doi: https://dx.doi.org/10.33631/sabd.1386939

# Nonsteroidal Antiinflamatuvar İlaçların Kemopreventif Etkileri

Sıla ÖLMEZ [1], Tolga KÖŞECİ [2], Erkan KOZANOĞLU [3]

**ÖZ**

Kanser, dünya genelinde her iki cinsiyet için de yüksek mortalite oranlarına sahip ve yaygın olarak görülen bir hastalıktır. Bu sebeple, kanserin önlenmesi ve tedavisine yönelik yeni stratejilerin geliştirilmesi, büyük bir önem arz etmektedir. Non-steroidal antiinflamatuvar ilaçlar, ağrı kesici, ateş düşürücü ve inflamasyon önleyici etkileri nedeniyle, akut ve kronik hastalıkların tedavisinde yaygın olarak kullanılan ilaçlar arasında yer almaktadır. Bu ilaçlar, özellikle fiziksel tıp ve rehabilitasyon, romatoloji, ortopedi, algoloji gibi tıbbi branşlarda rutin olarak sıkça reçete edilmektedir. Bununla birlikte, son yıllarda non-steroidal antiinflamatuvar ilaçların sadece ağrı kesici etki ve inflamasyon kontrolü sağlamadıkları, aynı zamanda çeşitli kanser türlerinde kemopreventif etki gösterme potansiyeline sahip olabilecekleri yönünde birçok çalışma yapılmıştır. Non-steroidal antiinflamatuvar ilaçların kanser hücrelerinin büyümesini engellemeye, metastazı azaltmaya ve tümör gelişimini önlemeye yönelik farklı mekanizmalar üzerindeki etkileri araştırılmaktadır. Bu derleme, non-steroidal antiinflamatuvar ilaçların çeşitli kanser türlerine karşı potansiyel kemopreventif etkilerini ve antikanser etki mekanizmalarını ele alarak, bu konudaki güncel literatürü kapsamlı bir şekilde incelemeyi amaçlamaktadır.

**Anahtar Kelimeler:** Nonsteroidal antiinflamatuvar ilaçlar; NSAİİ; karsinogenez; profilaksi.

## Chemopreventive Effects of Nonsteroidal Antiinflammatory Drugs

**ABSTRACT**

Cancer is a common disease with high mortality rates for both sexes worldwide. Therefore, the development of new strategies for the prevention and treatment of cancer is of great importance. Non-steroidal anti-inflammatory drugs are widely used in the treatment of acute and chronic diseases due to their pain relieving, antipyretic and anti-inflammatory effects. These drugs are routinely prescribed in medical specialties such as physical medicine and rehabilitation, rheumatology, orthopedics and algology. However, in recent years, there have been many studies suggesting that non-steroidal anti-inflammatory drugs not only provide pain relief and inflammation control but may also have the potential to exert chemopreventive effects in various cancer types. The effects of non-steroidal anti-inflammatory drugs on different mechanisms to inhibit cancer cell growth, reduce metastasis and prevent tumor development are being investigated. This review aims to provide a comprehensive review of the current literature on the potential chemopreventive effects of non-steroidal anti-inflammatory drugs against various types of cancer and their mechanisms of anticancer action.

**Keywords:** Nonsteroidal antiinflammatory drugs; NSAID's; carcinogenesis; prophylaxy.

1 Ege Üniversitesi Tıp Fakültesi Fiziksel Tıp ve Rehabilitasyon Ana Bilim Dalı, İzmir, Türkiye
2 Çukurova Üniversitesi Tıp Fakültesi Tıbbi Onkoloji Bilim Dalı, Adana, Türkiye
3 Çukurova Üniversitesi Tıp Fakültesi Fiziksel Tıp ve Rehabilitasyon Ana Bilim Dalı, Adana, Türkiye

Sorumlu Yazar / Corresponding Author: Sıla ÖLMEZ, e-mail: sila.olmez@ege.edu.tr
Geliş Tarihi / Received: 06.11.2023, Kabul Tarihi / Accepted: 07.01.2025

## GİRİŞ

Nonsteroidal antiinflamatuvar ilaçların (NSAİİ), antipiretik, analjezik ve antiinflamatuvar etkileri ağırlıklı olarak siklooksijenaz-2 (COX-2) inhibisyonu ile ortaya çıkarken, siklooksijenaz-1 (COX-l) inhibisyonu gastrointestinal sistemdeki advers etkilerin çoğunluğundan sorumludur. Bu durumda seçici COX-2 inhibitörleri gastrointestinal sistem açısından daha güvenlidir.

NSAİİ çeşitlerinden propiyonik asit, asetik asit ve enolik asit türevleri COX enzimleri için araşidonik asitle yarışırlar. Aspirin ise COX enzimini geri dönüşümsüz olarak asetiller; bu yüzden genellikle diğer NSAİİ'lerden ayrı incelenir. Yine antipiretik ve analjezik etkisine karşın zayıf antiinflamatuvar etkisi nedeniyle asetaminofen, diğer NSAİİ'lerden ayrı incelenir (1).

Kas-iskelet sistemi hastalıklarında NSAİİ'ler sıkça kullanılır. Osteoartrit, spondiloartropatiler, romatoid artrit, SLE gibi kronik romatolojik hastalıklarda uzun süreli kullanılırken bursit, tendinit gibi akut veya kronik iltihabi hastalıklarda semptomatik tedavi için tercih edilirler (1).

Bu derlemede, fiziksel tıp ve rehabilitasyon, romatoloji, ortopedi, algoloji klinikleri başta olmak üzere tıpta yaygın olarak kullanılan NSAİİ'lerin farklı kanser türlerindeki kemopreventif etkilerine ilişkin güncel literatür incelenmiştir.

### NSAİİ'lerin Antikanser Etki Mekanizması

Kronik inflamasyonun karsinogenezin başlangıcında ve yayılımında önemli bir faktör olduğu bilinmektedir. Bu süreçte hücre proliferasyonu uyarılır, apoptoz inhibe edilir, kanserli dokunun damar ağı yoğunlaşır ve bağışıklık sistemi istilaya izin verecek şekilde baskılanır (2).

NSAİİ'lerin antikanser mekanizmalarından en çok kabul edileni COX inhibisyonudur. Kanserli hücrelerde görülen COX-2 overekspresyonu ve yüksek prostaglandin E2 (PGE2), yoğun inflamasyon göstergesidir ve NSAİİ'ler için önemli bir kemopreventif hedeftir (3).

NSAİİ'lerin kemopreventif etkilerinin COX inhibisyonu dışında, farklı mekanizmalarla da gerçekleştiği bilinmektedir. Hücre döngüsüne dair Fosfatidilinositol 3-kinaz/Protein Kinaz B (PI3K/Akt) sinyal iletim yolağını ve ERK 1-2 yollarını düzenleyerek, bir antiapoptotik protein olan Mcl-1'i azaltarak, p53/kaspazlar aracılığıyla apoptozu arttırarak veya hücre döngüsü ile apoptozda görevli siklin D1 ve survivin protein seviyelerini etkileyerek antikanser etki gösterdikleri bildirilmiştir. Ayrıca E-cadherin ekspresyonunu arttırarak hücrelerin tutunmasını sağlayıp metastazı azaltabilirler (2). Sıra dışı bir örnek olarak; bir selektif COX-2 inhibitörü olan selekoksibin neoplastik hücrelerde mitokondriyal oksijen tüketimini baskılamak, yüksek reaktif oksijen türlerini desteklemek, epitelyal-mezenkimal geçişi (EMT) engellemek gibi sitotoksik etkileri bildirilmiştir (4,5). Kanser hücreleri, trombosit agregasyonunu indükleyerek bağışıklık sisteminden kaçabilir. Sonrasında anjiyogenez ve büyüme faktörü salınımıyla metastaz yaparlar. Bu nedenle, düzenli aspirin kullanımının COX-2 inhibisyonunun yanında antiplatelet mekanizmayla da kemopreventif etkisinin olduğu bildirilmektedir (6). (Tablo 1)

**Tablo 1.** NSAİİ'lerin antikanser etki mekanizmaları

| Etki Mekanizması | Yolak | Sonuç |
|---|---|---|
| COX-2 | PGE2 üretimi azaltılarak | İnflamasyon, proliferasyon,metastaz ve anjiyogenez baskılanır. |
| Fosfatidilinositol 3-kinaz/Protein Kinaz B (PI3K/Akt) ve ERK 1-2 | Hücre döngüsüne etki ederek | Proliferasyon,metastaz ve anjiyogenez baskılanır. |
| Mcl-1 | Antiapoptotik protein inhibisyonu ile | Tümör hücresinde apopitoz arttırılır. |
| P53/kaspazlar | | Tümör hücresinde apopitoz arttırılır. |
| Siklin D1 | Hücre döngüsünde görevli protein seviyelerini etkiyerek | Proliferasyon azaltılır. |
| Survivin | Apopitoz inhibitörü protein baskılanarak | Apopitoz arttırılır. |
| E-cadherin | Hücre adezyonu arttırılarak | Metastaz engellenir. |
| Mitokondriyal oksijen tüketimini baskılamak, yüksek reaktif oksijen türlerini desteklemek, epitelyal-mezenkimal geçişi (EMT) engellemek | Sitotoksik etki ile | Tümör hücresinde apopitoz arttırılır. |
| Antiplatelet mekanizma | Tümör hücrelerinin bağışıklık sisteminden kaçışı engellenerek | Metastaz engellenir. |

### NSAİİ ve Baş-Boyun Kanserleri

Normal mukozaya göre baş ve boyun skuamöz hücreli karsinomunda COX-2 ve PGE2 ekspresyonunun arttığı, hatta oral karsinogenezin erken evreleri olan hiperplazi ve displazi lezyonlarında dahi COX-2'nin over eksprese edildiği bilinmektedir. COX-2'nin overekspresyonu, oral squamöz hücreli kanser (SCC)'de lenf nodu metastazını da arttırmakta ve kötü prognozla ilişkilendirilmektedir. Bir çalışmada, selekoksib kullanımının oral SCC gelişme riski yüksek olan kişilerde ve nodal metastazı olmayan erken evre hastalarda, doz ve zamana bağımlı şekilde önleyici hatta terapötik etkisi gösterilmiştir (7). Yine de NSAİİ'lerin BBK'yi önlemede kullanımı konusunda onkoloji rehberlerinde net bir öneri bulunmamaktadır.

### NSAİİ ve Gastrointestinal Sistem Kanserleri

İsveç'te yapılan bir kohort çalışmasında hem uzun süreli (>5,5 yıl) düşük doz aspirin kullanımı hem de seçici olmayan NSAİİ kullanımının, gastrointestinal kanser (mide, özofagus ve kolorektal kanserler) riskinde azalmayla ilişkili olduğu gösterilmiştir (8).

GİS malignitelerinden özofagus kanseri, düşük beş yıllık sağkalım ile kötü prognozlu bir kanserdir. Özofagus adenokarsinomunun öncülü olarak bilinen "barret özofagus" gastroözofageal reflünün komplikasyonudur. Bu metaplazik dokuda COX-2 ekspresyonunun, reflü özofajitli hastalardan yüksek olduğu bildirilmiştir. Çalışmalarda selekoksibin COX-2 inhibisyonu sayesinde daha hafif bir özofajit formuyla ilişkili olduğu, dolayısıyla özofagus metaplazisini önleyebileceği öne sürülmüştür. Özetle NSAİİ kullanımı, barret özofagus gelişimi riskinin azalmasıyla ilişkili bulunmuştur (9). Aynı sene yayınlanan başka bir çalışmada minimum 1 yıl boyunca kullanılan düşük doz aspirin, mide kanseri riskinde %54, özofagus kanser riskinde %41 oranında azalmayla ilişkili bulunmuştur (10). Arai ve ark. çalışmasında ise, COX-2

inhibitörü kullanımı daha düşük özofagus SCC riski ile, aspirin ise daha düşük özofagus adenokarsinomu riski ile ilişkili bulmuştur (11). Buna karşın, aterosklerotik kardiyovasküler hastalığı olmayan 40 yaş üstü Çinli erişkinlerde, düşük doz aspirin kullanımının, kontrol grubuna göre özofageal kanser insidansında azalmayla ilişkili olmadığı ancak düşük mide kanseri ve kolorektal kanser (KRK) riski ilişkili olduğu bildirilmiştir (12). Özofagus kanseri nedeniyle özofajektomi yapılan hastalarda postoperatif adjuvan tedavi olarak bir yıl aspirin kullanımının 5 yıllık sağkalıma etkisinin araştırıldığı bir çalışmada, aspirin kullanan grupla kullanmayanlar arasında anlamlı fark görülmemiştir (13). Düşük doz aspirin kullanımının, gastrik adenokarsinom hastalarında gastrektomi sonrası 5 yıllık sağkalıma etkisi de araştırılmış, benzer şekilde iki grup arasında anlamlı bir fark kaydedilmemiştir (14).

KRK, dünya genelinde erkekler ve kadınları etkileyen kansere bağlı ölümler arasında üçüncü sıradadır ve sıklıkla adenomatöz polip zemininde gelişmektedir. Otozomal dominant geçişli bir sendrom olan Ailesel Adenomatöz Polipozis (FAP), gastrointestinal sistemde yaygın adenomatöz poliplerle karakterizedir. FAP'lı hastalarda sulindak ve beksaroten kombinasyon tedavisinin polip sayısının azalttığı gösterilmiştir (15).

Kalıtsal bir kolorektal kanser sendromu olan Lynch Sendromu, DNA onarımında eksiklik sonucu gelişir. Lynch sendromlu hastalarda yapılan bir çalışmada naproksen etkisiyle kolorektal mukozada PGE2 seviyeleri azalmış, T lenfosit tutulumu artmıştır. Bu çalışmada, bir NSAİİ, kolonik mukozanın hücresel kompozisyonunu değiştirerek immunpreventif etki oluşturmuştu r(16).

Son yıllarda KRK üzerine yapılan çalışmalar aspirin üzerine yoğunlaşmaktadır. Zhang ve ark. çalışmasında, KRK kemoprevensiyonu için aspirin kullanım süresinin minimum 10 yıl olması gerektiği ve uzak veya yakın dönem fark etmeksizin uzun süreli yüksek doz aspirin kullanımının, KRK'ye karşı daha koruyucu olduğu bildirilmiştir. Ayrıca düşük dozlu uzun süreli aspirin kullanan grupla kısa süreli yüksek doz aspirin kullanan grup benzer faydalar elde etmiştir (17). Bir başka çalışmada tanı öncesi uzun süreli aspirin kullanımı (ayda minimum 15 kez) KRK'ye özgü mortalitede azalmayla ve daha düşük uzak metastazla ilişkilendirilmiştir (18). Aspirinin antikanser etkisinde barsak mikrobiyotasının rolünün araştırıldığı bir çalışmada, Lysinibacillus Sphaericus bakterisini yoğun olarak bulunduran bireylerde aspirinin plazma seviyesinin düştüğü ve antikanser etkinin azaldığı tespit edilmiştir (19).

Bir başka metaanalizde 40 yaş üstü kişilerde aspirin dışı NSAİİ kullanımının, KRK için kemopreventif etkiye sahip olduğu gösterilmiştir (20). He ve ark. çalışmasında selektif COX-2 inhibitörlerinin (coxib grubu) KRK riskinde azalmayla ilişkili olduğu, ancak bu etkinin zamanla azaldığı, ayrıca coxibler ve aspirinin uzun süre birlikte kullanımının KRK riskini arttırabileceği gösterilmiştir (21).

**NSAİİ ve Hepatobiliyer Sistem Kanserleri**

Hepatoselüler kanser (HCC) için ana risk faktörü batı popülasyonunda kronik HCV enfeksiyonu ve yağlı karaciğer hastalığıyken Asya'da kronik HBV enfeksiyonu birincil risk faktörüdür. Wang ve ark. çalışmasında aspirin kullanıcılarının (özellikle kronik karaciğer hastalığı olanların) kullanmayanlara göre HCC riski daha düşük bulunmuştur (22).

Aspirin ile HCV ilişkili HCC riski arasındaki ilişkiyi incelemek üzere Tayvan'da yapılan kohort çalışmasında 1997-2011 yılları arasında kronik HCV enfeksiyonu olan hastalarda minimum 90 gün düşük doz aspirin tedavisi alanların 5 yıllık ve 10 yıllık kümülatif HCC insidansının, almayan gruba göre belirgin olarak düşük olduğu görülmüştür (23). Benzer bir kohort çalışmasında HCV taşıyıcılarında aspirin kullanan grubun HCC insidansı, kullanmayanlara göre daha düşük bulunmuştur. Kemopreventif etki, bir yıldan az aspirin kullanımı ile ortaya çıkarken, en büyük koruyucu etkinin 1-2 yıllık kullanımda görüldüğü bildirilmiştir (24).

Kronik karaciğer hastalığı (viral hepatit, alkole bağlı ve bağlı olmayan karaciğer hastalıkları) olan risk altındaki bireylerde, NSAİİ ve antiplatalet tedavinin HCC insidansı ve nüksü üzerine etkisinin incelendiği bir çalışmada, risk altındaki popülasyonlarda düşük doz NSAİİ -özellikle aspirin- kullanımı, HCC insidansı riskini azaltmış ve mortaliteyi iyileştirmiştir. Aspirin bu popülasyonda nüksü azaltmasa da aspirin olmayan NSAİİ tedavisiyle daha düşük nüks oranı kaydedilmiştir (25). Bir başka meta-analizde de kronik karaciğer hastalığı olanlarda aspirin alımı ile HCC riski arasındaki ters ilişki doğrulanmıştır. Ayrıca, 100 mg/gün aspirin dozuyla elde edilen koruyucu etki 160 mg/gün dozunda gösterilmemiştir. Bu sonuç, hastalar için aspirin kullanımında gastrointestinal yan etkiler açısından da avantajlıdır (26).

Kolanjiokarsinom, intrahepatik ve/veya ekstrahepatik safra kanallarından kaynaklanan bir hepatobiliyer malignite türüdür. Bu kanserler sinsi seyirlidir ve hastalar çoğunlukla çevre dokulara invazyon sonucu ortaya çıkan belirtilerle doktora başvururlar. Bu yüzden geç tanı konur ve tedavi imkanları sınırlıdır (3).

Lapumnuaypol ve ark. tarafından yapılan bir metaanalizde aspirin ve aspirin dışı NSAİİ kullanımının kolanjiyokarsinom üzerindeki koruyucu etkisi araştırılmıştır. COX-2'nin güçlü ekspresyonunun, invaziv safra kesesi ve ampullar kanser formlarında kötü prognozla ilişkili olduğu bildirilmiştir. Aspirin kullanımı, kolanjiyokarsinom riskinin 0,56 kat azalmasıyla ilişkilendirilirken aspirin dışı NSAİİ kullanımı ile kolanjiyokarsinom riski arasında anlamlı bir ilişki bulunamamıştır (3). Buna karşın İsveç tabanlı bir kohort çalışmasında düşük doz aspirin, safra yolu kanserleri riskinde azalma ile ilişkilendirilirken, aspirin dışı NSAİİ kullanımı daha yüksek risk ile ilişkili bulunmuştur (27).

**NSAİİ ve Pankreas Kanseri**

Pankreas kanseri, erken tanının oldukça zor olması ve hızlı progresyonu nedeniyle en ölümcül kanser türü olarak bilinir. Bu yüzden pankreas kanserine dair kemoprevensiyon ajanlarının keşfi oldukça önemlidir.

Sun ve ark. çalışmasında 5 yıldan fazla aspirin kullanımının pankreas kanseri riskini azaltabileceği ancak aspirin dozuyla pankreas kanseri mortalitesi arasında anlamlı bir ilişki olmadığı bildirilmiştir. Fakat bu çalışmanın az sayıda araştırmayla yapılabildiği düşünülürse sonucun dikkatli yorumlanmalıdır (28).

**NSAİİ ve Akciğer Kanseri**

Akciğer kanseri, dünya çapında yaygın ve mortalitesi yüksek bir malignite türüdür. Kore'de yapılan retrospektif kohort çalışmasında 5 yıldan uzun düşük doz aspirin (<100

mg) kullanımının, yaşlılar ve diyabeti olmayan kişilerde akciğer kanseri insidansında azalmayla ilişkili olduğu görülmüştür (29). Ayrıca, Kronik Obstruktif Akciğer Hastalığı (KOAH) hastalarında düşük doz aspirin (<160 mg) kullanımı, akciğer karsinomu riskinde %25 azalma ve hastalığa bağlı mortalitede %26 azalma ile ilişkilendirilmiştir (30).

Geçmişte veya halen sigara içme öyküsü olan kişiler üzerinde, ibuprofen, akciğer kanseri kaynaklı ölüm riskini %48 oranında azaltırken, aspirin ve asetaminofen etkisiz bulunmuştur (31). Benzer şekilde, seçici COX-2 inhibitörlerinin de kemopreventif etkilerine dair çalışmalar yapılmıştır. Dai ve ark. çalışmasında, ileri evre küçük hücre dışı akciğer kanserli (KHDAK) hastalarda COX-2 inhibitörlerinin (özellikle rofekoksib), kemoterapiye genel yanıt oranını iyileştirdiği ancak sağkalım üzerinde etkili olmadıkları gösterilmiştir (32).

**NSAİİ ve Endometrium Kanseri**

Endometrial kanserde, progesteron olmaksızın östrojene maruz kalmak önemli bir risk faktörüdür. Premenopozal kadınlarda östrojen kaynağı overlerdir ve fizyolojik olarak progesteronla karşılanır. Ancak postmenopozal kadınlarda esas östrojen kaynağı yağ dokudur (33). Androjenler, yağ dokuda "aromataz" enzimiyle östrojene dönüştürülür ve COX-2 enziminin ürünü olan prostaglandin, aromataz ekspresyonunu indükler (6). Dolayısıyla endometrial kanserlerin bir kısmı obeziteyle bağlantılı olabilir (33). Obezitede kronik, düşük dereceli inflamasyon oluştuğu ve NSAİİ'lerin obezite ilişkili endometrium kanseri riskini azalttığı düşünülmektedir.

Düzenli NSAİİ kullanan postmenopozal kadınların östrodiol seviyelerinin kullanmayanlara göre daha düşük olduğu gösterilmiştir (33). Buna karşın, Danimarka'da yapılan bir kohort çalışmasında, tanı sonrası düşük doz aspirin kullanımı, endometrial kanser mortalitesinde azalma ile ilişkili bulunmamıştır (34). Aynı ekibin bir başka çalışmasında aspirin dışı NSAİİ'lerin endometrial kanser mortalitesi üzerine etkisi incelenmiş, benzer şekilde bu ilaçlar da endometrial kanser mortalitesini azaltmamıştır. Hatta, yüksek kümülatif miktarda ve yüksek yoğunluklu aspirin dışı NSAİİ kullanımının, mortalite artışıyla ilişkili olabileceği görülmüştür (35).

**NSAİİ ve Over Kanseri**

Over kanseri sıkça karşımıza çıkan ve mortalitesi yüksek olan bir jinekolojik malignensidir. Hurwitz ve ark. yaptığı çalışmada postmenopozal kadınlarda aspirin kullanımının (doz, sıklık ve süreye göre) yumurtalık kanseri riski ile anlamlı bir ilişkisi gözlenmemiştir (36).

ABD'de 1143 epitelyal over kanseri hastasının dahil edildiği başka bir çalışmada, tanı sonrası aspirin ve aspirin dışı NSAİİ'leri kullanan katılımcıların sağkalımında iyileşme kaydedilmiş ancak parasetamol kullanımı ile aynı ilişki görülmemiştir (37). Başka bir retrospektif araştırmada, epitelyal over kanserinin bir türü olan ve sıklıkla endometriyozdan kaynaklanan berrak hücreli over kanserinde aspirin kullanımı ile sağkalım arasındaki ilişki değerlendirmiştir. Berrak hücreli over kanseri tanılı, cerrahi rezeksiyon sonrası en az altı kür kemoterapi (platin bazlı ) alan 77 kadının dahil edildiği çalışmada, aspirin kullanımı, genel sağkalımla ilişkili bulunmuştur (38).

**NSAİİ ve Meme Kanseri**

Endometrium kanserinde olduğu gibi, meme kanserinde de (hormon reseptörü pozitif olanlar) östrojen maruziyeti önemli rol oynar. Aromataz inhibitörleri, premenopozal kadınlarda östrojen seviyesini azaltarak hipofizden gonadotropinlerin salınımına, dolayısıyla vücuttaki östrojen seviyesinin artmasına yol açabilir. Ancak postmenopozal kadınlarda gonadotropin uyarısını overler cevaplayamayacağı için aromataz inhibisyonuyla meme kanseri riski azalmaktadır (6).

Bir metaanalizde; 3 yıl boyunca düzenli aspirin kullanımı, genel meme kanseri riskini, in situ kanseri, hormon reseptörü pozitif tümörleri ve postmanopozal kadınlarda genel meme kanseri riskini azaltttığı bildirilmiştir (6). Bir başka metaanalizde ise meme kanserli hastalarda aspirin kullanımının nüks/metastaz riskini %9, meme kanseri kaynaklı ölümü %31, tüm nedenlere bağlı ölümü %22 oranında azalttığı belirlenmiştir (39).

Memede kanser riskini arttıran (1,5 ila 4 kat) faktörlerden biri de benign meme hastalığı (benign breast disease)dır. BBD, biyopsi sonuçlarına göre; proliferatif olmayan lezyonlar, atipisiz proliferatif lezyonlar ve atipik hiperplazi olarak sınıflandırılır. Sherman ve ark. yaptıkları bir çalışmada, BBD tanılı kadınlarda düzenli aspirin dışı NSAİİ kullanımının %37 daha düşük meme kanseri riski ile ilişkili olduğu, bu ilişkinin 50 yaş altı kadınlarda daha belirgin görüldüğü belirtilmiştir (40).

**NSAİİ ve Mesane Kanseri**

2020 yılında yayınlanan bir çalışmada, sıçanlarda N-butil-(4-hidroksibutil) nitrozamin ile indüklenen mesane kanseri progresyonu ve nüksünü önlemede, aralıklı veya sürekli düşük doz naproksen ile erlotinib (EGFR inhibitörü) kombinasyonunun pulsatil uygulamasının etkinliği araştırılmıştır. Tüm naproksen + erlotinib müdahalelerinde tümör sayısında ve ağırlığında düşme ile palpe edilebilir tümöre sahip sıçan sayısında azalma görülmüştür (41).

**NSAİİ ve Prostat Kanseri**

Prostat kanseri erkeklerde en sık görülen kanserdir (42). Danimarka'da yapılan bir çalışmada, düşük doz aspirin veya aspirin dışı NSAİİ kullanımının, azalmış prostat kanseri riskiyle ilişkili olmadığı gösterilmiştir (43). Bir başka metaanalizde, aspirin kullanımı ile prostat kanserine özgü ölüm oranları arasında bir ilişki saptanmamıştır (42). Broadfield ve ark. salisilatın prostat kanseri için önemli bir terapötik modalite olan radyoterapinin antitümör aktivitesini arttırdığını göstermişlerdir (44).

Cerrahi rezeksiyon, birçok kanser türü için küratif bir tedavi seçeneği olabilir. Shaji ve ark. metaanalizinde; ameliyat sırasında inflamatuvar ve anjiyojenik faktörlerdeki artış ve immün supresyon nedeniyle "mikrometastaz" riskinin fazla olduğu belirtilmiştir. Kullanılan ilaç çeşidi, dozu, süresi, zamanlaması ve kanser çeşidine göre değişken olmakla birlikte perioperatif, kısa süreli NSAİİ kullanımının genel sağkalım açısından faydalı olabileceği belirtilmiştir (45).

## SONUÇ

NSAİİ'lerin kanser önleyici etkilerine ilişkin veriler henüz net değildir. Daha geniş serilerde yapılacak in-vivo/ in-vitro çalışmalar ve metaanalizler sonucunda elde edilecek veriler, bu ilaçların kanser prevensiyonunda kullanımına ışık tutacaktır. Sadece kanser profilaksisi için uzun süreli kullanım, bu ilaçların gastrointestinal, renal, kardiyovasküler vb. yan etkileri açısından riski arttıracağından halen yaygın biçimde önerilmemektedir.

**Yazarların Katkıları:** Fikir/Kavram: E.K.,S.E.; Tasarım: S.E., T.K., E.K.; Literatür Taraması: S.E., E.K.; Makale Yazımı: S.E., T.K., E.K.; Eleştirel İnceleme: T.K., E.K.

**KAYNAKLAR**


1. Hilal-Dandan R, Brunton LL, Goodman LS. Goodman and Gilman's manual of pharmacology and therapeutics. 2nd ed. New York: McGraw-Hill; 2014.
2. Saka-Herran C, Jane-Salas E, Estrugo-Devesa A, Lopez-Lopez J. Head and neck cancer and non-steroidal anti-inflammatory drugs: systematic review and meta-analysis. Head Neck. 2021; 43(5): 1664-82.
3. Lapumnuaypol K, Tiu A, Thongprayoon C, Wijarnpreecha K, Ungprasert P, Mao MA et.al. Effects of aspirin and non-steroidal anti-inflammatory drugs on the risk of cholangiocarcinoma: a meta-analysis. QJM. 2019; 112(6): 421-7.
4. Tudor DV, Bâldea I, Olteanu DE, Fischer-Fodor E, Piroska V, Lupu M et. al. Celecoxib as a valuable adjuvant in cutaneous melanoma treated with trametinib. International Journal of Molecular Sciences. 2021; 22 (9): 4387.
5. Liu X, Wu Y, Zhou Z, Huang M, Deng W, Wang Y et. al. Celecoxib inhibits the epithelial-to-mesenchymal transition in bladder cancer via the mirna-145/tgfbr2/smad3 axis. International Journal of Molecular Medicine. 2019; 44(2): 683-93.
6. Ma S, Guo C, Sun C, Han T, Zhang H, Qu G, et.al. Aspirin use and risk of breast cancer: a meta-analysis of observational studies from 1989 to 2019. Clin Breast Cancer. 2021; 21(6): 552-65.
7. Chiang SL, Velmurugan BK, Chung CM, Lin SH, Wang ZH, Hua CH, et.al. Preventive effect of celecoxib use against cancer progression and occurrence of oral squamous cell carcinoma. Sci Rep. 2017; 7(1): 6235.
8. Brusselaers N, Lagergren J. Maintenance use of non-steroidal anti-inflammatory drugs and risk of gastrointestinal cancer in a nationwide population-based cohort study in Sweden. BMJ Open. 2018; 8(7): e021869.
9. Zhang J, Wu H, Wang R. Effect of nonsteroidal anti-inflammatory drugs on barrett's esophagus risk: a systematic review and meta-analysis. Clin Res Hepatol Gastroenterol. 2021; 45(3): 101552.
10. Garcia-Rodriguez LA, Soriano-Gabarro M, Vora P, Cea-Soriano L. Low-dose aspirin and risk of gastric and oesophageal cancer: a population-based study in the United Kingdom using The Health Improvement Network. Int J Cancer. 2020; 147(9): 2394-404.
11. Arai J, Niikura R, Hayakawa Y, Kawahara T, Honda T, Hasatani K, et.al. Chemoprevention of oesophageal squamous-cell carcinoma and adenocarcinoma: a multicentre retrospective cohort study. Digestion. 2022; 103(3): 192-204.
12. Shami JJP, Zhao J, Pathadka S, Wan EYF, Blais JE, Vora P, et. al. Safety and effectiveness of low-dose aspirin for the prevention of gastrointestinal cancer in adults without atherosclerotic cardiovascular disease: a population-based cohort study. BMJ Open. 2022; 12(2): e050510.
13. Holmberg D, Gottlieb-Vedi E, Hedberg J, Lindblad M, Mattsson F, Lagergren J. Aspirin or statin use in relation to survival after surgery for esophageal cancer: a population-based cohort study. BMC Cancer. 2023; 23(1): 375.
14. Holmberg D, Kauppila JH, Mattsson F, Asplund J, Leijonmarck W, Xie SH, et. al. Aspirin use in relation to long-term survival after gastrectomy for gastric adenocarcinoma. Gastric Cancer. 2022; 25(3): 652-8.
15. Bowen CM, Walter L, Borras E, Wu W, Ozcan Z, Chang K, et. al. Combination of sulindac and bexarotene for prevention of intestinal carcinogenesis in familial adenomatous polyposis. Cancer Prev Res (Phila). 2021; 14(9): 851-62.
16. Bowen CM, Deng N, Reyes-Uribe L, Parra ER, Rocha P, Solis LM, et. al. Naproxen chemoprevention induces proliferation of cytotoxic lymphocytes in lynch syndrome colorectal mucosa. Front Immunol. 2023; 14: 1162669.
17. Zhang Y , Chan AT, Meyerhardt JA, Giovannucci EL. Timing of aspirin use in colorectal cancer chemoprevention: a prospective cohort study. J Natl Cancer Inst. 2021; 113(7): 841-51.
18. Figueiredo JC, Jacobs EJ, Newton CC, Guinter MA, Cance WG, Campbell PT. Associations of aspirin and non-aspirin non-steroidal anti-inflammatory drugs with colorectal cancer mortality after diagnosis. J Natl Cancer Inst. 2021; 113(7): 833-40.
19. Diao F, Cai S. Aspirin-based chemoprevention of colorectal cancer: the role for gut microbiota. Cancer Commun (Lond). 2020; 40(11): 633-5.
20. Tomic T, Dominguez-Lopez S, Barrios-Rodriguez R. Non-aspirin non-steroidal anti-inflammatory drugs in prevention of colorectal cancer in people aged 40 or older: a systematic review and meta-analysis. Cancer Epidemiol. 2019; 58: 52-62.
21. He P, Yang C, Ye G, Xie H, Zhong W. Risks of colorectal neoplasms and cardiovascular thromboembolic events after the combined use of selective COX-2 inhibitors and aspirin with 5-year follow-up: a meta-analysis. Colorectal Dis. 2019; 21(4): 417-26.
22. Wang Y, Wang M, Liu C, Wang W, Shi J, Dang S. Aspirin use and the risk of hepatocellular carcinoma: a meta-analysis. J Clin Gastroenterol. 2022; 56(7): e293-e302.
23. Lee TY, Hsu YC, Tseng HC, Lin JT, Wu MS, Wu CY. Association of daily aspirin therapy with hepatocellular carcinoma risk in patients with chronic hepatitis c virus infection. Clin Gastroenterol Hepatol. 2020; 18(12): 2784-92 e7.
24. Liao YH, Hsu RJ, Wang TH, Wu CT, Huang SY, Hsu CY, et.al. Aspirin decreases hepatocellular carcinoma risk in hepatitis C virus carriers: a nationwide cohort study. BMC Gastroenterol. 2020; 20(1): 6.
25. Tan RZH, Lockart I, Abdel Shaheed C, Danta M. Systematic review with meta-analysis: the effects of non-steroidal anti-inflammatory drugs and anti-platelet therapy on the incidence and recurrence of hepatocellular carcinoma. Aliment Pharmacol Ther. 2021; 54(4): 356-67.
26. Yi M, Feng X, Peng W, Teng F, Tang Y, Chen Z. Aspirin for the prevention of hepatocellular carcinoma: an updated meta-analysis with particular focus on

patients with chronic liver disease. Eur J Clin Pharmacol. 2022; 78(4): 647-56.
27. Marcano-Bonilla L, Schleck CD, Harmsen WS, Sadr-Azodi O, Borad MJ, Patel T, et.al. Aspirin, statins, non-aspirin nsaids, metformin, and the risk of biliary cancer: a Swedish population-based cohort study. Cancer Epidemiol Biomarkers Prev. 2022; 31(4): 804-10.
28. Sun J, Li Y, Liu L, Jiang Z, Liu G. Aspirin use and pancreatic cancer risk: a systematic review of observational studies. Medicine (Baltimore). 2019; 98(51): e18033.
29. Ye S, Lee M, Lee D, Ha EH, Chun EM. Association of long-term use of low-dose aspirin as chemoprevention with risk of lung cancer. JAMA Netw Open. 2019; 2(3): e190185.
30. Yu SY, Ip MS, Li X, Cheung KS, Ren QW, Wu MZ, et.al. Low-dose aspirin and incidence of lung carcinoma in patients with chronic obstructive pulmonary disease in Hong Kong: a cohort study. PLoS Med. 2022; 19(1): e1003880.
31. Bittoni MA, Carbone DP, Harris RE. Ibuprofen and fatal lung cancer: a brief report of the prospective results from the third national health and nutrition examination survey (NHANES III). Mol Clin Oncol. 2017; 6(6): 917-20.
32. Dai P, Li J, Ma XP, Huang J, Meng JJ, Gong P. Efficacy and safety of cox-2 inhibitors for advanced non-small-cell lung cancer with chemotherapy: a meta-analysis. Onco Targets Ther. 2018; 11: 721-30.
33. Webb PM, Na R, Weiderpass E, Adami HO, Anderson KE, Bertrand KA, et.al. Use of aspirin, other nonsteroidal anti-inflammatory drugs and acetaminophen and risk of endometrial cancer: the epidemiology of endometrial cancer consortium. Ann Oncol. 2019; 30(2): 310-6.
34. Sperling CD, Verdoodt F, Aalborg GL, Dehlendorff C, Friis S, Kjaer SK. Low-dose aspirin use and endometrial cancer mortality-a Danish nationwide cohort study. Int J Epidemiol. 2020; 49(1): 330-7.
35. Sperling CD, Verdoodt F, Aalborg GL, Dehlendorff C, Friis S, Kjaer SK. Non-aspirin nsaid use and mortality of endometrial cancer. a nationwide cohort study. Cancer Causes Control. 2021; 32(5): 515-23.
36. Hurwitz LM, Pinsky PF, Huang WY, Freedman ND, Trabert B. Aspirin use and ovarian cancer risk using extended follow-up of the plco cancer screening trial. Gynecol Oncol. 2020; 159(2): 522-6.
37. Merritt MA, Rice MS, Barnard ME, Hankinson SE, Matulonis UA, Poole EM, et.al. Pre-diagnosis and post-diagnosis use of common analgesics and ovarian cancer prognosis (nhs/nhsii): a cohort study. Lancet Oncol. 2018; 19(8): 1107-16.
38. Wield AM, Walsh CS, Rimel BJ, Cass I, Karlan BY, Li AJ. Aspirin use correlates with survival in women with clear cell ovarian cancer. Gynecol Oncol Rep. 2018; 25: 78-81.
39. Liu J, Zheng F, Yang M, Wu X, Liu A. Effect of aspirin use on survival benefits of breast cancer patients: a meta-analysis. Medicine (Baltimore). 2021; 100(33): e26870.
40. Sherman ME, Vierkant RA, Kaggal S, Hoskin TL, Frost MH, Denison L, et.al. Breast cancer risk and use of nonsteroidal anti-inflammatory agents after a benign breast biopsy. Cancer Prev Res (Phila). 2020; 13(11): 967-76.
41. Mohammed A, Miller MS, Lubet RA, Suen CS, Sei S, Shoemaker RH, et.al. Combination of erlotinib and naproxen employing pulsatile or intermittent dosing profoundly inhibits urinary bladder cancers. Cancer Prev Res (Phila). 2020; 13(3): 273-82.
42. Fan LL, Xie CP, Wu YM, Gu XJ, Chen YH, Wang YJ. Aspirin exposure and mortality risk among prostate cancer patients: a systematic review and meta-analysis. Biomed Res Int. 2019; 2019: 9379602.
43. Skriver C, Dehlendorff C, Borre M, Brasso K, Larsen SB, Tjonneland A, et.al. Associations of low-dose aspirin or other nsaid use with prostate cancer risk in the Danish diet, cancer and health study. Cancer Causes Control. 2020; 31(2): 139-51.
44. Broadfield LA, Marcinko K, Tsakiridis E, Zacharidis PG, Villani L, Lally JSV, et.al. Salicylate enhances the response of prostate cancer to radiotherapy. Prostate. 2019; 79(5): 489-97.
45. Shaji S, Smith C, Forget P. Perioperative nsaids and long-term outcomes after cancer surgery: a systematic review and meta-analysis. Curr Oncol Rep. 2021; 23(12): 146.

Derleme / Review

Sağlık Bilimlerinde Değer / Sağlık Bil Değer
Value in Health Sciences / Value Health Sci
ISSN: 2792-0542 sabd@duzce.edu.tr 2025; 15(2): 321-325
doi: https://dx.doi.org/10.33631/sabd.1446059

# Evde Parenteral Nütrisyon Alan Hastalarda Kateter İlişkili Kan Dolaşımı Enfeksiyonları

Ali TAMER[1], Tunahan ZENGİN[1], Oğuz KARABAY[2]

**ÖZ**

Evde Parenteral Nütrisyon (EPN) tedavisi kısa bağırsak hastaları gibi özel tıbbi koşullara sahip hastalar için hayati bir tedavidir. EPN tedavisinde, santral kateterler (SVK) kritik rol oynamaktadır. Kateter ilişkili kan dolaşımı enfeksiyonu (KİKDE) EPN tedavisinde kateter ile ilişkili önemli morbidite ve mortaliteye yol açan bir komplikasyon olarak karşımıza çıkmaktadır.

KİKDE endo-luminal (kateter içi) veya ekstra-luminal (kateter dışı) kaynaklı olabilir. KİKDE fizyopatolojisinde barsak translokasyonu (BT), bağışıklık sistemi yapısının bağırsakta bozulması, kateter yüzeylerinde gelişen biyofilm tabakası gibi mekanizmalar rol oynamaktadır.

Kateter ile ilgili kan dolaşımı enfeksiyonları mono ve polimikrobiyal olabilir. Sıklık sırasına göre Gram pozitif bakteriler, Gram negatif bakteriler, mantarlar ve daha nadir enfeksiyonlar KİKDE etyolojisinde saptanan etkenlerdir. Koagülaz negatif stafilakoklar en yaygın nedensel patojendir. Ateş, spesifik olmamakla birlikte en yaygın klinik bulgudur.

Sonuç olarak, EPN tedavisi uygulanan hastalarda, KİKDE açısından hasta yönetim planı yapılmalıdır.

**Anahtar Kelimeler:** Evde parenteral nütrisyon; kateter ilişkili kan dolaşımı enfeksiyonu; kronik barsak yetmezliği

## Catheter-Related Bloodstream Infections in Patients Receiving Home Parenteral Nutrition

**ABSTRACT**

Home Parenteral Nutrition (HPN) therapy is a vital treatment for patients with special medical conditions, such as Short Bowel Syndrome (SBS). Central venous catheters (CVC) play a critical role in the treatment of HPN. Catheter related bloodstream infection (CRBSI) is a complication in HPN treatment that causes significant catheter-related morbidity and mortality. CRBSI may be endo-luminal (inside the catheter) or extra-luminal (outside the catheter). Mechanisms such as bacterial translocation (BT), disruption of the immune system structure in the intestines, and biofilm layer developing on catheter surfaces play a role in the pathophysiology of CRBSI. CRBSI infections can be mono or polymicrobial. In order of frequency, Gram-positive bacteria, Gram-negative bacteria, fungi and rarer infections are the factors detected in the etiology of CRBSI. Coagulase-negative staphylococci is the most common causative pathogen. Fever, although nonspecific, is the most common clinical finding.

As a result, in patients receiving HPN treatment, a patient management plan should be made in terms of CRBSI.

**Keywords**: Home parenteral nutrition; catheter related bloodstream infection; chronic intestinal failure.

## GİRİŞ

Evde Parenteral Nütrisyon (EPN) tedavisi kronik bağırsak yetmezliği (KBY) gibi özel tıbbi koşullara sahip hastalar için hayati bir tedavidir. EPN tedavisinde, periferik erişimli santral venöz kateterler (PSVK) santral venöz kateter (SVK) veya port kullanılmaktadır. Ancak kateterle ilişkili kan dolaşımı enfeksiyonları (KİKDE) özellikle sepsis, septik şok, metastatik enfeksiyonlar gibi yaşamı tehdit eden komplikasyonlarla ilişkilidir (1).

KİKDE'lerin kökeni bakteriyel veya mantar kaynaklı olabilir, ancak bu sorunların çoğu hastanın cilt florasından kaynaklanır. Kateterin ciltle temas ettiği bölge, endo-luminal (kateter içi) enfeksiyonların yaygın bir nedeni olarak kabul edilirken, kateter çıkış yeri veya tünel yolu kaynaklı enfeksiyonlar, doğası gereği ekstra-luminal (kateter dışı) enfeksiyonlar olarak kabul edilir. Ayrıca, epizotların süresine göre geçici, aralıklı veya sürekli (intravasküler bir kaynaktan kan dolaşımına sürekli mikroorganizma geçişi) ve toplum veya hastane-kaynaklı (hastaneye yatıştan 72 saat sonra saptanır) olarak sınıflandırılırlar (2-6).

1 Sakarya Üniversitesi, Tıp Fakültesi, İç Hastalıkları Anabilim Dalı, Sakarya, Türkiye
2 Sakarya Üniversitesi, Tıp Fakültesi, Enfeksiyon Hastalıkları ve Klinik Mikrobiyoloji Anabilim Dalı, Sakarya, Türkiye

Sorumlu Yazar / Corresponding Author: Sevil ŞAHİN, e-mail: tamer@sakarya.edu.tr
Geliş Tarihi / Received: 02.03.2024, Kabul Tarihi / Accepted: 26.03.2025

Bu derlemede KİKDE fizyopatolojisi, epidemiyolojisi, mikrobiyolojisi, komplikasyonları ve ayırt edici klinik ve laboratuvar bulguları konularına odaklanarak, bu tür enfeksiyonların etkili bir şekilde ele alınabilmesi için katkı sağlamayı amaçlanmaktadır.

**Fizyopatoloji ve Deneysel Fizyopatoloji**

Kateter kontaminasyonu, kateterin yapısal özelliği, fibrin ve fibronektin gibi protein yapışıklıkları, kateterin etrafındaki kılıf ve enfekte eden organizmanın virülansı KİKDE fizyopatolojisinde rol oynayan faktörlerdir. Hastanın cildi dış kateter yüzeyinin birincil kontaminasyon kaynağıdır. Kolonizasyondan enfeksiyona ilerleme, bakteri sayısına, mevcut türlere, organizmaların virülansına ve konakçının bağışıklık tepkisine bağlıdır (4,5).

Hayvan çalışmaları, bağırsak rezeksiyonunun barsak translokasyonu (BT) ile ilişkili olduğunu göstermiştir ve TPN ile beslenme bu ilişkiyi artırmaktadır. İleoçekal valvünün yokluğu BT riskini azaltabilir, ancak çekum yokluğu etkilememektedir (7,8).

TPN uygulanması, barsak trofizmini bozar ve villüs atrofisine neden olarak mukozal hasara katkıda bulunmaktadır. Ayrıca, CD4+ ve CD8+ T hücreleri, B hücreleri, M hücreleri, doğal öldürücü hücreler, makrofajlar ve mast hücrelerinden oluşan bağırsakla ilişkili lenfoid doku (GALT) bozulmasına katkıda bulunabilir. Duodenal aspirat kültürleri bakteriyel aşırı büyümenin önemli bir öngörücüsüdür (9-11).

Hem silastik, hem de poliüretan kateterler negatif yüklü yüzeye sahip olması nedeniyle, kalsiyum, magnezyum ve demir gibi iki değerlikli metal katyonlarından zengin biyofilm tabakası oluşturarak mikrobiyal organizmaların yerleşimini kolaylaştırmaktadır. Stafilokok biyofilmleri yedi gün içinde olgunlaşırken, *Pseudomonas* biyofilmleri, yaklaşık 10-12 gün içinde olgunlaşır. Genel olarak, biyofilmin uzun süreli ve yüksek konsantrasyonlarda antibiyotik ajanlarına maruz kalması, biyofilm hücrelerinin yaklaşık %90'ını öldürür; kalıcı hücreler antibiyotik tedavisinin kesilmesinden sonra hayatta kalır ve biyofilm yeniden oluşturulur (4,5).

Bakteriler, Toll benzeri reseptörleri (TLR'ler) bağlayabilen ve aktive edebilen toksinler taşırlar. Sepsis, KBY'li hastalarda bağırsak lümeninden bakterilerin veya bu bakterilerin endotoksin gibi ürünlerinin bu reseptörler aracılığıyla portal kan dolaşımına geçmesine ve proinflamatuar ve hipotansif maddelerin salgılanmasına yol açar. Bu durum, enterosit üretiminde azalma ve apoptoz yoluyla enterosit kaybına neden olarak bağırsak adaptasyonunun azalmasına yol açabilir. Ayrıca, karaciğerdeki Kupffer hücreleri, proinflamatuar sitokinlerin ana kaynağı olabilir ve organ fonksiyonu (karaciğer) bozukluğuna yol açabilir. KBY/sepsis sıçanları, IL-6, TNF-α ve TLR4'ün hepatik mRNA transkripsiyonunun arttığını göstermiştir. Tekrarlayan sepsis, ileal floranın dengesizliği ile ilişkilendirilmiştir (12,13).

**Epidemiyoloji**

Epidemiyolojik çalışmalarda KİKDE sıklığı, 1000 kateter günü başına infeksiyon sıklığı olarak tanımlanmıştır. EPN kullanan hastaların incelendiği çalışmalarda yetişkinlerde genel KİKDE oranları 1000 kateter günü başına 0,3-44 idi (14-21). Çocuk hasta grubunda genel KİKDE oranları 1000 kateter günü başına 0,94-6,9 arasında değişmektedir (22-25). Sepsis, KBY'de önemli bir morbidite ve mortalite nedenidir. Kateterle ilişkili enfeksiyonların insidansı KBY'de 7,8'e karşı KBY olmayan hasta grubunda 1,3/1000 kateter günüdür (9). KBY hastalarında hastalığa özgü mortalite oranı, KBY olmayan hastalara kıyasla 5 kat daha fazladır. EPN'de KİKDE'ye yol açan cilt çıkış yeri ve tünel sepsisi oranları %5-43 arasında değişmektedir. Tünelsiz kateterlerde KİKDE oranı %29' dur (21).

KBY' li EPN alan hastaları nosokomiyal enfeksiyon açısından incelendiğinde pnömoni (%14,3), nedeni bilinmeyen bakteriyemi (%13,5), KİKDE (%5,0), alt solunum yolu enfeksiyonu (%5,0), cerrahi ilişkili enfeksiyon (%3,9) ve idrar yolu enfeksiyonu (%1,9) olarak saptanmıştır (26).

Malign hastalarda malign olmayanlara göre KİKDE sıklığı değişken olarak saptanmıştır (27). Bu değişkenlikte kullanılan kemoterapötik ajan, PN kullanımı, kullanılan kateter türü, hastalığın evresi rol oynamaktadır (28).

Erişkinlerde KİKDE insidansı, EPN'nin başlandığı 1. yılda %2,2, 2. yılda %5,6, 5 yılda %13,7 ve 10. yılda %22,4 olarak saptanmıştır (29). KİKDE oranı, hastane PN'sine kıyasla EPN'de anlamlı olarak daha düşüktür (24).

*Candida spp*. ve *Staphylococcus aureus* KİKDE 'lerin, Gram-pozitif koklar veya Gram-negatif basiller gibi diğer nedensel ajanlara kıyasla daha yüksek mortalite ile ilişkilidir. *Candida parapsilosis* candidemi en düşük ölüm oranlarıyla ilişkilendirilirken, *Candida krusei* en yüksek ölüm oranlarıyla ilişkilidir (30).

**Risk Faktörleri**

İntravenöz beslenmeye ihtiyaç duyan hastalarda kateter takan ekip, kateter bakımı kalitesi enfeksiyon oranlarını azaltırken, VKI< 18 kg/m2, malnütrisyon, ileri yaş, önceki KİKDE varlığı, ostomi veya yara varlığı, kateterin çapı (>2 mm), lümen sayısı (çift lümen) ve kanüle edilen damarın tipi (juguler ven), beslenme tüpü varlığı, antikoagülan tedavi, bakan kişi sayısının artması, haftada ikiden fazla lipid emülsiyonu kullanımı, artan günlük PN infüzyon sıklığı, SVK'den kan alınması, dezenfeksiyon rejimleri, afyon veya sedatif bağımlılığı, Crohn hastalığı, vasküler hastalık ve radyasyon enteriti ve kalan ince bağırsak uzunluğunun azalması, bağışıklık fonksiyonlarını etkileyen kronik durumlar, uyumsuzluk, metastatik hastalık, ilaç kullanımı ve depresyon gibi psikososyal sorunlar, düşük sosyoekonomik faktörler, tünelli katetere göre port kullanımı ise artırmaktadır (16,18,21,23,25,27, 29,31).

**Kateter Türleri**

PSVK kullanımı tünelli kateter ve port kullanımına göre daha yüksek KİKDE oranlarına sahiptir (1,32). Hastanede yatış sırasında kan glikoz seviyeleri ve ilk PSVK kateteri bağımsız olarak hastane sonrası KİKDE ve KİKDE dışı enfeksiyon oranını artırmaktadır (26). Günlük intravenöz beslenme ihtiyacı olan hastalarda implante portların kullanımı en kesin risk faktörleridir (31). Kateter çıkarılma oranı yüksekliği implante port kullanımında tünelli kateter kullanımına göre daha yüksektir (15).

**Mikrobiyolojik Değerlendirme**

Kateter ile ilgili kan dolaşımı enfeksiyonları mono ve polimikrobiyal olabilir. Ancak yaygın olarak monobakteriyeldir (1). Monobakteriyel nedenler arasında

sıklık sırasına göre Gram pozitif bakteriler, Gram negatif bakteriler, mantarlar ve daha nadir diğer enfeksiyonlardır. Çalışmalara göre ve çocuk- erişkin yaşa göre polimikrobiyal sıklık değişmektedir.

KİKDE bakteriyel nedenleri arasında en yaygın neden Gram pozitif bakterilerdir (26). Bu grupta Koagülaz negatif Stafilokok (KoNS) en yaygın nedensel patojenlerdir. *Staphylococcus aureus, Staphylococcus epidermidis, Staphylococcus hominis, Staphylococcus haemolyticus* ve enterokoklar diğer Gram pozitif bakterilerdir (4,18,20,28). KİKDE etkeni olarak Gram negatif bakteriler daha az sıklıktadır (1,19). Gram-negatif bakteriler; sıklık sırasına göre *Klebsiella* türleri, *Escherichia coli, Pseudomonas aeruginosa, Acinetobacter* türleridir. (20,26). *S. aureus* enfeksiyonlarında, metisilin, oksasilin ve florokinolonlara direnç gözlenebilir. Enterokoklarda vankomisin direnci ön plana çıkmaktadır (33). *Candida* türleri KİKDE'lerin %6-%22'sında kültürde üretilmektedir (1, 20, 26, 34). Mantar enfeksiyonları arasında baskın türler

*C. parapsilosis, Candida glabrata, Candida tropicalis ve Candida albicansdır* (20). *C. parapsilosis, glabrata ve albicans* sıklıkla PN için kullanılan uzun süreli santral hatlardan alınan kültürde ürer. Polimikrobiyal enfeksiyon, erişkin EPN hastalarının %7-45'inde saptanmaktadır (14,26). Kan kültürlerinde üreme pozitifliği en erken polimikrobiyal enfeksiyonlar ile meydana gelirken sırasıyla Gram negatif ve Gram pozitif mikroorganizmalar bunu takip etmektedir (23).

Pediatrik grupta yapılan çalışmalarda en sık Gram pozitif bakteriler (ana patojen KoNS, *S. aureus*) dir. Daha sonra enterokoklar dikkati çekmektedir (22,24,25,34). Pediatrik grupta, metisiline dirençli *S. aureus* ve vankomisine dirençli enterokoklar sorun olarak karşımıza çıkmaktadır. Pediatrik yaş grubunda da Gram negatifler Gram pozitiflere göre daha az sıklıkta saptanır (*Klebsiella türleri, E coli, Enterobacter cloacae*) (22-25). Pediatrik grupta mantar saptanma sıklığı %5-12'dir (24,25). Genelde polimikrobiyal enfeksiyonların parçasıdır (23,30). Pediatrik EPN hastalarında en sık *C. albicans* izole edilmektedir. Polimikrobiyal enfeksiyon pediatrik EPN hastalarında ise %20-27' sıklıktadır (22-25).

EPN uygulanan KBY'li hastalarda nozokomiyal infeksiyon olarak; Kökeni bilinmeyen bakteriyemiye neden olan ana mikroorganizmalar. *S. epidermidis, S. haemolyticus, Klebsiella pneumoniae ve E. Coli'* dir. *Escherichia. excreta, S. aureus ve P. aeruginosa,* KİKDE'lere neden olan ana patojenlerdir. Üriner sistem enfeksiyonları için *Klebsiella* türleri ve *E coli,* pnömoni veya alt solunum yolu enfeksiyonu için *C. albicans, E. Coli ve Acinetobacter baumannii* ve cerrahi ilişkili enfeksiyon için *Proteus* türleri ve *E. coli* ön plana çıkmaktadır (31).

KoNS'ler hemodinamik instabiliteye genellikle neden olmazlar. Relaps enfeksiyonları en sık olarak KoNS ve Gram-negatif bakterilerle görülür. KİKDE vakalarında hemodinamik instabilite en sık *S. aureus* ve maya enfeksiyonlarında görülür. Gram-negatif bakteriler ve polimikrobiyal KİKDE'ler de hemodinamik instabiliteye neden olurlar.

Bağışıklık yetmezliği olan hastalarda tüberküloz dışı mikobakteri, polimikrobiyal enfeksiyonlar, *Mycobacterium* türleri, Non-fermentatif Gram-negatif basiller, *Listeria. monocytogenes, Corynebacterium* türleri, *Candida* türleri gibi fırsatçı mikroorganizmalar daha sıktır.

**Komplikasyonlar**

SVK'lerin kullanımıyla ilişkili komplikasyonlar, pnömotoraks, brakiyal pleksus yaralanması, subklavian ven trombozu, kateter tıkanması, kateter hasarı, cilt erozyonu, kateter embolizasyonu, çıkış yeri enfeksiyonları, endokardit ve septik komplikasyonlardır (35,36). Şiddetli yorgunluk, depresif bozukluklar, sosyal davranış bozukluğu ve yaşam kalitesinde azalma diğer komplikasyonlar olarak karşımıza çıkmaktadır (7,37).

SVK noninfeksiyöz genel komplikasyon oranı 0,6-11,6/1000 kateter günüdür (20,38,39). Enfeksiyöz olmayan kateter komplikasyonları için; ileri yaş, tünelli kateter kullanımı, daha uzun PN süresi, haftada> 2 kez lipid infüzyonları, salin veya heparin kullanımı, uyuşturucu bağımlılığı, kateterin çoklu kullanımı, altta yatan malignite, intestinal dismotilite, yaygın mukozal hastalık bir risk faktörü olarak bulunmuştur (20,39). Ultrason eşliğinde kateterizasyon kullanılması, infüzyon tedavisine uygun en küçük kalibreli kateterin seçilmesi ve kateter ucunun atriyo-kaval bileşkeye veya yakınına yerleştirilmesi komplikasyon riskini azaltabilmektedir (3). Kateterle ilişkili tromboz insidansı çalışmalarda %3 ile %70 arasında değişir. Kateter yapılarına göre tromboz gelişme riski azalan sırasına göre, polivinil klorür, polietilen, poliüretan ve Silastik kateterlerdir. Altta yatan patoloji diğer bir etkendir (Lösemi, siroz, yetersiz beslenme, kronik böbrek yetmezliği) (40).

*S. aureus ve Candida* kateter kolonizasyonu, KİKDE ile ilişkili komplikasyon geliştirme riski (osteomyelit, spinal enfeksiyon, membranoproliferatif glomerulonefrit) ile ilişkilidir (41-43).

**Klinik ve Laboratuvar Bulguları**

38°C'nin üzerinde ateş (%58-%82), titreme, hipotansiyon, kateter giriş yeri etrafında ağrı, kızarıklık, akıntı, gastrointestinal semptomlar (mide bulantısı, kusma, karın ağrısı, şişkinlik) ve üst solunum yolu enfeksiyonu semptomları rapor edilmiştir (18,29). Üşüme ile başvuran port kateterli hastalarda Gram negatif basiller daha sık saptanmıştır (44).

Laboratuvar olarak; lökosit sayısı, C-reaktif protein (CRP), albümin ve bilirubin gibi belirli parametrelerin enfeksiyon ile ilişkilendirildiği saptanmıştır. Bu enfeksiyonlar potansiyel olarak hayatı tehdit edici olduğundan, hastalar ve sağlık çalışanları bu semptomları yakından izlemeli ve enfeksiyon şüphesi durumunda hızlı bir değerlendirme talep etmelidir (29,45).

Özellikle evde döngüsel gece infüzyonu sırasında titreme veya titremesiz ateşin ortaya çıkması, kateterin enfeksiyon kaynağı olarak değerlendirilmesi gerektiğini gösteren bir belirteç olarak kabul edilmektedir (21). KİKDE tanısının hala zor olduğu ancak yeni anormal CRP, albümin veya bilirubin düzeylerinin saptandığı hastalarda bu enfeksiyonların düşünülmesi gerektiği vurgulanmıştır.

Sonuç olarak; SVK ile EPN uygulanan KBY tanılı hastalarda olası komplikasyonlar ve KİKDE risk faktörleri açısından değerlendirilmelidir. KİKDE mono ve polimikrobiyal olabilir. Ancak yaygın olarak monobakteriyeldir. KİKDE vakalarında hemodinamik instabilite en sık S. aureus ve maya enfeksiyonlarında

görülür. Gram-negatif bakteriler ve polimikrobiyal KİKDE'ler de hemodinamik instabiliteye neden olurlar. KİKDE tanısı için klinik bulgular spesifik olmasa da ateş ve/veya üşüme, titreme olması dikkate alınmalıdır.

**Yazarların Katkıları:** Fikir ve Kavram; A.T., O.K.; Tasarım; A.T., O.K.; Veri toplama ve/veya İşleme; A.T., T.Z.; Analiz ve/veya Yorum: A.T., O.K.; Literatür tarama; A.T., T.Z.; Makale Yazımı; A.T., O.K.; Eleştirel İnceleme; O.K.

**KAYNAKLAR**


1. Gompelman M, Causevic E, Bleeker-Rovers CP, Wanten GJA. Catheter-related bloodstream infection management in patients receiving home parenteral nutrition: An observational cohort study. Clin Nutr ESPEN. 2022; 50: 155-61.
2. https://www.klimud.org/public/uploads/content/files/KLIMUD%20Rehberleri_Kan%20Dolasimi_ver02.pdf.
3. Pironi L, Arends J, Bozzetti F, Cuerda C, Gillanders L, Jeppesen PB, et al. ESPEN guidelines on chronic intestinal failure in adults. Clin Nutr. 2016; 35: 247-307.
4. Mermel LA, Allon M, Bouza E, Craven DE, Flynn P, O'Grady NP, et al. Clinical practice guidelines for the diagnosis and management of intravascular catheter-related infection: 2009 Update by the Infectious Diseases Society of America. Clin Infect Dis. 2009; 49 (1): 1-45.
5. O'Grady NP, Alexander M, Burns LA, Dellinger EP, Garland J, Heard SO, et al. Guidelines for the prevention of intravascular catheter-related infections. Am J Infect Control. 2011; 39(4 Suppl): 1-34.
6. NHSN. 2023; published online March 16. https://www.cdc.gov/nhsn (accessed Aug 30, 2023).
7. Asensio AB, García-Urkia N, Aldazabal P, Bachiller P, García-Arenzana JM, Eizaguirre I. Incidence of bacterial translocation in four different models of experimental short bowel syndrome. Cir Pediatr. 2003; 16(1): 20-5.
8. Eizaguirre I, Aldazábal P, García N, Orgiles I, García-Arenzana JM, Ariz C. Bacterial translocation associated with short bowel: role of ileocecal valve and cecum. Cir Pediatr. 2001; 14(2): 57-60.
9. Aprahamian CJ, Chen M, Yang Y, Lorenz RG, Harmon CM. Two-hit rat model of short bowel syndrome and sepsis: independent of total parenteral nutrition, short bowel syndrome is proinflammatory and injurious to the liver. J Pediatr Surg. 2007; 42(6): 992-7.
10. Aldazabal P, Eizaguirre I, Barrena MJ, Garcia-Arenzana JM, Ariz C, Cuadrado E. Bacterial translocation and T-lymphocyte populations in experimental short-bowel syndrome. Eur J Pediatr Surg. 1998; 8(4): 247-50.
11. Gutierrez IM, Kang KH, Calvert CE, Johnson VM, Zurakowski D, Kamin D, et al. Risk factors for small bowel bacterial overgrowth and diagnostic yield of duodenal aspirates in children with intestinal failure: a retrospective review. J Pediatr Surg. 2012; 47(6): 1150-4.
12. Sukhotnik I, Yakirevich E, Coran AG, Siplovich L, Krausz M, Sabo E, et al. Lipopolysaccharide endotoxemia reduces cell proliferation and decreases enterocyte apopotosis during intestinal adaptation in a rat model of short-bowel syndrome. Pediatr Surg Int. 2002; 18(7): 615-9.
13. Romond M-B, Colavizza M, Romond PC, Bezirtzoglou E. Selective decontamination by antimicrobials during long term treatment: perspectives for saving host indigenous microbiota. Anaerobe. 2011; 17(6): 468-73.
14. Bond A, Kopczynska M, Conley T, Teubner A, Taylor M, Abraham A, et al. Long-term survival following fungal catheter-related bloodstream infection for patients with intestinal failure receiving home parenteral support. JPEN J Parenter Enteral Nutr. 2023; 47(1): 159-64.
15. Pohju AK, Hakkarainen AI, Pakarinen MP, Sipponen TM. Longitudinal evolution of catheter-related bloodstream infections, kidney function and liver status in a nationwide adult intestinal failure cohort. Scand J Gastroenterol. 2022; 57(7): 763-7.
16. Xue Z, Coughlin R, Amorosa V, Quinn R, Schiavone P, Stoner N, et al. Factors Associated With Central Line-Associated Bloodstream Infections in a Cohort of Adult Home Parenteral Nutrition Patients. JPEN J Parenter Enteral Nutr. 2020; 44(8): 1388-96.
17. Bond A, Conley T, Teubner A, Taylor M, Abraham A, Salazar FR, et al. Management of home parenteral nutrition catheter-related bloodstream infections in hospitals outside of a specialized intestinal failure center. JPEN J Parenter Enteral Nutr. 2022; 46(7): 1731-5.
18. Saqui O, Fernandes G, Allard J. Central venous catheter infection in Canadian home parenteral nutrition patients: a 5-year multicenter retrospective study. Br J Nurs. 2020; 29(8): 34-42.
19. Crivelli A, Fabeiro M, Puga M, Dieguez N, Giunta L, Pochettino F, et al. Care of patients on home parenteral nutrition during the first year of the COVID-19 pandemic: Management of central line-associated bloodstream infections. Clin Nutr ESPEN. 2022; 52: 250-3.
20. Reitzel RA, Rosenblatt J, Chaftari A-M, Raad II. Epidemiology of Infectious and Noninfectious Catheter Complications in Patients Receiving Home Parenteral Nutrition: A Systematic Review and Meta-Analysis. JPEN J Parenter Enteral Nutr. 2019; 43(7): 832-51.
21. Messing B. Catheter-related sepsis during home parenteral nutrition. Clin Nutr. 1995; 14 (Suppl 1): 46-51.
22. Tourvieilhe L, Jandot E, Quessada T, Barreto C, Marotte S, Heissat S et al. Increase of recurrent central line-associated bloodstream infections in children with home parenteral nutrition in a rehabilitation care facility compared to home. Clin Nutr. 2022; 41(9): 1961-8.
23. Wozniak LJ, Bechtold HM, Reyen LE, Chan AP, Marcus EA, Vargas JH. Epidemiology and Risk Factors for Outpatient-Acquired Catheter-Related Bloodstream Infections in Children Receiving Home

Parenteral Nutrition. JPEN J Parenter Enteral Nutr. 2018; 42(5): 942-8.
24. Trivić I, Mišak Z, Kerman V, Prlić H, Kolaček S, Hojsak I. Central Catheter-related Bloodstream Infection Rates in Children on Home Parenteral Nutrition. J Pediatr Gastroenterol Nutr. 2020; 70(3): e59-62.
25. Seddik TB, Tian L, Nespor C, Kerner J, Maldonado Y, Gans H. Risk Factors of Ambulatory Central Line-Associated Bloodstream Infection in Pediatric Short Bowel Syndrome. JPEN J Parenter Enteral Nutr. 2020; 44(3): 500-6.
26. Zhao VM, Griffith DP, Blumberg HM, Dave NJ, Battey CH, McNally TA, et al. Characterization of post-hospital infections in adults requiring home parenteral nutrition. Nutrition. 2013; 29(1): 52-9.
27. Vashi PG, Virginkar N, Popiel B, Edwin P, Gupta D. Incidence of and factors associated with catheter-related bloodstream infection in patients with advanced solid tumors on home parenteral nutrition managed using a standardized catheter care protocol. BMC Infect Dis. 2017; 17(1): 372.
28. Lowell JA, Bothe A Jr. Venous access. Preoperative, operative, and postoperative dilemmas. Surg Clin North Am. 1991; 71(6): 1231-46.
29. Bonnes SL, Mundi MS, Hurt RT, Salonen BR. To Pull or Not to Pull: Salvaging Central Line Catheters in Home Parenteral Nutrition. Curr Nutr Rep. 2018; 7(4): 324-8.
30. Phua AI-H, Hon KY, Holt A, O'Callaghan M, Bihari S. Candida catheter-related bloodstream infection in patients on home parenteral nutrition- Rates, risk factors, outcomes, and management. Clin Nutr ESPEN. 2019; 31: 1-9.
31. Yang J, Sun H, Wan S, Mamtawla G, Gao X, Zhang L, et al. Prolonged Parenteral Nutrition Is One of the Most Significant Risk Factors for Nosocomial Infections in Adult Patients With Intestinal Failure. Nutr Clin Pract. 2020; 35(5): 903-10.
32. Bech LF, Drustrup L, Nygaard L, Skallerup A, Christensen LD, Jensen LV, et al. Environmental Risk Factors for Developing Catheter-Related Bloodstream Infection in Home Parenteral Nutrition Patients: A 6-Year Follow-up Study. JPEN J Parenter Enteral Nutr. 2016; 40(7): 989-94.
33. Al-Tawil ES, Almuhareb AM, Amin HM. Catheter-related blood stream infection in patients receiving long-term home parenteral nutrition: Tertiary care hospital experience in Saudi Arabia. Saudi J Gastroenterol. 2016; 22(4): 304-8.
34. Raphael BP, Fournier G, McLaughlin SR, Puder M, Jones S, Flett KB. Antibiotic Susceptibility and Therapy in Central Line Infections in Pediatric Home Parenteral Nutrition Patients. J Pediatr Gastroenterol Nutr. 2020; 70(1): 59-63.
35. Grant J. Recognition, prevention, and treatment of home total parenteral nutrition central venous access complications. JPEN J Parenter Enteral Nutr. 2002; 26(5 Suppl): 21-8.
36. McIntyre AS, Gertner DJ, Wood S, Phillips RK, Lennard-Jones JE. Long-term parenteral nutrition: problems with venous access. J R Soc Med. 1990; 83(6): 371-2.
37. Huisman-de Waal G, Versleijen M, van Achterberg T, Jansen JB, Sauerwein H, Schoonhovenet L, et al. Psychosocial complaints are associated with venous access-device related complications in patients on home parenteral nutrition. JPEN J Parenter Enteral Nutr. 2011; 35(5): 588-95.
38. Wing VK, Song Y, Xiang C, Liu X, Macaulay D, Ponsillo M, et al. Incidence of catheter-related complications among Japanese patients with central venous catheters as well as patients with short bowel syndrome. Clin Exp Gastroenterol. 2018; 11: 439-45.
39. Williams N, Scott NA, Irving MH. Catheter-related morbidity in patients on home parenteral nutrition: implications for small bowel transplantation. Ann R Coll Surg Engl 1994; 76(6): 384-6.
40. Dibb M, Lal S. Home Parenteral Nutrition: Vascular Access and Related Complications. Nutr Clin Pract. 2017; 32(6): 769-76.
41. Allan P, Stevens P, Chadwick P, Teubner A, Abraham A, Carlson G, et al. Osteomyelitis in adult patients on long-term parenteral nutrition: 2745 patient-years of experience in a national referral centre. Clin Nutr. 2016; 35: 1135-9.
42. Topan R, Ambrose T, Small M, Lightman E, Nightingale J, Gabe SM. Spinal Infections Among Patients With Long-Term Central Venous Catheters for Home Parenteral Nutrition: A Descriptive Case Series. Nutr Clin Pract. 2017; 32(1): 133-8.
43. Yared G, Seidner DL, Steiger E, Hall PM, Nally JV. Tunneled right atrial catheter infection presenting as renal failure. JPEN J Parenter Enteral Nutr. 1999; 23(6): 363-65.
44. Vidal M, Genillon JP, Forestier E, Trouiller S, Pereira B, Mrozek N, et al. Outcome of totally implantable venous-access port-related infections. Med Mal Infect. 2016; 46(1): 32-8.
45. Clare A, Teubner A, Shaffer JL. What information should lead to a suspicion of catheter sepsis in HPN? Clin Nutr. 2008; 27: 552-6.

Editöre Mektup / Letter to Editor

Sağlık Bilimlerinde Değer / Sağlık Bil Değer
Value in Health Sciences / Value Health Sci
ISSN: 2792-0542 sabd@duzce.edu.tr 2025; 15(2): 326-327
doi: https://dx.doi.org/10.33631/sabd.1513605

# Management of Hip Fractures from Emergency Physician Perspective

Serkan ÖZDEMİR [1], Abdullah ALGIN [2]

Dear Editor

We read with great interest the article "Early Mortality Rates and Types of Surgery in Geriatric Patients with Hip Fractures Undergoing Surgical Treatment" prepared by Özel et al, published in the first issue of your journal in 2024 (1). We would like to thank the authors and the editorial board for the article revealing the relationships between mortality within 30 days after surgery and fracture incidence, implant type and surgical timing in patients older than 65 years who developed hip fractures after a simple fall and were treated surgically. Furthermore, we would like to touch upon a few points to contribute to the discussion of the mentioned study and give readers a different perspective.

Hip fractures represent a significant health problem frequently encountered in emergency departments, leading to decreased quality of life, increased morbidity, and mortality. Annually, an estimated 1.5 million people suffer a hip fracture, and this number is expected to rise with the aging population. The initial point of contact for these patients is typically the emergency department, where the first medical interventions are performed by emergency medicine specialists. Therefore, proficiency in managing hip fractures is crucial for emergency department personnel (2).

Fractures are inherently painful conditions, and pain management in elderly patients is often inadequate, exacerbating the risk of delirium, prolonging hospital stays, impairing functional recovery, and increasing the likelihood of chronic pain syndromes. Appropriate pain management in the emergency department is essential. Peripheral nerve blocks, if available, can be effective in managing pain while minimizing the sedation and other potential complications associated with opioid use. In patients awaiting surgery, both single injections and continuous blocks can be used preoperatively and continued for postoperative analgesia. Given that older adults are generally more sensitive to opioids, lower initial doses should be administered and titrated rapidly to achieve adequate analgesia. Intravenous opioids provide faster relief, but oral medications can also be used.

Notably, preoperative traction does not offer any benefit in reducing pain or improving hip fracture reduction quality (3).

Patients with hip fractures are at high risk for venous thromboembolism. The decision to use pharmacological or mechanical prophylaxis should be based on the patient-specific risk of bleeding. For patients receiving pharmacological deep vein thrombosis prophylaxis, the selection and timing of antithrombotic drugs must be carefully coordinated with the surgical and anesthesia teams to mitigate the risk of epidural hematoma. Effective thromboembolic prophylaxis requires close collaboration between the surgeon and anesthesiologist (4).

Delirium is a common complication among hospitalized older adults, occurring in approximately two-thirds of patients with hip fractures. Although it is less likely to develop during the emergency department phase, it should still be anticipated and monitored (5).

In the emergency department, it is crucial to determine whether a fall resulting in a hip fracture was a simple fall or secondary to other events such as syncope or central neurological events. Patients should be thoroughly evaluated for additional injuries and any forensic implications.

Another critical aspect to consider in the management of geriatric patients with hip fractures is the role of underlying comorbid conditions. Chronic illnesses such as diabetes mellitus and hypertension are common in this population and can significantly impact perioperative outcomes (6). For instance, poorly controlled blood glucose levels in diabetic patients may increase the risk of infection and impair wound healing, while inadequate blood pressure regulation in hypertensive patients may elevate the risk of perioperative cardiovascular complications. Incorporating routine monitoring and optimization of these comorbidities in emergency and perioperative care protocols could further enhance patient outcomes and reduce mortality. Emphasizing the importance of a multidisciplinary approach that includes endocrinologists and cardiologists in caring for these patients would be a valuable addition to the discussion.

1 Ümraniye Training and Research Hospital Department of Emergency Medicine, Istanbul, Türkiye
2 University of Health Sciences Ümraniye Training and Research Hospital, Department of Emergency Medicine, Istanbul, Türkiye

Sorumlu Yazar / Corresponding Author: Serdar ÖZDEMİR, e-mail: dr.serdar55@hotmail.com
Geliş Tarihi / Received: 09.07.2024, Kabul Tarihi / Accepted: 20.03.2025

In conclusion, the study by Özel et al. provides valuable insights into the factors influencing early mortality in geriatric patients with hip fractures undergoing surgical treatment. To enhance the clinical utility of the findings, we recommend further attention to the integration of comorbid condition management, optimized pain control strategies, and preventive measures for complications such as thromboembolism and delirium in the emergency department. A holistic, multidisciplinary approach that addresses both the acute injury and the patient's overall health status is essential to improving outcomes in this vulnerable population. This comprehensive perspective will better equip clinicians to manage geriatric hip fracture patients effectively, from the emergency department to postoperative recovery.

**Authors's Contributions:** Idea/Concept: S.Ö., A.A.; Design: S.Ö., A.A.; Data Collection/Processing: S.Ö., A.A.; Analysis/Interpretation: S.Ö., A.A.; Literature Review: S.Ö., A.A.; Drafting/Writing: S.Ö., A.A.; Critical Review: S.Ö., A.A.

**REFERENCES**

1. Özel Z, Karaduman ZO, Arıcan M, Turhan Y, Tuncer C, Uludağ V. Early Mortality Rates and Types of Surgery in Geriatric Patients with Hip Fractures Undergoing Surgical Treatment. SABD. 2024; 14(1): 100-5.
2. Marks R, Allegrante JP, Ronald MacKenzie C, Lane JM. Hip fractures among the elderly: causes, consequences and control. Ageing Res Rev. 2003; 2(1): 57-93.
3. Houserman DJ, Raszewski JA, Palmer B, Chavan B, Sferrella A, Campbell M, et al. The impact of the fascia iliaca block beyond perioperative pain control in hip fractures: a retrospective review. Geriatr Orthop Surg Rehabil. 2022; 13: 21514593221099107.
4. He SY, Zhang P, Qin HJ, Jiang N, Yu B. Incidence and risk factors of preoperative deep venous thrombosis following hip fracture: a retrospective analysis of 293 consecutive patients. Eur J Trauma Emerg Surg. 2022; 48(4): 3141-7.
5. Cartei A, Mossello E, Ceccofiglio A, Rubbieri G, Polidori G, Ranalli C, et al. Independent, differential effects of delirium on disability and mortality risk after hip fracture. J Am Med Dir Assoc. 2022; 23(4): 654-9.e1.
6. Yoon SH, Kim BR, Lee SY, Beom J, Choi JH, Lim JY. Influence of comorbidities on functional outcomes in patients with surgically treated fragility hip fractures: a retrospective cohort study. BMC Geriatr. 2021; 21(1): 283.

Düzce Üniversitesi / Düzce University