BALIKESİR SAĞLIK BİLİMLERİ DERGİSİ

BALIKESIR HEALTH SCIENCES JOURNAL

BALIKESİR ÜNİVERSİTESİ

SAĞLIK BİLİMLERİ ENSTİTÜSÜ

ISSN:2146-9601
E-ISSN:2147-2238

CİLT VOLUME 14 SAYI ISSUE 2

AĞUSTOS AUGUST 2025

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ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1430064

Comparison of Two Separate Folding Methods Applied to Intraocular Lenses Used in Cataract Surgery in Terms of Mechanical Damage to the Lens and Causing Complications

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Geliş Tarihi / Received: *01.02.2024,* ***Kabul Tarihi / Accepted:*** *24.03.2025*

ABSTRACT
Objective: The aim of this study was to compare two different folding techniques recommended by companies and applied by scrub nurse to foldable intraocular lenses used in cataract surgery in terms of mechanical damage to the lens and the occurrence of lens-related intraocular surgical complications during surgery. **Materials and Methods:** The study was conducted as a non-randomized clinical trial with a control group. 150 patients who received surgical indication as a result of senile cataract were included in the study. The X-folding technique was applied to the first group (n=75), and the Y-folding technique was applied to the second group (n=75). Data were recorded on the data collection form at the end of each surgery. Chi-square test was used for statistical significance between two qualitative variables. Statistical significance was accepted as p <0.05. **Results:** While mechanical damage to the lens was less common in the patient group using the X technique, lens-related intraocular surgical complications were less common in the patient group using the Y technique. The differences between the two techniques were not found to be statistically significant (p>0.05). **Conclusion:** It can be said that the effects of both lens folding techniques on the mechanical damage of the lens and the formation of lens-related intraocular surgical complications during surgery are similar.
Keywords: Intraocular Lens, Implantation, Cataract, Surgery.

Katarakt Cerrahisinde Kullanılan Göz İçi Lenslerde Uygulanan İki Ayrı Katlama Yönteminin, Lensin Mekanik Hasara Uğraması ve Komplikasyon Oluşturması Açısından Karşılaştırılması

ÖZ
Amaç: Bu çalışmada, katarakt ameliyatlarında kullanılan katlanabilir göz içi lenslere, firmalarca önerilen ve scrup hemşirenin uyguladığı iki ayrı katlama tekniğinin; lenste mekanik hasar oluşumu ve ameliyat sırasında lense bağlı göz içi cerrahi komplikasyon oluşumu açısından karşılaştırılması amaçlanmıştır. **Yöntemler:** Bu çalışma randomize olmayan kontrol gruplu klinik bir çalışmadır. Senil katarakt sonucu cerrahi endikasyon alan 150 hasta çalışmaya alınmıştır. İlk gruba (n=75) X katlama tekniği, ikinci gruba (n=75) Y katlama tekniği uygulanmıştır. Her ameliyat sonunda veriler veri toplama formuna kaydedilmiştir. İki nitel değişken arasında istatiksel olarak anlamlılık için Ki-kare testi kullanılmıştır. İstatiksel anlamlılık p <0.05 kabul edilmiştir. **Bulgular:** Lensin mekanik hasara uğraması durumu X tekniği kullanılan hasta grubunda daha az tespit edilirken, ameliyat esnasında lense bağlı göz içi cerrahi komplikasyon oluşumu Y tekniği kullanılan hasta grubunda daha az tespit edilmiştir. İki teknik arasında oluşan farklar istatistiksel olarak anlamlı bulunmamıştır (p>0.05). **Sonuç:** Her iki lens katlama tekniğinin, lensin mekanik hasara uğraması ve ameliyat esnasında lense bağlı göz içi cerrahi komplikasyon oluşumu üzerine etkilerinin benzer olduğu söylenebilir.
Anahtar Kelimeler: Göz içi lens, İmplantasyon, Katarakt, Cerrahi.

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Bu makaleye atıf yapmak için / Cite this article: Demirel, A., & Yurt, S. (2025). Comparison of two separate folding methods applied to ıntraocular lenses used in cataract surgery in terms of mechanical damage to the lens and causing. *BAUN Health Sci J, 14*(2), 243-250. https://doi.org/10.53424/balikesirsbd.1430064

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

Cataract, defined as the progressive loss of transparency of the eye lens, is known as the most common cause of vision loss and blindness in the world. According to World Health Organization (WHO) data, it is estimated that 15 million people worldwide are blind due to cataracts (WHO, 2022). Cataract surgery is one of the most frequently performed and oldest surgeries in the world (Davis, 2016; Lindstrom, 2015; Zhang, Ji, Tan, Yu, & Guan, 2023). Today, the most commonly used surgical method in cataract treatment is phacoemulsification (Tekin, Çıtırık, Üzel, & İlhan, 2016) The phacoemulsification method was first used by Dr. Charles Kelman in 1967. (Kelman, 1994). In this method, first the anterior lens capsule is opened in a round shape and the lens nucleus is emulsified and aspirated with the help of a high-frequency ultrasonic needle. After this stage, the cortex is cleaned using the aspiration method. Finally, viscoelastic material is injected into the remaining capsular bag and an artificial foldable intraocular lens (IOL) is placed through the surgical incision (Gözüm, 2012). One of the most important factors in the transition to the phacoemulsification method, especially after 1992, was the development of foldable IOLs with a quality higher than in 1984 (Leaming, 1999). IOL material gained foldable properties in the 1990s by using first silicone and then acrylic materials by folding them with forceps, and then in the 2000s, surgeries could be performed with minimal incisions by injecting and inserting IOLs with cartridge-injector systems (Oshika et al., 1998). Recent developments in IOL design have increased the expectations of patients and doctors from cataract surgery (Halkiadakis et al., 2023). While the IOL folding method was initially done manually with the help of a surgical instrument, the cartridge and injector system was developed over time. As a result of increased manipulation during the insertion stage of the IOL into the cartridge, the IOL may be damaged. This is especially true for hydrophilic acrylic IOLs, which have been reported to be damaged by up to 28% during intraocular implantation with the injector system (Myers & Olson, 1999). Looking at the history of injection systems, it is known that they have some problems as well as their benefits. Even if it is not traumatic, it causes unpredictable placement (Aslan & Gücükoğlu, 2005). Folding styles applied to the IOLs for cartridge implantation may cause mechanical damage to the IOL. An intraocular lens that is not placed correctly in the cartridge may suffer mechanical damage during advancement by pushing the injector mechanism (Singh, Fang, & Rath, 1999). However, as with other rigid conventional IOL, some complications may occur, which may require foldable IOL to be removed from the eye again (Singh, Fang, & Rath, 1999). Having a mechanically damaged IOL removed from the eye causes surgical stress for the surgeon and scrub nurse. At the same time, removing the IOL from the eye and replacing it with a second IOL also increases the costs.

The aim of this study was to compare two different folding techniques recommended by companies and applied by scrub nurse to foldable intraocular lenses used in cataract surgery in terms of mechanical damage to the lens and the occurrence of lens-related intraocular surgical complications during surgery. As a result of the study, it is thought that determining the superior one of two different folding methods and adopting only the superior method in lens folding will reduce the rate of developing lens-related complications in patients and accordingly, accelerate recovery and shorten the hospital stay. If it is determined with the study that both techniques carry similar risks without providing superiority to each other, it is thought that it will help reduce the surgical stress experienced by surgical nurses when deciding on the lens folding technique. The result of the study is expected to contribute to the literature with the information that there is or is not a difference in terms of complication formation between the two folding techniques recommended by the companies.

MATERIALS AND METHODS

Study type

The study was conducted as a non-randomized clinical trial with a control group. Patients who underwent a cataract surgery in a state hospital operating room between April 2021 and December 2021 were included in the study. In order to find a significant difference between the two different methods to be applied in the study, the minimum sample size was 144 (n= 72 for each group), type I error was 0.05, and the power of the test was 0.90 (α= 0.05, β = 0.10). The study included 150 patients, with 75 patients in group X and 75 patients in group Y. In the study using sequential technique, the x technique was applied to the first 75 patients who met the inclusion criteria among the patients admitted to the operating room, and the y technique was applied to the next 75 patients. The research was limited to patients who underwent a surgery in the state hospital where the study was conducted and the two different lens folding methods used. A data collection form was designed specifically for the study, and the form included demographic information such as age, gender, and quantitative data such as IOL diopter and axial length. Quantitative data and demographic characteristics based on the measurements taken by the patients during the preparation for the surgery were taken from the patient cards and recorded in the data collection form. Data obtained from the lens folding technique used were taken from the operative report written by the surgeon on the patient's chart after the case, as determined independently from the study.

Procedures

Two separate lens folding techniques suggested by the companies were named X and Y methods specifically for the study.

A sequential technique was used for the research, and the X-folding technique was applied to the first group of 75 patients and the Y-folding technique was applied to the second group of 75 patients. One-piece, hydrophilic acrylic structure, foldable lenses with an optical diameter of 6.00 mm were used in the study. The IOL was prepared under sterile conditions and was removed from its bottle filled with the appropriate liquid and checked macroscopically for mechanical integrity before being placed in the cartridge. It was folded according to the X or Y technique and placed in the injector system. After making sure that the IOL moved easily inside the cartridge by gently pressing the injector plunger, it was delivered to the surgeon for implantation. In all cases included in the study, the folding technique was determined and applied by the research nurse.

X technique: After sufficient viscoelastic material was placed in the lens cartridge, the intraocular lens was placed in an inverted S shape. The front haptic of the IOL was placed flat on the front of the cartridge, and the rear haptic was moved closer to the body of the optic. X technique is shown in Figure 1.

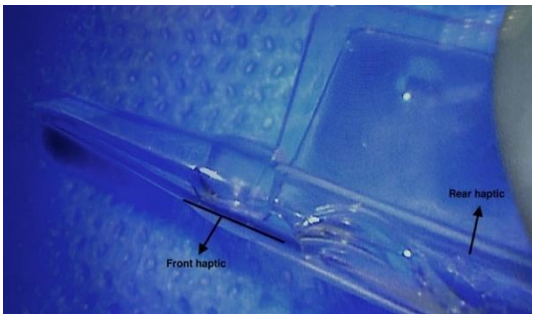

Figure 1. X technique

Y technique: After sufficient viscoelastic material was placed in the lens cartridge, the intraocular IOL was placed in an inverted S shape. Both the front haptic and rear haptic of the IOL are folded towards the optic. Y technique is shown in Figure 2.

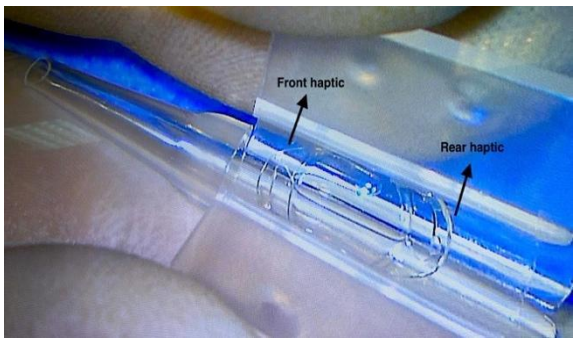

Figure 2. Y technique

Purposeful sampling selection technique was used in the study. To ensure that the only meaningful difference among the patients included in the study is the IOL folding technique, their other characteristics were planned to be within a similar range.

The exclusion and inclusion criteria of the study were established by consulting to experienced surgeons and determining appropriate parameters for the study. Especially since the IOL becomes thinner as the IOL diopter decreases and the IOL becomes thicker as the IOL diopter increases, the extra thin and the extra thick lenses were excluded from the study (EyeCyrl Plus, 2022).

Research inclusion criteria

- Being over 40 years old, under 80 years old.
- Axial length should be between 20-26 mm.
- Intraocular lens size between 14-26 diopters.
- The cataract that occurs in the patient is only age-related.
- No eye disease other than cataracts.
- No history of any eye-related surgery.
- The patient is literate.

Research exclusion criteria

- Being under the age of 40, over the age of 80.
- Axial length is not between 20-26 mm.
- Intraocular lens size is not between 14-26 diopters.
- The cataract that occurs in the patient is not only age-related.
- Having an eye disease other than cataracts.
- Having eye surgery before.
- The patient is illiterate.
- Patient's wish to withdraw from the study.

Statistical analysis

The data collected in the study was analyzed by creating a database in IBM SPSS 24.0 program. Chi-square test and independent groups t-test were used in statistical analysis. Statistical significance was accepted as $p<0.05$.

Ethical approval

Ethics Committee approval numbered 2021/80 and written consent from patients were obtained from Haydarpaşa Numune Training and Research Hospital Clinical Research Ethics Committee for this research. Verbal and written consent was obtained from each participant before the study, and they were asked to fill in the informed consent form, and only the participants who gave consent were included in the study. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki.

RESULTS

In this study, the effect of two different IOL folding methods on jam formation in the lens-injector system, mechanical damage to the IOL, use of a second IOL, and lens-related complications were investigated. A total of 62 female patients (38 in group X and 24 in group Y) and 88 male patients (37 in group X and 51 in group Y) were included in the study. There were no significant differences between the two groups for the variables specified in the inclusion criteria: age/ axial length/ IOL size ($p>0.05$). It was assumed that the gender variable indicating demographic characteristics would not affect the study results. The preoperative characteristics and test values of the groups are shown in Table 1.

Jam occurred in the lens-injector system used in a total of 44 patients, 18 of 75 patients (24%) using the X technique and 26 of 75 patients (34.6%) using the Y technique.

When the jamming results in the lens-injector system were examined according to the applied technique, it was seen that there was no statistically significant difference between the two techniques (X^2=2.058, p>0.05). The distribution of these data and the chi-square analysis results are shown in Table 2.

Table 1. Preoperative characteristics and test values of patients who underwent X and Y techniques.

		X		Y		
		n	%	n	%	p[a]
Gender	Male	37	49.3	51	68.0	X^2=5.389 p=0.015
	Female	38	50.7	24	32.0	
		Mean	sd	Mean	sd	p[b]
Age		68.910	8.197	67.230	8.359	0.216
Axial Length		23.564	1.356	23.834	1.089	0.180
IOL Size		20.453	3.496	19.757	2.633	0.171

[a] Chi-square Test-Fisher Exact; [b] Independent Groups T-Test χ^2: Chi-square Test sd: Standard deviation.

Table 2. Comparison of the number of jams occurring in the lens-injector system.

Groups		Techniques		X^2	df	p
		X	Y			
Lens-injector system jam	Yes	18 (%24)	26 (%34.7)	2.058	1	0.151
	No	57 (%76)	49 (%65.3)			
	Total	75	75			

χ^2: Chi-square Test df: degrees of freedom.

While the IOL was not damaged as a result of jamming in 34 (77.2%) of the 44 cases where jamming occurred in the lens-injector system, mechanical damage to the IOL occurred as a result of jamming in 10 (22.7%) of them. Of the 10 patients with mechanical damage to the IOL, the lens was used with the X technique in 3 (30%) and with the Y technique in 7 (70%).

When the results of mechanical damage to the IOL were examined according to the technique used, it was seen that there was no statistically significant difference between the two techniques (X^2=1.714, p>0.05). The distribution and analysis results of these data are shown in Table 3.

Table 3. Comparison of the number of mechanical damages to the IOL.

Groups		Techniques		X^2	df	p
		X	Y			
Mechanical damage to the IOL	Yes	3 (%4)	7 (%9.3)	1.714	1	0.190
	No	72 (%96)	68 (%90.7)			
	Total	75	75			

χ^2: Chi-square Test df: degrees of freedom.

A second IOL using occurred in a total of 10 patients within the study, due to mechanical damage to the IOL. In 3 of 10 patients (30%) who underwent second IOL placement, the IOL was folded using the X technique, and in 7 (70%) patients it was folded using the Y technique.

When the number of times a second IOL was used as a result of the applied technique was examined, it was seen that there was no statistically significant difference between the two techniques (X^2=1.714, p>0.05). The distribution and analysis results of these data are shown in Table 4.

Table 4. Comparison of the number of times a second IOL was used.

Groups		Techniques		X^2	df	p
		X	Y			
Using a Second IOL	Yes	3 (%4)	7 (%9.3)	1.714	1	0.190
	No	72 (%96)	68 (%90.7)			
	Total	75	75			

χ^2: Chi-square Test df: degrees of freedom.

Lens-related complications occurred in a total of 3 cases, 2 in patients using the X technique and 1 in the patients using the Y technique. As a result of chi-square analysis performed with complication data based on the technique used, the minimum expected count was found to be 1.49.

For this reason, the interpretation was based on Fisher's exact test value and there was no significant difference between the techniques (Fisher's=1.000, p>0.05). The distribution and analysis results of these data are shown in Table 5.

Table 5. Comparison of the number of complications resulting from the X and Y techniques.

Groups		Techniques		X^2	df	p
		X	Y			
Complication as a result of X and Y technique	Yes	2 (%2.7)	1 (%1.3)	0.327	1	1.00
	No	73 (%97.3)	74 (%98.7)			
	Total	75	75			

χ^2: Chi-square Test df: degrees of freedom

In the study, the complications that developed separately in the 2 patients in whom the X technique was used as the IOL folding technique were posterior capsule perforation and iris trauma. The complication that occurred in 1 patient in whom the Y technique was used as the IOL folding technique was Descemet's detachment.

DISCUSSION

Today, the most commonly used surgical method in cataract treatment is phacoemulsification. In this method, the lens of the eye that has lost its transparency is emulsified and aspirated with an ultrasonic hand device, and an artificial intraocular lens is placed in its place (Singh, Fang, & Rath, 1999). In this study, the rates of jamming in the lens-injector system, mechanical damage to the IOL, and lens-related complications of one-piece foldable intraocular lenses used in cataract surgeries as a result of two separate folding techniques applied and recommended by the scrub nurse were investigated. The two main methods of implanting a foldable lens are insertion by folding with folding forceps or insertion with a cartridge-injector system.

Folding the IOL with forceps can cause surface abnormalities, stress fractures, and fine tear lines in the IOL (Singh, Fang, & Rath, 1999). At the same time, the folding technique with forceps poses a risk of bacterial contamination. Injecting the lenses with a cartridge rather than folding them with forceps prevents the risk of bacterial contamination by preventing the IOL from coming into contact with the wound (Shimizu, Kobayashi, Takayama, & Zhaobin, 2008). In injection systems, complications such as IOL jamming and not being delivered, IOL damage or cartridge damage may occur (Singh, Fang, & Rath, 1999). One reason why injection systems cause such complications is the unpredictable insertion process that results from manual folding of IOLs. According to Shimizu's data, the rate of IOL damage observed after application was 0.14% in IOLs implanted using the ready-made injector system in which the IOL was placed by the company, while the damage after application with the manual cartridge-injector system was found to be 2.99%. It was suggested that the reason why IOLs pre-placed in the injector system were preferred was that they shortened the surgical time, but it was determined that it shortened the time compared to surgeries using the manual cartridge-injector system, which did not show statistical significance (Shimizu, Kobayashi, Takayama, & Zhaobin, 2008). The cause of IOL damage may be

various. Studies have shown that this can be due to poor packaging (Nguyen, Saleh, Pandey, & Bates, 2006), handling with forceps (Milazzo, Turut, & Blin, 1996), improper loading (Hesse, Freissler, & Lang, 2001), overloaded injector pistons (Singh, Fang, & Rath, 1999), friction during passage through the injector nozzle (Myers & Olson, 1999), quality and shape of the injector tip (Kleinmann, Marcovich, Apple, & Mamalis, 2005; Stefaniu et al., 2003). Before this study, when the issue of IOL damage was discussed with the manufacturer, it was argued by the manufacturer that the most likely cause was a poor loading technique, which caused the haptics to get stuck when closing the loading chamber, resulting in the haptics breaking during the injection attempt, as a result of the intraocular IOL not being fully placed in the cartridge groove. This possibility was eliminated by the fact that all IOLs used in the study were folded and prepared for implantation only by an experienced research nurse. IOL damage may occur due to the folding person or folding technique, or due to a manufacturing error in the IOL or cartridge-injector system. Even in highly accepted products from companies with excellent quality control systems, defects can develop as a result of changes in the manufacturing process or packaging process. Therefore, the IOL should always be examined under an operating microscope before preparing for implantation (Milazzo, Turut, & Blin, 1996). There have been a few reports of damage to certain IOLs when using injector systems, possibly during implantation. Reported damages include scratches, stress fractures, cracks, and tear lines (Kleinmann & Apple, 2007). In this study, folding techniques were used when placing the lens into the injector system. They were compared in terms of jamming in the lens-injector system, mechanical damage to the IOL, using a second IOL when necessary, and complications during the operation. The effect of the X and Y methods used in IOL folding on the formation of jamming in the lens-injector system was found to be 24% in the X technique and 34.6% in the Y technique. Although the jamming rate is higher in the Y technique, this rate does not present a statistically significant difference between the techniques. If excessive resistance is detected to the forward movement of the IOL when it is injected into the eye from the injector system, other maneuvers should be stopped and the IOL should be re-inserted into a new cartridge after being examined under the microscope for damage. When damage to the IOL is detected due to jamming in the injector system, a second IOL is used instead of the damaged IOL, and the case is continued. Under these circumstances, it can be said that there is an increase in surgical time and cost in cases where the Y technique is used. A second IOL was used as a result of mechanical damage to the IOL occurred in 3 cases in the X technique and in 7 cases in the Y technique. In cases where damage to the IOL is detected after the IOL is inserted into the eye, the damaged IOL in the anterior chamber must first be cut with the help of micro scissors and removed from the eye in order to place a new IOL. The possibility of other complications increases depending on the maneuvers performed during such procedures and the positions taken by the IOL as a result of these maneuvers. When the IOL is removed from the incision site, complications such as wound enlargement, iris or descemet membrane damage, and associated anterior chamber hemorrhage may occur, which may require suturing when the case is finalized. At the same time, it is known that each new intervention in the surgical field increases the risk of infection, along with the increase in cost in each case where a new IOL is replaced with a damaged IOL. It has been stated that the IOL requires significant manipulation after being removed from the sterile packaging and before being placed in the eye, and such manipulations may increase the risk of bacterial contamination (Bainbridge et al., 1998). Considering that cataract surgeries are routinely performed under local anesthesia; it can be said that all these situations prolong the surgical time and increase both the operation-related stress on the patient and the surgical stress experienced by the surgeon and the scrub nurse. During the implantation stage, when the lens exits the cartridge and unfolds in the anterior chamber, complications related to the folding technique were compared. In one patient using the X technique, posterior capsule perforation occurred due to the anteriorly positioned lens haptic pressing against the capsule, while another patient experienced iris trauma caused by the haptic passing through the iris. In contrast, in one patient using the Y technique, Descemet's membrane detachment occurred due to the lens.

In IOLs folded with the X technique; by not folding the front haptic towards the optical part and releasing it to the front of the cartridge, the passage of the IOL through the lumen in the cartridge becomes easier and it can be said that less jamming occurs in the lens-injector system. While in the Y technique, the IOL becomes thicker as a result of folding both the front and rear haptics onto the optic. Due to this situation, it can be said that as it becomes more difficult for the IOL to pass through the lumen, more jamming occurs in the lens-injector system, and as the jamming rate increases, the possibility of mechanical damage to the IOL and the possibility of a second IOL using as a result of mechanical damage increases. In a similar study, it was proven that cracks may form on the cartridge after the IOL passes through the lumen, depending on the density of the viscoelastic agents used during IOL loading into the cartridge-injector system (Singh, Fang, & Rath, 1999).

CONCLUSION

The results obtained from the research are summarized below:

- Jamming in the lens-injector system and mechanical damage to the IOL were detected less in the patient group using the X technique than in the patient group using the Y technique.
- A second IOL using occurred less frequently in the patient group using the X technique than in the patient group using the Y technique.
- Lens-related complications were detected less in the patient group using the Y technique than in the patient group using the X technique.

Within these results, the differences between the two groups in terms of jamming in the lens-injector system, mechanical damage to the IOL, and lens-related complications were not found to be statistically significant. In conclusion, our study revealed that there was no significant difference between X and Y IOL folding techniques.

Acknowledgement
We gratefully would like to thank all the patients participating in the research.

Conflict of Interest
All the authors of this article declare that they have no conflicts of interest.

Author Contributions
Plan, design: AD; **Material, methods and data collection:** AD; **Data analysis and comments:** AD, SY; **Writing and corrections:** AD, SY.

Funding
The study received no external funding.

Ethical Approval
Institution: Haydarpasa Numune Training and Research Hospital Clinical Research Ethics Committee
Date: 15.03.2021
Approval no: 2021/80

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ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1621158

Development, Validity and Reliability of the Elderly Internalized Stigma Scale*

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Geliş Tarihi / Received: *16.01.2025,* ***Kabul Tarihi / Accepted:*** *23.03.2025*

ABSTRACT
Objective: The objective of this study is to develop the "Elderly Internalized Stigma Scale" (EISS) and to assess its validity and reliability. **Materials and Methods:** The study was conducted as a cross-sectional methodological study. In the study, the Elderly Internalized Stigma Scale (EISS) was developed, and its validity and reliability were tested. A total of 162 individuals aged 65 and above participated in the study. Participants administered a sociodemographic information questionnaire, the EISS, the World Health Organization Quality of Life Scale for Older Adults (WHOQOL-AGE), and the WHO-Europe Attitudes of Aging Questionnaire (EAAQ). The EISS consists of 17 items, three subdimensions (Awareness, Agreement, and Self-Application), and a total score designed to assess the level of internalized stigma among elderly individuals. The response options for the scale items are based on a three-point Likert-type scale, with higher scores indicating greater stigma. Psychometric analyses of the developed EISS were conducted using Lisrel 9.1 and SPSS 25.0 software. **Results:** Of the participants, 54.3% were women, with a mean age of 76.5 ± 7.9 years; 40.1% were uneducated, and 48.1% were currently married. The confirmatory factor analysis results indicated a good model fit, with RMSEA=0.042, chi-square/degrees of freedom=1.28, CFI=0.98, and Stand.RMR=0.052. For concurrent validity, there was a strong correlation between the EISS and the EAAQ (r=-0.83), while for discriminant validity, a strong correlation was observed between the EISS and WHOQOL-AGE scores (r=-0.78). The EISS demonstrated high discriminative power regarding variables such as age, education level, economic status, place of residence, and health perception. The scale's internal consistency coefficient (Cronbach's alpha) was 0.89 overall, with subdimension values of 0.82 for Awareness, 0.67 for Agreement, and 0.88 for Self-Application. **Conclusion:** The developed scale is a valid and reliable tool for measuring internalized stigma in elderly people.
Keywords: Aging, Internalized Stigma, Validity, Reliability.

Yaşlı İçselleştirilmiş Damgalanma Ölçeğinin Geliştirilmesi, Geçerlilik ve Güvenilirliği

ÖZ
Amaç: Araştırmanın amacı yaşlı içselleştirilmiş damgalanma ölçeğinin (YİDÖ) geliştirilmesi, geçerlilik ve güvenilirliğinin sınanmasıdır. **Gereç ve Yöntem:** Araştırma kesitsel olarak yürütülmüş metodolojik türdedir. Araştırmada YİDÖ geliştirilmiş, geçerlilik ve güvenilirliği sınanmıştır. Araştırmaya 65 yaş ve üzeri 162 birey katılmıştır. Katılımcılara sosyodemografik bilgileri anketi, YİDÖ, Yaşlılar İçin Yaşam Kalitesi Ölçeği (WHOQOL-AGE) ve Avrupa Yaşlanma Tutum Ölçeği (AYTA) uygulanmıştır. YİDÖ yaş almış bireylerde içselleştirilmiş damgalanma düzeyini belirlemek üzere 17 soru ve 3 alt boyut (farkına varma, onaylama ve kendine uygulama) ile bir toplam puandan oluşmaktadır. Ölçek maddelerinin yanıt seçenekleri üç noktalı likert tipindedir. Artan puan damgalanma durumunu gösterir. Geliştirilen YİDÖ ölçeğinin psikometrik analizlerinde Lisrel 9.1 ve SPSS 25.0 programları kullanılmıştır. **Bulgular:** Katılımcıların %54.3'ü kadın, yaş ortalaması 76.5±7.9, %40.1'i eğitimsiz, %48.1'i halen evlidir. Doğrulayıcı faktör analizi sonuçlarına göre RMSEA=0.042, ki-kare/serbestlik derecesi=1.28, CFI=0.98 ve Stand.RMR=0.052 düzeyinde iyi uyumu göstermekteydi. Eş zaman geçerliliğinde AYTA ve ayırt edici geçerlilikte WHOQOL-AGE puanları ile YİDÖ arasında yüksek düzeyde korelasyon (sırasıyla r=-0.83 ve r=-0.78) vardı. YİDÖ yaş, eğitim, ekonomik durum, yaşanılan yer ve sağlık algısı gibi durumları yüksek düzeyde ayırt edebilmekteydi. Ölçeğin iç tutarlılık katsayısı Cronbach's alfa değeri 0,89; farkına varma, onaylama ve kendine uygulama alt boyutları için sırasıyla 0.82, 0.67 ve 0.88'di. **Sonuç:** Geliştirilen ölçek yaşlılıkta içselleştirilmiş damgalanmayı ölçebilen geçerli ve güvenilir bir ölçektir.
Anahtar kelimeler: Yaşlılık, İçselleştirilmiş Damgalanma, Geçerlilik, Güvenilirlik.

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Bu makaleye atıf yapmak için / Cite this article: *Karasoy, G. & Baydur, H.* (2025). Development, validity and reliability of the elderly internalized stigma scale. *BAUN Health Sci J, 14*(2), 251-263. https://doi.org/10.53424/balikesirsbd.1621158

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

Population aging is defined as the increase in the number of elderly individuals (those aged 65 and older) alongside a decrease in the proportion of children and young people. If a country's population increasingly consists of individuals aged 65 and over, it indicates that the society is progressively aging (WHO, 2015).

According to the data from the Turkish Statistical Institute for the year 2019, the population of Turkey is 83,154,997. The elderly population, as of 2019, is 7,550,727. The proportion of the elderly population in relation to the total population is 9.1%. Of the elderly population, 44.2% are men and 55.8% are women. Although Turkey has a relatively young population structure, the number of elderly individuals within the total population is quite significant (TÜİK, 2020).

Aging is a multifaceted concept in social life, to which individuals assign their own meanings. During the aging process, a decline in an individual's ability to adapt to the environment, a reduced capacity to maintain balance in response to internal and external factors, and an increased probability of death are all defined as "aging." (Yumurtacı, 2013). The process that begins with birth and is measurable in years is defined as "age." Individuals whose age advances are referred to as "elderly," and the condition of being elderly is termed "old age" (Ak, 1991). The World Health Organization (WHO), in defining old age, bases its definition on chronological age, categorizing the period of old age as "65 years and older." This definition further categorizes the elderly population into subgroups: the 65-74 age group is classified as "young old," the 74-84 age group as "old," and the 85 and older age group as "oldest old" (Tezcan & Seçkiner, 2012).

Chronological age does not provide sufficient information about the process or nature of aging. For this reason, researchers do not approach aging solely from a biological or chronological perspective. Aging can also be understood when examined through psychological, social, and cultural dimensions. Therefore, it is suggested that researchers should focus on the experiences that give meaning to age rather than concentrating solely on chronological age. (Aközer et al., 2011). Old age, conceptually, refers to the physiological and biological changes that occur in an individual over time. It also represents a period in which people experience declines in physical and psychological abilities (Beğer & Yavuzer, 2012).

Gerontologists primarily focus on three fundamental questions regarding the aging process: understanding how aging processes develop, explaining why they occur in this manner, and determining whether it is possible to influence these processes. Geriatrics, on the other hand, approaches aging from a medical perspective, aiming to evaluate, treat, and prevent age-related diseases. The World Health Organization defines old age as a "decline in the capacity and ability to adapt to the environment." Aging is an irreversible process of decline that encompasses chronological, psychological, sociological, and biological dimensions. This process continues throughout an individual's lifetime (Ardahan, 2010).

The aging period is characterized by various structural and physiological changes in the body. These include a decrease in muscle mass and bone density, a decline in vision and hearing abilities, and a loss of skin elasticity. Additionally, structural deterioration may manifest as slowed movements, reduced manual dexterity, and impaired walking abilities (Beğer & Yavuzer, 2012; Moreland et al., 2021; World Health Organization, 2015).

It is well known that various psychological issues arise during the aging period. These include depression, anxiety, loneliness, and cognitive decline. Specifically, geriatric depression, cognitive impairments, the development of Alzheimer's disease, increased physical limitations, and social isolation are significant problem areas for this stage of life (Luppa et al., 2012; Panza et al., 2010). Despite this general information, it has also been reported that the prevalence of depression and anxiety decreases with increasing age during the aging period (Streiner et al., 2006).

Stigma, in its literal sense, refers to meanings such as "wound, mark, stain, puncture, black mark" (Öztürk & Uluşahin, 2011). Stigmatization is a concept used to describe actions that harm individuals and communities, such as humiliating, demeaning, discriminating, and perceiving them as inferior (Yaman & Güngör, 2013). Stigmatization is defined as a form of differentiation or discrimination that arises from stereotypical thoughts related to certain characteristics of individuals (Çam & Çuhadar, 2011). The stigma refers to the perception that a person, group, or community is different. These differences attach many negative attributes to the stigmatized individual or group (Taşkın, 2007).

The existing literature defines three types of stigma: structural stigma, social stigma, and internalized stigma. "Structural stigma" is related to systems, "social stigma" pertains to groups, and "internalized stigma" involves individuals (Doğanavşargil Baysal, 2013). Internalized stigma is defined as the process by which individuals adopt negative stereotypes present in society, leading to feelings of shame, worthlessness, and inadequacy, and consequently withdrawing from social life. In simpler terms, internalized stigma refers to an individual stigmatizing themselves (Corrigan, 1998).

Internalized stigma refers to the process in which individuals adopt negative labels imposed by society or their environment, integrating them into their sense of self and allowing these labels to influence their behavior. This phenomenon has significant implications in both psychological and social contexts, as carrying an internalized stigma can damage individuals' self-perception and lead to

various negative outcomes in their social interactions (Corrigan & Watson, 2002; Livingston & Boyd, 2010).

Internalized stigma in old age refers to the adoption of negative perceptions attributed to older individuals by society. Like other members of society, older individuals acquire numerous stereotypes throughout their developmental stages. Inevitably, they internalize stereotypes related to aging and older individuals, identifying themselves as part of that group (Çam & Çuhadar, 2011).

The process of internalized stigma in old age unfolds in three stages: awareness of stereotypes, acceptance of stereotypes, and application of stereotypes to oneself. Stereotypes are understood as beliefs that are resistant to change once they are formed. They represent thoughts and statements supported by negative biases, assumed to be true, and widely accepted by large segments of society (Doğanavşargil Baysal, 2013). Older adults are exposed to and internalize various stereotypes about aging and old age over the course of their lives. These stereotypes are often reinforced and disseminated through multiple cultural and social mechanisms, including media, literature, and traditional customs. As individuals age, they may unconsciously adopt these societal narratives, normalize the attributed stereotypes, and adjust their behavior to align with these preconceived notions. This process not only shapes their self-perception but also facilitates the internalization of stigma associated with aging.

The aim of this study is to develop an elderly internalized stigma scale and to test its validity and reliability.

MATERIALS AND METHODS

Study design

This study is methodological research aimed at developing the Elderly Internalized Stigma Scale (EISS) and evaluating its validity and reliability.

Study group

The study group consisted of 162 elderly individuals. The size of the research group was determined based on the guideline of including a number of participants equal to at least 5 to 10 times the number of items in the scale (Tavşancıl, 2005). Participation in the study was based on voluntary consent. The Mini-Mental State Examination (MMSE) (Keskinoğlu et al., 2009) was administered to identify participants, and elderly individuals aged 65 and above who did not meet the criteria for dementia were included in the research. Among the participants who met these criteria, 54.3% (n=88) were women, with a mean age of 76.5±7.9 years. The age range spanned from 65 to 94 years. Of the elderly individuals, 40.1% had no formal education, 43.2% had completed primary education, and 16.7% had attained secondary education or higher. Additionally, 48.1% were currently married, 72.8% resided in urban areas, and 16.7% reported their economic status as insufficient/poor.

Data collection tools

The data for this study were collected using the following tools:

Elderly Internalized Stigma Scale (EISS): The Elderly Internalized Stigma Scale (EISS) was developed by researchers to assess the level of internalized stigma associated with aging among older individuals. The scale has undergone validity and reliability testing. It consists of 17 items grouped into three subdimensions—awareness of stereotypes, agreement with stereotypes, and self-application of stereotypes—in addition to providing a total score. The total score serves as an indicator of the overall level of internalized stigma.

The response options for the items on the scale are designed as a three-point Likert type. These options are coded as "Agree" (2 points), "Neither Agree Nor Disagree" (1 point), and "Disagree" (0 points). If at least 75% of the responses for a specific sub-dimension are marked, the score for that sub-dimension is calculated. In the scoring process, the average of the items within the relevant sub-dimension is first calculated. The resulting value, which ranges between 0 and 2, is then multiplied by 50 to obtain a rescaled sub-dimension score ranging from 0 to 100. The mean of the scores for the three sub-dimensions is calculated to determine the total score of the scale, referred to as the "Elderly Internalized Stigma Scale" total score. A higher total score indicates a greater level of negative stigma. In other words, it reflects a stronger awareness, acceptance, and application of stereotypes within the sub-dimensions, as well as a higher overall level of internalized stigma (Appendix 1).

The World Health Organization Quality of Life Scale for Older Adults (WHOQOL-AGE) : The scale developed for older adults is a quality of life scale specifically designed for individuals aged 60 and above (Caballero et al., 2013). The WHOQOL-AGE, developed based on the WHOQOL-OLD and EUROHIS scales, is a 13-item, 5-point Likert scale designed to assess the quality of life in older adults. Participants are asked to select the most appropriate response for each question based on their feelings, with scores ranging from 1 to 5. The response options vary according to the phrasing of each question. The scale consists of two subdomains. The WHOQOL-AGE, for which validity and reliability analyses were conducted by Özcan and Eser (2020), has Cronbach's alpha coefficients of 0.90 for the first dimension and 0.86 for the second dimension. The scale was used to test the discriminant validity of the developed EISS.

Mini Mental State Examination (rMMSE-T): The mental functioning status of participants, which was one of the inclusion criteria for the study, was assessed using the Mini Mental Test. The validity and reliability study of the Turkish version of the rMMSE-T, which was designed for both educated and uneducated groups, was conducted by Keskinoğlu and colleagues in 2009 (Keskinoğlu et al.,

2009). The rMMSE-T consists of 19 questions, with a total score of 30 points. The scores are calculated based on orientation (10 points), registration memory (3 points), attention and calculation (5 points), recall (3 points), and language (9 points). The cutoff score is 22/23 for the educated group and 18/19 for the uneducated group. The tests were administered to the elderly participants based on their educational status. If the elderly participant scored above the cutoff, they were included in the study.

WHO-Europe Attitudes of Aging Questionnaire (EAAQ): The Turkish version of the World Health Organization- Europe Attitudes of Aging Questionnaire (EAAQ) is a scale adapted by Eser and colleagues in 2011. The scale consists of three dimensions, each containing 8 questions. It includes 24 items in total, covering psychosocial loss, bodily change, and psychosocial development. Each question has Likert-type response options ranging from 1 to 5. The dimension scores are calculated by summing the relevant items. The total score for attitude towards aging is the sum of the dimensions scores (Eser et al., 2011). In this study, the WHO-EAAQ was used for the analysis of convergent validity.

Development Process of the Elderly Internalized Stigma Scale (EISS) : In the scale development process, the conceptual framework was initially established, an item pool was created, and a content analysis was conducted. Subsequently, validity and reliability analyses were performed following the pilot study and field application of the obtained form.

Development of the conceptual framework for the Elderly Internalized Stigma Scale (EISS*) :*A comprehensive review of the literature on stigma was undertaken to explore its conceptual framework, including its components, characteristics, dimensions, and types. This analysis provided a foundation for understanding the multifaceted nature of stigma and its relevance to the study (Öztürk & Uluşahin, 2011). Subsequently, the focus shifted to the concept of internalized stigma, a specific type of stigma, to examine how it has been addressed across various groups. This exploration provided insights into the application and impact of internalized stigma in different contexts (Corrigan, 1998).

The "Why Try Effect" model was used as the basis for identifying the conceptual dimensions of internalized stigma. According to this model, internalized stigma comprises three stages: "awareness of stereotypes," "acceptance of stereotypes," and "application of stereotypes" (Corrigan et al., 2009). In this model, whether an individual has internalized stigma is determined based on their acceptance of these stages. Concrete characteristics related to aging, organized under three dimensions, were used as scale items to assess the individual's internalization of stigma.

Development of EISS dimensions and related items

To identify which characteristics of aging could be associated with stigma, a comprehensive review of the aging literature was conducted. In order to conceptualize the tangible attributes that lead to stigma, the physical, psychological, cognitive, and social aspects of aging were examined based on some of the most widely accepted definitions of aging (Pehlivan & Karadakovan, 2013).

A pool of 62 items addressing the physical, psychological, cognitive, and social dimensions of aging was developed. Based on the literature review, these 62 items were drafted in alignment with the subdimensions of the "Why Try Effect" model: awareness of stereotypes, acceptance of stereotypes, and application of stereotypes. This process resulted in the creation of the initial scale draft (Corrigan et al., 2009).

Testing content validity

At this stage, expert opinions were sought to evaluate the relevance of the scale items to the subject, their necessity, simplicity, clarity, comprehensibility, and suitability for the target audience (Karakoç & Dönmez, 2014). The number and qualifications of experts are crucial for testing content validity and ensuring that the calculations yield objective results (Yurdugül, 2005). The content validity of the scale was evaluated by consulting experts in the fields of gerontology, psychology, health and social sciences. Ten experts in the field were contacted via email to participate in the evaluation process. The experts were asked to assess the scale items in terms of their relevance to stigma, simplicity, clarity, and the appropriateness of the response options. Additionally, they were requested to indicate whether any items were similar to others and to provide suggestions, if applicable (Polit & Beck, 2006).

The Item Content Validity Index (I-CVI) and the Scale Content Validity Index (S-CVI) were calculated. An I-CVI value > 0.78 and an S-CVI value > 0.80 were considered acceptable (Çapık et al., 2018; Polit & Beck, 2006; Yeşilyurt & Çapraz, 2018). Items with an S-CVI ≤ 0.80 and I-CVI ≤ 0.78 were removed from the item pool based on expert feedback. Additionally, 24 items were reported by experts to be similar to others. Following the recommendations provided by the experts, the item pool was revised, and the draft scale was reduced to 37 items.

Pilot and field testing of the EISS

The 37-item EISS form was administered to 10 older adults who achieved sufficient scores on the Mini-Mental Test during cognitive interviewing. For each participant, a Cognitive Interviewing Form was completed, noting gender, chronic illnesses, survey completion time, and general observations. Participants were asked questions such as, “Was the explanation of the survey difficult?”, “Did you find this question hard to understand?”, “How else could this question be asked?”, and “Do you think the

response options are clear and consistent?". Their answers were recorded. Based on the feedback from the cognitive interviews, the scale form was revised and finalized. The response options were structured as follows: 1-Agree, 2-Neither Agree nor Disagree, 3-Disagree.

The field application of the scale was conducted with elderly individuals who achieved sufficient scores on the Mini-Mental Test. Along with the 37-item scale, sociodemographic characteristics form and other scales used for comparisons were administered concurrently. Additionally, scale items were re-administered to 30 randomly selected participants two weeks after the initial session.

Validity and reliability analysis of the EISS

In the validity and reliability analyses of the Elderly Internalized Stigma Scale (EISS), a combination of exploratory and confirmatory approaches was employed to develop its final version. Initially, the item pool, consisting of 37 statements, underwent exploratory factor analysis (EFA). Principal component analysis was utilized as the extraction method, and varimax rotation was applied for factor rotation.

In parallel with the EFA, items representing the scale's dimensions were individually analyzed in terms of internal consistency using Cronbach's alpha coefficient, item-deleted Cronbach's alpha values, and item-total correlation coefficients. Based on the findings, some items were removed from the scale. The criteria for item removal were as follows: (Bindak, 2005; Gökdemir & Yılmaz, 2023; Şahin & Gülleroğlu, 2013):

- The factor loading of the item within its designated dimension being below 0.4,
- An increase in the Cronbach's alpha value when the item is deleted,
- The correlation coefficient of the item with other dimensions being higher than its correlation with its own dimension,
- The corrected item-total correlation coefficient being below 0.3.

EISS items were refined based on the criteria outlined above, resulting in the final version of the scale. To assess the construct validity of the scale, both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were performed. The concurrent validity of the EISS was evaluated using the WHO-EAAQ, while the criterion validity was assessed with the WHOQOL-AGE scale. Known-groups validity was examined by analyzing the

Construct validity

Exploratory and confirmatory factor analyses were performed to evaluate the construct validity of the EISS. Following item reduction, the scale was finalized with 17 items. The results of the exploratory factor analysis (EFA), including the factor loadings, are presented in Table 1. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was calculated as 0.881, and Bartlett's test of sphericity indicated significant correlations among the items ($p<0.001$), supporting the appropriateness of the data for factor analysis. The EFA, based on an eigenvalue threshold of 1, identified a three-factor structure. These three factors accounted for a cumulative variance of 55.9%. A factor loading of 0.35 or higher was deemed sufficient for an item to be assigned to its respective factor.

relationship between various sociodemographic characteristics and the subscale and total scores of the EISS using Student's t-test, with results presented in terms of significance levels and Cohen's d effect size values. For reliability analysis, Cronbach's alpha coefficients were calculated to determine internal consistency. Additionally, the scale's test-retest reliability over time was assessed using the intraclass correlation coefficient (ICC).

In the statistical analysis of the data obtained in this study, Lisrel 9.1 and Statistical Package for the Social Sciences (SPSS 25.0) software programs were used.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The ethics committee approval of the study was obtained from the Ethics Committee of Faculty of Medicine, Manisa Celal Bayar University (decision date: November 16, 2018; decision number: E. 97856). After they were informed about the study, the participants gave their informed consent form indicating that they volunteered to participate in the study.

RESULTS

The psychometric findings obtained from the study are presented under two main categories: reliability and validity.

Reliability results

In the reliability analyses of the study, Cronbach's alpha values, which indicate the level of internal consistency, were calculated alongside the Cronbach's alpha values when items were deleted. Additionally, the correlation coefficient of each item with its respective dimension was obtained (Table 1).

The internal consistency coefficients (Cronbach's alpha) for the awareness, agreement, and self-application dimensions of the scale are 0.82, 0.67, and 0.88, respectively. The internal consistency coefficient for the overall scale is 0.89. No dimension showed an increase in Cronbach's alpha value when any item was deleted. The lowest item-dimension correlation coefficient is 0.39. The intraclass correlation coefficients (ICCs) calculated for test-retest reliability are 0.98, 0.98, and 0.99, respectively. These findings indicate that the scale provides stable results over time.

Table 1. Cronbach's alpha, cronbach's alpha when item deleted, item-total correlation coefficients, and EFA results.

EISS		Reliability results			EFA loadings for EISS Dimentions		
No	**Dimensions/Items**	**Corrected Item-Dimension Correlation**	**Cronbach's Alpha When Item Deleted**	**Cronbach's Alpha**	**Awareness**	**Agreement**	**Self-Application**
	Awareness						
	Aging…						
1	… is the stage when learning becomes harder.	0.491	0.822	**0.82**	0.609	0.253	0.049
2	… is loneliness.	0.565	0.804		0.632	0.207	0.212
3	… is being less valued by others.	0.659	0.777		0.773	0.076	0.253
4	… is being a burden to the family.	0.700	0.764		0.777	0.203	0.149
5	… is feeling useless.	0.684	0.769		0.727	0.080	0.366
	Agreement						
	As people get older…						
6	… they lose strength for daily tasks.	0.435	0.632	**0.67**	0.225	0.681	0.099
7	… their sleep patterns get disrupted.	0.499	0.585		0.228	0.681	0.112
8	… they generally move more slowly.	0.485	0.611		0.446	0.524	0.097
9	… they become more careless.	0.474	0.601		0.526	0.369	0.193
10	… they get more sensitive compared to the past.	0.388	0.651		0.072	0.666	0.166
	Self-application						
	Because I'm aging…						
11	…I need more help from others.	0.787	0.842	**0.88**	0.193	0.154	0.825
12	…I don't enjoy life as much as I used to.	0.602	0.867		0.240	0.165	0.647
13	…I need more attention from others.	0.700	0.854		0.172	0.150	0.760
14	…I feel like I'm not useful anymore.	0.658	0.860		0.244	0.046	0.719
15	…I think more about death.	0.530	0.876		0.000	0.205	0.641
16	…My relationships with others have weakened.	0.681	0.857		0.231	0.043	0.747
17	…My manual skills have declined.	0.661	0.859		0.145	0.045	0.753
	Total EISS			**0.89**			

The factor structure obtained from the exploratory factor analysis (EFA) was subjected to confirmatory factor analysis (CFA). Based on the EFA results, the scale comprises three dimensions: Awareness, Agreement, and Self-Application. The total of these dimensions represents the level of internalized stigma experienced by the elderly. In other words, the scale includes three subdimensions and one total score.

Given this structure, the confirmatory factor analysis was conducted as a second-order factor analysis. A graphical representation of the applied analysis is provided figure 1.

The summary fit indices obtained from the confirmatory factor analysis indicate RMSEA = 0.042, chi-square/degree of freedom = 1.28, CFI = 0.98, and Standardized RMR = 0.052, suggesting a good model fit. The error variances of the scale items were found to be moderate, and the standardized coefficients indicating the relationship of each item with its respective dimension were also at a moderate level. The standardized coefficients representing the relationship between the dimensions and the overall construct were 0.93 for Awareness, 0.85 for Agreement, and 0.63 for Self-Application. Taken as a whole, the scale demonstrates that the measurement model aligns well with the conceptual model, indicating a satisfactory fit.

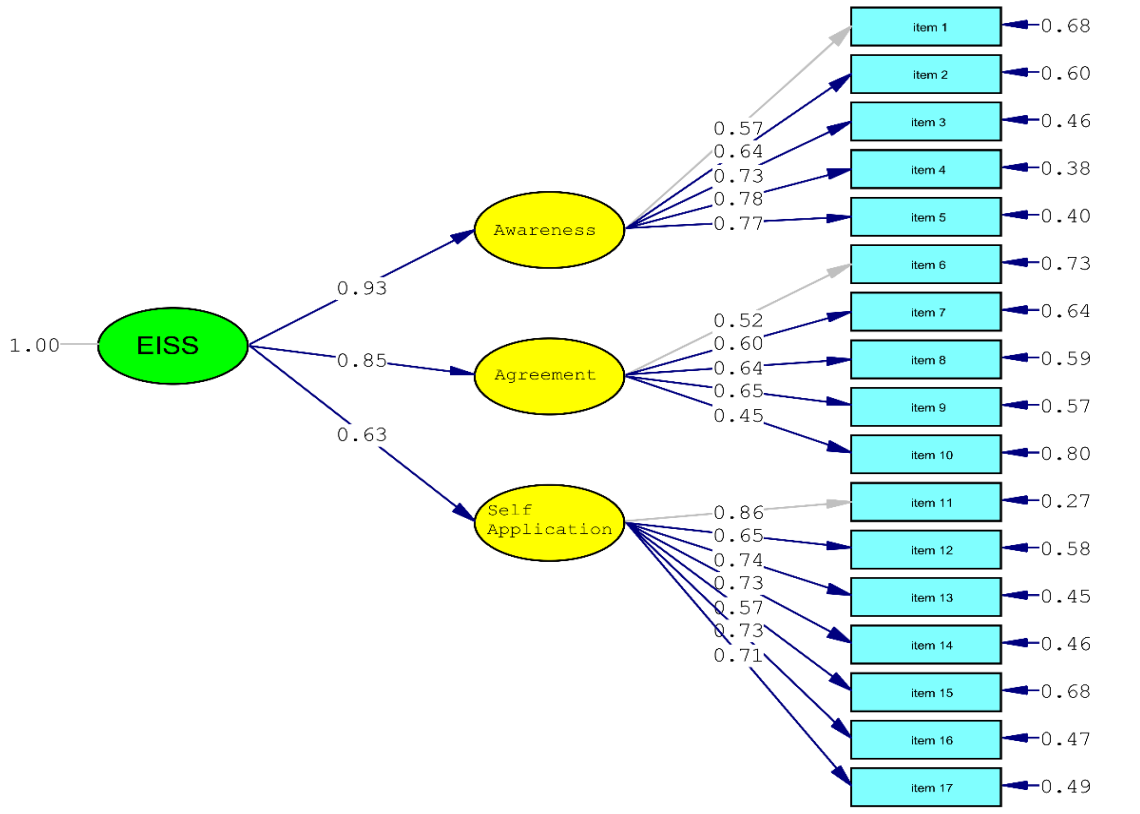

Figure 1. Results of confirmatory factor analysis for the EISS.

Concurrent validity

The subdimensions and total score of the scale are expected to exhibit high correlations with the scores obtained from scales measuring similar constructs. For this purpose, the WHO-Europe Attitudes of Aging Questionnaire (EAAQ) was administered in the study. The questionnaire consists of three subdimensions and a total score (Eser et al., 2011). The subdimensions are Psychosocial Loss, Bodily Change, and Psychosocial Growth. The correlation coefficients calculated between the Elderly Internalized Stigma Scale (EISS) and the WHO-Europe Attitudes of Aging Questionnaire (EAAQ) are presented in Table 2.

Table 2. Correlation Between EISS and EAAQ subscales.

Dimensions	Awareness	Agreement	Self-Application	EISS Total
Psychosocial Loss	0.645**	0.522**	0.869**	0.860**
Physical Change	-0.514**	-0.393**	-0.844**	-0.755**
Psychological Growth	-0.511**	-0.390**	-0.750**	-0.705**
EAAQ Total	-0.598**	-0.468**	-0.880**	-0.830**

** p<0.0

The total score of the EISS shows a high negative correlation with the total score of the EAAQ at -0.830. Additionally, the correlation coefficients between the total score of the EISS and the subdimensions of the EAAQ -Psychosocial Loss, Physical Change, and Psychological Growth- are 0.860, -0.755, and -0.705, respectively. These strong correlation coefficients indicate the effectiveness of the EISS in measuring the intended construct.

Table 3. Correlation coefficients between EISS and WHOQOL-AGE scores.

WHOQOL-AGE	Awareness	Agreement	Self-Application	EISS Total
General QoL	-0.520**	-0.385**	-0.891**	-0.778**
Elderly QoL	-0.483**	-0.388**	-0.876**	-0.756**
Total QoL	-0.509**	-0.392**	-0.895**	-0.778**

** p<0.01

Discriminant validity

Examining the relationship between the developed measurement tool and certain outcome variables is essential. In this study, the correlation coefficients between the subdimensions and total score of the WHOQOL-AGE and the subdimensions and total score of the EISS were analyzed (Table 3).

The analysis of the correlation coefficients revealed a strong negative correlation between the total score of the Elderly Internalized Stigma Scale (EISS) and the total quality of life score of the WHOQOL-AGE (r=0.778). Additionally, the EISS score was found to have a strong negative correlation with both the general and elderly quality of life subdimensions (r=-0.778 and r=-0.756, respectively). Among the EISS subdimensions, Awareness showed a moderate negative correlation (r=-0.509), Agreement demonstrated a low negative correlation (r=-0.392), and Self-Application exhibited a strong positive correlation (r=0.895) with the total quality of life score of the WHOQOL-AGE. These findings indicate that the EISS effectively predicts quality of life outcomes.

Known-Groups validity

In the known-groups validity analysis, the subdimension and total scores of the EISS were compared with variables such as gender, age, economic status, educational level, living arrangements, and perceived health using Student's t-test. The results were presented in terms of mean differences and effect sizes (ES).

It was determined that the total and subdimension scores of the Elderly Internalized Stigma Scale (EISS) did not show a significant difference based on gender. Additionally, no significant relationship was observed between age and economic status in the Agreement subdimension. However, all other variables (age, educational level, economic status, living arrangements, and perceived health status) demonstrated a highly significant relationship with the total EISS score, along with substantial effect sizes. These findings indicate that the EISS is capable of distinguishing between selected sociodemographic variables.

Table 4. Comparison of EISS total and subdimension scores with selected sociodemographic characteristics.

Variables	Awareness		Agreement		Self-Application		EISS Total	
	MD	d	MD	d	MD	d	MD	d
Gender (female – male)	-2.67	0.10	0.29	0.01	2.17	0.06	-0.07	0.00
Age (≤74 – ≥75)	15.17	**0.56*****	4.99	0.25	42.89	**1.63*****	21.02	**1.05*****
Educational level (educated – uneducated)	-14.36	**0.52*****	-8.89	**0.44****	-30.04	**0.96*****	-17.77	**0.83*****
Economic status (good – poor)	-23.78	**0.67*****	-6.07	0.23	-34.07	**1.79*****	-21.31	**0.75*****
Living arrangements (with family – alone/nursing home)	-18.94	**0.72*****	-10.39	**0.53*****	-37.46	**1.30*****	-22.26	**1.12*****
Perceived health (good – moderate/poor)	21.53	**0.82*****	12.51	**0.64*****	47.61	**1.91*****	27.22	**1.48*****

MD: Mean Differences; d: Cohen's d; Effect Size (ES): (Cohen's d) 0.3 = small, 0.5 = medium, 0.8 = large

* p<0.05, ** p<0.01, *** p<0.001

DISCUSSION

This scale, designed to measure the internalized stigma levels of elderly individuals, is based on the conceptual framework of the "Why Try Effect" model proposed by Corrigan et al. (2009). In this model, the dimensions of awareness of stereotypes, agreement with stereotypes, and self-application of stereotypes constitute internalized stigma. The scale's structure and item pool were developed with these three dimensions in mind. In constructing the scale items, the broadest definitions of aging were considered, addressing the physical, psychological, cognitive, and social characteristics of the elderly during this life stage (Pehlivan & Karadakovan, 2013). All developed items were reviewed by a panel of ten experts. Based on expert feedback and the resulting content validity

indices, the number of items was reduced to 37 (Polit & Beck, 2006; Yeşilyurt & Çapraz, 2018). The decisions for item reduction were guided by the consistency among expert opinions, item redundancy, and other evaluation criteria.

The scale was refined for field application following pilot testing and cognitive interviews. Validity and reliability analyses were conducted based on the results obtained after the field application. Items were removed based on these analyses, and the final analysis included 17 items. Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were employed to evaluate the construct validity of the scale. The EFA results indicated a Kaiser-Meyer-Olkin (KMO) value of 0.881, demonstrating that the sample size was sufficient. Bartlett's test of sphericity yielded a significance level of $p<0.001$, confirming adequate correlations among the scale items (Field, 2018). The cumulative variance explained by the three-factor structure of the scale was determined to be 55.9%. The factor loadings of the items within the predetermined factors ranged between 0.37 and 0.83. These results were deemed sufficient to support the three-dimensional structure of the scale (Hair et al., 2019; Henson & Roberts, 2006).

A second-order confirmatory factor analysis was conducted based on the item-dimension structure obtained from the exploratory factor analysis (EFA). The summary fit indices indicated good model fit and low error, with RMSEA = 0.042, chi-square/degree of freedom = 1.28, CFI = 0.98, and Standardized RMR = 0.052 (Kline, 2011; Schermelleh-Engel et al., 2003). The summary goodness-of-fit indices for the scale are within acceptable limits. In its current form, the scale demonstrates a strong structural fit. Additionally, the error variances of the items, as well as the item-subdimension and subdimension-scale values, were found to be consistent and at an adequate level.

In the concurrent validity analysis, the correlation coefficient with the WHO-Europe Attitudes of Aging Questionnaire (EAAQ) was found to be significantly high across all subdimensions and the total score ($r = -0.83$). The strong result obtained from concurrent validity, which is considered one of the criteria related to discriminant validity, indicates that the scale possesses a high level of validity (Shultz et al., 2020). Another comparison used to test the discriminant validity of the scale was the examination of the coefficients with the WHOQOL-AGE. The results indicated that the total and subdimension scores of the Elderly Internalized Stigma Scale (EISS) demonstrated a strong correlation with the subdimensions and total score of the WHOQOL-AGE. These findings suggest that the scale has a high level of discriminant validity (DeVellis & Thorpe, 2021; Shultz et al., 2020). Another validity assessment involved comparisons of known-groups validity. In these comparisons, the significance of the difference between two groups and the corresponding effect size were calculated (Cohen, 1988; Robitail et al., 2006). The results indicated that, except for gender, variables such as age, educational level, economic status, living arrangements, and perceived health status showed significant differences in the subdimension and total scores of the Elderly Internalized Stigma Scale (EISS). These differences were observed to be at a high level (Cohen, 1988). These results demonstrate that the scale is effective in distinguishing between known groups (DeVellis & Thorpe, 2021).

The internal consistency coefficient, as measured by Cronbach's alpha, was 0.89 for the total scale and 0.82, 0.67, and 0.88 for the Awareness, Agreement, and Self-Application subdimensions, respectively. These results indicate that the internal consistency of the scale is at an adequate level (Loewenthal & Lewis, 2001; Nunnally & Bernstein, 1994; Shultz et al., 2020). To determine the scale's stability over time, repeated measurements were conducted with 30 participants after a two-week interval. The intraclass correlation coefficient (ICC) was calculated as 0.99 for the total scale and 0.98, 0.98, and 0.99 for the Awareness, Agreement, and Self-Application subdimensions, respectively (Portney & Watkins, 1993). These results are significant in demonstrating the scale's consistency over time.

Limitations of the study

This study was conducted cross-sectionally on a small group, which may limit its ability to fully represent internalized stigma among elderly individuals. Additionally, it would be beneficial to administer the developed scale to larger groups and recalculate its validity and reliability measures. Another limitation of this study is the inability to test the sensitivity of the scale to changes over time. The scale's temporal sensitivity should be evaluated, particularly for assessing the effectiveness of interventions or examining the impact of significant life events.

CONCLUSION

Based on the results of the analyses, the Elderly Internalized Stigma Scale (EISS) has been determined to be a valid and reliable instrument. EISS demonstrates both construct and criterion validity. It effectively distinguishes known characteristics and produces stable and consistent results. The scale has successfully undergone all stages of development, implementation, and analysis, making it a suitable tool for measuring the level of internalized stigma among elderly individuals.

Acknowledgements

We would like to extend our sincere thanks to older adults who volunteered to participate in the present study.

Conflict of Interest

The author declares no potential conflicts of interest regarding the research, authorship, and/or publication of this article.

Author Contributions
Plan, design: GK, HB; **Material, methods and data collection:** GK, HB; **Data analysis and comments:** GK, HB; **Writing and corrections:** GK, HB.

Funding
The author(s) received no financial support for the research, authorship, and/or publication of this article.

Ethical Approval
Institution: Ethics Committee of Faculty of Medicine, Manisa Celal Bayar University
Date: 16.11.2018
Approval no: E. 97856

**This research was produced as a part of Gizem Bıyıklı Karasoy's thesis titled "The relationship of internalized stigma and social support with well-being and depression among the elderly".*

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Appendix 1.

YAŞLI İÇSELLEŞTİRİLMİŞ DAMGALANMA ÖLÇEĞİ

Açıklama:

Bu anket genel olarak yaşlılık ile ilgili bazı ifadeleri içermektedir. Ayrıca sizin yaşlılığa yönelik görüş ve düşüncelerinizi de sormaktadır. Ankette her bir ifadeyi ilgili bölüm içerisinde dikkatlice okuyunuz. Bu ifadeye katılıp katılmadığınızı yandaki size uygun seçeneklere bakarak işaretleyiniz. Her bir yanıtınız bizim için oldukça önemlidir. Boş seçenek bırakmamaya özen gösteriniz.

Yaşlılık…	**Katılıyorum**	**Emin Değilim/ Kararsızım**	**Katılmıyorum**
… öğrenmenin zorlaştığı çağdır (s1)	1☐	2☐	3☐
… yalnızlıktır (s2)	1☐	2☐	3☐
… insanlar tarafından daha az önemsenmektir (s3)	1☐	2☐	3☐
… aileye yük olmaktır (s4)	1☐	2☐	3☐
… işe yaramaz olmaktır (s5)	1☐	2☐	3☐
İnsanlar yaşlandıkça …			
… gündelik işleri için gücü kuvveti azalır (s6)	1☐	2☐	3☐
… uyku düzeni bozulur (s7)	1☐	2☐	3☐
… genellikle yavas haraket ederler (s8)	1☐	2☐	3☐
… daha dikkatsiz olurlar (s9)	1☐	2☐	3☐
… geçmişe göre daha fazla alıngan olurlar (s10)	1☐	2☐	3☐
Yaşlandığım için …			
… diğer insanların yardımına daha fazla ihtiyaç duyuyorum (s11)	1☐	2☐	3☐
… eskisi kadar hayattan zevk almıyorum (s12)	1☐	2☐	3☐
… insanların ilgisine daha fazla ihtiyaç duyuyorum (s13)	1☐	2☐	3☐
… artık işe yaramadığımı hissediyorum (s14)	1☐	2☐	3☐
… ölümü daha fazla düşünüyorum (s15)	1☐	2☐	3☐
… çevrem ile ilişkilerim zayıfladı (s16)	1☐	2☐	3☐
… el becerilerim azaldı (s17)	1☐	2☐	3☐

**** Yaşlı İçselleştirilmiş Damgalanma Ölçeği- SPSS puan hesaplama syntax ***.*
**** Ölçek maddelerinin değişken adlarını SPSS veri tabanına s1, s2, s3, …, s17 olarak tanımlayınız. Aşağıdaki komutlarını SPSS syntax editörüne kopyalayıp yapıştırın ve çalıştırın (RUN). Puanlarınız 0-100 aralığında olacak şekilde veri tabanının sonunda dört sütun olarak işlenecektir. ***.*

```
COMPUTE farkinavarma=((mean.4(s1,s2,s3,s4,s5) *(-1)) + 3) * 50.
COMPUTE onaylama=((mean.4(s6,s7,s8,s9,s10) *(-1)) + 3) * 50.
COMPUTE uygulama=((mean.5(s11,s12,s13,s14,s15,s16,s17) *(-1)) + 3) * 50.
COMPUTE damgalama=mean(farkinavarma,onaylama,uygulama).
EXECUTE.
```

ELDERLY INTERNALIZED STIGMA SCALE (EISS)

Instructions:

This questionnaire includes a series of statements generally related to aging. It also seeks to understand your views and thoughts regarding old age. Please read each statement carefully within its respective section. Indicate your level of agreement by selecting the option that best reflects your opinion. Each of your responses is highly valuable to us. Please make sure to answer all items without leaving any unanswered.

Aging …	**Agree**	**Neither Agree nor Disagree**	**Disagree**
… is the stage when learning becomes harder. (s1)	1☐	2☐	3☐
… is loneliness. (s2)	1☐	2☐	3☐
… is being less valued by others. (s3)	1☐	2☐	3☐
… is being a burden to the family. (s4)	1☐	2☐	3☐
… is feeling useless. (s5)	1☐	2☐	3☐
As people get older …			
… they lose strength for daily tasks. (s6)	1☐	2☐	3☐
… their sleep patterns get disrupted. (s7)	1☐	2☐	3☐
… they generally move more slowly. (s8)	1☐	2☐	3☐
… they become more careless. (s9)	1☐	2☐	3☐
… they get more sensitive compared to the past. (s10)	1☐	2☐	3☐
Because I'm aging …			
… I need more help from others. (s11)	1☐	2☐	3☐
… I don't enjoy life as much as I used to. (s12)	1☐	2☐	3☐
… I need more attention from others. (s13)	1☐	2☐	3☐
… I feel like I'm not useful anymore. (s14)	1☐	2☐	3☐
… I think more about death. (s15)	1☐	2☐	3☐
… My relationships with others have weakened. (s16)	1☐	2☐	3☐
… My manual skills have declined. (s17)	1☐	2☐	3☐

**** Elderly Internalized Stigma Scale- SPSS score calculation syntax ***.*

**** Define the variable names of the scale items as s1, s2, s3, …, s17 in the SPSS database. Copy and paste the following commands into the SPSS syntax editor and run. Your scores will be processed as four columns at the end of the database, ranging from 0-100. ***.*

```
COMPUTE awereness=((mean.4(s1,s2,s3,s4,s5) *(-1)) + 3) * 50.
COMPUTE agreement=((mean.4(s6,s7,s8,s9,s10) *(-1)) + 3) * 50.
COMPUTE selfaplication=((mean.5(s11,s12,s13,s14,s15,s16,s17) *(-1)) + 3) * 50.
COMPUTE stamp=mean(awereness, agreement, selfaplication).
EXECUTE.
```

ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1489223

Experiences of Obstetric Violence in Women in The Mediterranean Region: A Qualitative Study

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Geliş Tarihi / Received: *24.05.2024,* ***Kabul Tarihi / Accepted:*** *24.03.2025*

ABSTRACT
Objective: This study aims to make an in-depth investigation of women's experiences of obstetric violence**. Materials and Methods:** This study, which is qualitative in nature, used a phenomenological design. The study included 29 women who experienced at least one type of obstetric violence in the Mediterranean region. Data were collected through in-depth interviews conducted individually via video conferencing between September 2023 and February 2024. Data analysis was performed using content analysis methods. **Findings:** It was stated that women's experiences of obstetric violence were negative, they were exposed to physical and psychological violence, and they found having children a beautiful feeling. Women expected care providers to pay attention to them, be respectful to them, and act calmly. They also stated that if they were the caregivers, they would provide women with explanations, and be calm, patient and sensitive. **Conclusion:** This study found that women had negative childbirth experiences and were exposed to various types of obstetric violence. They were also found to have expectations regarding the management of labor.
Keywords: Experiences, Mediterranean Region, Obstetric, Qualitative Study, Violence, Women.

Akdeniz Bölgesi'ndeki Kadınların Obstetrik Şiddet Deneyimleri: Niteliksel Bir Çalışma

ÖZ
Amaç: Bu çalışma kadınların obstetrik şiddet deneyimlerini derinlemesine ortaya koymayı amaçlamaktadır. **Gereç ve Yöntem:** Çalışma fenomenolojik desenli nitel bir araştırmadır. Çalışmaya Akdeniz Bölgesi'nde yer alan obstetrik şiddet türlerinden en az birini yaşayan 29 kadın dahil edilmiştir. Veriler, Eylül 2023- Şubat 2024 tarihleri arasında video konferans yoluyla bireysel derinlemesine görüşmelerle toplanmıştır. Elde edilen nitel veriler içerik analizi yöntemi ile analiz edilmiştir. **Bulgular:** Kadınların obstetrik şiddet deneyimlerinin olumsuz olduğu, fiziksel ve psikolojik şiddet türlerine maruz bırakıldığı ve çocuk sahibi olmayı güzel bir duygu olarak kabul ettikleri ifade edilmiştir. Kadınlar kendilerine bakım verenlerin onlara ilgi gösterme, saygılı olma ve sakin davranmalarını beklemişlerdir. Eğer kendileri bakım veren olsalardı, kadınlara daha çok açıklayıcı bilgi vereceklerini, sakin olacaklarını, sabırlı ve hassas davranacaklarını dile getirmiştirler. **Sonuç:** Bu çalışmada kadınların olumsuz doğum deneyimi yaşadıkları ve çeşitli obstetrik şiddet türlerine maruz kaldıkları saptanmıştır. Ayrıca kadınların doğumun yönetimine yönelik beklentilerinin olduğu belirtilmiştir.
Anahtar kelimeler: Akdeniz Bölgesi, Çalışma, Deneyim, Kadın, Obstetrik Şiddet.

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Bu makaleye attf yapmak için / Cite this article: Karaçay Yıkar, S., Işık, B., Akçayüzlü, Ö., & Nazik, E. (2025). Experiences of obstetric violence in women in the mediterranean region: a qualitative study. *BAUN Health Sci J, 14*(2), 264-271. https://doi.org/10.53424/balikesirsbd.1489223

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

The United Nations Population Fund, a United Nations agency aimed at improving reproductive and maternal health worldwide, recognizes the global lack of consensus on how violence against women during facility-based childbirth is defined and measured (Mihret, 2019). To express this situation experienced by women, the World Health Organisation defined obstetric violence as any kind of harm to women, including ill-treatment, humiliation, verbal abuse, coercive or non-consensual medical procedures, a lack of confidentiality, a lack of medical information, a lack of fully informed consent, and privacy violations (WHO 2015). The literature reports the prevalence of obstetric violence across countries, with ratios between 15% and 97% (Shetty,Samant & Honavar 2021). Research shows that Peru is one of the countries where the highest prevalence of obstetric violence has been reported with a ratio of 97.4%, while Sri Lanka is one of the countries with the lowest prevalence of obstetric violence with a ratio of 18.1% (Perrotte,Chaudhary & Goodman, 2020; Perera, Munas & Swahnberg, 2022; Sánchez, Tanakaand Dantas-Silva 2022; Martínez-Galiano, Martinez-Vazquez & Rodríguez-Almagro, 2021; Cárdenas and Salinero 2022;Arias, Arteaga and San Sebastián, 2022; Molla,Wudneh and Tilahun, 2022; Yalley,Abioye & Appiah 2023). A study conducted in Türkiye found that 58.33% of women were exposed to some type of obstetric violence (Avcı & Kaydırak 2023).

The literature includes an insufficient number of studies that determines the rates of women's exposure to obstetric violence. Obstetric violence starts with the woman's first admission to the institution and continues during labor, in the postpartum period, and until discharge. Physical, verbal, and psychological violence perpetrated during childbirth is one of the most common forms of violence. In addition to these forms of violence, women could be subjected to obstetric violence due to factors such as unauthorized medical judgment, confidential and disrespectful care, discrimination, neglected care, and forced stay in a health facility. A systematic study in 2021 conducted in India between 2010 and 2021 reported that women were subjected mostly to physical violence, treated inhumanely, and asked for bribes (Faheem, 2021). A study that was conducted in 2022 and involved women with disabilities in the Genedo region of southern Ethiopia reported that women were exposed mostly to physical violence (Wudneh, Cherinet & Abebe, 2022). A systematic review in 2023 on the rate of women's perception of obstetric violence between 2015 and 2022 reported that women's perception of obstetric violence ranged between 22.6% and 45.2%; 1.2% to 59% were exposed to physical violence; 9% to 50.3% were exposed to verbal violence; and 25.4% to 35.2% were exposed to psycho-emotional violence (Silva-Fernandez,De la Calle & Arribas, 2023). A study conducted in Australia in 2022 revealed that one out of every ten women was exposed to violence and felt bad and violated (Keedle, Keedle &Dahlen, 2022). A study conducted in Madagascar in 2023 showed that obstetric violence perceived by women included procedures performed without their consent, lack of communication, and restriction of the presence of relatives during labor; therefore, they were hesitant about using a health institution during pregnancy; women gave birth at home without health personnel, and the rates of maternal-infant mortality were reported to be high (Brazy-Nancy, Mattern & Rakotonandrasana, 2023).It is believed that obstetric violence experienced by pregnant women is due to unmet needs by health professionals, inadequate health systems and the culture of any society (Aşci & Bal, 2024). In times when women's health services were not as they are today, births used to be given at home and mostly by people who were not trained in this regard. However, today, births are largely given in a health institution by doctors and midwives. In addition, it is more common in recent years that births are not given by midwives but by doctors, who are more likely to be men. The fact that doctors often see pregnancy as an illness and ignore the process that pregnant women go through and make unnecessary and aggressive interventions causes pregnant women to feel hurt, weak and sensitive (O'Brien & Rich, 2022; Aşci & Bal, 2024).

Obstetric violence against women during childbirth is an important problem that negatively affects women's health in our country (Aşci & Bal, 2024; Avcı & Kaydırak, 2023). Considering obstetric violence together with different types of violence or trying to reveal the scope of obstetric violence with limited experiences in the fertility process constitutes an important structure in diagnosing the situation in Türkiye (Çetin, Ergün &Işık, 2023). Therefore, there is a need for women, health professionals and politicians to reveal the existence, prevalence and types of obstetric violence in our country more clearly (Aşci & Bal,2024; Avcı & Kaydırak, 2023).

The obstetric violence experiences of pregnant women were determined in the study. In this context, pregnant women were asked to explain in their own words which types of obstetric violence they experienced during the birth process and which actions regarding obstetric violence bothered them. In addition, the study included the views of pregnant women on whether they would feel better if they were treated better and how they could manage the birth with empathy. It is thought that the study, which was conducted in Türkiye in terms of the specified characteristics, will contribute to the literature in terms of determining the obstetric violence characteristics of the region and the expectations of pregnant women.

Research questions

- What are the experiences of women exposed to obstetric violence during labor?

- What are the types of obstetric violence experienced by women during labor?
- What are the views of women exposed to obstetric violence regarding labor?
- What are the expectations of women exposed to obstetric violence?

MATERIALS AND METHODS

Study design

This study used a phenomenological approach and aimed to investigate the experiences of women exposed to obstetric violence, as well as their views and expectations regarding childbirth. The study complies with the guidelines of the Standards for Reporting Qualitative Research (SRQR).

Recruitment and sampling

The study utilized the purposive sampling method. The target population consisted of women who were exposed to obstetric violence during the normal delivery process in the Mediterranean region of Türkiye. In order to determine a pregnant women to be included in the study sample, a call was made via the researchers' social media platforms including WhatsApp and. According to this call, an announcement was made as follows: 'Join us! We are conducting an important study on [Obstetric Violence Experiences of Women in the Mediterranean Region: A Qualitative Study] and we are looking for volunteers who live in the Mediterranean Region and have had a normal birth!' The sample of the study consisted of women who responded to the study announcement made by the researchers on the WhatsApp and social media platforms, who were exposed to obstetric violence during normal delivery, and who met the inclusion criteria. A total of 58 women responded to the study call. An 18-item online Obstetric Violence Screening Questionnaire (consisting of 18 items) was formed to determine women's experiences of obstetric violence, and women who answered at least one of these questions were contacted. According to the responses in the Obstetric Violence Screening Questionnaire, 17 women were excluded because they were not exposed to obstetric violence, and 12 women were excluded because they did not live in the Mediterranean region. According to the inclusion and exclusion criteria, 29 women were administered detailed interviews. The study included women who were aged over 18, could communicate in Turkish, had childbirth within the last 24 months, reported at least one type of obstetric violence in the Obstetric Violence Screening Questionnaire, had vaginal delivery, and agreed to participate in the study.

Data analysis

After the interviews, the data obtained were transferred to a Microsoft Word document. The content analysis method was used in the analysis of the data obtained from the interviews. The data were coded independently by all researchers. By determining the same and different codes by the researchers, the data were compared and common codes were determined. By providing consensus, codes that can be derived from each sentence and sentence were created. Researchers came together and created a common code list. After the codes were determined, sub-themes and themes were created. Then, the interview data were interpreted and turned into a report. Direct quotations were included in the presentation of the findings to reflect the views of the participants. When quoting the participants, it was stated as “Participant” and the numbers given to the participants (for example, P1) were added to the end of the quotations.

Quality and rigour criteria

Conducting the interviews and analyzing the data by one person might affect the result of the study. Therefore, all researchers discussed and interpreted the results and data. The findings were corroborated by excerpts from the original interview. This step showed how well the findings of the study matched the data collected and were not affected by the researcher’s point of view. Determining the sample size based on a “saturation point” ensured that new ideas or themes were not overlooked. Finally, saving all documents is an additional step that serves to control the quality of the work.

Data collection

Data were collected using a participant information form an obstetric violence screening form, and a semi-structured interview form. The participant information form consisted of 8 questions about women’s sociodemographic and obstetric characteristics. The obstetric violence screening form was created by the researchers in line with the relevant literature (Mihret, 2019;Avcı &Meltem, 2023; Abuya, Sripad &Ritter, 2018), and consisted of 18 items to determine the participants’ exposure to common types of obstetric violence. The obstetric violence screening questionnaire included some statements such as: “healthcare personnel used physical force on me (e.g. hitting, pinching)”, “healthcare personnel shouted at me”, “healthcare personnel insulted me”, “healthcare personnel did not respect my privacy”, “healthcare personnel treated me disrespectfully”, “healthcare personnel did not care about me (my needs were not met, I was not emotionally supported)”, “healthcare personnel did not provide me with information (about the birth process, procedures applied, medications)”, and “a relative was not allowed to attend the birth (I felt alone)”. Pregnant women who answered at least one of these questions were contacted. During the interviews, the birth experiences of women exposed to obstetric violence, types of obstetric violence, expectations and opinions regarding labor and delivery were discussed. The interviews took about 15-27 min for each participant. The sample size was determined according to the theoretical saturation point, which meant that we stopped recruiting participants after 29 interviews when it became clear that interviewees’ responses become redundant and no unique information was achieved (Erdoğan, Nahçivan & Esin, 2015; Yıldırım and Şimşek, 2016). Data collection and

interviews were conducted in the period from October 2023-February 2024.

Semi-structured interview form

1. Could you tell us a little about your experience and how your birth was?
2. How did the practices performed during birth make you feel?
3. Could you share your feelings about the postpartum period and your baby?
4. How would you like to be treated during and after your birth?
5. How would you act if you were the one managing the birth and postpartum process?

Procedure

Women who met the research criteria were contacted and detailed information was given about the research. Verbal consent was obtained from the women who agreed to participate in the study. Appointments were made from women for interviews. The in-depth interviews with the participants were held via video conferencing (i.e. WhatsApp and voice call) and audio recordings, and lasted approximately 1 hour. Audio recordings of the interviews were taken with the permission of all participants.

Ethical approval

To carry out the study; an approval was obtained from the Ethics Committee of Cukurova University (Decision no: 134/69 Date: 02/06/2023). After explaining the study, verbal consent was obtained from the participants and they were informed that they could withdraw from participation at any time.

RESULTS

Table 1 presents the demographic characteristics of participating women, who were aged between 18 and 49 years (Table 1).

Table 1. Demographic characteristics of women.

Presents	Age	City of Residence	Education Level	Employment Status	Gravida	Week of birth	Place of Birth
P1	32	Antalya	University	Working	2	39+2	Private hospital
P2	28	Maraş	High school	Not working	1	38+4	Public hospital
P3	24	Adana	Primary school	Not working	2	38+3	Private hospital
P4	25	Maraş	High school	Not working	3	39+0	City hospital
P5	44	Osmaniye	Primary school	Not working	8	38+6	Public hospital
P6	19	Adana	Primary school	Not working	1	38+5	City hospital
P7	28	Adana	High school	Not working	1	39+0	City hospital
P8	29	Hatay	Primary school	Not working	2	40+0	Public hospital
P9	19	Hatay	Primary school	Not working	3	37+6	Public hospital
P10	31	Adana	High school	Not working	2	41+0	Private hospital
P11	30	Mersin	Secondary school	Not working	1	37+0	Private hospital
P12	39	Adana	University	Working	2	39+2	Private hospital
P13	28	Osmaniye	Secondary school	Not working	1	40+5	Public hospital
P14	38	Hatay	Primary school	Not working	3	40+4	University hospital
P15	49	Antalya	Primary school	Not working	4	40+1	Public hospital
P16	34	Adana	University	Working	2	39+5	University hospital
P17	40	Isparta	High school	Not working	2	39+2	University hospital
P18	40	Maraş	University	Working	2	39+1	Private hospital
P19	34	Hatay	Primary school	Not working	2	37+0	Public hospital
P20	35	Adana	High school	Not working	3	37+0	Private hospital
P21	25	Hatay	Secondary school	Not working	1	37+0	Public hospital
P22	30	Osmaniye	High school	Not working	2	40+0	Public hospital
P23	24	Maraş	High school	Not working	2	38+5	University hospital
P24	39	Antalya	University	Working	2	39+4	University hospital
P25	36	Adana	University	Working	2	41+0	University hospital
P26	18	Osmaniye	Primary school	Not working	1	40+2	Public hospital
P27	28	Hatay	Primary school	Not working	2	38+1	Public hospital
P28	27	Adana	Secondary school	Not working	2	39+0	City hospital
P29	33	Adana	University	Working	2	40+1	Public hospital

Women's labor experiences were grouped under three sub-themes. The most frequently cited negative experiences were that labor was very difficult and that their labor did not go as they wanted (Table 2).

P26 Osmaniye: 'No, it did not go as I wanted. I had induced labor. I was already screaming; my contractions became more frequent and my pain increased.'

Table 2. Women's views on birth experience.

Themes	Theme Clusters	f
Positive experience	It was for control/it was sudden	5
	It was easy	7
Negative experience	It was very difficult	19
	It wasn't what I wanted	10
	My flesh was falling off	9
	Labor induction	7
	Painful	4
	Scary	2
	Vaginal examination	3
	Panic/excitement	4
	I wasn't ready	2
Failure to describe the situation	I don't know how it went.	2

f: Frequency

Women reported that they felt verbal, physical, and psychological violence during labor. Verbal violence was found to be experienced less (Table 3).
P13 Osmaniye: 'During the labor, I could not push because of the pain. The midwife put pressure on my abdomen and I felt very bad. They were so insincere. There were two midwives and six interns in the room. The room was very crowded, and this situation made me very uncomfortable.'

Table 3. Women's feelings about procedures during labor and delivery.

Themes	Theme Clusters	f
Verbal Violence	Scolding/Shouting	2
Physical Violence	Pain during the process	9
	Fundal pressure	3
	Unnecessary episiotomy	9
	Frequent vaginal examination	7
	Forcing into position	2
	Connecting to excess NST	4
Psychological Violence	Failure to ensure privacy	4
	Behaving insincerely	1
	Rude behaviour	5
	Disrespect	4
	Disinterested behaviour	5
	Insistence on pushing	3
	Forcing stool	3

They reportedly felt very happy because their babies were born, yet they also stated that they felt a lot of pain (Table 4).
P16 Adana: 'I wanted to hold my baby in my arms immediately after delivery; I was very happy. I did not want to move away from her; I was afraid that something would happen to her.'

Table 4. Women's views on the postnatal period and the birth of the baby.

Themes	Theme Clusters	f
Emotions	Being happy	17
	Magnificent/miraculous	4
	Do not forget all the pain	3
	Don't suffer too much	10
	Very emotional	5
	Fear	4
Thoughts	Relaxation	8
	I don't want to give birth again	2
Behaviour	Crying	3
	Sleeping	2

Participating women were found to expect nurses to pay attention to them during labor, to allocate time and care for them, to act calmly, to provide information, and to treat them free of prejudices (Figure 1).
The women stated that if they were midwives, they would be understanding/patient with pregnant women, give them explanatory information, approach them carefully/sensitively, reassure and motivate them, and remain calm (Figure 2).

Figure 1. Opinions on women's expectations from nurses in labour

Figure 2. Women's views on what they would do if they were in charge of labour

DISCUSSION

Care services provided during labor vary across countries and regions, and women face negative situations in this process. This study found that women had negative labor experiences and were intensely exposed to types of physical and psychological violence (Yalley et al., 2023) reported that two out of every three women were exposed to obstetric violence (Yalley, Abena,Dare & Seth, 2023). The findings of the present study are in line with the literature (Brandão,Cañadas & Galvis, 2018; Bastian, 2024).

Research shows that women experienced psychological violence due to treatments such as not providing privacy, not acting sincerely, being rude, acting disrespectfully, being indifferent, insisting on straining, and forcing them to defecate (Alley, Abena, Dare &Seth, 2023;Avcı &Meltem, 2023). Topçu and Fiso (2023) reported that women did not receive adequate information, and their autonomy was not respected.

Vaginal examinations seem to be one of the main issues that made women feel uncomfortable. The women were reportedly exposed to too many vaginal examinations during labor and they felt pain during examinations. Having examinations more than needed and lack of necessary information during the procedure were found to affect women's labor negatively (Güneş & Karaçam, 2018). Kılcı et al. (2020) also detected that women were very uncomfortable with episiotomies. In their study, in which they interviewed 101 women who were subjected to obstetric violence, Morris et al. (2023) reported quite notable findings. The women stated that their obstetric violence experience made them feel that they were raped, and as a result, they saw themselves as victims of sexual assault. The statement of one of the women clearly shows the negative impact of obstetric violence on women. One of the women stated; "I was like crying and cussing them out, like telling her, you! Get of me!' Like, screaming, 'No! No!' It was literally like being raped. It was horrific … And I have been raped before, and I didn't mind being raped as much as I minded that. It felt like this is more traumatic to me than having been raped as a 14-year-old." Abuya et al. (2018) stated that women were mostly exposed to lack of privacy, which is an element of psychological violence. Contrary to these results, Martínez-Galiano et al. (2021) reported a higher prevalence of physical and verbal violence than psychological violence during childbirth. Studies have shown that women are exposed to various forms of physical violence during the childbirth process, such as hitting, beating, slapping, kicking, pinching, using force, physical restraint, unnecessary episiotomies and fundal pressure (Brandão,Cañadas & Galvis, 2018; Sharma et al., 2019; Van der Pijl et al., 2020).

Women's views about and responses to the questions concerning how they would act if they were the ones who managed the delivery process demonstrated similarities. An analysis of these views showed that the women wanted to exhibit behaviors that they expected to see but did not see if they managed the labor. The women stated that they would feel empathy if they were the ones managing labor. In this process, participating women felt that they were not respected, and they were treated with prejudices.In the study, it is seen that women perceive what is done to them as negative and are aware of violence. In the studies conducted in the literature in the opposite direction of our findings, it is seen that women cannot define what is done to them and do not perceive it as violence (Avcı & Kaydırak, 2023; Van der Pijl et al., 2020). Behaviours of midwives, such as not allocating enough time and care, being indifferent, and not acting calmly could be counted among the indicators that they did not empathize. Participating women were found to emphasize that healthcare professionals should respect their bodies, that the right to make decisions about their bodies belongs to them, and that interventions should be administered only when they are necessary. In a study conducted in Turkey, it was found that consent was not obtained from one in four women during the procedure (Aşçı and Bal 2023). Meyer et al., (2022) reported that almost all women expected health professionals to treat them with respect and empathy, provide more support, help them and spare more time. In a different study women wanted to be informed about decisions and measures related to the birth process (Annborn & Finnbogadóttir, 2022). In addition to excessive workload, understaffing, lack of infrastructure, and hierarchy within the obstetric team are among the factors that create and nurture obstetric violence (Faheem, 2021). In this regard, healthcare professionals should provide women's active participation in the labor process, encourage privacy, provide the necessary information, obtain patient consent, and respect women's decisions about their bodies by using safe communication skills (Moridi, Pazandeh&Hajian, 2020).

Limitations

This study has some limitations. This study contributes to understanding the dimensions of obstetric violence, which is a widespread problem internationally. Data are limited to self-reports from women living in a middle-income country where gender equality and human rights are not sufficiently ensured. Firstly, the study included women who lived in the Mediterranean region only. Secondly, the in-depth interviews were not conducted face-to-face. On the other hand, the study is believed to contribute to the literature in terms of focusing on a specific region and revealing the experiences of obstetric violence, the types of violence experienced by women living in this region, and their views and expectations regarding childbirth. Since people's recall of events can change over time, the inclusion of women who gave birth in the last 2 years is an important limitation

in this study. However, there is a study that examined women's experiences of obstetric violence over a longer period (5 years) than our study (Castro and Frías, 2020).

CONCLUSION

Women were found to be exposed to various types of obstetric violence in the labor process, which caused them to have negative and traumatic labor experiences. Further studies are needed for a more detailed evaluation of women's experiences of obstetric violence. Therefore, studies to be conducted in different geographical regions and larger groups are considered to contribute to the literature. Awareness of obstetric violence should be raised among health workers. Prevention of obstetric violence should be realized through a joint effort of all health professionals, which should be pioneers for women's positive childbirth experiences. It is also recommended that regular in-service trainings be organized to prevent obstetric violence. Laws and protocols on obstetric violence should be developed. Attempts should be made to improve the issues of excessive workload, insufficient staff, lack of infrastructure and hierarchy within the obstetric team, which are thought to increase obstetric violence.

Acknowledgements

The authors grateful to all the womenwho participated in this study.

Conflict of Interest

The author declares no potential conflicts of interest regarding the research, authorship, and/or publication of this article.

Author Contributions

Plan, design: SKY**,** BI, ÖA, EN; **Material, methods and data collection:** SKY, BI, ÖA, EN; **Data analysis and comments:** SKY, BI, ÖA, EN; **Writing and corrections:** SKY.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Ethical Approval

Institution: Ethics Committee of Cukurova University
Date: 02.06.2023
Approval no: 134/69

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ORİJİNAL MAKALE / ORIGINAL ARTICLE

Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1575642

Evaluation of Chronic Disease Care and Nursing Care Perceptions of Convicts/Detainees with Chronic Diseases

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Geliş Tarihi / Received: *29.10.2024,* ***Kabul Tarihi / Accepted:*** *24.03.2025*

ABSTRACT

Objective: This study was conducted to evaluate the chronic disease care of convicts/detainees with chronic diseases and to examine their perceptions of nursing care. **Materials and Methods:** The research is of a descriptive type and was conducted with 45 patient convicts/detainees who agreed to participate in the research at Artvin Closed Penal Institution between December 4, 2022 and March 4, 2023. Personal Information Form, Chronic Disease Care Evaluation Scale, and Patient Perception of Nursing Care Scale were used to collect data. **Results:** It was determined that 35.6% of the convicts/detainees with chronic disease had cardiology disease, 44.4% had been diagnosed for 1-3 years, 97.8% were on medication and 60% stayed in the hospital for 15-30 days. The mean score of the Perception of Nursing Care Scale was 62.55±17.56 and the mean score of the Chronic Disease Care Evaluation Scale was 3.68±1.34. A strong positive correlation was found between the Perception of Nursing Care Scale and Chronic Disease Care Assessment Scale scores. **Conclusion:** This study showed that the perception and satisfaction levels of chronically ill prisoners towards nursing care were high. These findings reveal that the quality of nursing care plays an important role in the management of chronic diseases and that improving care processes will positively affect health outcomes.

Keywords: Chronic Disease, Nursing, Prisoners, Patient Satisfaction.

Kronik Hastalığa Sahip Hükümlülerin/Tutukluların Kronik Hastalık Bakımları ve Hemşirelik Bakım Algılarının Değerlendirilmesi

ÖZ

Amaç: Bu araştırmada kronik hastalığa sahip hükümlü/tutukluların kronik hastalık bakımını değerlendirilmesi ve hemşirelik bakım algılarının incelenmesi amacıyla yapıldı. **Gereç ve Yöntem:** Araştırma tanımlayıcı türde olup, 4 Aralık 2022- 4 Mart 2023 tarihleri arasında Artvin Kapalı Ceza İnfaz Kurumunda araştırmaya katılmayı kabul eden 45 hükümlü/tutuklu hasta ile yürütüldü. Verilerin toplanmasında Kişisel Bilgi Formu, Kronik Hastalık Bakımını Değerlendirme Ölçeği, Hastanın Hemşirelik Bakımını Algılayışı Ölçeği kullanıldı. **Bulgular:** Kronik hastalığı olan hükümlülerin/tutukluların %35.6'sının kardiyoloji hastalığa sahip, %44.4'ünün 1-3 yıldır tanı almış, %97.8'inin ilaç kullanmakta olduğu ve %60'ının hastanede 15-30 gün arası kaldığı belirlendi. Hastanın Hemşirelik Bakımını Algılayışı Ölçeği puan ortalaması 62.55±17.56 ve Kronik Hastalık Bakımını Değerlendirme Ölçeği puan ortalaması 3.68±1.34 olarak belirlendi. Hemşirelik Bakımını Algılayışı Ölçeği ve Kronik Hastalık Bakımını Değerlendirme ölçek puanları arasında pozitif yönde güçlü bir ilişki bulundu. **Sonuç:** Bu çalışma, kronik hastalığı olan hükümlülerin hemşirelik bakımına yönelik algılarının ve memnuniyet düzeylerinin yüksek olduğunu göstermiştir. Bu bulgular, hemşirelik bakımının kalitesinin, kronik hastalıkların yönetiminde önemli bir rol oynadığını ve bakım süreçlerinin iyileştirilmesinin sağlık sonuçlarını olumlu yönde etkileyeceğini ortaya koymaktadır.

Anahtar Kelimeler: Kronik Hastalık, Hemşirelik, Tutuklular, Hasta Memnuniyeti.

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Bu makaleye atıf yapmak için / Cite this article: Ozalp, C. (2025). Evaluation of chronic disease care and nursing care perceptions of convicts/detainees with chronic diseases. *BAUN Health Sci J, 14*(2), 272-280. https://doi.org/10.53424/balikesirsbd.1575642

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

Chronic diseases constitute a large proportion of the diseases that cause death all over the world and this rate is increasing day by day (World Health Organization (WHO), 2010). The World Health Organization defines chronic diseases as "slowly progressive and long-lasting diseases" (WHO, 2019). According to Turkish Statistical Institute (TurkStat, 2018), 76.4% of the deaths in Türkiye are caused by chronic diseases (TurkStat, 2018). Living with a chronic illness presents significant difficulties, as it disrupts physical, mental, and social functions, leading to a considerable decline in the quality of life. Individuals with chronic conditions often encounter major challenges, including increased financial burdens, social isolation, loneliness, disability, fatigue, pain or discomfort, and a range of emotional struggles such as stress, anger, hopelessness, frustration, anxiety, and depression (Cocksedge et al., 2014; Gerontoukou et al., 2015). It has been reported that significant, chronic physical and mental illnesses such as hypertension, diabetes, asthma and depression are more common in prisoners than normal. Nurses not only respond to emergency health care needs in prisons, but also are indeed necessary for the administration of medication, coordination and continuity of treatment (Eşiyok et al., 2004). Although the increase in life expectancy has been considered positive, it has caused an increasing trend in chronic diseases (Akdoğan & Kaya, 2022).

Today, this increase in chronic diseases reveals the importance of chronic disease assessment. Chronic disease assessment is not only the treatment of the disease, in other words, the patient's care should be strengthened with different education and training techniques in order to acquire self-management skills (Beaglehole et al., 2008). In a study conducted by Hernandez & Anish (2020), it is emphasized that nurses in prisons are responsible for providing continuous care and treatment monitoring for prisoners with chronic diseases. The management of chronic diseases is greatly improved when nurses develop the skills of patients to manage themselves during the treatment process (Hernandez & Anish, 2020). However, most of these evaluations are scales in which the patient approach is reviewed from the nurse's perspective. However, in the chronic care model, it is valuable to examine the health service provided from the patient's perspective. Continuous evaluation of the health service provided from the patient's perspective is a part of individualized care, which is one of the basic principles. In this way, an effective communication will be established by working with the patient as a team and making the patient a partner in care (The European Definition of General Practice, 2011). Florence Nightingale (1860), the pioneer of modern nursing, defined nursing care as 'being responsible for the life of the individual' (Nightingale, 2005). Jean Watson, who defines nursing as the 'Science of Human Care', emphasises that care is a concept specific to nursing, that nursing/care can be defined as the experiences of the patient, and that the care provided by the nurse will not be forgotten by the patient even if the nurse is not personally present with the patient (Watson, 2012). It is the care that constitutes nursing and is considered above all other tasks. Care should be relational, moral and practical. These concepts are called the triad of care (Alvsvag, 2014). Individuals who receive adequately informed, cared and managed care are more loyal to nurses (Tobiano et al., 2015). The evaluation of care should be continued systematically, and the results should be transferred to nurses, institutions and policy makers (Eyi Çil et al., 2016). One of the most valuable situations in evaluating the quality of care in health services is patient's satisfaction with the care service provided. In addition to the technical skills of nurses, the perception of quality in care is possible by knowing the patient, feeling in trust, doing more for the patient, and being present with the patient for care behaviours (Kol et al., 2017).

Understanding patients' perceptions of nursing care is a valuable source of data for creating quality improvement strategies (Al-Hussami et al., 2017). In this way, the patients' evaluations of the care they receive and their perceptions of nursing care will be learned regularly over a period of time, and these results will support the development of hospital and prison services to improve the quality of care. It covers what needs to be done to understand the responsibilities and duties of nurses in prisons better and to improve the quality of health care. The development of nurses in terms of knowledge, skills, and job responsibilities is critical to improve prison health services and provide the highest level of care to prisoners. As a result of the literature review, no research on this subject was found. Therefore, it is thought that this study can contribute to the literature. The aim of the study was to examine the evaluation of chronic disease care and nursing care perceptions of convicts/detainees with chronic disease.

Research questions

-What is the level of evaluation of chronic disease care of convicts/detainees with chronic disease?

-What is the level of nursing care perceptions of convicts/prisoners with chronic diseases?

-Is there a relationship between the evaluation of chronic disease care of convicts/detainees with chronic disease and their perceptions of nursing care?

MATERIALS AND METHODS

Study type

The research is descriptive in nature. The research was conducted in Artvin Closed Penal Institution between 4 December 2022 and 4 March 2023.

Study group

The population of the study consists of individuals with chronic diseases who were hospitalised in Artvin Closed Penal Execution Institution between the dates

of the study. The study was conducted on 45 patients who met the research criteria in the specified time interval. In the study, the power of the study was calculated after data collection by using "G. Power-3.1.9.7" programme with a margin of error of 0.05. In the study, correlation analysis was used to determine the relationship between the mean scores of the Patient's Perception of Nursing Care Scale (PPNCS) and Chronic Disease Care Assessment Scale (CDCAS) of convicts/detainees. Accordingly, the effect size of the study was calculated as 0.5, alpha value as 0.05 and power as 0.98.

The criteria for inclusion in the study are;

Having a chronic disease,
Being in a Closed Penitentiary Institution,
Having at least 15 days of hospital care experience,
Being willing to participate in the study.

Data collection tools

Personal information form, PPNCS, CDCAS were used to collect the data.

Personal information form

It includes 14 questions inquiring the age, gender, educational status, marital status, occupation, having children, family structure, alcohol use, chronic disease, medication use, etc. of the individuals.

Patient's Perception of Nursing Care Scale (PPNCS)

The scale was developed by Dozier et al. (2001) in the USA. The validity and reliability research in our country was conducted by İpek Çoban and Kaşıkçı (2006). The Likert-type scale has 15 statements related to the quality of nursing care (İpek Çoban & Kaşıkçı, 2006;2010). The scale is scored between 15 and 75 points. The higher the scores on the scale, the higher the patient's satisfaction level with nursing care. When the score of the scale is 45 and above, it is understood that the perception of care is good. The Cronbach Alpha coefficient of the scale was found to be 0.94 (Dozier et al., 2001). In the scale validity and reliability study conducted by Çoban and Kaşıkçı (2006), Cronbach's alpha coefficient was found to be 0.92 (İpek Çoban & Kaşıkçı, 2006; 2010). The Cronbach's alpha was found to be 0.98 in the study.

Chronic Disease Care Assessment Scale (CDCAS)

Glasgow et al. (2005). Turkish validity and reliability research of the scale was conducted by İncirkuş and Nahcivan (2011). The scale enables chronic patients to self-evaluate the care they receive; it addresses the care provided with the dimensions of physicians, nurses and other health personnel and in line with the team approach. The scale has 20 items and 5 sub-dimensions, which include patient participation (1-3), decision making (4-6), goal setting/guidance (7-11), problem solving (12-15), monitoring and coordination (16-20). The higher the score obtained from the scale, the higher the level of satisfaction with the care provided (Glasgow et al. 2005). In the validity and reliability study conducted by İncirkuş and Nahcivan (2011), the alpha coefficient was 0.91 and the subscale alpha coefficients averaged 0.74 (İncirkuş & Nahcivan, 2011). The study found that Cronbach's alpha was 0.98.

Collection of the data

The study covers prisoners and detainees who received care in prisons and were sent to hospitals due to chronic diseases. These individuals were sent to hospitals when adequate care could not be provided in prisons or when their diseases required urgent treatment. Therefore, both prison and hospital services were considered together. How the care processes of these individuals were managed in both environments and how they could be improved by complementing each other were emphasized. In our study, a special emphasis was placed on the integration of these two environments and the continuity of care, because the health needs of these individuals required constant monitoring and coordination between environments directly affected the quality of care.

After the purpose of the study was explained by the researcher before starting the study, the questionnaires were applied by the researcher with face-to-face interview technique after the written consent of the patient convicts/detainees who agreed to participate in the study was obtained. The application of data collection tools took approximately 15-20 minutes.

Statistical analysis

Arithmetic mean, standard deviation, skewness and kurtosis coefficients, one-way analysis of variance (ANOVA), Welch ANOVA and correlation analysis were used in cases where group variances were not homogeneous. In order to determine that the data conform to normal distribution, the skewness value should be in the range of ±3 (Tabachnick & Fidell, 2013). It was found that the Skewness-Kurtosis values of PPNCS were in the range of 1.295-0.360 and CDCAS Skewness-Kurtosis values were in the range of 0.771-0.801. Since the skewness values obtained from the scales were in the range of ±1.5, it was determined that all scales showed normal distribution.

Ethical approval

Before starting the research process, permission was obtained by e-mail from the authors of the scale for the scales used. In order to conduct the research, the necessary written permissions were obtained from the Scientific Research and Publication Ethics Committee of Muş Alparslan University, dated 04.12.2022 and numbered 73214, and also from the Artvin Closed Penal Institution where the research was conducted. After the purpose of the study was explained to the patients who volunteered to participate in the study, written and verbal consent was obtained.

RESULTS

When the descriptive characteristics of the participants were analysed, it was found that 57.8% were within the age group of 45 and over, 97.8% were male, 33.3% were high school graduates and 62.2% were married. It was determined that 60% of the participants had a profession in the other group, 66.6% had children, 48.9% had a core family, 66.7% were smokers and 46.7% had never drunk alcohol (Table 1).

Table 1. Distribution of participants' descriptive characteristics.

Characteristics	n	(%)
Age		
20-45 age	19	42.2
45 and above	26	57.8
Gender		
Woman	1	2.2
Male	44	97.8
Education level		
Primary School	13	28.9
Middle School	12	26.7
High School	15	33.3
Undergraduate and above	5	11.1
Marital status		
Married	28	62.2
Single	17	37.8
Profession		
Pensioner	6	13.3
Officer	4	8.9
Labourer	8	17.8
Other	27	60.0
Childbearing Status		
Yes	30	66.6
No	15	33.4
Family Type		
Core	22	48.9
Wide	15	33.3
Shattered	8	17.8
Smoking Status		
Still smoking	30	66.7
He smoked and quit	12	26.7
Never smoked	3	6.6
Alcohol drinking status		
Still Drinking	4	8.9
He drank and quit	20	44.4
Never drank	21	46.7

It was determined that 35.6% of the participants had a cardiological disease, 44.4% had been diagnosed for 1-3 years, 97.8% used medication, 60% stayed in hospital for 15-30 days (Table 2).

The mean score of the individuals included in the study was 62.55±17.56 and the mean score of CDCAS was 3.68±1.34 (Table 3).

In the study, it was found that there was no statistically significant difference ($p>0.05$) between the groups in the mean PPNCS and CDCAS scores according to age, gender, marital status, occupation, having children, family type and smoking-alcohol use status (Table 4).

In the study, it was found that there was no statistically significant difference between the groups in the mean PPNCS and CDCAS scores according to the disease status, diagnosis duration, hospitalisation status and hospitalisation duration ($p>0.05$) (Table 5).

In Table 6, the correlation coefficient (r) was used to evaluate the relationship between the patient's HRQoL and CDCAS, and $r<0.3$ was defined as a weak relationship, $0.3<r<0.7$ as a moderate relationship, and $0.7<r<1$ as a strong relationship (Tabachnick & Fidell, 2013). It was found that there was a strong positive correlation between the PPNCS and CDCAS scores of the participants ($p<0.001$) (Table 6).

Table 2. Characteristics of the participants regarding disease and drug use.

Characteristics	n	(%)
Disease Status		
Psychiatry	14	31.1
Internal Medicine	7	15.6
Cardiology	16	35.6
Other	8	17.8
Diagnosis Period		
1-3 years	20	44.4
3 years and over	15	33.3
Not specified	10	22.3
Medication Use Status		
Yes	44	97.8
No	1	2.2
Length of Hospital Stay		
Between 15-30 days	27	60.0
More than 30 days	18	40.0

Table 3. Distribution of the mean scores of the participants in the PPNCS and CDCAS.

Scale Score Mean	Article Number	Distribution Range	X±SS	Cronbach Alfa
Patient's Perception of Nursing Care Scale	15	19-75	62.55±17.56	0.98
Chronic Disease Care Assessment Scale	20	1-5	3.68±1.34	0.98

Table 4. Comparison of the descriptive characteristics of the participants according to their PPNCS and CDCAS score averages.

	Patient's Perception of Nursing Care Scale		Chronic Disease Care Assessment Scale	
Characteristics	**X±SS**	**Test and p**	**X±SS**	**Test and p**
Age				
20-45 years	58.78±17.86	t=1.237	3.37±1.36	t=1.348
45 and above	65.30±17.15	p=0.223	3.91±1.30	p=0.185
Education level				
Primary School	60.76±18.95		3.70±1.22	
Middle School	67.16±16.85	F=1.371	4.04±1.50	F=0.692
High School	64.80±14.93	p=0.265	3.60±1.31	p=0.562
Undergraduate and above	49.40±21.05		3.02±1.50	
Marital status				
Married	63.56±15.63	t=0.542	3.65±1.30	t=0.217
Single	60.53±21.36	p=0.591	3.74±1.47	p=0.829
Profession				
Pensioner	57.66±26.97		3.20±1.88	
Officer	65.75±17.19	F(Welch)=2.241	4.02±1.51	F=0.631
Labourer	71.37±6.90	p=0.150	4.11±0.85	p=0.599
Other	60.55±17.31		3.61±1.33	
Childbearing Status				
Yes	63.56±15.63	t=0.542	3.65±1.30	t=0.217
No	60.53±21.36	p=0.591	3.74±1.47	p=0.829

Table 4. (Continue) Comparison of the descriptive characteristics of the participants according to their PPNCS and CDCAS score averages.

Family Type				
Core	65.63±15.00	F=1.226	4.08±1.26	F=2.060
Wide	56.80±20.97	p=0.304	3.22±1.33	p=0.140
Shattered	64.87±16.60		3.44±1.42	
Smoking Status				
Still smoking	63.80±16.35	F=0.225	3.70±1.32	F=0.023
He smoked and quit	60.33±19.37	p=0.800	3.61±1.32	p=0.977
Never smoked	59.00±27.71		3.73±2.19	
Alcohol drinking status				
Still drinking	66.00±16.06	F=0.599	4.23±1.52	F=0.814
He drank and quit	65.10±17.07	p=0.554	3.83±1.31	p=0.450
Never drank	59.47±18.54		3.43±1.35	

**Welch ANOVA test values were taken when group variances were not homogenous.*

Table 5. Comparison of participants' characteristics related to illness and drug use according to the mean scores of PPNCS and CDCAS.

	Patient's Perception of Nursing Care Scale		**Chronic Disease Care Assessment Scale**	
Characteristics	**X±SS**	**Test and p**	**X±SS**	**Test and p**
Disease Status				
Psychiatry	63.07±16.65		3.94±1.15	
Internal Medicine	59.57±23.41	F=0.137	3.24±1.57	F=0.661
Cardiology	64.25±18.34	p=0.937	3.83±1.30	p=0.581
Other	60.87±14.60		3.32±1.61	
Diagnosis Period				
1-3 years	64.75±15.91		4.00±1.34	
3 years and over	62.20±17.41	F=0.389	3.70±1.19	F=1.878
Not specified	58.70±21.78	p=0.680	3.01±1.43	p=0.166
Hospitalisation Status				
Yes	62.19±18.30	t=0.204	3.62±1.40	t=0.443
No	63.35±16.42	p=0.840	3.81±1.25	p=0.660
Length of Stay				
3-15 days	67.63±14.88	F=1.878	3.91±1.18	F=1.632
15 days and over	57.00±24.07	p=0.165	4.19±1.38	p=0.208
Not specified	57.88±17.96		3.25±1.46	

Table 6. Correlation of scale score means.

		1	2
(1) Patient's Perception of Nursing Care Scale	*r*	-	0.733
	p	-	**0.000**
(2) Chronic Disease Care Assessment Scale	*r*	0.733	-
	p	**0.000**	-

DISCUSSION

In the study, it was found that there was no significant relationship between the sociodemographic characteristics of the patients and their mean CDCAS scores. As stated by the developers of the original English version of this scale, CDCAS scores should

not be associated with patients' demographic characteristics (Glasgow et al., 2005). Indeed, Aragones et al. found that CDCAS scores were not associated with the number of chronic medical conditions or sociodemographic characteristics (Aragones et al., 2008). The reason why there is no relationship between the sociodemographic characteristics of the patients included in the study and the mean CDCAS scores can be explained as that there may not be a relationship because the patients are isolated from the outside life due to being convicted/imprisoned.

In the study, the mean CDCAS score was found to be 3.68±1.34. This result showed that the patients included in the study were quite satisfied with the care they received. Among the studies conducted in Türkiye, İncirkuş and Nahçivan (2011) found the mean score of the scale to be 2.54±0.94 (İncirkuş & Nahçivan, 2011). In the study conducted by Apaydın Kaya et al. (2013), it was found as 2,44±0,7414 (Apaydın Kaya et al., 2012). Karabulutlu et al. (2013) found 2.54±0.515 in their study (Karabulutlu et al., 2013). In the studies conducted abroad, the average scale score was reported to be between 2.49 and 3.17 (Apaydın Kaya et al., 2012). The mean CDCAS score of the studies conducted in our country was found to be lower compared to the studies conducted abroad. However, in this study, it was found that the patients were quite satisfied with the care they received according to the average scale score. The reason for this is that the number of patients in the prison is low, the nurse generally cares for patients with the same chronic disease while giving care, the nurse's previous acquaintance with the patients facilitates care giving, and it is thought that the patient may be more satisfied with the care received.

In the study, no statistically significant difference was found when the mean scores of the convicts/detainees' PPNCS score, education level and marital status were compared ($p>0.05$). In the study conducted by Durgun et al. no statistically significant difference was found when the level of education, marital status and PPNCS score averages were compared ($P>0.05$) (Durgun et al., 2022). Similarly, in the study conducted by Zarzycka and colleagues, it was found that marital status did not make a difference between patients' perception of nursing care, while education status made a difference (Zarzycka et al., 2019). Öztürk and colleagues found that satisfaction levels of patients decreased with increasing education level (Öztürk et al., 2020). The reason why there was no significant difference between the level of education and the mean scores of the PPNCS in the studies conducted may be because the convicts / prisoners have been in the same environment for a long time and the nurses who provide care do not change frequently.

The mean score of the convicts/detainees included in the study was 62.55±17.56. The scale score of 45 and above indicates that the perception of care is good (Buldan & Kurban, 2018). In other studies conducted in Türkiye, it was reported that the mean scale score was between 60 and 68 (Göktas et al., 2015; Dikmen et al., 2016). In addition, Kol et al. (2017) examined the perception of nursing care in Turkey and, Gül and Dinç (2018) examined the perceptions of patients towards nursing care and found that patients were quite satisfied with the nursing care. These results are in parallel with the findings obtained in this study. However, in the study conducted by Lotfi and colleagues in Iran to examine the satisfaction of patients with nursing care, it was found that the satisfaction levels of individuals with nursing care were quite low (Kol et al., 2017; Gül & Dinç, 2018; Lotfi et al., 2019). The fact that the results obtained in the research are similar to those in our country and the results of the research conducted in different countries are different may be related to the fact that the expectations of nursing care perception may change due to the difference in the sociocultural structure of the individuals participating in the research. However, in the study, it was determined that the patients were convicted/detained and were quite satisfied with the care they received. The reason for this may be that nursing care is provided under appropriate conditions in the environment where convicts / prisoners live.

Study limitations and strengths

This research cannot be generalised because it was conducted in a single centre. The fact that the research was conducted on certain dates is considered to be another limitation.

CONCLUSION

It was determined that the convicts/detainees with chronic diseases were quite satisfied with the care they received when the Nursing Care Perception Scale and CDCAS were applied to the patients examined within the scope of the study conducted to evaluate the care they received related to their current diseases from their own perspectives and to learn their nursing care perceptions. The strong positive relationship between the PPNCS and CDCAS suggests that increases in perceptions of care directly increase patient satisfaction and, that higher scores on both measures reinforce each other. It is known that nurses' giving information about the care given to patients or the subjects they do not know affects patient care perceptions and patient satisfaction level. It is thought that nurses considering patient perceptions, especially when caring for patients in prison, will increase the quality of care and satisfaction with care. It is recommended that nurses should make satisfaction measurements from time to time while providing care. It is recommended that these results should be analysed and the aspects that need to be improved should be evaluated. To improve the management of chronic diseases in prisons, nurses could be trained in patient-centred care and effective communication. Additionally, the health status of

inmates should be regularly monitored, and feedback systems should be established to continuously evaluate the quality of care.

Acknowledgement
The authors would like to extend their sincere thanks to anyone who contributed to this study.

Conflict of Interest
The author declares no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Author Contributions
Plan, design: CÖ; **Material, methods and data collection:** CÖ; **Data analysis and comments:** CÖ; **Writing and corrections:** CÖ.

Funding
No support received

Ethical Approval
Institution: Mus Alparslan University Ethics Committee
Date: 04.12.2022
Approval no: 73214

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ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1652432

Comparison of Microbial Contamination on Fomite Surfaces in Public Restrooms Based on Location and Gender Factors

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Geliş Tarihi / Received: *06.03.2025,* ***Kabul Tarihi / Accepted:*** *24.03.2025*

ABSTRACT

Objective: This study aims to investigate the microbial contamination on fomite surfaces such as door handles and faucets in student and staff toilets at Balıkesir University and to examine the relationship of contamination with surface location and gender. **Materials and Methods:** A total of 128 samples were collected using a sterile sponge swab method; 64 samples were obtained from fomite surfaces in female (32) and male (32) restrooms, while another 64 samples were taken from fomites on the right (32) and left (32) sides. The presence of total aerobic mesophilic bacteria (TAMB), *Staphylococcus/Micrococcus* spp., coliform bacteria, and *Escherichia coli* was assessed. **Results:** TAMB levels on faucet surfaces did not significantly differ between genders ($p>0.05$), whereas *Staphylococcus/Micrococcus* spp. counts were significantly higher in male restrooms ($p<0.05$). Exit door handles exhibited a higher bacterial load compared to entrance door handles, with statistically significant differences observed in TAMB and *Staphylococcus/Micrococcus* spp. counts ($p<0.05$). Contamination levels varied depending on fomite location, with the highest *Staphylococcus/Micrococcus* spp. counts detected on faucets on the right side and door handles on the left side. No coliform bacteria or *E. coli* were detected in any sample. **Conclusion:** A significant level of microbial contamination was detected on restroom fomite surfaces, with higher *Staphylococcus/Micrococcus* spp. levels in male restrooms and increased contamination on exit door handles. These findings indicate that microbial contamination on toilet fomite surfaces may pose a risk to public health and that hygiene measures should be improved, especially on surfaces with a high risk of microbial contamination.

Keywords: Fomite surfaces, Gender, Hand hygiene, Microbial contamination.

Genel Tuvaletlerdeki Fomit Yüzeylerde Mikrobiyal Kontaminasyonun Konum ve Cinsiyet Faktörlerine Göre Karşılaştırılması

ÖZ

Amaç: Bu çalışma, Balıkesir Üniversitesi'ndeki öğrenci ve personel tuvaletlerinde kapı kolları ve musluklar gibi fomit yüzeylerdeki mikrobiyal kontaminasyonu araştırarak, kontaminasyonun yüzey konumu ve cinsiyet ile ilişkisini incelemeyi amaçlamaktadır. **Gereç ve Yöntemler:** Toplam 128 örnek, steril sünger swab yöntemiyle toplanmıştır; bunların 64'ü kadın (32) ve erkek (32) tuvaletlerindeki fomit yüzeylerden, 64'ü ise sağ taraftaki (32) ve sol taraftaki (32) fomit yüzeylerden alınmıştır. Toplam aerobik mezofilik bakteri (TAMB), *Staphylococcus/Micrococcus* spp., koliform bakteriler ve *Escherichia coli* varlığı değerlendirilmiştir. **Bulgular:** Musluk yüzeylerindeki TAMB seviyeleri cinsiyetler arasında anlamlı bir fark göstermemiştir ($p>0.05$), ancak *Staphylococcus/Micrococcus* spp. sayıları erkek tuvaletlerinde daha yüksek bulunmuştur ($p<0.05$). Çıkış kapı kollarında giriş kapı kollarına kıyasla daha yüksek bakteriyel yük tespit edilmiştir ve TAMB ile *Staphylococcus/Micrococcus* spp. sayıları açısından istatistiksel olarak anlamlı farklılık gözlenmiştir ($p<0.05$). Kontaminasyon fomit konumuna bağlı olarak değişiklik göstermiştir; en yüksek *Staphylococcus/Micrococcus* spp. sayıları sağ taraftaki musluklarda ve sol taraftaki kapı kollarında bulunmuştur. Hiçbir örnekte koliform bakteri veya *E. coli* tespit edilmemiştir. **Sonuç:** Tuvalet fomit yüzeylerinde önemli düzeyde mikrobiyal kontaminasyon saptanmış olup, erkek tuvaletlerinde *Staphylococcus/Micrococcus* spp. seviyelerinin daha yüksek olduğu ve çıkış kapı kollarında artan kontaminasyonun olduğu belirlenmiştir. Bu bulgular, tuvalet fomit yüzeylerindeki mikrobiyal kontaminasyonun halk sağlığı açısından risk oluşturabileceğini ve özellikle mikrobiyal bulaşma riski yüksek yüzeylerde hijyen önlemlerinin iyileştirilmesi gerektiğini göstermektedir.

Anahtar Kelimeler: Fomit yüzeyler, Cinsiyet, El hijyeni, Mikrobiyal kontaminasyon.

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Bu makaleye atıf yapmak için / Cite this article: Güner, T. E., Göçmez, E. G., Merkan, B., Kireçci, S., & Tavşanlı, H. (2025). Comparison of microbial contamination on fomite surfaces in public restrooms based on location and gender factors. *BAUN Health Sci J, 14*(2), 281-287. https://doi.org/10.53424/balikesirsbd.1652432

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

The level of civilization's development today is directly associated with the importance individuals place on cleanliness and hygiene (Tunç, 1999). Hygiene is not only concerned with physical cleanliness but also plays a crucial role in maintaining and sustaining health. Personal hygiene, in particular, is a fundamental requirement for individuals to preserve their overall health status and contributes to their well-being (Seçim, 1991). Developing personal hygiene habits enhances an individual's quality of life and plays a significant role in preventing infections and diseases. However, assessments of whether personal hygiene is adequate may vary among individuals. Various factors, including cultural values, economic conditions, education level, social environment, and the individual's perception of hygiene, influence these differences (Yalçın & Özkalp, 2005).

The skin is the organ most exposed to external environments and serves as the primary interface between the body and microorganisms. The skin surface of an adult's hands covers approximately 2 square meters and is in constant contact with various microorganisms. Notably, enteric bacteria can be transferred to the skin surface via fecal contamination (Madigan et al., 2010). Awareness of toilet use and post-toilet hygiene practices play a crucial role in maintaining personal hygiene. Restrooms provide favorable conditions for microbial proliferation due to their warm and humid environments. Insufficient hygiene in these settings significantly increases the risk of infection. Pathogens such as *Shigella* spp., *Escherichia coli, Pseudomonas aeruginosa, Acinetobacter baumannii, Staphylococcus aureus*, and norovirus can persist on environmental surfaces for extended periods while maintaining their infectious potential (Suen et al., 2019a).

In restrooms, fomite surfaces play a crucial role in the transmission of microorganisms from person to person. Fomite surfaces include inanimate objects or materials that act as intermediaries in contamination, such as door handles, faucet heads, light switches, kitchen utensils, pens, desks, towels, money, and books (Madigan et al., 2010; Maori et al., 2013; Tiku et al., 2019; Türkseven, 2018). The location of fomite surfaces within or outside the restroom, the frequency of cleaning, the properties of detergents and disinfectants used, and user-related factors all influence the level of contamination. In an experimental study, it was reported that 30–60% of bacteria present on these surfaces could be transferred to hands with a single touch (Rusin et al., 2002). Faucets in restrooms, in particular, pose a bidirectional contamination risk. Since hands are contaminated before washing, touching the faucet handles to turn them on or off may transfer microorganisms to these surfaces. If the same surface is touched again after handwashing, hands can become recontaminated (Trampuz & Widmer, 2004). Therefore, in our study, faucet handles and door handles were identified as critical surfaces for sampling. Additionally, this study aimed to compare contamination levels between fomite surfaces located on the right and left sides.

In this context, the study aims to determine the level of microbial contamination on entrance doors and faucets in staff and student restrooms located within the Tourism Faculty, Engineering Faculty, and Veterinary Faculty of Balıkesir University, considering surface location and gender factors.

MATERIALS AND METHODS

To determine the effect of gender on microbial contamination, samples were collected from bidet faucet heads and entrance-exit door handles in male and female restrooms. The sampling process was conducted over a three-week period during the mid-term break of the academic calendar, with samples collected twice a week.

Sampling surfaces were selected as bidet faucet heads and entrance-exit door handles. To compare contamination levels based on the location of fomite surfaces, a coding system was implemented during sampling, categorizing fomites according to whether they were positioned on the user’s right or left side. Specifically, for bidet faucet samples, the position of the faucet relative to the user's toilet posture (right or left) was considered. For door handles, the likelihood of being held with the right or left hand was determined based on the door's opening direction.

For the sampling process, sterile sponge swabs measuring 2 cm × 5 cm, pre-moistened with sterile physiological saline (SPS), were used. A total of 128 samples were collected. The distribution of the samples was as follows: 64 samples were obtained based on the gender factor, with 32 from female restrooms and 32 from male restrooms. The remaining 64 samples were collected based on fomite location, with 32 from the right side and 32 from the left side. The collected swab samples were homogenized in stomacher bags containing 25 mL of SPS. Serial dilutions were then prepared from the homogenized samples using glass tubes containing 9 mL of SPS.

Microbial analyses

For microbial analysis, serial dilutions were prepared, and the following culture media and methods were used: total aerobic mesophilic bacteria (TAMB) were enumerated using the pour plate method on Plate Count Agar (PCA; Merck, Germany). Coliform bacteria were counted using the double-layer pour plate method on Violet Red Bile Lactose Agar (VRBL; Merck, Germany). *E. coli* counts were determined using the spread plate method on Tryptone Bile X-Glucuronide Agar (TBX; Merck, Germany). *Staphylococcus*/*Micrococcus* spp. were enumerated using the spread plate method on Baird-Parker Agar (BPA; Merck, Germany). Following the incubation period, the resulting colonies were evaluated.

Statistical analysis

Statistical analyses were performed using SPSS 25 statistical software. Data were expressed as mean ± standard deviation. The normality of data distribution was assessed using the Kolmogorov-Smirnov test. Differences among groups were analyzed using the Kruskal-Wallis test, while differences between two groups were evaluated using the t-test.

Ethical Approval

This study does not require ethics committee approval as it does not involve data collection from human or animal subjects.

Table 1. Microbial load results on fomite surfaces and external door handles in male and female restrooms (log_{10} CFU/surface±SD)

Surface Type	Faucet (log_{10} CFU/faucet±SD)		External Door Handle (log_{10} CFU/door handle±SD)	
	Female	Male	Entrance	Exit
TAMB	3.41±0.42	3.72±0.58	3.35±0.56[b]	4.09±0.78[a]
***Staphylococcus*/*Micrococcus* spp.**	2.83±0.53[b]	3.17±0.62[a]	2.82±0.53[b]	3.47±0.49[a]
Coliform	<1.39	<1.39	<1.39	<1.39
Escherichia coli	<2.39	<2.39	<2.39	<2.39

[a-b]: Mean values in the same row with different superscript letters indicate statistically significant differences ($p<0.05$)

RESULTS

The bacterial loads detected on fomite surfaces sampled from male and female restrooms are presented in Table 1. No statistically significant difference was detected in TAMB counts on faucet surfaces based on gender factor ($p>0.05$). The highest mean bacterial load was recorded on fomite surfaces in male restrooms, with 3.72 log_{10} CFU/faucet. However, a statistically significant difference was found between male and female restroom fomite surfaces in terms of *Staphylococcus*/*Micrococcus* spp. counts ($p<0.05$). The *Staphylococcus*/*Micrococcus* spp. count was 3.17 log_{10} CFU/faucet in male restrooms. For entrance and exit door handles, a statistically significant difference was detected in both TAMB and *Staphylococcus*/*Micrococcus* spp. counts ($p<0.05$). Higher bacterial loads were detected on exit door handles in both analyses. No coliform bacteria or *E. coli* were detected at either sampling point.

The bacterial loads on fomite surfaces are presented in Table 2. No statistically significant difference was observed in TAMB counts between faucet locations ($p>0.05$). The highest TAMB count was recorded in left-side faucet samples, with an average of 3.37 log_{10} CFU/faucet. A statistically significant difference was detected in *Staphylococcus*/*Micrococcus* spp. counts based on faucet positions ($p<0.05$). The highest *Staphylococcus*/*Micrococcus* spp. count, 2.95 log_{10} CFU/faucet, was found in faucets located on the right-hand side. For door handle samples held with the right and left hands, a statistically significant difference was observed in TAMB and *Staphylococcus*/*Micrococcus* spp. counts ($p<0.05$). The highest mean bacterial load for TAMB was detected on right door handles at 3.64 log_{10} CFU/door handle, while for *Staphylococcus*/*Micrococcus* spp., it was detected on left door handles at 2.89 log_{10} CFU/door handle. No coliform bacteria or *E. coli* were detected in any of the examined faucet or door handle samples.

Table 2. Microbial load results based on the location of fomite surfaces (log_{10} CFU/surface±SD)

Surface Type	Faucet (log_{10} CFU/faucet)		Door Handle (log_{10} CFU/door handle)	
	Right	Left	Right	Left
TAMB	3.34±0.52	3.37±0.37	3.64±0.69[a]	3.52±0.52[b]
***Staphylococcus*/*Micrococcus* spp.**	2.95±0.22[a]	2.74±0.41[b]	2.72±0.59[b]	2.89±0.35[a]
Coliform	<1.39	<1.39	<1.39	<1.39
Escherichia coli	<2.39	<2.39	<2.39	<2.39

[a-b]: Mean values in the same row with different superscript letters indicate statistically significant differences ($p<0.05$).

DISCUSSION

Restrooms are a crucial component of social hygiene areas and hold significant importance for public

health. Individuals using the restroom come into contact with various parts of their bodies with their hands and subsequently touch faucet handles or door handles, leading to the contamination of these surfaces. Until an individual effectively washes their hands, they continue to transfer microorganisms to door handles during exit, to people they shake hands with, to money used in transactions, to handrails in public transportation, and to other surfaces they touch (Erol, 2010).

Fecal matter is a major source of human pathogens and can lead to infectious diseases under inadequate hygiene conditions. Infections originating from feces are often associated with poor hygiene in shared environments. Surfaces such as door handles, faucets, soap dispensers, and light switches in restrooms are among the critical points for bacterial transmission. Even after washing their hands, individuals may come into contact with these surfaces, reintroducing pathogenic microorganisms and increasing the risk of transmission (Türkseven, 2018).

Societal gender norms play a significant role in shaping cleanliness and hygiene habits among men and women. In many cultures, women are expected to be more meticulous and hygienic, whereas similar expectations for men tend to be lower. A global study examining 56 countries found that hygiene-related norms are generally stricter for women compared to men (Eriksson et al., 2022). Additionally, cultural values and religious beliefs lead to significant differences in toilet hygiene practices across countries and societies. In many Asian, Middle Eastern, and African cultures, there is a cultural division of labor between the right and left hand: the left hand is considered "unclean" and is traditionally used for post-toilet cleaning, while the right hand is used for activities such as eating and greeting others (Bartram & Cairncross, 2010).

Studies evaluating post-toilet handwashing habits in terms of gender have identified significant differences between men and women. An observational study conducted in the United States with approximately 4,000 participants reported that women washed their hands more frequently and more correctly (using soap and for a longer duration) compared to men. In this study, 14.6% of men did not wash their hands at all after using the restroom, while 35.1% rinsed their hands with water only, without using soap. In contrast, these rates were 7.1% and 15.1% for women, respectively. Similarly, earlier studies conducted in the United Kingdom and the United States also found that men's post-toilet handwashing rates were lower than those of women. For instance, one study revealed that only 31% of men washed their hands, whereas this rate was 65% among women (Kelland, 2020). These differences suggest that men may be more prone to risky hygiene behaviors. All these findings indicate that gender disparities are clearly observed in hygiene practices, with men exhibiting more relaxed adherence to hygiene rules due to social and psychological factors. Consequently, numerous academic studies confirm that gender differences influence hygiene behaviors, attributing these disparities to sociocultural norms, risk perception, and knowledge levels (Suen et al., 2019b).

Studies on this subject have consistently reported that women wash their hands more frequently and for a longer duration compared to men, placing greater emphasis on hand hygiene before and after using the restroom (Üner et al., 2009; Deveci et al., 2010; Kaya et al., 2006; Balcı et al., 2005). Similarly, the study by Taşkıran et al. (2019) found that women had better hygiene habits than men, and that handwashing frequency was lower among men. Likewise, Oz et al. (2021) reported that handwashing frequency directly affects microbial load, with higher bacterial levels observed on the hands of male participants. The lower adherence to hand hygiene among men is a significant factor that can contribute to increased microbial contamination on restroom surfaces. Notably, one study found that men were more likely to skip handwashing when alone in the restroom or after urination only (Aunger et al., 2016). Moreover, women generally place greater importance on personal hygiene practices compared to men. It has been reported that women are more likely to engage in routines such as washing hands and face in the morning, washing hands after meals, cleaning food before consumption, practicing oral hygiene after breakfast, and changing underwear and socks daily (Erkal & Şahin, 2011). Women have also been shown to have better body hygiene practices than men, including more frequent bathing (Kaya et al., 2006; Şimşek et al., 2010). These behavioral differences may explain the higher levels of *Staphylococcus/Micrococcus* spp. detected in male restrooms in our study. There may be several reasons for these hygiene differences. For example, a large-scale survey conducted in the United States in 2025 identified the main reasons for individuals choosing to leave a public restroom without washing their hands. These included the absence of soap or paper towels, malfunctioning or dirty sinks, excessive crowding in the restroom, and unpleasant odors (Cleaning & Maintenance Management, 2023).

The literature review did not reveal any studies specifically examining the difference in microbial contamination between restroom entrance and exit door handles. However, the higher microbial load detected on exit door handles in our study suggests that post-toilet hand hygiene may be inadequate or that handwashing is being neglected. Indeed, a report indicated that the rate of handwashing with soap after using the restroom varies between 0% and 34% (World Bank, 2005). Similarly, according to CDC data, the global post-toilet handwashing rate is only around 19% (CDC, 2024). These findings support the high microbial contamination levels detected on restroom exit door handles in our study and highlight

behavioral deficiencies in hand hygiene as a potential explanation.

In our study, the TAMB count on fomite surfaces, based on their location, was detected at an average level of approximately 3.5 $\log_{10}$ CFU/faucet/door handle. A literature review did not reveal any studies specifically evaluating microbial contamination levels based on the location of restroom fomite surfaces. One relevant study in the literature, conducted by Suen et al. (2019a) in Hong Kong, reported that the TAMB count on fomite surfaces in public restrooms was approximately 2 $\log_{10}$ CFU, which is lower than the levels observed in our study. Additionally, our findings indicate that TAMB levels were higher on right-side door handle surfaces. This may be explained by the fact that over 90% of individuals worldwide are right-handed (McManus and Bryden, 1992), making the right hand more frequently exposed to surface contamination. Consistent with our findings, a study by De Alwis et al. (2012) also reported that dominant hand use (right hand) is a significant factor in door handle contamination.

Coagulase-negative and coagulase-positive *Staphylococcus* species, which are fundamental components of the normal human microbiota, have been increasingly recognized as causative agents of nosocomial infections in recent years (Schleifer & Bell, 2009). Consequently, the frequent presence of *Staphylococcus* spp. on restroom fomite surfaces where hands frequently come into contact has been reported in numerous studies. For example, in a study conducted by Nworie et al. (2012), 30.1% of total isolates obtained from public restroom fomite surfaces were identified as *S. aureus*. Similarly, Maori et al. (2013) reported that 43.3% of fomite surfaces in public restrooms were contaminated with *Staphylococcus* spp. Consistent with our study findings, a literature review revealed that Gram-positive microorganisms particularly *Staphylococcus* spp. are detected at higher rates on restroom fomite surfaces compared to *E. coli* and other Gram-negative microorganisms (Ngonda, 2017; Fakhoury & Nawas, 2018; Flores et al., 2011). This phenomenon may be explained by the greater adaptability of Gram-positive bacteria to dry environmental conditions, or by the inability of Gram-negative bacteria to effectively compete with Gram-positive microorganisms in such environments.

The *Enterobacteriaceae* family consists of Gram-negative, non-spore-forming, rod-shaped, oxidase-negative, facultative anaerobic, glucose-fermenting, and catalase-positive microorganisms. Some enterobacteria are potential pathogens for humans and, due to their ability to survive in various environments both inside and outside the body, they can cause opportunistic infections in immunocompromised individuals. The presence of fecal coliforms, a subgroup of enteric bacteria, is considered an indicator of fecal contamination or inadequate sanitary and hygiene conditions. The primary representative of this group is *E. coli*, which predominantly inhabits the intestines of humans and warm-blooded animals (Peixoto & Fontoura-da-Silva, 2007). In our study, no coliform bacteria or *E. coli* were detected on fomite surface samples. This situation may be attributed to several factors. First, considering the sampling method and analytical sensitivity, bacteria present on fomite surfaces must exceed a certain threshold level to be detected. This may be due to coliform bacteria being present on fomite surfaces (faucets and door handles) at levels below 25 CFU/faucet/door handle, and *E. coli* at levels below 250 CFU/faucet/door handle, making detection impossible. Additionally, due to sampling challenges, the study was conducted during the two-day weekend period when restrooms were not in use, which may have influenced the results. During this period, the lack of restroom use exposed bacteria on contaminated surfaces to environmental factors such as drying, temperature fluctuations, and ultraviolet (UV) radiation, which can significantly affect bacterial survival. Indeed, studies have shown that *E. coli* levels decline significantly within 24–48 hours on stainless steel and plastic surfaces under low humidity conditions (Visvalingam et al., 2017). Furthermore, at room temperature and low humidity (40–60% RH), *E. coli* has been reported to be largely eliminated within 24 hours (Shimoda et al., 2019). This suggests that *E. coli* is highly sensitive to desiccation and may not have survived on dried faucet and door handle surfaces, preventing its detection (Madigan et al., 2010; Gerhardts et al., 2012).

CONCLUSION

This study demonstrates that microbial contamination in restrooms is widespread and that hygiene habits are a key factor influencing contamination levels. Ensuring proper hand hygiene, along with the implementation of technological measures such as automatic door systems and sensor-operated faucets, are effective strategies to reduce the risk of transmission from fomite surfaces. Additionally, placing informational posters in public restrooms to raise hygiene awareness is considered another important measure that can encourage users to adopt proper hygiene practices.

Hygiene awareness campaigns conducted by health authorities and educational institutions are of great importance in reducing microbial contamination. The widespread promotion of hygiene education and the reinforcement of handwashing habits can play a critical role in infection prevention. In this context, it is essential to implement comprehensive educational programs and behavioral interventions aimed at increasing individual hygiene awareness.

Acknowledgement
The authors would like to extend their sincere thanks everyone who contributed to this study.

Conflict of Interest
The authors declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Author Contributions
Plan, design: TEG, HT; **Material, methods and data collection:** TEG, EBG, BM, SK, HT; **Data analysis and comments:** TEG, HT; **Writing and corrections:** TEG, EBG, BM, SK, HT.

Funding
No funding.

Ethical Approval
This study does not require ethics committee approval as it does not involve data collection from human or animal subjects.

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ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1534185

The Relationship Between Consanguinity and Other Factors with Gross Motor Function Levels in Children with Neuromotor Developmental Delay

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Geliş Tarihi / Received: *15.08.2024,* ***Kabul Tarihi / Accepted:*** *25.03.2025*

ABSTRACT

Objective: It is well established that consanguinity is a risk factor for neuromotor developmental delay. In our clinical observations, we have noted that children with neuromotor delay, and consanguineous parents tend to have more delayed gross motor skills. This study aimed to investigate the frequency of consanguinity in children with neuromotor developmental delay, and whether there is any relationship between consanguinity, gross motor function classification, and other parameters. **Materials and Methods:** Two hundred and six paediatric patients diagnosed with neuromotor developmental delay and referred to the rehabilitation clinic were included in the study. In the children included in the study, consanguinity and gross motor function levels were evaluated in conjunction with diagnosis, gestational age, birth weight, and various maternal and paternal factors, and inter-group comparisons were made. **Results:** 68% of the patients had a history of consanguinity. 65.5% of the children had a history of incubator care, 35.4% had a history of asphyxia, and 30.1% had a history of epilepsy. Upon reviewing the diagnoses, 63.6% were diagnosed with cerebral palsy, and 13.6% were diagnosed with axial hypotonia. Furthermore, no significant relationship was found between incubator care, asphyxia, epilepsy, neuromotor developmental delay, and consanguinity with gross motor classification. **Conclusion:** In our study, no significant relationship was found between consanguinity, gross motor classification, and other parameters in children with neuromotor developmental delay. Further studies are required to determine whether consanguineous marriage influences motor classification in neuromotor developmental delay.

Keywords: Consanguinity, Motor Skills Disorders, Neurodevelopmental Disorders.

Nöromotor Gelişim Geriliği Olan Çocuklarda Akraba Evliliği ve Diğer Faktörlerin Kaba Motor Fonksiyon Düzeyleri ile İlişkisi

ÖZ

Amaç: Akraba evliliğinin nöromotor gelişim geriliği için bir risk faktörü olduğu iyi bilinmektedir. Klinik gözlemlerimizde ebeveynlerinde akrabalık bulunan nöro-motor geriliği olan çocukların, kaba motor seviyesinin daha geride olduğunu gözlemledik. Bu çalışmada nöromotor gelişim geriliği olan çocuklarda akraba evliliği sıklığı ve kaba motor fonksiyon sınıflaması ile akraba evliliği ve diğer parametreler arasında bir ilişki olup olmadığı incelendi. **Gereç ve Yöntem:** Nöro-motor gelişim geriliği tanısı almış, rehabilitasyon polikliniğine başvuran 206 çocuk hasta çalışmaya dahil edildi. Çalışmaya dahil edilen çocuklarda akraba evliliği ve kaba motor fonksiyon düzeyleri; tanı, doğum haftası, doğum ağırlığı, çeşitli maternal ve paternal faktörler ile birlikte değerlendirilerek gruplar arası karşılaştırmalar yapıldı. **Bulgular:** Hastaların %68'inde akraba evliliği vardı. Çocukların %65,5'inde küvöz öyküsü, %35,4'ünde asfiksi öyküsü ve %30,1'inde epilepsi öyküsü vardı. Hastaların tanıları incelendiğinde %63,6'sında serebral palsi, %13,6'sında aksiyel hipotoni, saptandı. Ayrıca, küvözde kalma, asfiksi, epilepsi, nöromotor gelişim geriliği ve akraba evliliği ile kaba motor sınıflaması arasında anlamlı bir ilişki bulunmadı. **Sonuç:** Çalışmamızda nöromotor gelişim geriliği olan çocuklarda kaba motor sınıflaması ile akraba evliliği ve diğer parametreler arasında anlamlı ilişki bulunamadı. Bu konuda yapılacak ileri çalışmalar konunun aydınlatılmasına yardımcı olacaktır.

Anahtar Kelimeler: Kan Bağı, Motor Beceri Bozuklukları, Nörogelişimsel Bozukluklar.

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Bu makaleye atıf yapmak için / Cite this article: Kolutek Ay, B., & Tuna, M. (2025). The relationship between consanguinity and other factors with gross motor function levels in children with neuromotor developmental delay. *BAUN Health Sci J, 14*(2), 288-294. https://doi.org/10.53424/balikesirsbd.1534185

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

Neuromotor development is a process that starts from the intrauterine period and continues until adulthood. The most important feature that distinguishes children and adults from each other is that children show continuous growth and development. While growth is the increase in body volume and mass, development is the change in the functions of cells and tissues (Çarman, 2016).

The increase in the use and skills of large muscle groups of the body indicates gross motor development, while the increase in the use of small muscle groups that provide functions such as writing, grasping small objects or toys indicates fine motor development (Yimenicioglu et al., 2023). Neuromotor development in children progresses from gross motor movements to fine motor movements, from cranial to caudal and from center to peripheral. The chronological age of the child should be taken into account when evaluating neuromotor developmental stages (Çarman, 2016; Yimenicioğlu et al., 2023).

While biological factors play a role in the early stages of neuromotor development, environmental factors gain greater importance in the later stages. Neuromotor developmental delay may occur due to many risk factors in prenatal, perinatal and postnatal periods. Neuromotor developmental delay may occur in children due to genetic syndromes, premature birth history, asphyxia, low birth weight, twins, intrauterine infection history, maternal systemic disease or smoking history (Caesar et al., 2023; Çelik, 2021; Hsieh at al., 2023).

In clinical practice, we observed that children with motor retardation whose parents had a consanguineous marriage had severe gross motor classifications. We aimed to identify the factors associated with the level of motor delay and contribute to the literature with the results of this study. So, we investigated the frequency of consanguineous marriage in children with neuromotor developmental delay in Şanlıurfa, where consanguineous marriages are common, and whether there is a relationship between gross motor level and consanguineous marriage and the other parameters.

MATERIALS AND METHODS

Study type

This cross-sectional descriptive study was conducted in Şanlıurfa Training and Research Hospital.

Study group

Children, who were diagnosed with neuromotor developmental retardation by a Paediatric Neurology physician and referred to the Physical Medicine and Rehabilitation Outpatient Clinic for rehabilitation, were included in this study.

Patients who had not yet been diagnosed, those with orthopaedic disabilities but without neuromotor delay, children with one or both step-parents, as well as children who have lost one or both parents and those whose parents did not provide consent for participation were excluded from the study.

Due to the descriptive and cross-sectional nature of the study, no specific sample size calculation was made. After obtaining the study approval, all patients who met the criteria during the study period (four months) were included in the study.

Procedures

Gender, mode of delivery, birth weight, incubator history, maternal gestational age, number of pregnancies, epilepsy history, similar disease history in siblings, family pregnancy planning, mother's folic acid use history, mother's systemic disease history were questioned and recorded in all of the children included in the study. The patients included in the study were considered as consanguineous if they married second-degree relatives, while those who neither knew each other before marriage nor lived in the same village were considered as non-consanguineous. Couples who were not related to each other but lived in the same village and were married were not included in the study. The gross motor function level of the children included in the study was evaluated according to the Gross Motor Functions Classification System. Gross motor classification was evaluated as age appropriate. Gross motor classification system is easy, simple and can be applied in a short time, and the general classification that divides the severity of disability into five levels for all ages is as follows.

LEVEL I: Can mobilize independently and without support in the community without restriction.

LEVEL II: Can ambulate in the community with restrictions

LEVEL III: Walks indoors using hand-held mobility devices but requires a wheelchair to ambulate in the community.

LEVEL IV: Self-movement is limited. Can use a motorized mobility vehicle.

LEVEL V: They are transported at home and in the community in a manual wheelchair. They are completely dependent on others (Palisano et al., 1997).

Statistical analysis

Analyzes were evaluated in 22 package programs of SPSS (Statistical Package for Social Sciences; SPSS Inc., Chicago, IL). In the study, descriptive data were shown as n and % values in categorical data and mean±standard deviation (Mean±SD) values in continuous data. Chi-square analysis (Pearson Chi-square) was used to compare categorical variables between groups. Conformity of continuous variables to normal distribution was evaluated by Kolmogorov-Smirnov test. The Kruskal Wallis test was used to compare more than two groups. The statistical significance level in the analyses was accepted as $p<0.05$.

Ethical approval

Written permission was obtained from the Harran University Faculty of Medicine Clinical Research Ethics Committee and the institution where the study was conducted prior to data collection. In addition, all study participants' parents were informed about the nature of the study and that participation was on a voluntary basis.

Informed consent was obtained from all participants' parents.

RESULTS

206 patients with a mean age of 5.0±4.6 (min=1, max=13) years were included in the study, and 44.7% of the patients were female and 55.3% were male. There was consanguineous marriage in 68% of the patients' parents. 56.8% of the deliveries were caesarean section and 43.2% were normal deliveries. 38.8% of the mothers had a history of abortion and 18.4% had a history of multiple pregnancy. 11.2% of the mothers had a history of smoking during pregnancy and 16% had a history of additional disease. 60.2% of the patients had planned delivery and the mother had a history of folic acid use. 65.5% of the children had a history of incubator, 35.4% had a history of asphyxia and 30.1% had a history of epilepsy. When the diagnoses of the patients were examined, 63.6% had Cerebral Palsy (CP), 13.6% had a genetic disease that could cause central hypotonia (CH), 7.3% had Neural Tube Defect (NTD), 3.4% had Muscular Dystrophy (MD) and Spinal Muscular Atrophy (SMA) and 12.1% had Metabolic Disease (MDs).

Table 1. General characteristics of patients and parental factors.

		Number	%
Age, mean ±Standard Deviation			5.0±4.6
Gender	Female	92	44.7
	Male	114	55.3
Consanguineous marriage	Yes	140	68.0
	No	66	32.0
Father smoking history	Yes	113	54.9
	No	93	45.1
Type of birth	Cesarean section	117	56.8
	Vaginal	89	43.2
There is a history of abortion in the mother	Yes	80	38.8
	No	126	61.2
Multiple pregnancy history	Yes	38	18.4
	No	168	81.6
Smoking before and during pregnancy	Yes	23	11.2
	No	183	88.8
Mother's history of additional disease	Yes	33	16.0
	No	173	84.0
History of similar illness in siblings	Yes	55	26.7
	No	151	73.3
Pregnancy planning and use of folic acid	Yes	124	60.2
	No	82	39.8
Father's history of drug use during pregnancy planning	Yes	22	10.7
	No	184	89.3
Incubator story	Yes	135	65.5
	No	71	34.5
Perinatal Asphyxia	Yes	73	35.4
	No	133	64.6
History of epilepsy	Yes	62	30.1
	No	144	69.9
Diagnosis	Cerebral Palsy	131	63.6
	Central hypotonia	28	13.6
	Neural Tube Defect	15	7.3
	MD and SMA	7	3.4
	Metabolic Disease	25	12.1
Cerebral Palsy Classification	Diplegic	43	32.8
	Hemiplegic	27	20.6
	Tetraplegic	44	33.6
	Mixed type	17	13.0
Gross motor classification	1	13	6.3
	2	32	15.5
	3	30	14.6
	4	44	21.4
	5	87	42.2

MD: Muscular Dystrophy, SMA: Spinal Muscular Atrophy

It was observed that these MDs included Phenylketonuria(n=10), Mucopolysaccharidosis (n=7), Gaucher disease (n=4), Fatty Acid Oxidase Deficiencies (n=4), and Galactosemia (n=3). It was determined that 32.8% of CP patients were diplegic, 20.6% hemiplegic, 33.6% tetraplegic and 13% mixed type. When the gross motor classification of the patients was examined, 6.3% was level 1, 15.5% was level 2, 14.6% was level 3, 21.4% was level 4 and 42.2% was level 5 was (Table 1).

The classification of patients with CP showed significant difference among gross motor retardation levels ($p<0.001$). Gross motor retardation was lower in diplegic, and hemiplegic CP types compared to mixed and tetraplegic CP types. However, no statistically significant relationship was found between gross motor retardation and consanguinity or other parameters ($p>0.05$) (Table 2).

Table 2. Comparison of gross motor classifications of categorical parameters.

		1	2	3	4	5	p*
		N (%)	N (%)	N (%)	N (%)	N (%)	
Gender	Female	6 (6.5)	19 (20.7)	13 (14.1)	24 (26.1)	30 (32.6)	0.084
	Male	7 (6.1)	13 (11.4)	17 (14.9)	20 (17.5)	57 (50.0)	
Consanguineous marriage	Yes	8 (5.7)	20 (14.3)	18 (12.9)	30 (21.4)	64 (45.7)	0.590
	No	5 (7.6)	12 (18.2)	12 (18.2)	14 (21.2)	23 (34.8)	
Type of birth	Cesarean Section	7 (6.0)	14 (12.0)	14 (12.0)	28 (23.9)	54 (46.2)	0.254
	Vaginal	6 (6.7)	18 (20.2)	16 (18.0)	16 (18.0)	33 (37.1)	
Maternal abortion history	Yes	5 (6.3)	13 (16.3)	6 (7.5)	14 (17.5)	42 (52.5)	0.069
	No	8 (6.3)	19 (15.1)	24 (19.0)	30 (23.8)	45 (35.7)	
Multiple pregnancy history	Yes	3 (7.9)	8 (21.1)	3 (7.9)	11 (28.9)	13 (34.2)	0.344
	No	10 (6.0)	24 (14.3)	27 (16.1)	33 (19.6)	74 (44.0)	
Smoking during pregnancy	Yes	1 (4.3)	4 (17.4)	3 (13.0)	6 (26.1)	9 (39.1)	0.965
	No	12 (6.6)	28 (15.3)	27 (14.8)	38 (20.8)	78 (42.6)	
Mother's history of additional disease	Yes	3 (9.1)	4 (12.1)	7 (21.2)	6 (18.2)	13 (39.4)	0.694
	No	10 (5.8)	28 (16.2)	23 (13.3)	38 (22.0)	74 (42.8)	
Similar illness in siblings	Yes	3 (5.5)	8 (14.5)	6 (10.9)	14 (25.5)	24 (43.6)	0.836
	No	10 (6.6)	24 (15.9)	24 (15.9)	30 (19.9)	63 (41.7)	
Pregnancy planning and use of folic acid	Yes	8 (6.5)	17 (13.7)	17 (13.7)	28 (22.6)	54 (43.5)	0.882
	No	5 (6.1)	15 (18.3)	13 (15.9)	16 (19.5)	33 (40.2)	
Incubator story	Yes	10 (7.4)	14 (10.4)	19 (14.1)	29 (21.5)	63 (46.7)	0.053
	No	3 (4.2)	18 (25.4)	11 (15.5)	15 (21.1)	24 (33.8)	
Perinatal asphyxia	Yes	2 (2.7)	14 (19.2)	10 (13.7)	19 (26.0)	28 (38.4)	0.301
	No	11 (8.3)	18 (13.5)	20 (15.0)	25 (18.8)	59 (44.4)	
History of epilepsy	Yes	2 (3.2)	12 (19.4)	7 (11.3)	11 (17.7)	30 (48.4)	0.385
	No	11 (7.6)	20 (13.9)	23 (16.0)	33 (22.9)	57 (39.6)	
Diagnosis	Cerebral Palsy	11 (8.4)	24 (18.3)	16 (12.2)	29 (22.1)	51 (38.9)	0.277
	Central Hypotonia	1 (3.6)	4 (14.3)	8 (28.6)	6 (21.4)	9 (32.1)	
	Neural Tube Defect	1 (6.7)	1 (6.7)	1 (6.7)	2 (13.3)	10 (66.7)	
	MD And SMA	0 (0.0)	0 (0.0)	0 (0.0)	3 (42.9)	4 (57.1)	
	Metabolic Disease	0 (0.0)	3 (12.0)	5 (20.0)	4 (16.0)	13 (52.0)	
CP classification	Diplegic	6 (14.0)	6 (14.0)	7 (16.3)	13 (30.2)	11 (25.6)	**<0.001**
	Hemiplegic	5 (18.5)	13 (48.1)	4 (14.8)	5 (18.5)	0 (0.0)	
	Tetraplegic	0 (0.0)	1 (2.3)	2 (4.5)	10 (22.7)	31 (70.5)	
	Mixed Type	0 (0.0)	4 (23.5)	3 (17.6)	1 (5.9)	9 (52.9)	

* Chi-square analysis was applied. CP: Cerebral Palsy, MD: Muscular Dystrophy, SMA: Spinal Muscular Atrophy N: Number

There was a significant difference between gross motor classifications in terms of age (p=0.019). This difference was due to the difference among type 1 and type 2 and type 3 and among type 1 and type 2 and type 4. There was no significant difference between the gross motor classes in terms of other measurement parameters (p>0.05) (Table 3). 60.7% of the patients with consanguineous parents had a diagnosis of CP, while 69.7% of the patients without consanguineous parents had a diagnosis of CP. In both groups, the most common diagnosis was CP, and the distribution of disease diagnoses was similar. No statistically significant relationship was found between consanguineous marriage and the diagnosis of the disease (Table 4).

Table 3. Comparison of measurement parameters of gross motor classification.

	1	2	3	4	5	p*
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	
Age	7.4±5.2[a]	6.0±4.5[a]	3.8±4.1[b]	4.1±4.4[b.c]	5.0±4.6[a.b.c]	**0.019**
Father Age at Birth	33.2±6.9	31.0±9.3	31.7±7.0	31.0±6.8	32.2±7.4	0.575
Mother Age at Birth	31.7±7.6	25.8±6.8	27.6±8.3	26.0±5.7	27.0±5.7	0.118
Birth Order	3.8±2.5	3.7±2.6	3.9±2.3	3.6±2.3	3.9±2.2	0.891
Birth Week	37.2±3.7	36.7±4.7	36.0±3.9	36.2±4.4	37.1±3.7	0.545
Days of spent in incubator	22.8±32.8	12.9±20.2	25.0±33.3	30.3±38.7	31.0±40.8	0.095
Birth weight (grams)	2420.4±929.2	2416.3±876.4	2495.3±776.5	2832.5±3078.0	2508.7±808.7	0.959

Kruskal Wallis analyses was applied. a,b,c: Group where the difference originated. SD: Standard deviation

Table 4. Comparison of diagnosis frequency based on consanguineous marriage.

	Yes	No	p*
	N (%)	N (%)	
Cerebral palsy	85 (60.7)	46 (69.7)	0.400
Central hypotonia	20 (14.3)	8 (12.1)	
Neural tube defect	11 (7.9)	4 (6.1)	
MD and SMA	7 (5.0)	0 (0)	
Metabolic disease	17 (12.1)	8 (12.1)	

* Chi-square analysis was applied. MD: Muscular Dystrophy, SMA: Spinal Muscular Atrophy N: Number

DISCUSSION

Neuromotor development is a process that starts from the intrauterine period and continues until adulthood. Many risk factors that cause this process to stop may cause neuromotor developmental delay (Çelik, 2021). After neuromotor developmental retardation occurs, the effort and cost for treatment is very high. For this reason, protective-preventive approaches are of great importance in terms of preventing neuromotor developmental retardation. In order to be successful in this area, it is necessary to know the factors that prepare neuromotor developmental delay and how they can be controlled (Kleigman, Stanton, Geme, Schor & Behrman, 2015). In this study, we examined the patients with neuromotor developmental delay and examined the frequency of consanguineous marriage, the relationship between consanguineous marriage and gross motor level, and whether some factors have an effect on the level of gross motor function.

Consanguineous marriage was present in 68% of the parents of the patients included in our study. In another study, consanguineous marriages were also found at a high rate in the Arab society, which shares a culture similar to ours (Mushta et al., 2022). In addition, consanguineous marriages are common in Turkish culture and the frequency of genetic diseases is higher than in other societies.

There was no statistically significant relationship between the diagnoses of our cases included in the study and consanguineous marriage.

Prolongation of labor and decreased Apgar score are seen as risk factors for neuromotor developmental retardation (Aslan, Çalkavur, 2022). In our study, 56.8% of the patients had a history of caesarean section and 43.2% of them had a vaginal delivery, and no significant relationship was found between delivery type and gross motor function level. In addition, no significant relationship was found between the birth type of consanguineous marriage and the gross motor classification system.

In many studies, it is known that the mother's smoking or systemic disease is a risk factor for neuromotor developmental delay (Asif et al., 2022; Kahn, Talat &Malik, 2022). In our study, 11.2% of the mothers had a history of smoking during

pregnancy and 16% had a history of additional disease. Although no significant relationship was found in our study, a study conducted in Türkiye demonstrated that consanguinity, maternal anaemia during pregnancy, and maternal occupational status were associated with the age at which children began to walk independently in healthy children (Yalçın, Yurdakök, Tezel & Özbaş, 2012). This situation highlights the importance of maternal factors, which were also investigated in our study.

In studies, asphyxia, incubator and epilepsy history are known to be risk factors for neuromotor developmental delay (Asif et al., 2022; Aslan, Çalkavur, 2022; Kahn et al., 2022). In our study, 65.5% of the children had a history of incubator, 35.4% had a history of perinatal asphyxia and 30.1% had a history of epilepsy, which was consistent with the literature. There was no statistically significant relationship between neuromotor developmental retardation stage and these risk factors. In a study conducted in Türkiye on children with CP, no significant relationship was found between consanguinity and the presence of epilepsy in CP patients. However, it was shown that the gross motor classification was more impaired in the group of patients with epileptic cerebral palsy (Karatoprak, Sözen & Saltık, 2019). It was shown that prematurity and low birth weight are risk factors for developmental delay (Kerimoglu et al., 2004) In our study, no significant relationship was found between low birth weight and prematurity and neuromotor developmental delay stage. Gross motor retardation is more common in those with a history of asphyxia and low birth weight (Diabelkova et al., 2022). Our study was not compatible with the literature and no relationship was found between the level of gross motor retardation and these risk factors. It may be due to the presence of neuromotor retardation and multiple risk factors in all the patients included in this study.

In our study, a significant relationship was found between gross motor classification level and CP classification, which is compatible with the literature. It was expected that the gross motor level of diplegic and hemiplegic CPs was better than tetraplegic and mixed type CPs. Again, no relationship was found between CP and consanguineous marriage. While diplegic CP is seen more frequently in the normal literature, the rate of tetraplegic CP is higher in countries where consanguineous marriages are common, such as our country. In our study, the rate of tetraplegic CP was 33.6%, which was consistent with studies conducted in Pakistan and Arabia (Kahn et al., 2022; Keramat et al., 2022; Mushta et al., 2022).

In a study comparing Israeli and Arab children with CP, it was found that the prevalence of wheelchair-dependent children at GMFCS levels 4 and 5 was higher in the Arab population, and one of the possible reasons for this could be the higher rate of consanguinity within the Arab community. This finding appears to be consistent with our clinical observations (Blumenfeld, Ben-Pazi, Ornoy, Josef & Shohat, 2020).

History of prematurity and asphyxia is common in multiple pregnancies. This may cause neuromotor developmental delay and low gross motor classification system level in one and/or both twins. There are studies reporting a relationship between multiple pregnancy and neuromotor developmental delay (Chen et al., 2023; Christensen, Chau, Synnes, Grunau &Miller, 2021). In our study, no significant relationship was found between multiple pregnancy and neuromotor developmental delay stage.

Although in our clinical observations, we have noticed that children with consanguineous parents have more severe gross motor impairments, several factors may explain why this was not statistically significant in the study. These factors include the small sample size, the study being conducted at a single centre, and covering a limited time. Other possible contributing factors include maternal self-care and nutritional status during pregnancy, the child's nutritional status, whether the child received breast milk, and individual circumstances such as socio-economic conditions.

Limitation of the study

The retrospective nature of the study, its cross-sectional design, being conducted at a single centre, the small sample size, the measurement of gross motor level through instant examination rather than monitoring the limited number of similar studies in the literature, and the short duration of the study are among the limitations.

CONCLUSION

More research is needed on the epidemiology of children and adolescents with neuromotor developmental delay. In recent years, the number of individuals with neuromotor developmental delay has increased significantly. These registries provide a platform for epidemiological research, a sampling framework for clinical research, and can also provide information on healthcare planning and delivery.

Acknowledgement

We would like to thank Assoc. Prof. Dr. Muhammed Seyithanoğlu for his support in the statistical analysis of the study.

Conflict of Interest

The authors declare no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

Author Contributions

Plan, design: BKA; **Material, methods and data collection:** BKA, MT; **Data analysis and comments:** BKA, MT; **Writing and corrections:** BKA, MT.

Funding
None

Ethical Approval
Institution: Harran University Ethics Committee
Date: 28.11.2022
Approval no: HRU/22.23.03

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ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1441933

Determining the Relationship Between Irrational Beliefs and Problem-Solving Skills of Adolescents

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Geliş Tarihi / Received: *23.02.2024,* ***Kabul Tarihi / Accepted:*** *27.03.2025*

ABSTRACT
Objective: This descriptive study was conducted to determine the relationship between irrational beliefs and problem-solving skills of adolescents and to examine them according to their sociodemographic characteristics. **Materials and Methods:** The research was conducted with 353 6th, 7th and 8th grade students studying in Ankara between April 15 and June 15, 2022. In the study, "Data Collection Form" and "Problem Solving Inventory for Children" were used as data collection tools. **Results:** In the study, a significant negative correlation was found between adolescents' irrational beliefs and problem-solving skills (r=-0.389; p<0.01). When the sub-dimensions of the scales were evaluated in the study, a significant negative relationship was found between the sub-dimensions of self-control, avoidance, and problem-solving confidence of adolescents (r=-0.255; r=-0.273; r= -0.286, p<0.01). When the irrational belief levels of adolescents were examined according to sociodemographic characteristics: their mother's occupation and parents' educational status; When examined according to problem solving skill levels, a significant difference was found according to gender, school success status and mother's profession (p<0.05). **Conclusion:** The research conducted reveals the importance of the relationship between adolescents' irrational beliefs and problem-solving skills. In this respect, the research contributes to school health nursing studies by creating data.
Keywords: Adolescence, Nursing, School Health, Problem Solving, Beliefs.

Adölesan Bireylerin İrrasyonel İnanışları ve Problem Çözme Becerisi Arasındaki İlişkinin Belirlenmesi

ÖZ
Amaç: Bu araştırma, adölesan bireylerin irrasyonel inanışları ve problem çözme becerisi arasındaki ilişkinin belirlenmesi ve sosyodemografik özelliklere göre incelenmesi amacıyla tanımlayıcı türde yapılmıştır. **Gereç ve Yöntem:** Araştırma, 15 Nisan-15 Haziran 2022 tarihleri arasında Ankara'da okuyan 6., 7. ve 8. Sınıf 353 öğrenci ile yapılmıştır. Araştırmada veri toplama araçları olarak: ''Veri Toplama Formu'', ''Çocuklar İçin Problem Çözme Envanteri'' ve ''Ergenler İçin Mantıkdışı İnanç Ölçeği'' kullanılmıştır. **Bulgular:** Araştırmada, adölesan bireylerin irrasyonel inanışları ve problem çözme becerisi arasında negatif yönde anlamlı bir ilişki bulunmuştur (r=-0.389; p<0.01). Yapılan araştırmada ölçeklerin alt boyutu değerlendirildiğinde, adölesanların öz denetim, kaçınma ve problem çözmeye güven alt boyutları arasında negatif yönde anlamlı ilişki bulunmuştur (r=-0.255; r=-0.273; r=-0.286, p<0.01). Adölesanların, irrasyonel inanış düzeyleri sosyodemografik özelliklere göre incelendiğinde: annelerinin mesleği ve ebeveynlerin eğitim durumu; problem çözme becerisi düzeylerine göre incelendiğinde cinsiyet, okul başarı düzeyi ve annenin mesleğine göre anlamlı fark bulunmuştur (p<0.05). **Sonuç:** Yapılan araştırma adölesanların irrasyonel inanışları ve problem çözme becerileri arasındaki ilişkinin önemini ortaya koymaktadır. Araştırma bu yönüyle okul sağlığı hemşireliği çalışmalarına veri oluşturarak katkı sağlamaktadır.
Anahtar Kelimeler: Adölesan, Hemşirelik, Okul Sağlığı, Problem Çözme, İnançlar.

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Bu makaleye atıf yapmak için / Cite this article: Karagoz, F., & Atasoy E. (2025). Determining the relationship between ırrational beliefs and problem-solving skills of adolescents. *BAUN Health Sci J, 14*(2), 295-305. https://doi.org/10.53424/balikesirsbd.1441933

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

Adolescence is defined as a transition period that starts from childhood and continues until adulthood. It is generally thought that individuals in adolescence do not have sufficient skills to cope with problems (Kabasakal, 2018). It is important for individuals to gain problem-solving skills for a healthy adolescence. One of the most important factors affecting this skill is irrational beliefs. For this reason, it is important to determine the relationship between PSS and irrational beliefs. PSS is one of the basic cognitive processes of people. Problem solving is a process that involves systematic observation and critical thinking, providing a suitable solution to achieve the desired goal (Nihan and Baran, 2021). One of the important areas of study of PSS is the beliefs of adolescents. Beliefs are examined under two headings: rational and irrational. Rational beliefs help individuals focus and solve problems. Irrational beliefs are illogical and unsafe. It can be challenging to convey rational beliefs to adolescents, so it is important to be creative when conveying templates and present them to adolescents in procedures that are appropriate for the school curriculum (Abiogu et al., 2021). School health nursing, which is one of the fields of study of public health nursing, is one of the important fields of study. School health nurses have duties such as monitoring the normal development of individuals, educating individuals, creating a healthy environment, intervening in current and potential health problems, and providing case management services. However, protecting the mental health of students is one of the important duties of school health nurses. (Bohnenkamp et al., 2015; Holmes et al., 2016; Ulutaşdemiş et al., 2016). In this context, a team consisting of school administrators, teachers, and public health professionals can protect mental health and help students improve their academic success by developing problem-solving skills (Serin & Derin, 2008). When the literature is examined, there are few studies specific to the field of nursing on irrational thoughts and problem-solving skills in adolescents (Bohnenkamp et al., 2015; Şahin, 2015; Holmes et al., 2016; Kabasakal, 2018). School health nurses can help adolescents realize their irrational thoughts and strengthen their problem-solving skills, thus providing them with positive health behaviors (Ersoy & Ünsal, 2017). Therefore, it is expected that this research will provide new information to the literature by generating data for school health nursing studies.

MATERIALS AND METHODS

Type of research

The research was carried out in a descriptive relational type.

Design, setting, and sample

The research population was selected from Keçiören district of Ankara province. Keçiören is in the central district of Ankara and there are 44 secondary schools. The school where the study would be conducted was determined by lottery method. There are 672 students in the research population of the selected school. The sample of the study was obtained by calculating the sample size formula for a known universe. The research sample consists of 353 students who meet the sample selection criteria. 5th grade students were not included in the study because they were not in the IBSA age range. The sample included students who met the selection criteria: students in adolescence (6th, 7th, and 8th grades) and students who gave written (student-parent) and verbal (student) consent to participate in the research.

Data collection

In the study, data were collected with "Sociodemographic Information Form", "Irrational Belief Scale for Adolescents" and "Problem Solving Inventory for Children".

Sociodemographic Characteristics Information Form: There is a survey formula that includes 11 introductory questions such as the demographic characteristics of the researchers, the profession of the mother and father, and their educational status (Kabasakal, 2018; Yıldız, 2020).

Irrational Beliefs Scale for Adolescents (IBSA): This scale can be applied to secondary school students. The scale, which consists of 21 items, has three sub-dimensions. These are 8 items in Success Requests, 7 items in Comfort Requests, and 6 items in Respect Requests. The questions are answered by scoring from 1 to 5. The total score of the scale ranges from 21 to 105. Çivitçi (2003) found the reliability value of the scale to be 0.82 (Çivitçi, 2003). In the analyzes, Cronbach-α value was calculated as 0.74 and the reliability of the study was found to be high.

Problem Solving Inventory for Children (PSIC): This scale can be applied to secondary school students. Scale questions consist of 24 items. The scale has 3 sub-dimensions. These are: Avoidance: 5 items, Reliance on Problem Solving: 12 items, and Self-Control: 7 items. Questions are answered as Likert type. The total score of the scale is between 24-120. As the score obtained from the scale increases, the problem-solving skills of individuals increase. The reliability, and validity of the scale was determined by Serin et al., (2010) and was found to be 0.80 (Serin et al., 2010). In the analyses, the Cronbach-α value of the scale was found to be 0.78, and the reliability level of the study was found to be high.

Application of data collection forms

The research survey and consent forms were administered between April 15 and June 15, 2022. The classrooms where the study was to be conducted were visited during the hours permitted by the school principal. Parent and student permission forms 6.,7. and 8th grade students were visited, the study was explained, and the forms were distributed. Later, the same classes were visited again, and consent forms were collected from the students (parents and

students) who accepted the study, and the survey form was distributed by the researcher.
The survey questions were introduced to the students by the researcher. Students were given 1 class hour to answer. At the end of 1 hour, the forms received from the students were checked and collected by the researcher.

Analysis of research data

Excel 2010 and SPSS-26 (Statical Package for Social Sciences (SPSS) 26 package programs were used to enter and analyze the data. Descriptive statistics and frequency tables were used to interpret the data. In statistical analysis, parametric methods "Independent Sample-t", "ANOVA (F-table value) and "Tukey" tests were used for normally distributed data. Non-parametric methods: Mann-Whitney U Test, Kruskal-Wallis H Test, Bonferroni correction, Spearman correlation coefficient tests were used for measurement data that did not show normal distribution.

Ethical approval

Necessary permissions were obtained for the scales to be used in this research. In addition, necessary permissions were obtained from Ankara Yıldırım Beyazıt University Health Sciences Ethics Committee (Date: 22 March 2022 Issue: 3), Ankara Provincial Directorate of National Education (Date: 14.04.2022 Issue: 111243), Keçiören District National Education Directorate and School administrators. No confidential information was received from parents and students, and participation was voluntary, and a consent form was signed.

RESULT

In this part of the research, the statistical analysis of the scales and the socio-demographic characteristics of the research are given in tabular form.

Table 1. Distribution of adolescents according to their sociodemographic characteristics.

Variable (n=353)	n	%
Gender		
Male	183	51.8
Female	170	48.2
Age		
11	11	3.1
12	145	41.1
13	105	29.7
14	92	26.1
Class		
6.	131	37.1
7.	113	32.0
8.	109	30.9
Number of siblings		
1	45	12.7
2	161	45.6
3	110	31.2
4 and ↑	37	10.5
Mother's occupation		
Not working	257	72.8
Employee	59	16.7
Officer	32	9.1
Executive	5	1.4
Father's occupation		
Not working	21	5.9
Employee	209	59.2
Officer	83	23.5
Executive	40	11.4
Income level (monthly TL)		
≤5004	87	24.6
5.005-8.000	153	43.4
8.001-11.000	74	21.0
>11.000	39	11.0
Mother's education level		
Uneducated	12	3.4
Elementary	78	22.1
Secondary	78	22.1
High school	137	38.8
University	48	13.6

Table 1. (Continued) Distribution of adolescents according to their sociodemographic characteristics.

Father's education level		
Uneducated	14	4.0
Elementary	57	16.1
Secondary	68	19.3
High school	138	39.1
University	76	21.5
School success status		
Very successful	77	21.8
Good	117	33.1
Moderate	145	41.1
Unsuccessful	14	4.0
Total	353	100

Sociodemographic characteristics of adolescents are given in Table 1. It was determined that 183 (51.8%) of the adolescents were male, 145 (41.1%) were 12 years old and 131 (37.1%) were in the 6th grade. In addition, it was determined that the mothers of 257 adolescents (72.8%) were not working, 209 (59.2%) fathers were workers and 161 students (45.6%) had 2 siblings. On the other hand, 153 (43.4%) of them had a family income of 5,005-8,000 TL, 145 (41.1%) of them stated their success at school at a moderate level, 138 (39.1%) of them were high school graduates and 137 (38.8%) of their mothers were high school graduates. It was observed that adolescents had moderate levels of irrational beliefs and PSS (Table 2).

Table 2. Status of scores on the PSIC and the IBSA.

Ölçek (n=353)		**Average**	**SD**	**Med.**	**Min.**	**Max.**
Irrational Beliefs for Adolescents Scale	The Demand for Respect	23.18	5.74	23.0	8.0	37.0
	The Demand for Comfort	19.65	5.88	19.0	7.0	35.0
	The Demand for Success	24.14	4.30	25.0	10.0	30.0
	IBSA – Total	66.97	11.18	67.0	25.0	102.0
Problem Solving Inventory for Children	Self-confidence related to PSS	37.13	8.20	37.0	21.0	59.0
	Self-control	19.83	5.63	20.0	7.0	34.0
	Avoidance	11.99	3.97	12.0	5.0	25.0
	PSIC – Total	68.95	12.83	69.0	34.0	118.0

*SD: Standard Deviation, *Med.: Median

Table 3. Examination of statistical analysis scores of the IBSA.

Variable (n=353)	**n**	**IBSA**				
		The Demand for Respect	The Demand for Comfort	The Demand for Success	**IBSA – Total**	
		Med. [IQR]	**Med. [IQR]**	**Med. [IQR]**	**$\bar{X} \pm$ SD**	**Med. [IQR]**
Gender						
Female	170	23.0 [9.0]	19.0 [9.0]	25.0 [6.0]	67.34±11.47	68.0 [15.0]
Male	183	22.0 [8.0]	19.0 [9.0]	25.0 [6.0]	66.60±10.92	65.0 [15.0]
Analysis*		Z=-0.028	Z=-0.432	Z=-1.412		Z=-1.001
P		p=0.978	p=0.666	p=0.158		p=0.317
Age						
11	11	23.0 [10.0]	21.0 [8.0]	25.0 [7.0]	67.91±11.19	66.0 [17.0]
12	145	24.0 [9.0]	19.0 [9.0]	24.0 [6.0]	67.67±11.92	66.0 [15.5]
13	105	22.0 [8.0]	18.0 [8.0]	25.0 [6.0]	65.09±10.11	65.0 [13.5]
14	92	23.0 [7.8]	20.0 [9.8]	26.0 [5.0]	67.86±11.06	68.0 [17.8]
Analysis		χ^2=6.181	χ^2=1.455	χ^2=7.552		F=1.397
P		p=0.103	p=0.693	p=0.056		p=0.243
Class						
6. (1*)	131	24.0 [9.0]	19.0 [8.0]	24.0 [6.0]	67.87±12.11	66.0 [16.0]
7. (2*)	113	23.0 [8.0]	19.0 [9.0]	25.0 [5.5]	66.21±10.15	66.0 [14.0]
8. (3*)	109	22.0 [8.0]	18.0 [9.0]	26.0 [6.0]	66.64±11.04	66.0 [17.0]
Analysis		χ^2=7.312	χ^2=0.340	χ^2=5.742		χ^2=0.919
P		**p=0.026**	p=0.844	p=0.057		p=0.632
Difference		**[1-3]**				

Table 3. (continued) Examination of statistical analysis scores of the IBSA.

Variable (n=353)	n	IBSA				
		The Demand for Respect	The Demand for Comfort	The Demand for Success	IBSA – Total	
		Med. [IQR]	**Med. [IQR]**	**Med. [IQR]**	**$\bar{X} \pm$ SD**	**Med. [IQR]**
Number of siblings						
1	45	22.0 [8.5]	20.0 [6.5]	24.0 [6.0]	67.11±10.82	69.0 [16.0]
2	161	23.0 [9.0]	20.0 [9.0]	25.0 [7.0]	67.64±12.14	66.0 [18.0]
3	110	22.0 [8.0]	17.0 [8.0]	25.5 [6.0]	66.12±10.65	65.0 [14.0]
4 and ↑	37	24.0 [8.0]	20.0 [8.5]	23.0 [5.5]	66.32±8.79	65.0 [10.5]
Analysis		χ^2=1.464	χ^2=3.940	χ^2=5.466		χ^2=0.921
P		p=0.691	p=0.268	p=0.141		p=0.820
Mother's occupation						
Notworking (1)	257	22.0 [8.0]	18.0 [8.0]	25.0 [6.0]	66.15±10.85	65.0 [14.0]
Worker (2)	59	22.0 [9.0]	19.0 [8.0]	24.0 [6.0]	67.39±11.87	66.0 [20.0]
Officer (3)	32	26.0 [9.5]	24.0 [7.5]	25.0 [6.5]	72.40±10.98	74.0 [15.3]
Manager (4)	5	24.0 [5.5]	21.0 [11.5]	26.0 [12.0]	68.60±14.01	73.0 [26.0]
Analysis*		χ^2=7.161	χ^2=12.710	χ^2=1.396		χ^2=8.899
P		p=0.067	**p=0.005**	p=0.498		**p=0.031**
Difference			**[1-3]**			**[1-3]**
Father's occupation						
Not working	21	24.0 [11.5]	19.0 [10.0]	23.0 [11.0]	66.33±13.92	68.0 [24.5]
Worker	209	22.0 [8.0]	19.0 [8.0]	25.0 [6.0]	66.84±10.87	66.0 [15.0]
Officer	83	24.0 [8.0]	19.0 [9.0]	25.0 [6.0]	67.65±11.12	67.0 [17.0]
Manager	40	22.6 [9.0]	20.5 [5.0]	25.0 [6.8]	66.48±11.51	66.5 [15.0]
Analysis		χ^2=4.151	χ^2=0.332	χ^2=0.942		χ^2=0.751
P		p=0.246	p=0.954	p=0.815		p=0.861
Mother's Education level						
Uneducated (1)	12	23.0 [11.0]	23.0 [12.3]	27.0 [8.0]	72.17±12.26	8.5 [13.0]
Elementary	78	21.0 [8.0]	18.0 [8.0]	25.0 [7.0]	65.81±11.02	66.5 [14.5]
education (2)	78	22.0 [10.0]	17.0 [7.3]	24.0 [6.0]	65.35±11.66	64.0 [16.3]
Secondary	137	21.0 [7.0]	20.0 [7.0]	25.0 [5.5]	66.75±10.39	65.0 [13.5]
education (3)	48	25.5 [8.8]	22.0 [9.8]	25.0 [5.0]	70.73±11.77	72.5 [19.8]
Highschool (4)						
University (5)						
Analysis		χ^2=12.048	χ^2=8.945	χ^2=4.184		F=2.092
P		**p=0.017**	p=0.062	p=0.382		p=0.081
Difference		**[2-4;2-5]**				
Father's Education level						
Uneducated (1)	14	23.5 [11.3]	18.5 [7.8]	27.5 [5.0]	70.43±13.87	68.5 [18.5]
Elementary	57	21.0 [7.0]	19.0 [6.0]	26.0 [7.5]	66.58±9.74	68.0 [11.5]
education (2)	68	22.0 [8.0]	18.0 [9.0]	26.0 [5.0]	67.69±10.25	65.5 [15.3]
Secondary	138	22.0 [9.0]	18.0 [9.0]	24.0 [6.0]	65.42±11.68	64.0 [16.0]
education (3)	76	25.0 [8.8]	21.0 [9.8]	25.0 [5.8]	68.75±11.34	69.0 [17.0]
Highschool (4)						
University (5)						
Analysis		χ^2=9.229	χ^2=1.520	χ^2=12.188		χ^2=6.207
P		p=0.056	p=0.823	**p=0.016**		p=0.184
Difference				**[1-4]**		
Income level (monthly TL)						
≤5004	87	22.0 [7.0]	21.0 [9.0]	26.0 [7.0]	66.80±11.71	65.0 [15.0]
5.005-8.000	153	22.0 [8.0]	18.0 [8.0]	24.0 [6.0]	65.74±11.41	65.0 [13.0]
8.001-11.000	74	24.5[10.0]	20.0 [9.0]	25.0 [5.3]	69.20±10.38	69.0 [17.0]
>11.000 TL	39	23.0 [8.0]	20.0 [6.0]	25.0 [5.0]	67.84±10.15	66.0 [14.0]
Analysis*		χ^2=7.532	χ^2=3.954	χ^2=1.249		F=1.699
P		p=0.057	p=0.266	p=0.741		p=0.167
School success status						
	77	22.0 [8.5]	18.0 [8.5]	25.0 [7.5]	64.84±11.46	65.0 [14.0]
Very good	117	23.0 [7.0]	20.0 [10.5]	25.0 [5.5]	68.03±11.41	68.0 [17.0]
Good	145	22.0 [9.0]	19.0 [8.0]	25.0 [5.0]	67.26±11.04	67.0 [16.5]
Modarate	14	22.5 [8.0]	22.0 [7.3]	24.5 [9.3]	66.64±8.16	69.0 [11.5]
Bad						
Analysis		Z=-1.630	Z=-1.888	Z=-0.790		Z=-1.759
P		p=0.103	p=0.059	p=0.430		p=0.079

* *SD: Standard Deviation, *Med.: Median

"ANOVA (F-table value)" to compare three or more normally distributed independent groups", "Mann-Whitney U test " to compare the analysis values of two non-normally distributed independent groups; The "Kruskal-Wallis H test " was used to compare three or more independent groups.

Adolescents' success demand scores of those studying in the 6th grade were higher than those of those studying in the 8th grade ($\chi2$=7.312; p=0.026); Comfort demand sub-scale scores of those whose mothers were civil servants were higher than those whose mothers were not working ($\chi2$=12.710; p=0.025); IBSA-total scores of those whose mothers are not working are higher than those whose mothers are civil servants ($\chi2$=8.899; p=0.031); Demand for achievement sub-scale scores were higher among those whose mothers were university graduates than those whose mothers were primary or high school graduates ($\chi2$=12.048; p=0.017); The respect demand scores of those whose fathers were illiterate were found to be significantly higher than those whose fathers were high school graduates ($\chi2$=12.188; p=0.016); PSIC – total scores were found to be significantly higher in those with very good school success compared to those with average and poor school success ($\chi2$=9.339; p=0.025)(Table-3).

Table 4. Examining the statistical analysis scores of the PSIC.

Variable (n=353)	n	PSIC				
		Self-confidence related to PSS	Self-control	Avoidance	PSIC – Total	
		Med. [IQR]	Med. [IQR]	Med. [IQR]	$\bar{X} \pm SD$	Med. [IQR]
Gender						
Female	170	38.0 [13.3]	21.0 [9.0]	12.0 [6.0]	76.54±13.15	75.0 [18.0]
Male	183	36.0 [13.0]	18.0 [7.0]	11.0 [5.0]	78.03±12.51	77.0 [17.0]
Analysis		Z=0.704	Z=-2.896	Z=-1.214		Z=-1.395
P		p=0.482	**p=0.004**	p=0.225		p=0.163
Age						
11	11	34.0 [18.0]	21.0 [10.0]	14.0 [7.0]	74.73±16.19	74.0 [27.0]
12	145	36.0 [13.0]	18.0 [8.5]	12.0 [5.5]	77.22±12.27	76.0 [16.0]
13	105	38.0 [13.5]	20.0 [8.5]	12.0 [5.0]	78.17±12.36	77.0 [16.5]
14	92	36.5 [15.0]	20.0 [9.0]	11.0 [6.0]	76.79±13.87	75.0 [22.8]
Analysis		χ^2=0.617	χ^2=3.768	χ^2=2.519		F=0.357
P		p=0.893	p=0.288	p=0.472		p=0.784
Class						
6.	131	36.0 [13.0]	18.0 [7.0]	12.0 [5.0]	76.69±12.65	76.0 [17.0]
7.	113	38.0 [12.5]	19.0 [8.0]	12.0 [5.0]	77.93±12.52	77.0 [18.0]
8.	109	37.0 [14.5]	20.0 [9.0]	11.0 [6.0]	77.42±13.42	75.0 [21.5]
Analysis		χ^2=2.187	χ^2=2.977	χ^2=2.075		χ^2=0.515
P		p=0.335	p=0.226	p=0.354		p=0.773
Number of siblings						
1	45	36.0 [12.0]	22.0[10.5]	12.0 [5.5]	76.00±12.19	76.0 [13.0]
2	161	37.0 [13.5]	18.0 [8.5]	12.0 [5.0]	77.98±12.61	76.0 [16.5]
3	110	38.0 [14.3]	20.0 [7.5]	11.0 [7.3]	77.45±14.01	76.5 [21.0]
4 and ↑	37	35.0 [13.0]	19.0 [7.5]	12.0 [5.0]	75.57±10.88	75.0 [15.5]
Analysis		χ^2=2.579	χ^2=3.716	χ^2=0.657		χ^2=1.051
P		p=0.461	p=0.294	p=0.883		p=0.789
Mother's occupation						
Notworking[(1)]	257	30.0 [17.0]	20.0 [9.0]	11.0 [6.0]	70.47±10.70	71.0 [13.5]
Worker [(2)]	59	32.0 [10.5]	19.0 [7.0]	12.0 [5.0]	76.20±10.73	74.0 [14.0]
Officer [(3)]	32	35.0 [14.0]	19.5 [10.5]	12.5 [6.0]	78.56±13.19	78.0 [18.5]
Manager [(4)]	5	39.0 [13.0]	19.0 [6.5]	16.0 [6.0]	74.00±14.65	74.0 [28.0]
Analysis*		χ^2=16.356	χ^2=3.943	χ^2=6.480		F=4.864
P		**p=0.001**	p=0.268	p=0.090		**p=0.003**
Difference		**[1-3;1-4]**				**[1-3]**
Father's occupation						
Not working	21	38.0 [13.5]	20.0 [11.5]	11.0 [9.5]	76.85±17.39	80.0 [30.0]
Worker	209	37.0 [13.5]	19.0 [8.0]	12.0 [5.0]	77.73±12.63	77.0 [17.0]
Officer	83	36.0 [15.0]	20.0 [9.0]	11.0 [6.0]	77.27±12.48	75.0 [17.0]
Manager	40	36.5 [12.8]	21.0 [7.3]	13.0 [6.8]	75.50±12.13	74.5 [17.8]
Analysis		χ^2=0.591	χ^2=3.030	χ^2=1.083		χ^2=1.008
P		p=0.898	p=0.387	p=0.781		p=0.799
Mother's Education level						
Uneducated [(1)]	12	37.5 [13.8]	20.0 [8.8]	14.5 [6.5]	72.83±13.97	76.0 [22.5]
Elementary education [(2)]	78	37.5 [12.0]	21.0 [10.0]	12.0 [6.3]	75.95±11.80	74.5 [15.3]
Secondary education [(3)]	78	38.5 [13.3]	18.0 [7.0]	11.0 [5.3]	79.91±11.86	79.5 [17.3]
Highschool [(4)]	137	37.0 [16.0]	20.0 [7.0]	12.0 [5.5]	77.67±13.74	76.0 [21.0]
University [(5)]	48	34.5 [12.5]	19.0 [10.0]	11.0 [7.8]	75.42±12.58	74.0 [18.5]
Analysis		χ^2=3.168	χ^2=10.737	χ^2=6.726		χ^2=5.610
P		p=0.530	**p=0.030**	p=0.151		p=0.230
Difference			**[2-3]**			

Table 4. (continued) Examining the statistical analysis scores of the PSIC.

Variable (n=353)	n	PSIC				
		Self-confidence related to PSS	Self-control	Avoidance	PSIC – Total	
		Med. [IQR]	Med. [IQR]	Med. [IQR]	X̄ ± SD	Med. [IQR]
Father's education level						
Uneducated (1)	14	37.0 [12.8]	18.5 [14.3]	11.5 [4.8]	76.43±12.77	77.5 [13.5]
Elementary education (2)	57	39.0 [11.0]	20.0 [8.0]	13.0 [6.5]	76.68±12.10	76.0 [19.0]
Secondary education (3)	68	36.0 [12.5]	19.5 [7.0]	11.0 [4.8]	76.84±12.29	74.0 [16.5]
Highschool (4)	138	38.0 [14.0]	19.5 [9.0]	11.0 [6.0]	78.86±13.38	79.0 [19.3]
University (5)	76	35.0 [15.0]	19.0 [8.0]	11.5 [7.0]	75.57±12.81	74.0 [15.8]
Analysis		χ^2=6.474	χ^2=1.225	χ^2=7.728		χ^2=3.441
P		p=0.166	p=0.874	p=0.102		p=0.487
Income level (monthly TL)						
≤5004 TL	87	39.0 [11.0]	20.0 [7.0]	12.0 [6.0]	75.79±12.84	76.0 [16.0]
5.005-8.000 TL	153	37.0 [13.0]	18.0 [8.0]	12.0 [5.0]	78.83±13.26	77.0 [22.0]
8.001-11.000 TL	74	33.0 [15.0]	19.0 [8.5]	11.5 [5.0]	75.72±11.93	75.0 [13.0]
>11.000 TL	39	36.0 [15.0]	19.0 [6.0]	10.0 [6.0]	77.79±12.42	78.0 [14.0]
Analysis*		χ^2=7.266	χ^2=6.512	χ^2=7.058		χ^2=3.135
P		p=0.064	p=0.089	p=0.070		p=0.371
School success status						
Very good (1)	77	39.0 [12.0]	18.0 [7.0]	11.0 [6.0]	80.41±14.88	80.0 [18.5]
Good (2)	117	38.0 [13.5]	19.0 [9.0]	11.0 [6.0]	77.96±12.99	76.0 [20.0]
Modarate (3)	145	35.0 [13.5]	20.0 [8.0]	12.0 [6.0]	74.63±11.18	74.0 [15.5]
Bad (4)	14	30.5 [14.8]	22.0 [8.3]	11.5 [5.3]	72.21±12.07	71.5 [10.8]
Analysis		χ^2=8.519	χ^2=5.932	χ^2=2.796		χ^2=9.339
P		**p=0.036**	p=0.115	p=0.424		**p=0.025**
Difference		**[1-3;1-4]**				**[1-3;1-4]**

*SD: Standard Deviation, *Med.: Median

*"Mann-Whitney U" test for comparing measurement values of two independent groups in non-normally distributed data; "Kruskal-Wallis H" test statistics were used to compare three or more than three to ten independent groupings.

Adolescents' self-control scores according to gender were higher in girls than in boys (Z=-2.896; p=0.004); Problem solving confidence scores of those whose mothers are managers are higher than those whose mothers are civil servants and not working (χ2=16.356; p=0.001); PSIC – total scores of those whose mothers are civil servants are lower than those whose mothers are not working (F=4.864; p=0.003); self-control scores of those whose mothers are primary school graduates. scores were found to be significantly higher than those whose mothers were secondary school graduates (χ2=10.737; p=0.030); problem-solving confidence scores of those with very good school success were found to be significantly higher than those with average and poor school success (χ2=8.519; p=0.036) (Table 4).

Table 5. Examining the correlation levels of the PSIC and the Irrational Beliefs Scale for Adolescents.

Correlation* (n=353)			PSIC			
			Self-confidence related to PSS	Self-control	Avoidance	PSIC – Total
Irrational beliefs for adolescents scale	The Demand for Respect	r	-0.190	0.071	0.109	-0.202
		p	**0.000**	0.186	**0.000**	**0.000**
	The Demand for Comfort	r	-0.413	0.273	0.394	-0.511
		p	**0.000**	**0.000**	**0.000**	**0.000**
	The Demand for Success	r	0.088	0.222	0.077	-0.063
		p	0.097	**0.000**	0.149	0.238
	IBSA –Total	r	-0.286	0.255	0.273	-0.389
		p	**0.000**	**0.000**	**0.000**	**0.000**

*When examining the relationships of two quantitative variables, "Spearman correlation coefficient" was used in cases where at least one variable was not normally distributed.

As adolescent individuals' demand for success, demand for comfort, and IBSA-total score increased, their problem-solving confidence scores decreased. There was a negative and weak significant correlation between adolescents' demand for self-control and comfort, demand for respect and IBSA-total score (r: 0.273; r: 0.222; r: 0.255; p<0.05). As The Demand for Comfort, demand for respect, and IBSA–total scores increased, confidence in problem-solving scores decreased. A negative, weakly significant relationship was found between adolescents' avoidance and desire for achievement, demand for comfort and IBSA - total score (r: 0.109; r: 0.394; r: 0.273; p<0.05). As the Demand for Respect, Demand for Comfort, and IBSA-total score increased, avoidance scores decreased. A statistically significant, weak, and negative correlation was found between the PSIC total of

adolescents and the demand for achievement, demand for comfort and IBSA total score (r: -0.413; r: -0.286; r: -0.190; p<0.05). As The Demand for Respect, comfort demand and IBSA – total score increased, PSIC – total scores decreased (Table 5).

DISCUSSION

This research was conducted to evaluate the relationship between PSS and irrational beliefs of adolescent individuals. In addition, an answer was sought to the question of whether the irrational belief level and PSS level of adolescent individuals differ according to sociodemographic characteristics. When the PSS level of adolescent individuals was examined, it was found that they had a medium level of problem-solving skill. In other words, although adolescent individuals sometimes have difficulty in giving the appropriate reaction when faced with a problem, they can solve it at an acceptable level. When we examine the literature, there are studies that mostly find the PSS of adolescents at a moderate level (Vatansever et al., 2018; Tezel & Tezgören, 2019; Kozikoğlu & Tunç, 2020; and high (Tunç & Taşgın, 2018; Yıldız, 2020), while there are studies that find them to be at a weak level. Nevertheless, it is thought that factors such as sociodemographic characteristics of adolescents, the environment they live in, parental attitudes, and the school they go to bring their PSS to a certain level (Serin & Derin, 2008).

It is seen that PSS level of adolescent individuals varies when we evaluate them in terms of sociodemographic characteristics. When we evaluated PSS according to gender variable, the self-control subscale scores of female adolescents were found to be significantly higher than those of males. Looking at the literature, in addition to the findings of a significant relationship between PSS and gender (Derin, 2006; Kozikoğlu & Tunç, 2020; Yıldız, 2020), there is also evidence to the contrary in studies conducted in different age groups (Hoxha & Surucu, 2015). This situation is thought to be caused by developmental differences between genders: brain structure, mental development, learning skills, and social intelligence level. In cognitive processes, mental development and learning skills elements have a great impact on problem-solving skill levels (Doğan, 2007; Converse et al., 2014). However, it is important to consider the gender factor in intervention studies to be carried out at school. Having PSS can lead an individual to a higher academic life. In this study, the finding that the problem-solving confidence score was significantly higher in adolescents with very good school success compared to adolescents with average and poor school success is evidence of the importance of this issue. While there is a study in the literature that found a significant relationship in terms of problem-solving confidence scores regarding adolescent individuals (Serin & Derin, 2008), there are also contrary findings (Çivitçi, 2006). In this regard, we can consider students with good PSS as individuals who define their academic success as good and study regularly daily (Serin & Derin, 2008). One of the variables that predict PSS in terms of individual characteristics is the mother's working status. The mother's profession affects the problem-solving skill level at different levels. The level of confidence in problem-solving among adolescents whose mothers were managers was found to be significantly higher than those who were civil servants and did not work. However, it is thought that working mothers have better PSS because they overcome the difficulties of business life as well as their responsibilities for home life, and as a result, their children can solve problems better. Although it is stated that PSS differ depending on the mother's profession (Yıldırım et al., 2011), there are also contrary findings (Serin & Derin 2008). Since the mother's occupation alone is not predictive, it is thought that it should be evaluated together with parental attitudes and occupations and other sociodemographic characteristics (Uygur, 2018).

In this study, it was found that adolescent individuals had moderate levels of irrational beliefs (Table 2). In other words, adolescent individuals have moderate irrational beliefs that, although not extreme, prevent the individual from thinking correctly in their cognitive processes. Looking at the literature, while adolescents generally have a moderate level of irrational belief (Kabasakal, 2018; Küçük et al., 2016; Terjesen et al., 2017; Yıldız, 2020), there is also a study that finds the level of irrational belief to be high (Yıldırım, 2021). The moderate level of irrational beliefs of adolescents is noteworthy as a finding that should be taken into consideration to prevent their increase in adulthood and to improve positive mental health. However, it is known that irrational beliefs are affected by factors such as perfectionism, stress, self-esteem, and PSS. In this regard, it is very important for school health nurses to work to reduce irrational beliefs by taking these elements into account for the biopsychosocial development of individuals (Kabasakal, 2019; Ulutaşdemiş et al., 2016; Yıldırım, 2021).

Individual characteristics of adolescents are effective in their irrational belief level. For example, in studies conducted according to the gender variable, there is evidence that female adolescents have high irrational beliefs (Küçük et al., 2016; Aydın & Sevim, 2018). Of course, this finding is not surprising; since girls are expected to be shy, dependent, and emotional in traditional gender roles from an early age, it is thought that when they encounter a problem, they develop irrational beliefs by approaching it with the perspective of "I can't do it, I can't succeed" (Aydın & Sevim, 2018; Balkıs & Duru, 2020). However, it is also noted in the study and other studies that irrational beliefs don't differ significantly according to the gender variable

(Çivitçi, 2006; Yıldız, 2020). It is thought that the gender variable is not a single predictor at the level of irrational belief and should be considered together with other sociodemographic variables (Tunç & Taşgın, 2018; Yıldız, 2020).

One of the variables predicting the level of irrational belief of adolescents is the education level of the father and mother. It appears as a product of the reflection of the parents' upbringing styles and attitudes on the child. Respect demands of those whose fathers are illiterate compared to high school graduates; was found to be significantly high. In other words, as the father's education level decreases, he expects more obedience and respect from his children. Adolescents growing up in a traditional family structure may develop irrational beliefs because of the father's attitude and behavior. While there are studies like this study in the literature there are also studies (Şengönül, 2019) to the contrary (Boyacıoğlu, 2010; Yıldız, 2020). However, the success demand scores of those whose mothers graduated from university were found to be significantly higher than those whose mothers graduated from primary and high school. It is known that as the education level of the mother increases, they expect their children to be more successful and direct them to professions with high status (Şengönül, 2019). Although there is a relationship between the mother's education level and her child's irrational beliefs (Tunç & Taşgın 2018), there are also studies to the contrary (Boyacıoğlu, 2010; Yıldız, 2020).

One of the factors predicting the level of irrational belief in terms of individual characteristics is the mother's occupation. The total irrational belief score of those whose mothers were not working was found to be significantly higher than those whose mothers were civil servants. In other words, adolescents whose mothers do not work have a high level of irrational beliefs. There are limited studies in the literature evaluating the relationship between adolescents' irrational beliefs and the mother's profession. Studies have found that mothers in business life have a higher level of education and better self-improvement, therefore they have more information about their child's development and thus have more realistic expectations (Yeşilyaprak, 2003).

When the relationship between adolescents' PSS and irrational beliefs was evaluated, a negative, statistically weakly significant relationship was found. It was observed that as adolescents' irrational beliefs increased, their school success and mother's occupation increased. In this respect, the study reveals the importance of the relationship between irrational beliefs and PSS of adolescent individuals. Problem-solving skill levels decreased in all sub-dimensions. When the relationship levels between irrational beliefs and problem solving were evaluated, a weak relationship was found in the study. When the literature was examined, there were studies that found a weak (Yıldız, 2020), moderate (Kabasakal, 2019) and high (Uygur, 2018) relationship. It is thought that the reason for the existence of relationships at different levels is related to the sociodemographic characteristics of the sample group studied (Yıldız, 2020). Adolescence is a period in which the individual experiences physical, sensory, and cognitive changes. This change can be complex and challenging for the individual. While overcoming all these, individuals with high irrational beliefs may have difficulty solving problems (Uygur, 2018). Approaching the problem with negative thoughts such as "I can't solve it" or "I can't do it" while solving a problem negatively affects the individual's problem-solving skills and makes him feel inadequate. However, since adolescence individuals are at the beginning of this period, they have difficulty thinking abstractly when solving problems and can only evaluate the event as good or bad, therefore they develop irrational beliefs. For this reason, it is very important for the individual to approach problems rationally by transforming negative thoughts and beliefs into positive ones (Uygur, 2018). In this context, school health nurses have a great responsibility.

To improve the positive mental health of adolescents, they should conduct health screenings, determine individuals' irrational belief and problem-solving skill levels, and create training programs, make plans for individual and family-oriented care, develop rational nursing skills, and cooperate with other members of the team (Kabasakal, 2019).

Limitations of the research

This research is limited to 6th, 7th, and 8th grade students in adolescence.

CONCLUSION

In this study, a moderate and negative relationship was found between irrational beliefs and problem-solving skills of adolescents. It was observed that as the irrational beliefs of adolescents increased, their problem-solving skills decreased. In addition, the irrational belief levels of adolescents were found to be high in 6th grade students, those with unemployed mothers, those with illiterate fathers, and those with university graduate mothers. However, the problem-solving skills of adolescents were found to be high in female students, those with good academic success, and those whose mothers were administrators. In this respect, the study contributes to school health nursing studies by generating data to develop positive mental health. In further studies, it is recommended that the relationship between irrational beliefs and problem-solving skills be investigated in depth in different sample groups and its effectiveness be evaluated in intervention studies.

Acknowledgments
All adolescent individuals participating in the study we thank you.

Conflict of Interest
There is no conflict of interest in the study.

Author Contributions
Plan, design: FK, EA; **Materials and methods:** FK; **Data collection:** FK, **Data analysis and comments:** FK, EA; **Writing and corrections:** EA, FK**.**

Funding
The author(s) received no financial support for the research, authorship, and/or publication of this article.

Ethical Approval
Institution: Ankara Yıldırım Beyazıt University Health Sciences Ethics Committee
Date: 22.03.2022
Approval no: 03-723

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ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1643629

Determining the Health Literacy Levels of University Students: A Cross-Sectional Study

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Geliş Tarihi / Received: *20.02.2025,* ***Kabul Tarihi / Accepted:*** *12.04.2025*

ABSTRACT
Objective: The aim of this study is to determine the health literacy level of university students and to identify whether it varies based on certain variables. **Materials and Methods:** This study was conducted with vocational school students in Balikesir. The simple random sampling method was used to determine the study group, and 190 individuals who agreed to participate in the study were included. The data were analyzed using descriptive statistics, t-tests, one-way ANOVA, and Tukey tests. **Results:** According to the statistical analysis results, it was found that 20.53% of the students participating in the study had an insufficient level of health literacy, 36.84% had a problematic-limited level of health literacy, and that health literacy level showed a significant difference based on students' departments, the place where the families live, mother's education level, father's education level, area of access to health information, and what they do first when experiencing a health problem. **Conclusion:** The research found that more than half of the students had a low level of health literacy.
Keywords: Health, Health Literacy, University Student.

Üniversite Öğrencilerinin Sağlık Okuryazarlığı Düzeyinin Belirlenmesi: Kesitsel Bir Çalışma

ÖZ
Amaç: Bu çalışmanın amacı üniversite öğrencilerinin sağlık okuryazarlığı düzeyini belirlemek ve bazı değişkenler açısından farklılaşıp farklılaşmadığını tespit etmektir. **Gereç ve Yöntem:** Bu çalışma, Balıkesir'de bir meslek yüksekokulu öğrencileri ile gerçekleştirilmiştir. Çalışma grubunun belirlenmesinde basit tesadüfi örnekleme yöntemi kullanılmış olup, çalışmaya katılmayı kabul eden 190 kişi dahil edilmiştir. Veriler, tanımlayıcı istatistikler, t testi, tek yönlü varyans (ANOVA) testi ve Tukey testleri kullanılarak analiz edilmiştir. **Bulgular:** İstatistiksel analiz sonuçlarına göre, araştırmaya katılan öğrencilerin %20,53'ünün yetersiz sağlık okuryazarlığı düzeyine sahip olduğu, %36,84'ünün sorunlu-sınırlı sağlık okuryazarlığı düzeyine sahip olduğu ve sağlık okuryazarlığının öğrencilerin bölümleri, ailelerin yaşadığı yer, annenin eğitim seviyesi, babanın eğitim seviyesi, sağlık bilgisine erişim alanı ve sağlık problemi yaşadıklarında ilk ne yaptıklarına göre anlamlı bir farklılık gösterdiği ortaya konulmuştur. **Sonuç:** Araştırma sonucunda öğrencilerin yarısından fazlasının sağlık okuryazarlığı düzeyinin düşük olduğu tespit edilmiştir.
Anahtar Kelimeler: Sağlık, Sağlık Okuryazarlığı, Üniversite Öğrencileri.

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Bu makaleye atıf yapmak için / Cite this article: Çelik, G. (2025). Determining the health literacy levels of university students: a cross-sectional study. *BAUN Health Sci J, _14*(2), 306-315. https://doi.org/10.53424/balikesirsbd.1643629

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

Literacy is a concept that encompasses reading, writing, as well as the comprehension and interpretation of written material (Passamai et al., 2012). When addressing the concept of literacy within the healthcare field, health literacy can be defined as the ability to understand both verbal and written information related to health (Cevik & Kayabek, 2022). Health literacy is a significant concept because, it reflects individuals' ability to comprehend and interpret health-related information (World Health Organization [WHO], 2021). According to Parker (2009), health literacy is the understanding of health information, which is dependent on individuals' personal abilities and skills. Although there are various definitions of health literacy, it is generally described as the ability to easily access health-related information, comprehend it, and effectively utilize that information (Stormacq et al., 2023). Health literacy enhances individuals' capacity to make informed decisions about their health by improving their understanding of health-related issues. (Baker et al., 2002). Additionally, health literacy enables individuals to make informed decisions and take appropriate actions when seeking healthcare services, as well as following up with correct practices after receiving care. It also empowers them to stay updated with advancements in health-related topics (Sorensen et al., 2013).

The level of health literacy is considered a crucial concept as it contributes to the proper utilization of healthcare services, which in turn leads to a reduction in healthcare expenditures (Marinucci et al., 2023). This is because it has been observed that low health literacy increases the cost of provided healthcare services (Bailey et al., 2014). Individuals with higher health literacy have been found to better understand and evaluate treatment options for themselves and their loved ones, leading to improved health outcomes (Parker & Gazmararjan, 2003). Furthermore, health literacy not only affects the understanding and interpretation of health-related information but also influences communication with healthcare professionals. Individuals with high health literacy are shown to better comprehend the information provided by healthcare workers (Shaw et al., 2009).

Research has revealed that individuals with low health literacy levels lack knowledge about treatment protocols (Kondilis et al., 2006; Eichler et al., 2009; Kobayashi et al., 2014) and proper medication usage when they become ill, leading to the incorrect use of medications and insufficient skills in accessing and utilizing healthcare services (Berkman et al., 2011). Similarly, inadequate health literacy has been found to hinder individuals from using medications correctly, which subsequently results in the development of various health problems (Budnitz & Layde, 2007).

Experts emphasize that health literacy should be a critical educational objective, and measures should be implemented from an early age to enhance individuals' health literacy (Paakkari & Okan, 2019). Since the health-related behaviors and attitudes of university students' impact both their future lives and society, it is crucial for them to possess sufficient health literacy (Mullan et al., 2017).

The aim of this study is to determine the health literacy level of university students and to identify whether it varies based on certain variables.

MATERIALS AND METHODS

Study design

The population of the study consists of students from a Vocational School at Balikesir University. According to the information obtained from the Council of Higher Education's website, the number of registered students at the school is 411 (Council of Higher Education [CoHE], 09 January 2025, https://yokatlas.yok.gov.tr/onlisans-univ.php?u=1015). It was determined that during the 2024-2025 academic year, fall semester, 228 students were registered for courses at the vocational school, based on the data collected.

The sample size was calculated using the formula proposed by Barlett, Kortlij, and Chadwick (2001), which is commonly used for quantitative research with a known population.

$$n = \frac{n_0}{1 + \frac{n_0}{\mathrm{N}}}$$

$$n_0 = \frac{\mathrm{t}^2 \mathrm{x}\,(\mathrm{p})\,.\,(q)}{\mathrm{d}^2}$$

N: Population size
n: Sample size
p: The occurrence frequency of the event being studied (probability of occurrence)
q: The non-occurrence frequency of the event being studied (probability of non-occurrence)
t: The theoretical value found according to the t-table at a specific significance level (for a significance level of 0.05, the value is 1.96)
d: The sample error accepted by the researcher based on the occurrence frequency of the event (0.05).

In the study, p = q = 0.5 was assumed, with a confidence interval of 0.95 and a margin of error of 0.05. Based on these values, the sample size for the study was calculated to be 144 students, and the study was completed with the participation of 193 out of the 228 students in the population. Upon reviewing the surveys, it was found that 3 surveys contained missing information, so a total of 190 surveys were subjected to statistical analysis.

Data collection

The surveys were administered to students selected through simple random sampling, both face-to-face and electronically.

Data collection tools

This research is a quantitative study conducted using survey method. The "Personal Information Form" and

"Turkey Health Literacy Scale (TSOY-32)" were used as data collections tools in this study.

Personal information form: In the first section, the personal information form administered to participants includes 9 questions such as the participants' gender, age, place of residence, mother's education level, father's education level, field of study, chronic illness status, the source from which they first accessed health information, and the first action they took when experiencing a health issue.

Turkey Health Literacy Scale (TSOY-32): The Turkey Health Literacy Scale (TSOY-32)," developed by Okyay and others (2016), was used in the study. The Turkey Health Literacy Scale in the second section consists of 32 Likert-type statements. The scale consists of two dimensions: "Treatment and service dimension" and "Disease prevention and health promotion dimension". Both dimensions consist of the sub-dimensions "Accessing information, understanding information, evaluating information, using and applying information". The statements used for scoring the scale are rated as follows: "0: no idea, 1: very difficult, 2: difficult, 3: easy, 4: very easy." The scores are calculated based on this rating system. When evaluating the scale, the scores are categorized within the range of 0-50, and the following formula has been applied. The index represents the average of each answered question.

Index = (average- 1) x (50/3)

The results obtained from the scoring based on the specified formula correspond to the following health literacy levels:

0-25 points: inadequate health literacy,
25-33 points: limited health literacy,
33-42 points: sufficient health literacy,
42-50 points: excellent health literacy.

Statistical analysis

The data obtained from the application were analyzed using the SPSS 24 (Statistical Package for the Social Sciences), and the results were presented in tables.

Research hypotheses

The hypotheses determined in the study are as follows:

H1: The health literacy level of university students differs by gender.

H2: The health literacy level of university students differs by age.

H3: The health literacy level of university students differs according to the where their families live.

H4: The health literacy level of university students differs by the mother's education level.

H5: The health literacy level of university students differs by the father's education level.

H6: The health literacy level of university students differs according to their departments.

H7: The health literacy level of university students differs by the first source of health information they access.

H8: The health literacy level of university students differs according to the presence of chronic diseases.

H9: The health literacy level of university students differs by what they do first when experiencing a health problem.

Ethical approval

Ethical approval for data collection was obtained from the Balikesir University Social, Human, and Administrative Sciences Ethics Committee with decision number 2024/12-55, dated December 30, 2024.

In addition, surveys were administered after obtaining permission from the institution where the research was conducted. The participants were notified that the gathered data would be exclusively used for research purposes, that their identities would be kept confidential, and that they had the right to withdraw from the study at any point. Verbal agreement was secured from the participants.

RESULTS

Reliability analysis and normality test

Cronbach's alpha coefficient

In this section of the research, the data obtained from the Cronbach's Alpha statistic are presented to test the reliability of the survey administered to the participants. The Cronbach's Alpha coefficient for the content validity of the TSOY-32 scale and its subdimensions is provided in the table below (Okyay et al.,2016).

Table 1 demonstrates that the survey administered to the participants and its subdimensions have a high degree of reliability.

Table 1. Results of Cronbach's alpha statistic.

	Cronbah's Alpha	Item number
TSOY-32	0.920	32
Treatment and service dimension	0.853	16
Prevention of illness and health promotion dimension	0.873	16

Normality analysis

The Kolmogorov-Smirnov test was applied to determine whether the data distribution is normal, and it was found that the data follows a normal distribution. Additionally, the skewness and kurtosis values of the data were calculated and presented in Table 2.

Table 2. Results of normality analysis.

	Skewness	Kurtosis	Result
Health Literacy	-0.735	0.912	Data is normally distributed

When Table 2 is examined, the skewness and kurtosis values fall between -1 and +1, indicating that the data follows a normal distribution. Based on the normal distribution of the data, parametric tests were deemed appropriate, and thus, mean, standard deviation, t-test, ANOVA test, and post hoc tests were applied to the data.

Table 3. Participants' Turkey Health Literacy Scale-32 index evaluations.

TSOY-32 Index	**n**	**%**
Low health literacy (0-25 point)	39	20.53
Problematic-limited health literacy (26-33 point)	70	36.84
Adequate health literacy (34-42 point)	38	20.00
High level health literacy (43-50 point)	43	22.63
Total	190	100

n: Count, **%**: Column percentage

It was determined that 20.53% of the students participating in the study had insufficient health literacy, 36.84% had problematic-limited health literacy, 20% had adequate health literacy, and 22% had excellent health literacy (Table 3).

Table 4. Index mean scores of students' health literacy scale subdimensions.

	Min-Max	Mean±SD
General	11.50-50	32.4±8.95
Treatment and Service Dimension	5.32-50	35.52±9.97
Accessing information	0-50	38.62±8.32
Understanding information	0-50	33.39±9.32
Evaluating information	2.33-50	32.22±10.30
Using and applying information	0-50	37.16±9.25
Prevention of Illness and Health Promotion Dimension	3.33-50	36.14±8.52
Accessing information	0-50	37.48±9.33
Understanding information	0-50	35.77±8.78
Evaluating information	0-50	33.05±11.97
Using and applying information	0-50	32.98±10.35

SD: Standard deviation.

Table 4 shows the index mean scores of the TSOY-32 Health Literacy Scale. It can be observed that the highest mean score of students is found in the "Accessing Health Information" statements under the "Treatment and Services" dimension (38.62±8.32). The lowest mean score, on the other hand, is found in the "Evaluating Health Information" statements, also within the "Treatment and Services" dimension (32.22±10.30).

Table 5. Index evaluations of health literacy level by students' department.

	TSOY-32 Evaluations									
Department	**Low health literacy**		**Problematic-limited health literacy**		**Adequate health literacy**		**High level health literacy**		**Total**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Health Institution Management	8	14.3	22	39.3	10	17.8	16	28.5	56	100
Tourism and Hotel Management	6	16.7	12	33.3	10	27.8	8	22.2	36	100
Foreign Trade	3	9.7	11	35.5	7	22.6	10	32.2	31	100
Electricity	16	40.0	15	37.5	5	12.5	4	10.0	40	100
Cooking	6	22.2	10	37.1	6	22.2	5	18.5	27	100
Total	39	20.53	70	36.84	38	20.00	43	22.63	190	100

n: Count, **%**: Column percentage

In Table 5, the TSOY-32 index evaluations of the students department they are enrolled in, are presented. When the index evaluations are examined, it is observed that 28.5% of the students in the Health Institutions Management program, 22.2% of the students in the Tourism and Hotel Management program, 32.2% of the students in the Foreign Trade program, 10% of the students in the Electrical program, and 18.5% of the students in the Cooking program have excellent health literacy levels.

Table 6. Test results of research hypotheses.

Gender	**n**	**%**	**X̄**	**t**	**p**	
Female	100	52,6	34.91	1.867	0.063	
Male	90	47.4	33.50			
Age	**n**	**%**	**X̄**	**F**	**p**	
18-20	142	74.8	32.87	4.382	0.065	
21-23	34	17.9	30.34			
24-26	9	4.7	34.63			
27+	5	2.6	33.19			
The place where the family lives	**n**	**%**	**X̄**	**F**	**p**	**Tukey**
Village	26	14.1	30.29	6.74	0.001*	3>1
District	63	34.1	33.86			
City	96	51.8	38.97			
Mother's education level	**n**	**%**	**X̄**	**F**	**p**	**Tukey**
Illiterate	7	3.7	30.72	6.98	0.005*	2>1
Primary school	53	28.0	35.28			3>1
Secondary school	66	34.7	41.68			4>2
High school	50	26.3	38.73			
Associate's degree	5	2.6	35.14			
Bachelor's degree	8	4.2	35.57			
Postgraduate education	1	0.5	33.12			
Father's education level	**n**	**%**	**X̄**	**F**	**p**	**Tukey**
Illiterate	5	2.7	31.72	5.43	0.000*	4>2
Primary school	38	20.0	35.95			
Secondary school	59	31.0	38.59			
High school	66	34.8	42.91			
Associate's degree	4	2.1	30.43			
Bachelor's degree	18	9.4	37.21			
Postgraduate education	0	0	00.00			
Department	**n**	**%**	**X̄**	**F**	**p**	**Tukey**
Health Institution Management	57	30.0	47.49	44.89	0.001*	1>2
Tourism and Hotel Management	35	18.4	37.13			1>4
Foreign Trade	33	17.3	48.29			1>5
Electricity	39	20.5	27.19			3>2
Cooking	26	13.8	30.38			3>4
						3>5
Chronic disease	**n**	**%**	**X̄**	**t**	**p**	
Yes	26	13.7	33.39	3.44	0.061	
No	164	86.3	35.47			
Where they access health information	**n**	**%**	**X̄**	**F**	**p**	**Tukey**
Internet	92	48.4	33.72	3.68	0.002*	4>3
Tv-Newspaper-Magazine	1	0.5	28.35			4>1
Social Media	20	10.5	27.43			
Healthcare personnel	77	40.5	38.62			
What they do first when they experience a health problem	**n**	**%**	**X̄**	**F**	**p**	**Tukey**
I would ask for help from my family and friends.	55	28.9	36.65	3.97	0.002*	3>2
I would wait to heal without doing anything	29	15.3	33.28			3>4
I would go to a healthcare facility	77	40.5	40.37			
I would try to understand the problem by searching the symptoms on the internet						

n: Count, **%:** Column percentage, **X̄,** Mean, **t:** T test, **F:** ANOVA test, p<0.05*

According to the results, 100 female students (52.6%) and 90 male students (47.4%) participated in the study. 142 individuals are in the age range of 18-20. In this sample, 96 individuals live in the city.

When examining the educational levels of the participants' mothers, it is observed that 66 individuals (34.7%) have completed secondary school. When examining the educational levels of the participants' fathers, it is observed that 66 individuals (34.8%) have completed high school.

When examining the programs the participants are enrolled in, it was found that 57 individuals (30.0%) are students of Health Institutions Management, 35 individuals (18.4%) are students of Tourism and Hotel Management, 33 individuals (17.3%) are students of Foreign Trade, 39 individuals (20.5%) are students of Electrical and Energy, and 26 individuals (13.8%) are students of Cooking.

It was found that 26 participants (13.7%) reported having a chronic illness, while 164 participants (86.3%) stated they did not have a chronic illness. When examining where the participants first accessed health information, it was found that 92 students (48.4%) reported using the internet, 1 student (0.5%) cited TV-newspapers-magazines, 20 students (10.5%) mentioned social media, and 77 students (40.5%) stated health personnel as their source.

When asked what they do first when experiencing a health problem, 55 participants (28.9%) responded that they would ask for help from family or friends, 29 participants (15.3%) said they would do nothing and wait for recovery, 77 participants (40.5%) stated they would visit a healthcare facility, and 29 participants (15.3%) said they would search for symptoms online to understand the problem.

According to the obtained results in table 6, no significant relationship was found between gender and health literacy level, and therefore, H1 hypothesis is rejected. In addition, it was found that there was no significant difference in health literacy levels based on age and accordingly, the H2 hypothesis is rejected.

Upon examining table 6, the analysis revealed a significant difference in health literacy levels based on where students' families live, thus the H3 hypothesis is accepted. To determine which groups exhibited this difference, a Tukey test was conducted. The test results indicated that students whose families live in the city had higher health literacy levels compared to those whose families live in village.

According to the results of the analysis, a significant difference in health literacy levels based on mothers' education level was found, and thus, the H4 hypothesis is accepted. In order to identify which groups showed this difference, a Tukey Test was conducted. The results of the Tukey Test revealed that students whose mothers had primary or secondary school education had higher health literacy levels than students whose mothers were illiterate, and students whose mothers had a high school education had higher health literacy levels than students whose mothers had an elementary school education.

Again, according to the results in table 6, a significant difference was found between students' health literacy levels and their fathers' education level, and therefore, the H5 hypothesis is accepted. The results of the Tukey Test revealed that students whose fathers had a high school education had higher health literacy levels than students whose fathers had an elementary school education.

When the analysis results were examined, a significant difference in health literacy levels was found based on department, and thus, the H6 hypothesis is accepted. To identify which groups the difference was found between, the Tukey Test was applied. According to the results, students enrolled in the Health Institutions Management and Foreign Trade programs had higher health literacy levels compared to students enrolled in other programs.

According to the results of the analysis, a significant difference in health literacy levels based on the source of health information was found, and thus, the H7 hypothesis is accepted. The results show that students who accessed health information through healthcare professionals had higher health literacy levels compared to students who accessed health information through the internet and social media.

When the table 6 is examined, no significant difference in health literacy levels was found between students with chronic diseases and those without. Therefore, the H8 hypothesis is rejected.

The analysis results indicate that health literacy levels significantly differ based on the first action students take when faced with a health problem. The test results revealed that participants who sought help from a health institution when experiencing a health problem had higher health literacy levels compared to those who waited for improvement without doing anything or tried to understand the problem by searching symptoms on the internet. Thus, the H9 hypothesis is accepted.

DISCUSSION

This research was conducted to determine the health literacy level of vocational school students and to identify whether health literacy differs based on certain variables and to reveal the health literacy level index evaluations according to their departments. It was found that 20.53% of the students who participated in the research had inadequate health literacy, while 36.84% had problematic-limited health literacy. In research conducted by Soykan and Şengül (2021) with 286 students at a vocational school, it was determined that 9.60% of the students had inadequate health literacy, while 28.30% had problematic-limited health literacy. In the nationwide research conducted by Okyay and others (2016), only 5.8% of participants had excellent health literacy. Overall, research conducted with different groups has revealed that the health literacy levels of participants are generally low (Durmaz et al., 2016; May et al., 2018).

It is observed that the highest average score of students is related to the statements under the "Accessing Health Information" category in the

"Treatment and Services" dimension (38.62 ± 8.32). The lowest average score is related to the statements under the "Evaluating Health Information" category within the same dimension (32.22 ± 10.30). When examining other studies in the literature, similar findings are observed. For instance, in the research conducted by Arıkan (2020) and Gamsızkan and Sungur (2020) with university students, it was also found that the lowest average score was associated with the "evaluation of information" category. In the study by Uysal and Yıldız (2021), the health literacy level was found to be adequate, except for the "evaluation sub-dimension" in the treatment and services dimension.

The TSOY-32 index evaluations according to the department of the students participating in the research are presented. Upon examining the index evaluations, it was found that 28.5% of the students in the Health Institutions Management program had excellent health literacy levels, and that the health literacy levels of students differed according to the program they were studying. In the study conducted by Şahinöz and others (2018) with 344 students at a faculty of health sciences, it was also revealed that health literacy levels varied by department. However, in the study conducted by Okur and others (2021) with vocational school students, no significant difference was found between the academic program and health literacy levels. Similarly, in the research conducted by Yılmaz and Günal (2020) no significant difference was found between the students' health literacy and their departments.

In this study, no significant relationship was found between gender and health literacy levels. The findings of the studies conducted by Tatar (2020) and Ertaş and others (2019) also support the results of this research. However, some studies in the literature have found that female students have higher health literacy levels than male students (Akçilek, 2017; Arıkan, 2020; Çın et al., 2024; Ergün, 2017; Sukys et al., 2017;). On the other hand, some studies have stated that male students have higher health literacy levels than female students (Ateş et al., 2024; Lee et al., 2022).

It has been determined that health literacy levels do not differ according to age. Similarly, in Palabıyık's (2024) study with health sciences faculty students, no significant difference was found between age and health literacy levels.

The analysis revealed a significant difference in students' health literacy levels based on the location of their families; with students whose families live in city having higher health literacy levels than those whose families live in village. While Ergün's (2017) study supports these findings, Biçer and Malatyalı (2018) did not find a significant relationship between place of residence and health literacy.

In the studies by Palabıyık (2024) and Kazak et al. (2021), it was found that as the education level of parents increased, the health literacy levels of students also increased. Similarly, this research also found that as the education level of both mothers and fathers of university students increased, their health literacy levels increased. Khajouei and Salehi (2017) reported a significant relationship between parental education level and health literacy. However, in the study by Tuğut et al. (2021), no significant relationship was found between the education level of mothers and fathers and health literacy.

The study found that students who accessed health information through health professionals had higher health literacy levels compared to students who accessed health information via the internet and social media. This highlights the importance of obtaining health information through a professional, as it ensures the accuracy of the information and its proper usage. Accessing health information from professionals can lead to more reliable and effective health literacy, as opposed to relying on potentially inaccurate or misleading sources like the internet and social media.

Soykan and Şengül (2021) and Cevik and Kayabek (2022) found that individuals with chronic diseases had higher health literacy index scores. However, in this study, it was determined that university students' health literacy levels did not differ based on whether they had chronic diseases. Similarly, Ateş and others (2024) found that university students with chronic diseases in their families had higher health literacy levels. This suggests that while chronic disease may influence health literacy in some populations, in this specific group of university students, chronic disease status did not have a significant impact on their health literacy levels.

In this study, it was found that participants who sought medical care when they experienced a health problem had a higher health literacy level than those who waited for recovery without doing anything or tried to understand the problem by typing symptoms on the internet. This suggests that students with higher health literacy are better able to assess their health condition and seek medical services from a health institution when needed.

Limitations and Strengths of the Study

The study was conducted only with one vocational school students and students who did not attend class during data collection could not be reached. The research results cannot be generalized to all university students. The main strengths of this study are reaching almost the entire sample and conducting the study with a reliable survey.

CONCLUSION

This study revealed that the health literacy level of vocational school students is generally inadequate and limited. It was also found that students' health literacy levels varied depending on where their families lived, their parents' level of education, their departments, where they accessed health-related information, and what they did first when they

experienced a health problem. While the health literacy levels of students whose families lived in the city were found to be higher, it was found that the health literacy levels of students increased as the level of education of their mothers and fathers increased. The health literacy levels of students who accessed health information from a health professional and students who applied to a health institution when they experienced a health problem were also found to be higher.

An individual's health literacy level directly affects their decisions when facing health problems, service demands, and the effectiveness of patient care, as well as the associated healthcare costs. More work is needed to increase students' knowledge about health literacy. Therefore, health literacy should be included in primary school, high school and university curricula and course content should be arranged accordingly. In addition, social awareness should be created to increase parents' knowledge levels about health literacy, especially in villages and districts. Education and seminars should be planned on where students can access accurate information about health and what to do first when they experience a health problem.

Since this study was conducted with a vocational school student sample, future studies with larger sample sizes are recommended.

Acknowledgement

I would like to thank the students who participated in this research.

Conflict of Interest

The author declares no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Author Contributions

Plan, design: GÇ; **Material, methods and data collection:** GÇ; **Data analysis and comments:** GÇ; **Writing and corrections:** GÇ.

Funding

None.

Ethical Approval

Institution: Balikesir University Social, Human, and Administrative Sciences Ethics Committee
Date: 30.12.2024
Approval no: 2024/12-55

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ORİJİNAL MAKALE / ORIGINAL ARTICLE

Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1600744

Determination of Frailty and Malnutrition Status and Risk Factors in Elderly Surgical Patients

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Geliş Tarihi / Received: *13.12.2024,* ***Kabul Tarihi / Accepted:*** *22.04.2025*

ABSTRACT

Objective: To determine the frailty and malnutrition status and risk factors of elderly patients undergoing surgery. **Material and Methods:** The study is descriptive and cross-sectional. Data were collected using the Patient Identification Form, FRAIL Scale, and Mini Nutritional Assessment (MNA) test. Data were evaluated by SPSS 23.0. **Results:** The mean age of the patients was 70.03±5.74; 47.9% underwent orthopedic surgery. In this study, 63.6% of the patients were frail and 10.7% were malnourished. It was determined that women, patients with chronic diseases, those using medication, and patients who were mobilized with assistive device or immobile before surgery were more fragile. Patients with poor preoperative nutritional status stayed in the intensive care unit after surgery, had higher ASA scores and longer hospital stays. It was determined that preoperative mobilization level and ASA score had a significant effect on frailty status, while American Society of Anesthesiologists score and body mass index had a significant effect on nutritional status. **Conclusion:** This study showed that frailty is common in elderly patients undergoing surgery and more than half of the patients were at risk of malnutrition. These results emphasize the importance of evaluating the frailty and nutritional status of patients before surgery.

Keywords: Elderly Patients, Frailty, Malnutrition, Nutritional Risk Assessment, Surgical Patients.

Yaşlı Cerrahi Hastalarının Kırılganlık ve Malnütrisyon Durumlarının ve Risk Faktörlerinin Belirlenmesi

ÖZ

Amaç: Cerrahi uygulanan yaşlı hastaların kırılganlık ve malnütrisyon durumlarının ve risk faktörlerinin belirlenmesidir. **Yöntem:** Araştırma, tanımlayıcı ve kesitsel niteliktedir. Veriler, Hasta Tanılama Formu, FRAİL Ölçeği, Mini Nütrisyonel Değerlendirme (MNA) testi ile toplandı. Veriler, SPSS 23.0 ile değerlendirilmiştir. **Bulgular:** Araştırmaya dahil edilen 140 hastanın yaş ortalaması 70.03±5.74 olup; %47.9'una ortopedik cerrahi uygulanmıştır. Hastaların %63.6'sı kırılgan ve %10.7'sinde ise malnütrisyon olduğu belirlenmiştir. Ameliyat öncesi beslenme durumu kötü olan hastalar ameliyat sonrası yoğun bakımda kaldığı, ASA skorlarının yüksek ve hastanede kalış sürelerinin daha uzun olduğu belirlenmiştir. Ameliyat öncesi mobilizasyon düzeyi ve ASA skorunun kırılganlık durumu üzerinde; ASA skoru ve beden kitle indeksinin ise beslenme durumu üzerinde anlamlı bir etkiye sahip olduğu belirlenmiştir. **Sonuç:** Bu çalışma, cerrahi uygulanan yaşlı yetişkinlerde kırılganlığın yaygın olduğu ve hastaların yarısından fazlasının malnütrisyon riski altında olduğu gösterilmiştir. Bu sonuçlar, ameliyat öncesi hastaların kırılganlık ve beslenme durumlarının değerlendirilmesinin önemli olduğunu vurgulamaktadır.

Anahtar Kelimeler: Yaşlı Hastalar, Kırılganlık, Malnütrisyon, Beslenme Risk Değerlendirmesi, Cerrahi Hastalar.

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Bu makaleye atıf yapmak için / Cite this article: Kaya, Ç., & Özdemir, S. (2025). Determination of frailty and malnutrition status and risk factors in elderly surgical patients. *BAUN Health Sci J, 14*(2), 316-324. https://doi.org/10.53424/balikesirsbd.1600744

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

During the next ten years, the population of people aged 60 years or over worldwide is projected to grow by 38 per cent, outnumbering youth (Ghebreyesus, 2021). With the aging population, the rate of surgery in this population will increase. It is difficult to define surgical risk in the elderly. Age alone is not sufficient to define surgical risk. Chronic diseases, American Society of Anesthesiology (ASA) score, Charlson comorbidity score, Lee's Revised Cardiac Risk Index are the parameters that are frequently used together with age (Richards et al., 2018). With demographic aging, frail elderly will constitute the majority of patients undergoing surgery (Greenstein & Gorczyca, 2019; Watt et al., 2018). Frailty is a prevalent and crucial geriatric syndrome characterized by age-associated declines in physiologic reserve and function across multiorgan systems (Gleason et al., 2017). Affects 70% of older adults living in the community; increases risk of functional loss and dependency (Zhang et al., 2020). In a systematic review and meta-analysis conducted by Panayi et al. 65% of 683,487 patients undergoing surgery in different branches were found to be frail (Panayi et al., 2019). The presence of frailty in elderly patients has been shown to predict postoperative mortality, complications and prolonged length of stay (Cooper et al., 2016; Lin et al., 2016; Watt et al., 2018).

Nutritional status is an crucial factor in optimizing surgical outcomes and preventing postoperative complications (Hirsch et al., 2021; Thomas et al., 2016). Patients undergoing surgery are at increased risk of malnutrition for many reasons, including the pathological process associated with the condition requiring surgery, the inflammatory nature of the surgery, and decreased intake and delayed return of bowel function due to preoperative and postoperative fasting (Gillis & Wischmeyer, 2019). In clinical nutrition, inadequate nutrition is used synonymously with malnutrition. Malnutrition in patients undergoing surgery has been shown to be associated with an increased risk of surgical site infections, delayed wound healing, increased lenght of hospital stay, higher readmission rates, sepsis, and increased mortality and costs (Geurden et al., 2015; Gn et al., 2021; Kamath et al., 2017; Kishawi et al., 2020; Mahakalkar et al., 2014a; Thomas et al., 2016; Yuwen et al., 2017). Despite these negative consequences of malnutrition, it is stated that it is not adequately diagnosed and continues to affect 50% of hospitalized patients (Williams & Wischmeyer, 2020).

Frailty and nutritional status are important factors affecting postoperative recovery. Despite its prevalence and impact, especially frailty are often overlooked in routine perioperative evaluations. Body Mass Index (BMI) is frequently used in patient evaluation. But, it is not a sufficient parameter alone in the assessment of nutritional status (Gastelurrutia et al., 2011). In older surgical patients, the assessment of frailty and nutritional status before surgery has become increasingly important to identify patients whose outcomes may improve with early intervention, to modify treatment options, to evaluate preoperative recovery expectations, and to optimize prognosis, treatment, and care processes (Cooper et al., 2016; Gleason et al., 2017; Watt et al., 2018). In our country, there is no study that includes patients undergoing surgery in different branches and evaluates frailty and nutritional status together and investigates risk factors. In this context, this study was conducted to determine the frailty and malnutrition status and risk factors of elderly patients undergoing surgery. Questions of the research;

- What are the preoperative frailty levels of elderly patients undergoing surgery?
- What is the preoperative nutritional status of elderly patients undergoing surgery?
- What are the factors affecting the frailty status of elderly patients undergoing surgery?
- What are the factors affecting the nutritional status of elderly patients undergoing surgery?

MATERIALS AND METHODS

Study type

This descriptive and cross-sectional study was conducted in the orthopedics and traumatology, general surgery, and brain and neurosurgery wards of Balıkesir University Health, Practice and Research Hospital and Balıkesir State Hospital between November 2023 and August 2024.

Study group

Out of 140 elderly patients who had surgery in the general surgery, orthopedics and traumatology, neurosurgery wards of an university and a state hospital and who met the sampling criteria were included in the research sample. Inclusion criteria for the study were; being 60 years of age or older, having undergone surgery, being able to understand and speak Turkish, having orientation to person, place and time, not having hearing and speech problems, and participating in the study voluntarily. Exclusion criteria for the study were; having a neurological (such as dementia/Alzheimer's) and psychiatric (such as schizophrenia) medical diagnosis affecting cognitive status, and having undergone minor surgery (e.g., mass excision with local anesthesia, correction of carpal tunnel syndrome, arthroscopy, etc.).

The sample size was determined as 125 patients based on the number of independent variables (22), Cohen's medium effect size of 0.30, significance value of 0.05 and 90% power and using the online calculation tool (https://www.danielsoper.com/statcalc/calculator.aspx?id=1). At the end of the research, the sample power was calculated by performing a power analysis with the G* Power software version 3.1.9.4 programme. In the power analysis performed by taking into account the difference between the mean frailty scores according to gender in patients undergoing surgery. The results of this post-hoc analysis indicated that

with an effect size (d) of 0.58 and alpha error probability of 0.05, the power of the study was 0.89.

Dependent and independent variables

The independent variables of this research are age, gender, presence of chronic disease, use of medication and number of medications, Body Mass Index (BMI), smoking use, dietary, preoperative and postoperative nutritional support status, preoperative mobilization status, length of hospital stay (day), preoperative and postoperative blood values (albumin, total protein, hemoglobin). The dependent variables are frailty and malnutrition status.

Procedures

Data were collected using the Sociodemographic-Clinical Characteristics Form, FRAIL Scale, and Mini Nutritional Assessment (MNA) test.

Sociodemographic-Clinical Characteristics Form

The form prepared by researchers in line with the literature includes questions regarding age, gender, diagnosis, surgery, presence of chronic disease, use of medication and number of medications, BMI, smoking use, dietary, preoperative and postoperative nutritional support status, preoperative mobilization status, preoperative and postoperative blood values (albumin, total protein, hemoglobin) (Hogan, 2018; Jiao et al., 2020; Mahakalkar et al., 2014b; Setiati et al., 2019; Venianaki et al., 2021).

Frail Scale

The scale was developed by Morley et al. (2012) and adapted to Turkish by Hymabaccus Muradi (2017). It allows evaluation by questioning the patient's fatigue status, resistance, mobility, weight loss and other diseases. The FRAIL scale, consisting of 5 items, receives 0 or 1 points according to the answers given by the patients, and a total of 0 points is evaluated as non-frail, 1-2 points as pre-frail and those who score >2 are considered frail (Morley et al., 2012; Muradi, 2017). The Cronbach Alpha Internal Consistency coefficient of the scale was calculated as 0.787 (Muradi, 2017). In this study, the Cronbach alpha internal consistency coefficient of the scale was found to be 0.89.

Mini Nutritional Assessment (MNA)

It was developed in 1994 by the collaboration between the University of Toulouse, the Faculty of Medicine of New Mexico and the Nestle Research Center in Switzerland (Vellas et al., 2006). It consists of 4 sections and 18 items: anthropometric assessment (BMI, weight, arm and calf circumferences); general assessment (lifestyle, medication, mobility, depression and dementia symptoms); brief nutritional assessment (number of meals, food and fluid intake, autonomy in nutrition) and subjective assessment (self-perception of health and nutrition). The MNA classifies elderly patients as having normal nutritional status (≥ 24), at risk of malnutrition (between 17-23.5) or malnourished (<17) (Sarıkaya et al., 2015). Its importance in evaluating geriatric nutrition is great and patients are classified correctly by 78% (Guigoz, 2006). The most important feature of the test is that it can detect the risk of malnutrition before severe changes occur in body weight and serum albumin levels when the MNA value is between 17-23.5. The Turkish validity and reliability was performed by Sarıkaya et al.; sensitivity and specificity were determined as 92% and 86%, respectively (Sarıkaya et al., 2015).

Data Collection

Data were collected by face-to-face interviews with inpatients aged 60 and over who were admitted to surgical wards and scheduled for surgery. Data such as patients' blood values, ASA scores, and length of hospital stay were obtained from the hospital information system.

Statistical analysis

Statistical analyses were performed using IBM SPSS Statistics version 23.0 (released 2016; Armonk, NY: IBM Corp.) Descriptive data were evaluated with number, percentage, mean, and standard deviation. Skewness and kurtosis values (+2 and −2) were used to assess the normality of data distributions (George & Mallery, 2010). Oneway Anova test was used in the comparison of quantitative data showing normal distribution between groups, and Tukey HDS test and two-group independent t test was used in determining the group causing the difference. Kruskal Wallis test was used in the comparison of parameters not showing normal distribution between groups, and Mann Whitney U test was used in determining the group causing the difference and in two-group evaluations. Pearson and Spearman correlation analyses were used to evaluate the relationships between variables. Multiple linear regression analysis was used to determine the effect of factors on frailty and malnutrition. The significance level was determined as $p<0.05$.

Ethical approval

This study conducted in accordance with the Helsinki Decleration Principles. The study protocol was approved by an University Health Sciences Non-Interventional Research Ethics Committee (Date: 13.06.2023 and Decision No: 2023/58;). Permission was acquired from the hospital (Date: 26.10.2023 and Decision No: 309814; Date: 03.11.2023 and No: 312691). All participants were informed about the research and written and verbal consent was obtained.

RESULTS

The mean age of the participants was 70.03±5.74; 67.1% (n=94) were female, 95.7% (n=134) were married.

Patients of 47.9% (n=67) underwent orthopedic surgery (knee/hip arthroplasty, Proximal Femoral Nail, etc.), 27.9% (n=39) general surgery, and 24.3% (n=34) neurosurgery. 80.7% had chronic diseases, and 23.6% stayed in the intensive care unit after surgery (Table 1).

Of the patients in the study, 28.6% (n=40) were pre-frail and 63.6% (n=89) were frail. In the nutritional status assessment, 55% (n=77) were at risk of

malnutrition and 10.7% (n=15) were malnourished (Table 2).

It was found that women, patients with chronic diseases, those using medication, and patients who were mobilized with assistive devices or immobile before surgery had statistically higher FRAIL Scale scores ($p<0.05$).

MNA scores of patients who remained in intensive care after surgery were statistically significantly lower ($p<0.05$; Table 1).

It was determined that there was a positive correlation between the patients' FRAIL scale score and the number of medications (r=.264); and the ASA score (r=.397; $p<0.05$); and length of hospital stay (r=.187 p=0.035; Table 1). It was determined that there was a negative correlation between the patients' FRAIL scale score and the preoperative (r=-.229) and postoperative (r=-.235) hemoglobin levels ($p<0.05$; Table 1).

It was found that there was a low level negative correlation between the MNA score and the length of hospital stay (r=-.298) and the ASA score (r=-.286).

Table 1. Evaluation of frailty and nutritional status of patients according to sociodemographic and clinical characteristics.

Variables	N (%)	Frail Scale		Mini Nutritional Assessment	
		Mean ± SD	Test statistics p	Mean ± SD	Test statistics p
Age ($\bar{x}$ ± SD)	140(100.00)	70.03±5.74	r=-0.068 p=0.425		r=0.036 p=0.759
BKİ ($\bar{x}$ ± SD)	140 (100.00)	26.16±4.66	r=0.08 p=0.346		r=0.263 p=0.024
Sex					
Female	94 (67.1)	2.86±0.99	t=2.437 p=0.018	20.79±4.60	t=-1.019
Male	46 (32.9)	2.28±1.45		21.92±4.47	p=0.312
Presence of chronic disease					
Yes	113 (80.70)	2.78±1.16	t=2.460 p=0.015	21.05±4.08	t=-.933
No	26 (18.60)	2.15±1.19		22.26±5.86	p=0.354
Use of medication					
Yes	122(87.10)	2.76±1.14	U=761.00	20.96±4.41	U=269.00
No	18(12.90)	2.06±1.34	p=0.029	22.33±5.31	p=0.129
Smoking					
Yes	10 (7.10)	2.40±1.26	U=558.00 p=0.437	18.25±4.64	U=-77.50
No	130(92.90)	2.69±1.18		21.35±4.53	p=0.133
Preoperative mobilization status					
Independent	73 (52.1)	2.29±1.29	U=1632.50	20.94±5.48	U=644.50
Mobilized with auxiliary equipment/ Immobilized	67 (47.9)	3.09±0.90	p=0.000	21.41±3.59	p=0.679
Dietary					
Yes	84 (60.00)	2.74±1.18	t=0.811	20.36±5.34	t=-1.626
No	56 (40.00)	2.57±1.20	p=0.419	22.05±3.41	p=0.109
Preoperative nutritional support					
Yes	9(6.4)	2.56±1.23	U=551.50	15.75±8.65	U=176.50
No	131(93.6)	2.68±1.19	p=0.736	21.50±4.11	p=0.127
Postoperative nutritional support					
Yes	18(12.9)	2.61±1.24	U=1065.00	16.57±7.87	U=138.00
No	122(87.1)	2.68±1.18	p=0.830	21.67±3.85	p=0.073
Postoperative intensive care stay					
Yes	33 (23.60)	2.82±1.26	t=0.809 p=0.420	18.31±5.79	t=-2.392
No	107 (76.40)	2.63±1.17		21.98±3.85	p=0.027
ASA Score (min-max/ $\bar{x}$ ± SS) [a]	2.11±0.84		r= 0.397. p=0.000		r=-0.286 p=0.013
Number of medications used[a]	2.90±2.45		r= 0.264 p=0.002		r=-0.119 p=0.313
Preoperative albumin [a]	39.68±5.89		r=-0.124 p=0.145		r= .471 p=0.00
Postoperative Albumin [a]	33.20±5.17		r=-0.030 p=0.724		r=0.366 p=0.001
Preoperative Hemoglobin [a]	12.33±1.52		r=-0.229 p= 0.007		r= .483 p=0.000
Postoperative Hemoglobin [a]	10.74±1.53		r=-0.235 p=0.005		r=0.511 p=0.000
Preoperative total protein [b]	65.66±8.82		r=-0.025. p=0.768		r= 0.166 p=0.157
Postoperative total protein[b]	56.04±7.57		r=-0.011 p= 0.901		r=0.231 p=0.047
Length of hospital stay (day)[b]	6.53±3.62		r=.187* p=0.035		r=-0.298 p=0.010
MNA[a]	21.18±4.56		r= .045 p=0.596		

t: Independent Samples t-Test; U: Mann Whitney U Test; a: Pearson correlation analysis; BMI: Body Mass Index; ASA: American Society of Anesthesiologists; MNA: Mini Nutritional Assessment; SD: Standard deviation; *p<0.05

It was found that there was a positive, moderate correlation between MNA score and BMI (r=.263), preoperative (r=.471) and postoperative (r=.366) albumin, and preoperative (r=.483) and postoperative (r=.511) hemoglobin. In addition, it was determined that there was a low level negative correlation between the MNA score and length of hospital stay (r=-.298) and a moderate level negative correlation with the FRAIL score (-.574) ($p<0.05$; Table 1).

Multiple linear regression analysis was performed to determine the contribution of factors associated with frailty status and variables with significant associations were included in the regression model. The model explained 22% of the total variance ($F=6.733$, $p < 0.05$). Among the independent variables included in the model, preoperative mobilization level ($\beta = -0.191$, $p = 0.019$) and ASA score ($\beta = 0.299$, $p = 0.001$) had a significant effect. These variables are statistically significant factors affecting the frailty status of elderly patients undergoing surgery (Table 3).

Table 2. Results of the Patients' Frailty Scale and Mini Nutritional Status Assessment Test.

	min-max	$\bar{x} \pm SS$
Frail Fragility Scale Score	0-5	2.67±1.19
MNA Score	5-28	21.18±4.56
	n	%
Frailty Situations		
Not Frail	11	7.9
Pre-Frail	40	28.6
Frail	89	63.6
MNA Category		
Normal nutritional status	48	34.3
Malnutrition risk	77	55
Malnutrition	15	10.7

Table 3. Factors Affecting Frailty (n=140).

Independent variables	β	T	p	Tolerance	VIF
Preoperative mobilization status	-0.191	-2.373	0.019	0.865	1.156
ASA	0.299	3.271	0.001	0.670	1.493
Number of medications used regularly	0.043	0.499	0.619	0.736	1.360
Preoperative Hemoglobin	-0.108	-1.024	0.308	0.498	2.010
Postoperative Hemoglobin	-0.164	-1.544	0.125	0.492	2.034
Length of hospital stay (day)	-0.086	-1.072	0.286	0.866	1.155
BKİ	0.119	1.530	0.128	0.924	1.082
Adjusted R^2					0.224
F					6.733

BMI: Body Mass Index; ASA: American Society of Anesthesiologists; *P<0.05

Multiple linear regression analysis was performed to determine the contribution of factors related to nutritional status and variables with significant associations were included in the regression model. The model explained 22% of the total variance ($F=5.906$, $p<0.05$). Among the independent variables included in the model, ASA score ($\beta = -0.245$, $p = 0.002$) and BMI ($\beta = 0.187$, $p = 0.022$) had a significant effect. These variables are statistically significant factors affecting the nutritional status of elderly patients who underwent surgery (Table 4).

Table 4. Factors Affecting Nutritional Status (n=140).

Independent variables	β	T	p	Tolerance	VIF
ASA_score	-0.245	-3.137	0.002	0.919	1.088
Preoperative Albumin	0.172	1.314	0.191	0.326	3.063
Preoperative Albumin	-0.067	-0.501	0.617	0.312	3.202
Preoperative Hemoglobin	0.161	1.360	0.176	0.400	2.500
Postoperative Hemoglobin	0.059	0.517	0.606	0.431	2.323
Postoperative Total Protein	0.049	0.527	0.599	0.658	1.520
Length of hospital stay (day)	-0.038	-0.462	0.645	0.836	1.196
BKİ	0.187	2.326	0.022	0.864	1.158
Adjusted R^2					0.22
F	5.906				

BMI: Body Mass Index; ASA: American Society of Anesthesiologists; *P<0.05

DISCUSSION

This study examined frailty and malnutrition status and associated risk factors in elderly surgical patients. Our study shows that a large proportion of elderly patients undergoing surgery are at risk of frailty and malnutrition.

The mean frailty score of the patients 2.67±1.19 and 28.6% were pre-frail, while 63.6% were frail. It has been shown that 30% of patients over 50 years of age who underwent surgery for vertebral fragility fracture and 15.8% of patients who underwent surgery for spinal meningioma (n=3345) were fragile (Elsamadicy et al., 2023; Walters et al., 2016). Studies conducted with patient groups undergoing different types of surgeries have shown that frailty is prevalent in the literature (Birkelbach et al., 2019; Theriault et al., 2020). İn this study included patients over 60 years of age who underwent surgery and age is an important parameter for frailty, so this situation explains the high rate of frailty. Also, the study found that women, patients with chronic diseases, those using medication, and patients who were mobilized with assistive device or immobile before surgery were more fragile. Frailty is associated with biological age, wear and tear of the body, polypharmacy and the presence and accumulation of chronic health issues (Hogan, 2018; Jiao et al., 2020; Setiati et al., 2019). Findings in this study are consistent with the literature showing that frailty is often associated with more than one factor (He et al., 2019; Qin et al., 2023). A systematic review and meta-analysis by Gordon et al. showed that females were more frail than males for any age group (Gordon et al., 2017). In women, the higher prevalence of 'non-lethal' diseases that affect negatively on function and quality of life, the higher rates of reported disability, and changes in body composition with an increase in fat mass and an increased likelihood of metabolic syndrome, especially over 40, explain why women are more vulnerable (Gordon et al., 2017; Marques-Santos & de Oliveira, 2021).

It has been found that as patients' frailty status increases, the number of medications and ASA scores and length of hospital stay increase, while their preoperative and postoperative hemoglobin levels decrease. It has also been shown that the ASA score has a significant impact on patients' frailty status. The ASA score is a risk tool that reflects the general health status of the patient. Frailty and the ASA score have complementary features that also emphasise different aspects of each other (Committe of Oversight, 2019; Li et al., 2021). When used together, they help predict surgical outcomes more accurately. Therefore, it is expected that they are positively related to each other and that the ASA score has an impact on frailty. Anemia is more commonly observed in frail patients due to factors such as chronic diseases, nutritional deficiencies and reduced physical activity. Therefore, it is considered a part of frailty syndrome, with both conditions being associated with an increased risk of morbidity and mortality (Cooper et al., 2016; Shander et al., 2023; Watt et al., 2018). Therefore, monitoring hemoglobin levels in the assessment of older surgical patients can be considered an important component in managing frailty. Frailty is associated with many physiological, functional and clinical factors that prolong hospital stay after surgery (Hogan, 2018; Jiao et al., 2020; Setiati et al., 2019). In this study and studies in the literature, frailty has been shown to increase length of hospital stay(Lin et al., 2016; Makary et al., 2010; Panayi et al., 2019).

Nutritional status in the elderly patients has important effects on both surgical outcomes and long-term health status. In our study, 55% of the patients were at risk of malnutrition and 10.7% were malnourished, shows that nutritional status is an important problem among elderly surgical patients. In addition, it has been shown that patients with worse preoperative nutritional status stayed in intensive care after surgery, had worse ASA scores and longer length of hospital stays. In the literature show that approximately 24-65% of patients undergoing major surgery, ranging in age from young to older adults, are malnourished or at risk of malnutrition (Geurden et al., 2015; Thomas et al., 2016). Also, malnutrition has been reported as a common condition among older surgical patients, adversely affecting the recovery process and increasing postoperative hospital length of stay and complication risks (Geurden et al., 2015; Gn et al., 2021; Kamath et al., 2017; Kishawi et al., 2020; Mahakalkar et al., 2014a; Thomas et al., 2016; Turhan Damar et al., 2021; Yuwen et al., 2017).

In this study, the ASA score and BMI were also identified as factors influencing nutritional status. Patients with high ASA scores often have multiple comorbidities that can impact food intake (e.g., dysphagia, gastrointestinal issues, loss of appetite) and nutrient absorption, potentially leading to malnutrition. A higher ASA score is associated with a worse nutritional condition (Venianaki et al., 2021). On the other hand, BMI is a simple tool which can be universally used, and lower BMI is an indicator of malnutrition (Cederholm, Jensen, Correia, Gonzalez, Fukushima, Higashiguchi, Baptista, Barazzoni, Blaauw, Coats, Crivelli, Evans, Gramlich, Fuchs-Tarlovsky, Keller, Llido, Malone, Mogensen, Morley, Muscaritoli, Nyulasi, Pirlich, Pisprasert, de van der Schueren, Siltharm, Singer, Tappenden, Velasco, Waitzberg, Yamwong, Yu, Gossum, et al.,2019) So, low BMI is a factor contributing to the deterioration of the nutritional status in older surgical patients.

Study Limitations and Strengths

The strength of the study lies in emphasizing the need to consider nutritional status and frailty in the evaluation of elderly surgical patients, which can provide a foundation for future research in this area. The limitation of the study is that the data obtained are limited to the surgical specialties and patient

group covered by the study. Since nutritional status and frailty play an important role in surgical processes, it is important to similarly evaluate elderly patients in other specialties, such as cardiothoracic surgery, urology, and plastic surgery.

CONCLUSION

Our study revealed a high prevalence of frailty among individuals aged 60 and older undergoing surgery, with over half of the patients identified as being at risk for malnutrition. In addition, it was determined that women, patients with chronic diseases, those using medication, and patients who were mobilized with assistive device or immobile before surgery were more fragile. Patients with worse preoperative nutritional status stayed in intensive care after surgery, had worse ASA scores and longer length of hospital stays. This study emphasizes the importance of evaluating frailty and nutritional status before surgery. Early identification of frailty and malnutrition may contribute to improved postoperative outcomes for patients.

Acknowledgement

The authors would like to extend their sincere thanks to anyone who contributed to this study.

Conflict of Interest

The author declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Author Contributions

Plan, design: ÇK; **Material, methods and data collection:** ÇK, SÖ; **Data analysis and comments:** ÇK, SÖ; **Writing and corrections:** ÇK.

Funding

This research was supported by Tubitak 2209-A Research Project Support Programme for Undergraduate Students.

Ethical Approval

Institution: Balikesir University Health Sciences Non-Interventional Research Ethics Committee
Date: 13.06.2023
Approval No: 2023/58

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ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1648447

The Investigation of Musculoskeletal Disorders, Fatigue and Job Satisfaction of Nurses: A Cross-Sectional Study in Turkey

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Geliş Tarihi / Received: *28.02.2025,* ***Kabul Tarihi / Accepted:*** *26.04.2025*

ABSTRACT
Objective: This study aimed to evaluate the relationship between musculoskeletal disorders, fatigue and job satisfaction among nurses. **Materials and Methods:** This cross-sectional study was conducted at a university hospital in Turkey with a population of 282 nurses. The data were collected between 12.01.2021 and 08.01.2022. A question form, Cornell Musculoskeletal Disorders Index, Nurse Job Satisfaction Scale and Checklist Individual Strength Fatigue Scale were used to collect the data. **Results:** There was a negative-weak relationship between the fatigue scale and job satisfaction scores, a positive-weak relationship between fatigue and musculoskeletal discomfort scores and a negative-weak relationship between nurse job satisfaction and musculoskeletal discomfort scores. **Conclusion:** These results show that nurses experience musculoskeletal disorders due to their profession, but their fatigue levels are high and their job satisfaction is moderate.
Keywords: Fatigue, Job satisfaction, Nurse.

Hemşirelerde Kas İskelet Sistemi Rahatsızlıkları, Yorgunluk ve İş Doyumunun İncelenmesi: Türkiye'de Kesitsel Bir Çalışma

ÖZ
Amaç: Bu çalışmada hemşirelerde kas iskelet sistemi rahatsızlıkları, yorgunluk ve iş doyumu arasındaki ilişkinin değerlendirilmesi amaçlanmıştır. **Gereç ve Yöntem:** Bu kesitsel çalışma, Türkiye'de bir üniversite hastanesinde 282 hemşirenin katılımıyla gerçekleştirilmiştir. Veriler 01.12.2021-01.08.2022 tarihleri arasında toplanmıştır. Verilerin toplanmasında soru formu, Cornell Kas İskelet Sistemi Bozuklukları İndeksi, Hemşire İş Memnuniyeti Ölçeği ve Bireysel Güç Yorgunluk Ölçeği Kontrol Listesi kullanılmıştır. **Bulgular:** Yorgunluk ölçeği ile iş doyumu puanları arasında negatif-zayıf ilişki, yorgunluk ile kas-iskelet rahatsızlığı puanları arasında pozitif-zayıf ilişki ve hemşire iş doyumu ile kas-iskelet rahatsızlığı puanları arasında negatif-zayıf ilişki bulunmuştur. **Sonuç:** Bu sonuçlar, hemşirelerin meslekleri nedeniyle kas-iskelet sistemi rahatsızlıkları yaşadıklarını, yorgunluk düzeylerinin yüksek ve iş doyumlarının ise orta düzeyde olduğunu göstermektedir.
Anahtar Kelimeler: Yorgunluk, İş doyumu, hemşire.

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Bu makaleye atıf yapmak için / Cite this article: *Günaydın*, Ö. E., & Bulut, S. (2025). The investigation of musculoskeletal disorders, fatigue and job satisfaction of nurses. *BAUN Health Sci J, 14*(2), 325-333. https://doi.org/10.53424/balikesirsbd.1648447

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

Nurses are a professional group who work outside of normal working hours, engage in life-threatening practices, use different technologies at the same time, and work under intense stress (Tambağ et al., 2015; Çoban et al., 2011). Considering the direct patient contact, working postures and working conditions of nurses, it can be said that they are at high risk for work-related musculoskeletal diseases (Sançar et al., 2021). Although the majority of healthcare workers are at risk for musculoskeletal problems, the nursing profession is included in the group of occupations considered dangerous (Usta, 2019; Gül et al., 2014). For these reasons, nursing is a stressful profession with an intense workload due to many negative factors in the working environment (Tambağ et al., 2015; Çoban et al., 2011).

Studies on shift and on-call working systems of nurses indicate that working in this way negatively affects employees' social lives, physiological and psychological health, and even patient safety (Tambağ et al., 2015; Çoban et al., 2011). In particular, lack of sleep due to the length of shifts and the number of consecutive days of work, postponing to meet natural needs due to intense workload, excessive standing and walking distance, frequent bending forward, pushing and pulling, heavy lifting and repetitive movements during patient care activities are among the causes of pain and physical fatigue due to overloading the musculoskeletal system (Şapulu & Akansel, 2021; Usta & Başkurt, 2019).

Fatigue affects the quality of life of individuals and is an important symptom affecting stress and anger control, leading to decreased productivity and performance. Fatigue is the body response to stress that it cannot cope with. Nurses are likely to experience fatigue owing to their high workloads. It is inevitable that fatigue will increase with insomnia, lack of exercise and responsibilities in family life (Yorulmaz et all., 2018). The Canadian Nurses Association stated that work-related fatigue is a condition that affects nurses physically and mentally, negatively affecting their physical and cognitive abilities and leading to the development of burnout (Şapulu & Akansel, 2021).

It is thought that with the occurrence of fatigue, nurses' professional practices and thus their job satisfaction may also be affected. Job satisfaction, which can be defined as an emotional reaction developed as a result of the evaluation of one's work and work environment, is expressed as the level of meeting the physical, mental and social needs of employees in line with expectations (Tambağ et al., 2015). It is stated that job satisfaction levels of nurses are affected by individual (age, education, marital status, socio-cultural environment and personality traits) and institutional (wage, work environment and working conditions, communication in the work environment, relationships with managers, career opportunities) factors (Çam &Yıldırım, 2010). Ensuring job satisfaction in nurses and thus providing patient-centered, quality nursing care to patients at the standards they deserve has a critical importance in the health care system (Yılmaz & Yıldırım, 2016).

In the literature, there is lacking information about the effects of musculoskeletal disorders, fatigue level and job satisfaction of nurses on each other. For this reason, it is thought that this study will enlighten the new studies by examining the concepts of musculoskeletal disorders, fatigue levels and job satisfaction of nurses together.

This study aimed to evaluate the relationship between musculoskeletal disorders, fatigue and job satisfaction among nurses.

MATERIALS AND METHODS

Study type

The study was conducted in the internal-surgical clinics and intensive care units of University Hospital between 01.12.2021 and 01.08.2022.

Study group

The study population consisted of nurses (N= 367) working in the internal and surgical clinics and intensive care units of Aydın Adnan Menderes University Research Hospital. The sample size of the study was calculated as 187 using the sampling method with estimated population. The study was completed with 282 nurses.

Procedures

In the collection of the data, the question form regarding socio-demographic data, Cornell Musculoskeletal Disorders Index, Nurse Job Satisfaction Scale and Checklist Individual Strength Fatigue Scale be used.

Question form

In the form developed by the researchers to define the socio-demographic characteristics of the nurses, age, gender, the unit in which they work, how many years they have been working as a nurse, marital status, the region where they have lived for the longest time, economic status, and family type be questioned.

The Cornell Index of Musculoskeletal Disorders

The questionnaire was developed in 1999 by Hedge and assesses the frequency, severity, and impact on work performance of pain, soreness, or discomfort in 11 different body parts during the last week of work. The frequency of ache, pain or discomfort is rated from never to many times every day; the severity is rated from mildly severe to very severe; and the effect on work performance is rated from not interfering at all to very interfering. The questionnaire consisted of right and left subcategories for all extremity parts except neck, back, waist and hip. For each body part, the weighted score of that body part is calculated by multiplying the ratings marked in the areas of frequency, severity and effect on work performance. The weighted score for each body area takes a value between 0 and 90. An increase in the score indicates an increase in the frequency and severity of pain and its effect on work performance. The Turkish translation was done by by Erdinç et al. (2008), cronbach alpha

value was 0.875 for work performance. It was found 0.876 in our study.

Checklist Individual Strength (CIS - Checklist Individual Strength Fatigue Questionairre)

The CIS questionnaire was used to determine the fatigue level of nurses. This questionairre was developed by Vercoulen, and most widely used to assess chronic fatigue. Here, fatigue is assessed in four aspects: subjective perception of fatigue, decreased concentration, decreased motivation and decreased physical activity. The questionnaire consists of 20 statements measuring fatigue in the last 2 weeks and a 7-point scale is used for the answers. The maximum score that can be obtained from the scale is 140. In our study, Cronbach's value was found to be 0.79.

Nurse Job Satisfaction Scale

This scale was developed by Muya et al. (2014) to determine the job satisfaction of nurses. The reliability and validity study was conducted by Yılmaz & Yıldırım (2016), consists of 27 items and 4 sub-dimensions "Positive Feelings About Work" (1-8, 8 items), "Appropriate Support from Superiors" (9-14, 6 items), "Perceived Importance in the Workplace" (15-22, 8 items), and "Pleasant Working Environment" (23-27, 5 items). The total Cronbach's alpha value of the scale was 0.90. In our study, the Cronbach value was found to be 0.85.

Collection of data

After institutional permission was obtained, information about the study was given by the researchers during the break time of the nurses during working hours. Nurses who agreed to participate in the study were taken to a separate room and asked to fill out the questionnaires based on their self-reports.

Statistical analysis

SPSS 20.00 package program was used for data analysis. The dependent variables of the study were nurses' musculoskeletal disorders, fatigue index and nurse job satisfaction mean scores. Independent variables were socio-demographic variables. Number, percentage distributions, mean, standard deviation values were given in the analysis of the data. According to the number, percentage, mean and standard deviation of the descriptive variables of the nurses, the Mann-Whitney U test was used for the comparison of paired groups that did not fit the normal distribution according to the results of the Skewnes Kurtosis test, the Kruskal Wallis test was used for the comparison of groups of three or more, the Student t test was used for the comparison of paired groups with normal distribution, and the ANOVA test was used for the comparison of groups of three or more. To determine the correlation of the questionnaires, Pearson correlation analysis was used when the data were normally distributed and Spearman correlation analysis was used when the data were not normally distributed. A level of $p<0.05$ was considered statistically significant.

Ethical approval

Before the study was started, written permissions were obtained from the administrations of the university hospital. Written approval was obtained from the author's Aydın Adnan Menderes University Non-Interventional Ethics Committee (Date: 11.24.2021, Approval no: E-15189967-050.04.04-106260). Verbal permission was also obtained from the nurses participating in the study.

RESULTS

Among the nurses who participated in the study, 76.6% were female, 62.8% were in the 22-30 age group, 56.4% were married, 88.3% had a nuclear family structure, 55.3% had a Bachelor's degree, 69.9% worked as a clinic nurse, 66% had been working as a nurse for 1-9 years, 40.1% cared for 2-7, 8-13 patients, and the average working pattern per week was approximately 3 days during the day and approximately 1 day at night. 72.3% of the nurses stated that they liked their profession, and 72.0% stated that they chose this profession voluntarily (Table 1).

Table 1. Sociodemographic and occupational characteristics of nurses (n=282).

Characteristics		n	%
Gender	Female	216	76.6
	Male	66	23.4
Age group	22-30 years	177	62.8
	31-39 years	73	25.9
	40-49 years	32	11.3
Marital Status	Married	159	56.4
	Single	123	43.6
Family type	Nuclear family	249	88.3
	Extended family	33	11.7
Education Level	VSH	53	18.8
	Associate degree	39	13.8
	License	156	55.3
	Postgraduate	34	12.1

Table 1. (Continue). Sociodemographic and occupational characteristics of nurses (n=282).

Characteristics		n	%
Working unit	Clinic	197	69.9
	Intensive care	85	30.1
Enjoyment of the profession	Liked	204	72.3
	Disliked	78	27.7
Voluntary choice of profession	Voluntary choice	203	72.0
	Involuntarily choice	79	28.0
Duration of work	1-9 years	187	66.3
	10-19 years	67	23.8
	20-29 years	28	9.9
Number of patients cared daily	2-7 patients	113	40.1
	8-13 patients	113	40.1
	14-17 patients	56	19.8
Average weekly work pattern	Day shift (8 hours)		3.27±1.69
	Night shift (16 hours)		1.36±1.25

n: Count, **%:** Column percentage.

The mean score of the CIS Fatigue Scale of the nurses was found to be 75.18±0.82, the mean subscale scores were subjective fatigue perception 30.38±0.41, decrease in concentration 17.89±0.25, decrease in motivation 15.30±0.21, decrease in physical activity 11.62±0.21. The mean score of the Nurse Job Satisfaction Scale was found to be 3.36±0.04, and the mean subscale scores were; positive feelings about work 3.47±0.04, appropriate support from superiors 3.35±0.06, perceived importance at work 3.75±0.04, pleasant working environment 2.56±0.05, Cornell Musculoskeletal Disorders Index mean score 193.97±14.77, back discomfort mean score 21.10±1.48 and 19.20±0.65 for the lumbar region (Table 2).

It was found that there was a negative and weak relationship between the mean scores of the CIS fatigue scale and job satisfactions, a positive and weak relationship with the Cornell discomfort index, and a negative and weak relationship between nurse job satisfaction and the mean scores of the Cornell discomfort index (Table 3).

Table 4 shows the distribution of the nurses according to the body regions specified in the Cornell Musculoskeletal Disorders Index in relation to feeling pain and whether the pain affects their work. It was found that the majority of the nurses felt pain in the lower back (83.3%), back (80.9%) and neck (74.5%). Nurses stated that pain in the left wrist (91.1%), right/left forearm (84.4%, 84.8%) and left upper leg (80.5%) affected their work.

Table 5 shows the comparison of the relationship between the mean scale scores of the nurses participating in the study and some variables. There was no significant relationship between the mean score of the fatigue scale and gender, age, marital status, and duration of employment as a nurse, whereas a significant relationship was found between the work unit, the status of enjoying the profession, the status of choosing the profession voluntarily, and the average number of patients cared for. There was no significant relationship between the mean score of the nurse job satisfaction scale and age, marital status, work unit, duration of employment as a nurse, average number of patients cared for, while a significant relationship was found between gender, enjoyment and voluntary choice of profession, duration of employment as a nurse, and average number of patients cared for.

Table 2. Mean scale scores of nurses (n=282).

	X±SD*
CIS Fatigue Scale	**75.18±0.82**
Subjective perception of fatigue	30.38±0.41
Decreased concentration	17.89±0.25
Decreased motivation	15.30±0.21
Decreased physical activity	11.62±0.21
Nurse Job Satisfaction Scale	**3.36±0.04**
Positive work related emotions	3.47±0.04
Appropriate support from superiors	3.35±0.06
Perceived importance at work	3.75±0.04
Pleasant working environment	2.56±0.05
Cornell Musculoskeletal Disorders Index	**193.97±14.77**
Neck	13.44±1.18
Right shoulder	10.95±1.07
Left shoulder	9.60±1.05
Upper back	21.10±1.48
Right arm	4.98±0.67
Left arm	4.19±0.65
Back	19.20±0.65
Right forearm	4.12±0.71
Left forearm	4.01±0.77
Right wrist	7.30±0.99
Left wrist	6.44±1.02
Hip	10.65±1.26
Right upper leg	8.84±1.18
Left upper leg	7.26±1.06
Right knee	8.11±0.92
Left knee	7.75±0.95
Right lower leg	8.59±0.94
Left lower leg	8.23±0.95
Right foot	14.39±1.28
Left foot	14.84±1.33

X: Mean, **SD**:Standart Deviation

Table 3. Comparison of the mean scale scores of nurses.

	CIS Fatigue Scale	Nurse Job Satisfaction Scale r*/p	Cornell Musculoskeletal Disorders Index r*/p
CIS Fatigue Scale	-	**-0.239/0.000**	**0.134/0.024**
Nurse Job Satisfaction Scale	-	-	**-0.158/0.008**
Cornell Musculoskeletal Disorders Index	-	-	-

*** r:** Spearman Correlation Coefficient

There was no significant correlation between the mean Cornell Discomfort Index scores of the nurses and age, marital status, unit of employment, love for the profession, duration of employment as a nurse, average number of patients cared for, while a significant correlation was found with the gender factor.

Table 4. Distribution of nurses according to their body parts in terms of feeling pain and whether pain interferes with their work.

Cornell Musculoskeletal Disorders Index	Pain sensation		Preventing him/her from doing work	
	Pain n(%)	No pain n(%)	Yes n(%)	No n(%)
Neck	**210 (74.5)**	72 (25.5)	190 (67.4)	92 (32.6)
Right shoulder	166 (58.9)	116 (41.1)	212 (75.2)	70 (24.8)
Left shoulder	145 (51.4)	137 (48.6)	219 (77.7)	63 (22.3)
Upper back	**228 (80.9)**	54 (19.1)	205 (72.7)	77 (27.3)
Right arm	118 (41.8)	164 (58.2)	213 (75.5)	69 (24.5)
Left arm	102 (36.2)	180 (63.8)	220 (78.0)	62 (22.0)
Back	**235 (83.3)**	47 (16.7)	203 (72.0)	79 (28.0)
Right forearm	86 (30.5)	196 (69.5)	**238 (84.4)**	44 (15.6)
Left forearm	79 (28.0)	203 (72.0)	**239 (84.8)**	43 (15.2)
Right wrist	113 (40.1)	169 (59.9)	246 (87.2)	36 (12.8)
Left wrist	87 (30.9)	195 (69.1)	**254 (91.1)**	28 (9.9)
Hip	149 (52.8)	133 (47.2)	223 (79.1)	59 (20.9)
Right upper leg	136 (48.2)	146 (51.8)	214 (75.9)	68 (24.1)
Left upper leg	121 (42.9)	161 (57.1)	**227 (80.5)**	55 (19.5)
Right knee	147 (52.1)	135 (47.9)	213 (75.5)	69 (24.5)
Left knee	131 (46.5)	151 (53.5)	220 (78.0)	62 (22.0)
Right lower leg	151 (53.5)	131 (46.5)	206 (73.0)	76 (27.0)
Left lower leg	139 (49.3)	143 (50.7)	212 (75.2)	70 (24.8)
Right foot	192 (68.1)	90 (31.9)	207 (73.4)	75 (26.6)
Left foot	176 (62.4)	106 (37.6)	221 (78.4)	61 (21.6)

DISCUSSION

This cross-sectional study was conducted to examine musculoskeletal disorders, fatigue levels and job satisfaction of nurses, it was found that as the fatigue level of nurses increased, their job satisfaction decreased and musculoskeletal pain averages increased. These results suggest that nurses' job satisfaction and musculoskeletal pain may be related to fatigue levels.

When the Cornell Musculoskeletal Disorders Index of the nurses was evaluated according to the body region, the mean scores of the back and lumbar region were higher than the other regions, It was shown that pain was mostly felt in the lower back, back and neck, and that pain in the left wrist, right/left forearm and left upper leg interfered with the work performed. In the literature, Kandemir et al. (2019) stated in their study that operating room nurses mostly felt pain in the back, neck and shoulder region and that their home/work life was affected due to pain. Sançar et al. (2021) and Gül et al. (2014) reported that work-related musculoskeletal disorders are quite common in nurses, and Gök (2021) stated that the prevalence of pain experience of intensive care nurses is quite high. These results suggest that intense and long working hours have an effect on the pain experienced by nurses. There was no significant correlation between the mean Cornell Discomfort Index scores of nurses and age, marital status, work unit, enjoyment of the profession, working duration as a nurse, and average number of patients cared for, while a significant correlation was found between the gender factor.

Table 5. Comparison of nurses' mean scale scores with specific variables.

	CIS Fatigue Scale X±SD	Nurse Job Satisfaction Scale X±SD	Cornell Musculoskeletal Disorders Index X±SD
Gender			
Female	75.36±13.58	3.38±0.55	210.50±18.01
Male	74.61±14.64	3.27±0.75	139.88±21.43
t/p	0.582/0.446	21.11/0.000	6.86/0.009
Age group			
22-30 years	74.69±13.92	3.35±0.63	197.57±261.86
31-39 years	76.08±14.48	3.30±0.53	173.17±225.17
40-49 years	75.84±11.77	3.36±0.60	221.52±221.14
F/p	0.303/0.739	1.602/0.203	0.471/0.625
Marital Status			
Married(n:159)	75.67±13.78	3.33±0.57	206.01±279.85
Single(n:123)	74.54±13.88	3.39±0.63	178.41±199.72
	0.284/0.595	0.751/0.863	3.844/0.335
Working unit			
Clinic (n=197)	76.34±15.07	3.35±0.63	182.47±233.61
İntensive Care (n=85)	72.51±91.88	3.36±0.55	220.64±278.61
t/p	17.74/0.012	6.50/0.885	2.704/0.270
Enjoyment of the profession			
Liked (n=204)	76.19±14.31	3.48±0.59	178.40±238.12
Disliked (n=78)	72.54±12.10	3.03±0.51	234.69±269.77
t/p	9.740/0.033	1.573/0.000	0.266/0.108
Voluntary choice of profession			
Voluntary choice (n:203)	77.52±14.56	3.41±0.55	177.29±225.03
Involuntarily choise (n:79)	69.18±9.33	3.22±0.708	236.84±296.60
t/p	16.09/0.000	5.043/0.017	5.614/0.109
Duration of work			
1-9 years	75.32±14.22	3.33±0.62	199.48±260.99
10-19 years	74.01±13.51	3.34±0.54	164.32±224.27
20-29 years	77.00±11.82	3.57±0.60	228.13±211.41
F/p	0.490/0.613	1.970/0.141	0.789/0.455
Number of patients cared daily			
2-7 patients	74.15±11.64	3.36±0.55	189.36±251.72
8-13 patients	78.10±14.59	3.35±0.63	178.17±217.65
14-17 patients	71.38±15.83	3.37±0.65	235.16±294.34
F/p	5.106/0.007	0.018/0.983	1.021/0.362

X: mean, SD: Standard Deviation, t: t test, F: ANOVA

Krishnan et al. (2021) found that nurses had a high rate of work-related musculoskeletal pain, with the highest incidence of low back and ankle/foot pain, followed by neck and shoulder pain. It was also reported that age, low education level, being female, high BMI and working time were the main risk factors for musculoskeletal problems. In a study conducted by Attar (2014), it was reported that the most common musculoskeletal problems in nurses were low back, ankle, foot, neck and shoulder. Soylar & Özer (2018) stated in his systematic review study that work-related musculoskeletal system problems in nurses ranged between 33% and 88%, the most common condition was low back pain, it was mostly seen in nurses working in the operating room, and it was also stated that it was the most important reason for absenteeism, requesting a change of duty/job and consulting a doctor. According to Soylar, a significant relationship was found between gender and low back pain in studies and it was reported that women had more low back pain than men. Younan et al. (2019) reported that the prevalence of work-related musculoskeletal disorders among nurses working in acute care hospitals across Lebanon was 71%, back pain was the most common musculoskeletal disorder, and nurses with 5-10 years of experience had 1.6 times more work-related musculoskeletal disorders than nurses with less than 5 years of experience. Gündüz & Sayılan (2021) showed that there was a significant correlation between age, unit of work, type of task, time spent in the same position and low back pain. At the same time, it was stated that most of the nurses experienced low back pain and that low back pain negatively affected job satisfaction, and that weight lifting, walking, sitting, sitting, standing, sleeping, housework, and social activities were most affected by low back pain. It is known that the physical workload of nurses may vary depending on the nature of the unit they work in and the variety of tasks expected, the frequency of exposure to

excessive postures and the duration of exposure, and prolonged exposure may cause various musculoskeletal problems (Krishnan et al., 2021). According to these results, it was seen that the nurses were able to continue working even though they felt pain in areas such as the back and neck. However, the pain they experience in areas affecting fine hand functions interrupts and prevents their professional practices. Since there are frequently repeated and challenging movements within the basic practices of nursing care, it is thought that reducing the intensity of these movements by reducing the number of patients or providing support staff, short breaks, relaxing exercises, posture trainings, and maintaining hand and upper extremity functions at an optimal level will prevent occupational deformation and will be protective in terms of musculoskeletal system disorders in the long term.

In this study, it was found that nurses had higher mean scores on the CIS Fatigue Scale and higher mean scores on the subjective fatigue perception subscale than the others. This result shows that nurses perceive themselves individually tired as well as being physically tired in the working environment. A significant relationship was found between the fatigue levels of the nurses and the unit they worked in, their enjoyment of their profession, their voluntary choice of their profession and the average number of patients they cared for. It was stated that clinical nurses felt significantly more fatigue than nurses in intensive care, nurses who liked their profession than those who did not like their profession, nurses who preferred their profession voluntarily than those who preferred their profession involuntarily, and nurses who cared for an average of 8-13 patients per week felt significantly more fatigue than others. In the literature, Tirviene et al. (2020) reported that the general fatigue level was higher in intensive care nurses, the mental fatigue level was higher in young nurses, and physical and mental fatigue reduced the quality of work of nurses. Hosseini et al. (2021). In a study conducted with Iranian nurses, they stated that fatigue, age and working year were among the factors affecting work-related musculoskeletal system and that there was an interactive relationship between fatigue and work-related musculoskeletal system findings. They stated that fatigue causes a decrease in performance with insufficient rest following excessive activity and that nurses move more slowly when they are tired and perform even simple tasks longer than expected. Karahan et al. (2020) evaluated nurses according to the shifts they worked; they reported that the fatigue level of nurses was generally severe. Şapulu & Akansel (2021), examining fatigue and related concepts in intensive care nurses, emphasized that nurses felt tired in most of the studies. It is thought that this result may be due to the long working time of nurses, the fact that the profession involves repetitive movements, the information processing process is long and the number of patients per nurse is high due to the low number of employees. Chronic fatigue, which develops for these reasons, directly affects nurses, who are expected to have the ability to make urgent decisions and to implement them without error, and who are in constant communication with patients and their relatives, in all units of hospitals. With increasing expectations, it can be said that the level of fatigue felt by nurses working in units such as intensive care will increase in parallel with the level of stress and tension. In line with these results, it is thought that increasing the number of employees and providing the necessary technical support to the applications by taking into account the fatigue in all units, especially in intensive care units, is important in improving the quality of care, patient satisfaction and preventing medical errors. In our study, it was found that the mean scores of the Job Satisfaction Scale of the nurses were at a moderate level, there was no significant relationship between age, marital status, the unit where they worked, the duration of working as a nurse, the average number of patients they cared for, and there was a significant relationship between gender, enjoyment and willingness to choose their profession. In the literature, job satisfaction and work-related musculoskeletal pain were found to be inversely related. In particular, the risk of low back pain, which was 0.65 times higher in nurses with more than 10 years of work experience compared to nurses with 6-10 years of work experience, was evaluated as a reason for a decrease in job satisfaction. Nurses with more work experience are also responsible for clinical education and management in the unit. These responsibilities bring physical and mental fatigue to nurses and thus inadequate job satisfaction (Thiese et al., 2020). Yüksel et al. (2016) stated that nurses have a low level of job satisfaction in their study, while Eraydın et al. (2021) and Baran & Kavuran (2021) stated that nurses' job satisfaction is at a medium level in their study. When the findings of the studies are examined, it is thought that the fact that nurses have medium and low levels of job satisfaction is due to the difficulty of nurses' working conditions and inadequate wage policy.

In our study, it was observed that practicing the profession with enjoyment also had a positive effect on job satisfaction. The increased risk of work-related musculoskeletal pain in nurses who are dissatisfied with their job shows that job satisfaction in nursing can cause a psychosocial stress factor with physical burden and dissatisfaction. Satisfaction while practicing the profession shows that satisfaction has not only psychological effects but also physical effects. While a significant relationship was found between female gender and job satisfaction in our study, it has been argued that female employees are more sensitive in tasks such as patient transportation and changing position, where physical load increases, and job satisfaction will be adversely affected (Sun et

al., 2021). Similarly, Aylaz et al. (2017) obtained higher scores in male employees in general job satisfaction evaluations in their study. Kızılırmak & Bulut (2022) stated that, Carol Gliggan, one of the developmental theoristspointed that the perception of care is mostly specific to women, that they consider the care of others more than men, and that they are more inclined to take ownership of care. According to the findings, it is thought that the higher job satisfaction of female nurses may be due to the perception of the nursing profession as a woman's profession in the society, the belief that women should struggle with the difficulties of this profession, and their ability to assume the responsibility of giving care. It was found that there was a negative low-level significant relationship between the mean scores of the CIS fatigue scale and job satisfactions, a positive low-level significant relationship with the Cornell discomfort index, and a negative low-level significant relationship between nurse job satisfaction and Cornell discomfort index mean scores. The findings obtained are thought to have a negative effect on job satisfaction when evaluated together with physical loads, general fatigue and regional musculoskeletal system pains experienced in working conditions.

Study Limitations and Strengths

The limitations of the study are that it is a cross-sectional study and that it was conducted only on nurses working in the institution where the application was made.

CONCLUSION

In our study, it was concluded that nurses had high levels of musculoskeletal disorders and fatigue levels and moderate levels of job satisfaction. Significant correlations between job satisfaction, fatigue level, musculoskeletal disorders and variables such as gender of the nurses, the clinic they work in and the average number of patients they care for, and preferring their profession willingly are important results of our study.

From these results, it is seen that problems such as musculoskeletal system pain and fatigue level are important factors affecting job satisfaction of nurses and the regulation of factors such as the number of clinical patients worked with are variables that may affect these disorders and related professional satisfaction. It is thought that improving the working environment in terms of factors such as the number of employees in the units where nurses work in health institutions and the average number of patients cared for will be a factor in reducing the problems experienced in the profession. It may be recommended that personal fatigue should be taken into consideration in units where care practices are intensive, resting areas should be located close to the unit where they work, effective break arrangements should be established, and equipment support should be provided to assist care. It is recommended that training emphasizing the importance of correct posture and protective exercises should be provided to nurses, and regular physical and psychological controls should be performed. With these recommendations, it is thought that not only nurses will increase the quality of health care and patient satisfaction but also contribute positively to the reduction of medical errors.

Acknowledgement

The authors would like to extend their sincere thanks to anyone who contributed to this study.

Conflict of Interest

The author declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Author Contributions

Plan, design: OEG,SB; **Material, methods and data collection:** OEG,SB; **Data analysis and comments:** OEG,SB; **Writing and corrections:** OEG,SB.

Funding

This no funding.

Ethical Approval

Institution: Aydın Adnan Menderes University Non-Interventional Ethics Committee
Date: 24.11.2021
Approval no: E-15189967-050.04.04-106260

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ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1655894

The Relationship Between Nurses' Perception of Nursing Diagnoses and Their Workload*

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**The research was submitted as an oral presentation to the International Health, Tourism and Sports Congress to be held in Sinop between 28-30 April 2025.*

Geliş Tarihi / Received: *11.03.2025* ***Kabul Tarihi / Accepted:*** *28.04.2025*

ABSTRACT

Objective: The study was conducted to determine the relationship between nurses' perception of nursing diagnoses and their workload and the affecting factors. **Materials and Methods:** The study was designed with a descriptive and correlational design. Data obtained from 257 participants were collected using an individual information form, the Perceptions of Nursing Diagnoses Survey (PNDS), and the Workload Subscale. **Results:** The mean age of the nurses in the study was 31.84±9.19, the mean working year was 9.87±9.45. 65% of nurses worked in internal medicine units, 93.8% had received training on the nursing process, and 94.6% thought that determining nursing diagnosis contributed to nursing care positively. The PNDS total mean score was 2.45±0.43 and the Workload Subscale mean score was 16.11±2.01. No statistically significant relationship was found between PNDS and Workload Subscale mean scores($p>0.05$). **Conclusions:** PNDS and Workload Subscale scores vary according to age, working year, position, shift, self-preference of the unit, difficulty in using nursing process and thinking the positive contribution of determining the nursing diagnosis to care. Nursing diagnosis is extremely important for the patient to receive individualized, quality, and safe care. Workload affects the performance of employees. Using the nursing process and diagnoses in practice, supporting nurses with in-service training programs about this, and making plans to reduce workload will positively contribute to employee performance.

Keywords: Nursing, Nursing care, Nursing diagnoses, Nursing process, Workload.

Hemşirelerin Hemşirelik Tanılarını Algılamaları ile İş Yükleri Arasındaki İlişki

ÖZ

Amaç: Araştırma hemşirelerin hemşirelik tanılarını algılamaları ile iş yükleri arasındaki ilişkiyi ve etkileyen faktörleri belirlemek amacı ile gerçekleştirilmiştir. **Gereç ve Yöntem:** Araştırma, tanımlayıcı ve ilişkisel desenle tasarlanmıştır. 257 katılımcıdan elde edilen veriler "Bireysel Bilgi Formu", "Hemşirelik Tanılarını Algılama Ölçeği" ve "İş Yükü Alt Ölçeği" ile toplanmıştır. **Bulgular:** Çalışmada hemşirelerin yaş ortalaması 31.84±9.19 yıl, çalışma yılı ortalaması 9.87±9.45 yıldır. Hemşirelerin %65'i dahili kliniklerde çalışmakta ve %93.8'i hemşirelik süreci ile ilgili eğitim almış ve %94.6'sı hemşirelik tanısını belirlemenin hemşirelik bakımına olumlu yönde katkı yaptığını düşünmektedir. Hemşirelik Tanılarını Algılama Ölçeği toplam puan ortalaması 2.45±0.43 ve İş Yükü Alt Ölçeği puan ortalaması 16.11±2.01'dır. Hemşirelik Tanılarını Algılama Ölçeği ve İş Yükü Alt Ölçeği puan ortalamaları arasında istatistiksel olarak anlamlı ilişkiye rastlanmamıştır ($p>0.05$). **Sonuç:** Hemşirelik Tanıları Algılama Ölçeği ve İş Yükü Alt Ölçek puanları yaş, çalışma yılı, pozisyon, vardiya, servisini kendi tercih etme, hemşirelik sürecini kullanmada zorluk ve hemşirelik tanısının bakıma pozitif katkısı olduğunu düşünme durumlarına göre farklılaşmaktadır. Hemşirelik tanısının kullanımı hastanın bireyselleştirilmiş, kaliteli ve güvenli bakım alması için son derece önemlidir. İş yükü çalışanların performansını etkilemektedir. Hemşirelik sürecini ve tanılarını uygulamada kullanmak ve bu konuda hizmet içi eğitim programlarıyla hemşireleri desteklemek, iş yükünü azaltmak için planlar yapmak çalışan performansına olumlu katkı sağlayacaktır.

Anahtar Kelimeler: Hemşirelik, Hemşirelik bakımı, Hemşirelik tanıları, Hemşirelik süreci, İş yükü.

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Bu makaleye atıf yapmak için / Cite this article: Tosun, A., Tosun, H., Zengin, N., Gedikli, F., & Erdal, N. (2025). The relationship between nurses' perception of nursing diagnoses and their workload. *BAUN Health Sci J, 14*(2), 334-340. https://doi.org/10.53424/balikesirsbd.1655894

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

The most important step in increasing patient care satisfaction is the implementation of quality nursing care activities organized and strengthened by the nursing process (Areri et al., 2024). The nursing process (NP), which has been used in nursing care since the 1950s, is a scientific method that supports nursing care management, helps nurses to make appropriate clinical decisions and think critically, and ensures the delivery of high-quality care (Lotfi et al., 2020). It is also a systematic approach used to guide nursing care as well as form the basis for nursing practice (Ahtisham, 2017). This systematic approach consists of five steps: assessing the individual's health needs, determining the nursing diagnosis, planning care, implementation, and evaluation. It is the most common way of documenting nursing practices as written evidence. The main purpose of the NP is to provide standardized, holistic, patient-centered care and to evaluate and record the effectiveness of the care provided (Ahtisham, 2017; D'Agostino et al., 2018).

Nursing diagnosis (ND), the second step of NP, is the clinical judgment that forms the basis for selecting nursing interventions to achieve patient-centered outcomes that are the responsibility of nurses (D'Agostino et al., 2018). In addition to developing critical thinking, it is also effective in gaining professional autonomy. ND enables nurses to plan and implement more qualified care by improving quality interventions and patient outcomes (Sanson et al., 2017). It is recommended to ensure and facilitate the development of a common and universal language for care standardization (Cachón-Pérez et al., 2021; Aleandri et al., 2022). ND is the formulation of problem, etiology, and symptom according to the North American Nursing Diagnosis Association (NANDA-I) classification in line with the needs of the patient/healthy individual by the collected data (Ahtisham, 2017).

Nursing workload is the period nurses spend on all activities related to the care process. It also includes nurses' indirect care activities and practices related to interdisciplinary collaboration (Campos et al., 2018). The ever-increasing demand for nursing care and the number of patients, the needs of patients, the limited resources (Griffiths et al., 2020), and the heavy patient load negatively affect the quality of care, as well as increase the time pressure on nurses and cause them to be exposed to excessive workload. Nurses' workload affects patients, nurses, and healthcare institutions (Alghamdi, 2016). It is an influential factor in patient outcomes and safety (Almenyan, 2021).

Although there has been an increase in the use of the NP with the effect of positive contributions to the nursing profession and the quality of care and legal regulations, it is also a fact that the NP is not used sufficiently in practice due to various reasons (Oliveira et al., 2019). In a study, it was stated that there were problems in the use of NP, which is expressed as a highly ideal system for carrying out the care process, due to the high workload (Cachón-Pérez et al., 2021). In a different study, the difficulties related to NP use were listed as workload, high number of patients, lack of system/infrastructure, lack of staff and time, not having sufficient knowledge and equipment, and seeing working with the care plan as workload (Yurtsever & Karagözoğlu, 2020). In addition, the barriers to the use of nursing diagnosis in clinical practice are; lack of motivation, inadequate education and knowledge, high number of patients per nurse, low salary policy, lack of resources, lack of institutional belief in its necessity, not seeing the nursing diagnosis system as an approach to problem solving in reflecting it to care practice (D'Agostino et al., 2018; Miskir & Emishaw, 2018; Oliveira et al., 2019). In line with this scope and due to the lack of sufficient studies on the use of nursing diagnoses and workload perception in our country; the study aimed to determine the relationship between nurses' perception of ND, which is an important step of the NP, their workload, and the affecting factors in a university hospital. For this purpose, the research questions are;

-What is the level of nurses' perception of nursing diagnosis?

-What is the level of workload of nurses?

- Is there a relationship between nurses' perception of nursing diagnosis and their workload?

-What factors differentiate nurses' perceptions of nursing diagnosis and workloads?

MATERIALS AND METHODS

Study type

The study was conducted in a descriptive and correlational design.

Study sample

The study population consisted of nurses working in internal medicine and surgical units of a university hospital in Istanbul province that uses the NP in their units. No sample selection was made in the study, and nurses (n=257) with at least 6 months of experience, could be reached during working hours on the relevant dates, and agreed to participate in the study voluntarily were included. Since the COVID-19 pandemic was ongoing during the study, intensive care units were excluded from the scope of infection risk.

Data collection tools

The data were obtained by an individual information form related to sociodemographic and professional characteristics of nurses (11 questions), the Perceptions of Nursing Diagnoses Survey (PNDS) (26 questions), and the Swedish Demand Control Support Questionnaire (SDCSQ)-The Workload Subscale (5 questions).

Individual Information Form: The form prepared by the researchers consists of 11 questions regarding nurses' sociodemographic and professional characteristics.

Perceptions of Nursing Diagnoses Survey (PNDS): PNDS, developed by Olsen, Frost, and Orth (1991), was validated in Turkish by Akın-Korhan,

Hakverdioğlu-Yönt, Ak & Erdemir (2013). The scale consists 26 items and four sub-domains that evaluates nurses' perceptions about the ease of use of ND and their Professional benefits to the care process. These sub-domains are "Definition and Introduction of the Nursing Profession, Clearly Defining the Patient's Condition, Ease of Use, and Conceptual Aspects. The scale is a five-point Likert type (completely agree/completely disagree) with a total score ranging from 1 to 5. A low total score obtained from the scale indicates that nurses perceive ND positively. Cronbach alpha was determined as 0.84 in the validity and reliability study (Akın-Korhan et al., 2013), and it was found as 0.86 in this study.

Workload Subscale: Workload Subscale of the Swedish Workload Control Support Questionnaire, which is the modified version of the Workload-Job Control Model developed by Karesek et al. (2005) and modified by Bjarte et al. (2005), was used in the study. The questionnaire was adapted into Turkish by Demiral et al. (2007), and the "Workload Subscale", consisting of 5 items and aiming to determine the level of workload, was used in the study. In the evaluation of the scale, each item score (1-4) is summed and a total score is obtained. A high score indicates a high workload. The Cronbach's alpha value reported in the Turkish validity-reliability study is 0.68 for the workload (Demiral et al., 2007). In this study, the Cronbach's Alpha value was found to be 0.63.

Data collection

The data was collected between 01.12.2020 and 31.03.2021 using face-to-face interview method. During data collection, because of the ongoing COVID-19 process, the social distance rule was followed and protective equipment such as masks and gloves were worn. The data collection tool was filled in an average of 15 to 20 minutes.

Statistical analysis

IBM SPSS (Statistical Package for Social Sciences) Statistics 26.0 software was used for data analysis and the data were analyzed at 95% confidence interval ($p<0.05$). Descriptive statistics (number, percentage, mean, standard deviation, median, minimum-maximum values) and Cronbach's Alpha reliability coefficient were used. The suitability of the data for normal distribution was examined with steepness and skewness coefficients. Kruskal-Wallis test, Mann-Whitney U test, Bonferroni Corrected Mann-Whitney U, and Spearman correlation were used to evaluate the data since the data were not normally distributed.

Ethical Approval

Ethics committee approval (Number: 2020/A-46, Date: 3/11/2020) from the Cerrahpaşa Faculty of Medicine Clinical Research Ethics Committee, study permission from the institution where the study would be conducted, and permission to use both scales in the study from the relevant authors (Hakverdioğlu-Yönt and Demiral) via e-mail was obtained. In addition, verbal and written consents were obtained from all volunteer participants, and the principles of research and publication ethics of the Declaration of Helsinki were followed at every stage of the study.

RESULTS

The mean age of the nurses in the study was 31.84±9.19, 86% were female, 68.1% had a bachelor's degree, and had an average working year of 9.87±9.45. 76.3% were staff nurses and 66.1% worked in a mixed day and night shift. It was also determined that 65% worked in internal medicine units, 67.7% of them preferred the unit where they worked, 93.8% received training on the NP, 67.7% had difficulty in using the NP and 94.6% thought that determining the ND contributed to nursing care positively (Table 1).

The PNDS total mean score was 2.45±0.43 and the mean score of the Workload Subscale was 16.11±2.01 (Table 1). In the study, it was determined that the level of nurses' perception of ND was positively above average and their workload was high. No significant relationship was found between the PNDS and Workload subscale (Table 2).

When the PNDS mean score was examined according to the individual characteristics of the nurses; it was determined that the perception of ND was more positive in manager nurses ($p=0.018$), those working on the day shift ($p=0.033$), those who preferred the unit where they worked ($p=0.028$), those who had no difficulty in using the NP ($p=0.010$), and those who thought that determining the ND contributed to nursing care positively ($p<0.001$) (Table 1).

When the workload subscale mean score according to individual characteristics was examined, it was found that the workload of those in the 25-35 age group ($p=0.004$), those with a working period of 5-15 years ($p<0.001$), those who did not prefer the unit where they worked ($p=0.023$), and those who had difficulty using the NP ($p=0.002$) was higher (Table 1).

DISCUSSION

It is extremely important to use the ND, which is an important step of the NP, effectively and efficiently in practice. Nursing is a profession with a high workload in general. It is an undeniable fact that the difficulties encountered in the work environment make it difficult to integrate the NP and ND, which ensure that nursing practices are carried out systematically and improve the quality of care. The study, which was conducted in a descriptive and correlational design to determine the relationship and effective factors between nurses' perception of nurses regarding ND and their workload, is important in terms of positively developing nurses' perceptions regarding ND, reducing their workload and contributing to the more effective and efficient use of ND in nursing practices.

Table1. Comparison of individual characteristics of nurses and mean scores of PNDS and Workload Subscale (N=257)

				Perceptions of nursing diagnoses survey		Workload subscale	
				Mean±SD	Med (Max.-Min.)	Mean±SD	Med (Max.Min.)
Individual characteristics	**Grups**	**N=257**	**%**	2.45±0.43	2.42 (1.04-4.35)	16.11±2.01	17 (7-20)
Age /Years	24 and ↓ [a]	57	22.2	2.41±0.30	2.42 (1.69-3.31)	15.65±2.02	16 (11-19)
	25-35[b]	128	49.8	2.43±0.46	2.42 (1.04-4.31)	16.56±1.69	17 (12-20)
	36 and ↑[c]	72	28.0	2.52±0.48	2.50 (1.42-4.35)	15.65±2.35	16 (7-20)
	Mean±SD 31.84±9.19			KW= 3.665	p=0.160	**KW= 11.012 a<b, c<b**	**p=0.004***
Gender	Female	221	86.0	2.46±0.43	2.42 (1.04-4.35)	16.05±2.08	16 (7-20)
	Male	36	14.0	2.40±0.48	2.44 (1.31-4.31)	16.47±1.52	17 (13-20)
				U=3578.500	p=0.334	U=3658.000	p=0.431
Educational status	High scholl	15	5.8	2.36±0.46	2.19 (1.69-3.31)	15.87±1.46	16 (13-18)
	Bachelor's	175	68.1	2.46±0.39	2.46 (1.04-4.31)	16.24±1.92	17 (10-20)
	Postgraduate degree	67	26.1	2.44±0.53	2.38 (1.08-4.35)	15.80±2.32	16 (7-20)
				KW=1.941	p=0.379	KW=2.160	p=0.340
Working Year	4 years and ↓	107	41.6	2.43±0.37	2.42 (1.69-3.96)	15.98±1.90	16 (11-20)
	5-15 years[b]	94	36.6	2.44±0.45	2.42 (1.04-4.31)	16.63±1.93	17 (7-20)
	16 years and ↑[(c)]	56	21.8	2.50±0.51	2.50 (1.42-4.35)	15.45±2.15	16 (10-20)
	Mean±SD 9.87±9.45			KW=1.362	p=0.506	**KW=15.907 a<b, c<b**	**(p<0.001) ** **
Position	Staff Nurse	196	76.3	2.48±0.42	2.46 (1.08-4.31)	16.23±1.92	17 (10-20)
	Manager	61	23.7	2.35±0.46	2.35 (1.04-4.35)	15.69±2.25	16 (7-20)
				U=4782.000	**p=0.018***	U=5060.000	p=0.065
Working shift	Daytime	87	33.9	2.36±0.46	2.35 (1.04-3.96)	15.97±2.08	16 (11-20)
	Night-Daytime Mixed	170	66.1	2.49±0.42	2.46 (1.31-4.35)	16.18±1.98	17 (7-20)
				U=6196.000	**p=0.033***	U=6860.000	p=0.334
Working unit	Surgery Unit	90	35.0	2.45±0.30	2.46 (1.69-3.23)	16.23±2.23	17 (7-20)
	Internal Medicine Unit	167	65.0	2.44±0.49	2.42 (1.04-4.35)	16.04±1.89	16 (10-20)
				U=7067.000	p=0.430	U=6748.000	p=0.170
The situation of preferring the unit where he/she works	Yes	174	67.7	2.40±0.42	2.40 (1.04-4.35)	15.98±1.87	16 (10-20)
	No	83	32.3	2.55±0.46	2.50 (1.69-4.31)	16.37±2.27	17 (7-20)
				U=5998.500	**p=0.028***	**U=5974.000**	**p=0.023***
Receiving training related to the NP	Yes	241	93.8	2.44±0.43	2.42 (1.04-4.35)	16.14±1.99	17 (7-20)
	No	16	6.2	2.58±0.53	2.52 (1.88-3.42)	15.56±2.22	17 (12-18)
				U=1675.500	p=0.380	U=1698.500	p=0.417
Difficulty using the NP	Yes	174	67.7	2.49±0.43	2.48 (1.08-4.35)	16.37±1.96	17 (7-20)
	No	83	32.3	2.35±0.44	2.38 (1.04-3.96)	15.55±2.00	16 (10-19)
				U=5782.500	**p=0.010***	**U=5514.500**	**p=0.002***
Thinking that determining ND contributes to nursing care positively	Yes	24	94.6	2.41±0.40	2.42 (1.04-4.35)	16.12±2.02	17.00 (7-20)
	No	14	5.4	3.07±0.48	3.00 (2.27-4.31)	15.79±2.00	16.50 (13-19)
				U=389.500	**(p<0.001)****	U=1527.000	p=0.513

SD:Standard Deviation, Min:Minimum, Max:Maximum, Med:Medyan, Mann Whitney U Test (U), Kruskal Wallis Test (KW), *p<0.05 **p<0.001

The nursing process, which is at the core of the nursing education curriculum, provides coordinated, effective and qualified care practices for the needs of the individual, and forms the basis of nursing education and care practices (Miskir & Emishaw, 2018). In this study, almost all nurses stated that they received training on the NP and thought that determining the ND positively contributed to nursing care. However, 67.7% of the nurses stated that they had difficulty in using the NP. Receiving training on the NP facilitates practice (Miskir & Emishaw, 2018). In the literature, it is stated that nurses have difficulty in using the NP due to lack of time and personnel, workload, and an excessive number of patients (Agyeman-Yeboah et al., 2017; Yurtsever & Karagözoğlu, 2020; Çakar & Avşar, 2020). The study suggests that although nurses are informed about NP and believe in its benefits, more than half of them do not use it due to workload.

Table 2. Relationship between PNDS and Workload Subscale Score

Scales	Workload Subscale
Perceptions of nursing diagnoses survey (PNDS)	**r=**-0.008 **p=0.904**
Total	257

Spearman's rho correlation test, p<0.05*, p<0.01**.
Data are expressed as r and p value.

In the current study, it was determined that nurses' perceptions of ND were positive above the average. In some studies, similar to this study, nurses' perceptions of ND were expressed as moderately positive (Akın-Korhan et al., 2013; Karakurt et al., 2020; Şahin & Khorshid, 2021; Çağa et al., 2023), while in others it was found to be moderately negative (Köse & Sis-Çelik, 2020; Bağrıaçık & Bostanoğlu, 2022). In addition, similar to the study results, there are studies in foreign literature stating that nurses' perception of diagnosis is positive (Leoni-Scheiber et al., 2019; Tsiami & Kolovas, 2021; Gligor et al., 2024). It can be considered that the nurses' institutional, educational, and professional characteristics may be effective in the difference in the results.

It was determined that nurses' perception of ND did not differ according to age, gender, educational status, years of work, working unit, and NP training status in this study. There are studies with similar results in the literature (Köse & Sis-Çelik, 2020; Karakurt et al., 2020; Çağa et al., 2023). In addition, in parallel with this study, Karakurt et al. (2020) stated that the unit where they worked did not make a difference in their study, while Çağa et al. (2023) found that the unit where they worked had a positive effect on their perception difference. The study showed a significant difference in the perception of ND of nurses who preferred the unit where they worked. This situation suggests that working in the units they want and like positively affects the perception of ND.

One of the important results of the study is that the perception of ND by the manager nurses is at a better level. In the literature, it is stated that the use of ND by manager nurses is easier than staff nurses (Şahin & Khorshid, 2021); and they have a more positive attitude toward ND (Lumillo-Gutierrez et al., 2019). It is also stated that this may be because they do not actively use the NP (Şahin & Khorshid, 2021).

Another important result of the study was that daytime nurses had a more positive attitude towards ND. More positive perception of the quality of care among nurses who consistently work during the day (Soysal et al., 2022) may be considered an effective factor in this result. In the study, a significant difference was found according to the nurses' high level of workload and their difficulty in using the NP. In different studies, it is similarly reported that the workload of nurses is high (Özkan & Uydacı, 2020; Arıkan, 2021) and that workload is an important barrier to use of the NP by nurses (Thuvaraka et al., 2018; Owusu-Ansah & Agyeman-Yeboah, 2022). In a study conducted in the Intensive Care Unit (ICU), the excessive workload of nurses was shown among the reasons for the insufficient use of ND (Korhan et al., 2015). However, no relationship was found between ND perceptions and workload in this study, and this result may have been affected by the fact that the study was conducted during the ongoing COVID-19 process and that the work was carried out with intense workload with intensive and insufficient staff and equipment. As a result of the study, it is thought that it is important for authorities to take measures to reduce nurses' workload perceptions and improve working conditions to increase the use of NP and ND, which is a leading factor in achieving quality patient care results in health institutions.

Limitations and Strengths of the Study

The results were evaluated according to the participants' responses to the questionnaire. Due to the COVID-19 pandemic process, the number of nurses that can be reached was limited due to nurses' intense working hours and the risk of infection.

CONCLUSION

According to the results of this study, no significant relationship was found between nurses' perceptions of ND and workload, the ND perceptions of nurses were positively above average, their workload was high and their perceptions varied according to some personal and professional factors.

The NP is the basis of providing nursing care with a systematic approach. An important step of this systematic method is to determine the ND. ND is the evidence of the nurses' practices and it provides qualified care by formulating the data obtained. As a result of the study, it is recommended that nurses should be supported with in-service training programs related to the NP and ND and motivated to use the NP and ND in their practices, measures should be taken to reduce the workload of nurses, sufficient manpower should be provided, and clinicians and nurse managers should act together in workload planning and find common solutions. In addition, planning studies on the relationship between professional value attitudes and ND perceptions is also important as it is thought that it will reveal the barriers to the use of ND.

Acknowledgement

We would like to thank all volunteers who supported our work.

Conflict of Interest

No conflict of interest was declared by the authors.

Author Contributions

Plan, design: AT,HT,NZ; **Material, methods and data collection:** AT,HT,FG,NE; **Data analysis and comments:** AT,HT; **Writing and corrections:** AT, HT,NZ.

Funding
The authors declared that this study has received no financial support.

Ethical Approval
Institution: Cerrahpaşa Faculty of Medicine Clinical Research Ethics Committee
Date: *3.11.2020*
Approval no: *2020/A-46*

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ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1623548

Motivational Interviewing in Nursing: Bibliometric Analysis

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Geliş Tarihi / Received: *20.01.2025,* ***Kabul Tarihi / Accepted:*** *07.05.2025*

ABSTRACT
Objective: There is increasing interest in motivational interviewing techniques in nursing research. This study aimed to define the present state of publications related to motivational interviewing in nursing and identify gaps in literature. **Materials and Methods**: This study is a descriptive bibliometric analysis. The study on motivational interviewing and nursing in the Web of Science (WoS) database and using the Bibliometrix Package in R software. **Results:** Within the scope of the study, 564 articles published in 139 different journals between 1998 and 2025 were reached. Articles published in WoS were mostly published in 2019 (49 articles) and 2021 (47 articles). The most published journal is Journal of Clinical Nursing, and the most productive author is Barbara Riegel. The most frequent author keywords were motivational nursing (134 times), nursing (45 times), motivational (32 times), heart failure, and motivation (21 times). **Conclusion:** The number of studies on motivational interviewing in nursing has gradually increased over the years. While motivational interviewing was applied in cases of illness and problematic behavior in previous years, today, it is also applied in breastfeeding and healthy individuals.
Keywords: Bibliometric Analysis, Motivational Interview, Nursing, Nursing Research.

Hemşirelik Araştırmalarında Motivasyonel Görüşme: Bibliyometrik Bir Analiz

ÖZ
Amaç: Hemşirelik araştırmalarında motivasyonel görüşme tekniklerine artan bir ilgi vardır. Bu çalışmanın amacı hemşirelikte motivasyonel görüşme ile ilgili yayınların mevcut durumunu tanımlamak ve literatürdeki boşlukları belirlemektir. **Gereç ve Yöntem:** Bu çalışma tanımlayıcı bibliyometrik bir analizdir. Çalışma, Web of Science (WoS) veri tabanında ve R yazılımında Bibliometrix Paketi kullanılarak motivasyonel görüşme ve hemşirelik üzerine yapılmıştır. **Bulgular:** Çalışma kapsamında 1998-2025 yılları arasında 139 farklı dergide yayınlanmış 564 makaleye ulaşılmıştır. WoS'ta yayımlanan makaleler en çok 2019 (49 makale) ve 2021 (47 makale) yıllarında yayımlanmıştır. En çok makale yayınlanan dergi Journal of Clinical Nursing, en üretken yazar ise Barbara Riegel'dir. En sık yazar anahtar kelimeleri motivasyonel hemşirelik (134 kez), hemşirelik (45 kez), motivasyonel (32 kez), kalp yetmezliği ve motivasyon (21 kez) olmuştur. **Sonuç:** Hemşirelikte motivasyonel görüşme ile ilgili çalışmaların sayısı yıllar içinde giderek artmıştır. Motivasyonel görüşme önceki yıllarda hastalık ve problemli davranış durumlarında uygulanırken, günümüzde emziren ve sağlıklı bireylerde de uygulanmaktadır.
Anahtar Kelimeler: Bibliyometrik Analiz, Motivasyonel Görüşme, Hemşirelik, Hemşirelik Araştırmaları.

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Bu makaleye atıf yapmak için / Cite this article: Cicek Ozdemir, S., & Karakısla, F. S. (2025). Motivational interviewing in nursing: bibliometric analysis. *BAUN Health Sci J, 14*(2), 341-351. https://doi.org/10.53424/balikesirsbd.1623548

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

Motivational interviewing was first developed by Rollnick and Miller in 1995, following addicts' resistance to classical approaches. Motivational interviewing is an individual-centered and directive method that aims to enhance internal motivation by exploring and resolving ambivalence. Focusing on individuals' interests, anxieties, and perspectives promotes a counselee-centered approach. Motivational interviewing, usually targeting a transformation, is based on the resolution of ambivalence. Rather than a series of techniques, it is a means of communication. In motivational interviewing, transformation and resolution of problems are individuals' responsibility. In this process, accompanying, acknowledging, and respecting their freedom to bear the consequences are of great significance (Rollnick & Miller, 1995; Miller & Rollnick, 2002).

Motivational interviewing is a cheap and high-potential method that can be applied regardless of patient's age, gender, or severity of the disorder and can be easily mastered by health professionals (Steffen, Mendonça, Meyer, & Faustino-Silva, 2021). In clinical environments where motivational interviewing is gaining popularity, nurses and nursing trainers should be aware of this effective communication strategy (Sherry & Perona, 2018).

Motivational interviewing is used in the management of depression, chronic diseases treatment of drug addiction, smoking cessation, methods of diets and weight control, keeping up with exercises, maintenance of breastfeeding, facilitating contraceptive use, prevention of sexually transmitted diseases, reduction in the rate of C-sections, encouragement of the pregnant to participate in antenatal classes and elicit behavioral changes in individuals (Kızılırmak & Demir, 2018).

Bibliometric analysis facilitates a new approach recently used to determine qualitative and quantitative variations in a certain study, to create a scientific research profile on a certain subject, and to map out research tendencies (Kokol & Blažun Vošner, 2019). It allows for the revelation of the most productive authors, institutes, countries, journals, rates of scientific productions, number of citations attributed works, models of communication and cooperation among authors, and trend topics pertaining to any subject or field (Su, Hwang, & Chang, 2022). This method illustrates an extensive picture of studies on certain subjects and enables the determination of re-exploration tendencies (Esen, Bellibas, & Gumus, 2020). The generation of data to enhance research strategies in the future by assessing an ever-expanding mass of literature is one of the greatest advantages of this method (Zupic & Cater, 2015).

Although bibliometric analysis is currently gaining popularity and attracting interest (Kantek, Yesilbas, & Aytur Ozen, 2023), it appears to have a limited scope of use (Kantek, Kurnaz, & Yeşilbaş, 2019). The number of motivational interviewing studies used by nurses in various healthcare environments is on the rise (Sherry & Perona, 2018). However, no study that portrays the accumulation of knowledge regarding motivational interviewing now exists. It is thought that research results constitute a database for planning further research and enabling guidance. This study aims to define the present state of publications related to motivational interviewing in nursing by using bibliometric analysis techniques to identify gaps in the literature and offer recommendations with regard to these gaps. It is expected that the collected results will provide guidance for works of improvement in this field.

Questions of research

The research questions in line with the purpose of the study are as follows:

- What are the descriptive features of the publications related to motivational interviewing in nursing?
- What are the most published authors, countries and journals?
- What is the distribution of the number of published works by year?
- What are the top 10 most cited publications?
- What are the most examined subjects in these publications according to keywords?
- What did the thematic evolution of keywords demonstrate in research on motivational interviewing in nursing?

MATERIALS AND METHODS

Study design

The type of research is descriptive bibliometric analysis. Bibliometric analysis can be defined as the analysis of scientific studies through quantitative analysis and statistics. Bibliometric methods can provide data from a broad perspective on the literature and can guide the work of other researchers by showing the most effective studies in the field of study. In addition, thanks to bibliometric analysis, the number of articles in the examined time interval can be determined, and it reveals important findings in terms of revealing how much research affects the studies conducted after it (Zupic & Cater, 2015). Bibliometric analysis allows researchers to base their findings on collective bibliographic data produced by other researchers in the field. In addition, it reveals the potential for researchers to cite, collaborate, and publish their ideas (Krauskopf, 2018). In this way, the performance analysis of researchers is also determined. Performance analysis evaluates the research and publication activities of individuals and institutions. This method also determines the structure and dynamics of the scientific field and creates a scientific map (Zupic & Cater, 2015).

Study sample

The data of this study consists of 564 studies on motivational interviewing and nursing.

Data collection

The data of the study were obtained from the Web of Science (WoS) database. WoS database was chosen due to its advantages, such as the older age of journal and citation archiving and the presence of journals with higher impact values in the database. In this way, the study was planned by choosing an effective and reliable tool to access the data required for bibliometric analysis (Kantek et al., 2023; Zavadskas, Skibniewski, & Antucheviciene, 2014). The WoS search was conducted on December 11, 2024, using the terms "motivational interview*" in the subject headings. After this search in the database, 10,468 documents were found. The results were then filtered in the WoS database by category (nursing), publication type (only original articles and review articles), languages (English), and WOS index (SSCI, SCI-E, and ESCI). As a result of the inclusion criteria specified in the analysis of the WoS database, 564 publications were reached (1998-2025). As a result, the data of the study was realized over the 564 articles obtained. In the study, SALSA steps (search, evaluation, synthesis, and analysis) were used to ensure objectivity in the data acquisition and analysis process. In this way, a safe path was followed in achieving the research objectives (Papaioannou, Sutton, Carroll, Booth, & Wong, 2010) (Figure 1).

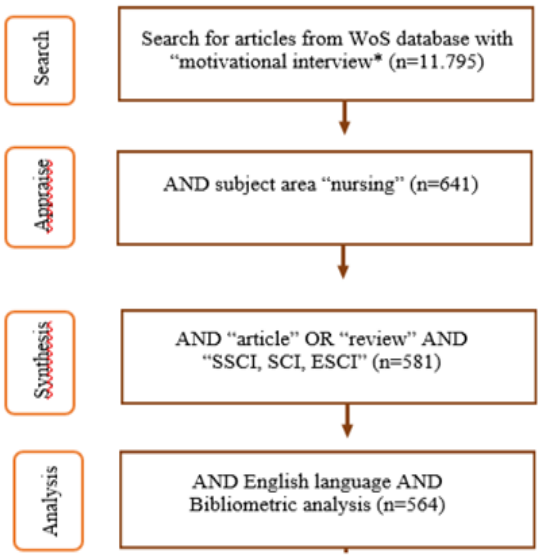

Figure 1. Data selection and analysis procedure.

All studies were individually reviewed by the researchers for suitability. When evaluating the research data, the titles, abstracts, or full texts were read and evaluated by two researchers to determine whether they met the research topic. For each article by the researchers, information about the names of the authors, the institution and country of the first author, the year of publication, the language of the study, the journal in which the study was published, the total number of citations, the type of publication and keywords were recorded.

The included data were selected by excluding the following criteria:

(1) publications without keywords.
(2) publications not in the nursing category.
(3) publications without abstracts.
(4) duplicate publications.
(5) publications not officially published.
(6) publications not in English.
(7) publications outside the SSCI, SCI-E, and ESCI index.

Data analyses

Bibliometric analysis has gained popularity in recent years due to its advantages, such as providing a systematic, transparent, and consistent review of literature. In the data collection phase, the data obtained from the WoS database were exported in txt format. While the WoS database was used in the descriptive analysis of the data included in the analysis, the RStudio program was used in the bibliometric analysis. In this way, annual scientific production, the most prolific authors, the most frequently used words, and the most popular journals will be analyzed. Thematic evolution and word cloud analysis were used for the research focus, the keywords of the research, and the evolution of the studies. These results are presented and visualized using The Bibliometrix program in RStudio.

Ethical approval

Since the study is in the literature review model, it has no direct effect on humans and/or animals. Therefore, an ethics committee approval decision is not required.

RESULTS

The findings from the WoS database showed that there were 564 documents on motivational interviewing and nursing between 1998 and 2025, which included 520 articles (%92) and 44 review articles (%8). The authors with the most publications are Riegel B (7), Vellone E (6), Alvaro R, Bennett JA, and Chang YP (5). The five countries with the most publications are The United States of America (USA) (275), Australia (48), Sweden (28), Iran (27), and Peoples R China (21).

The number of publications per year is given in Figure 2. Accordingly, it was determined that motivational interviewing studies in the field of nursing first started in 1998 and, started to increase after 2005 and peaked in 2019. Articles published in WoS were mostly published in 2019 (49 articles) and 2021 (47 articles) (Figure 2).

The 564 publications examined were published in 139 different journals. The journal-based distribution of publications showed that the Journal of Clinical Nursing had the most publications (30 publications), followed by the Journal of Advanced Nursing (25 publications), the Journal of Addictions Nursing (18 publications), and the Journal of Cardiovascular Nursing (17 publications) (Figure 3).

Citation analysis on publications accessed through WoSCC constitutes the first step of bibliometric analysis. This results in a basic science mapping analysis that reveals the intellectual connections between studies (Appio, Cesaroni, & Di Minin, 2014). When measuring the impact of a study, it is one of the most objective methods to identify the most effective studies by determining the number of citations it receives (Stremersch, Verniers, & Verhoef, 2007). Table 1 shows the citation counts of the 10 most cited publications. The two most cited articles are Motivational Interviewing to Increase Physical Activity in Long-term Cancer Survivors: A Randomized Controlled Trial (155 citations) (Bennet, Lyons, Winters-Stone, Nail, & Scherer, 2007) and Translating the Diabetes Prevention Program to Primary Care A Pilot Study (131 citations) (Whittemore, Melkus, Wagner, Dziura, Northrup, & Grey, 2009) (Table 1).

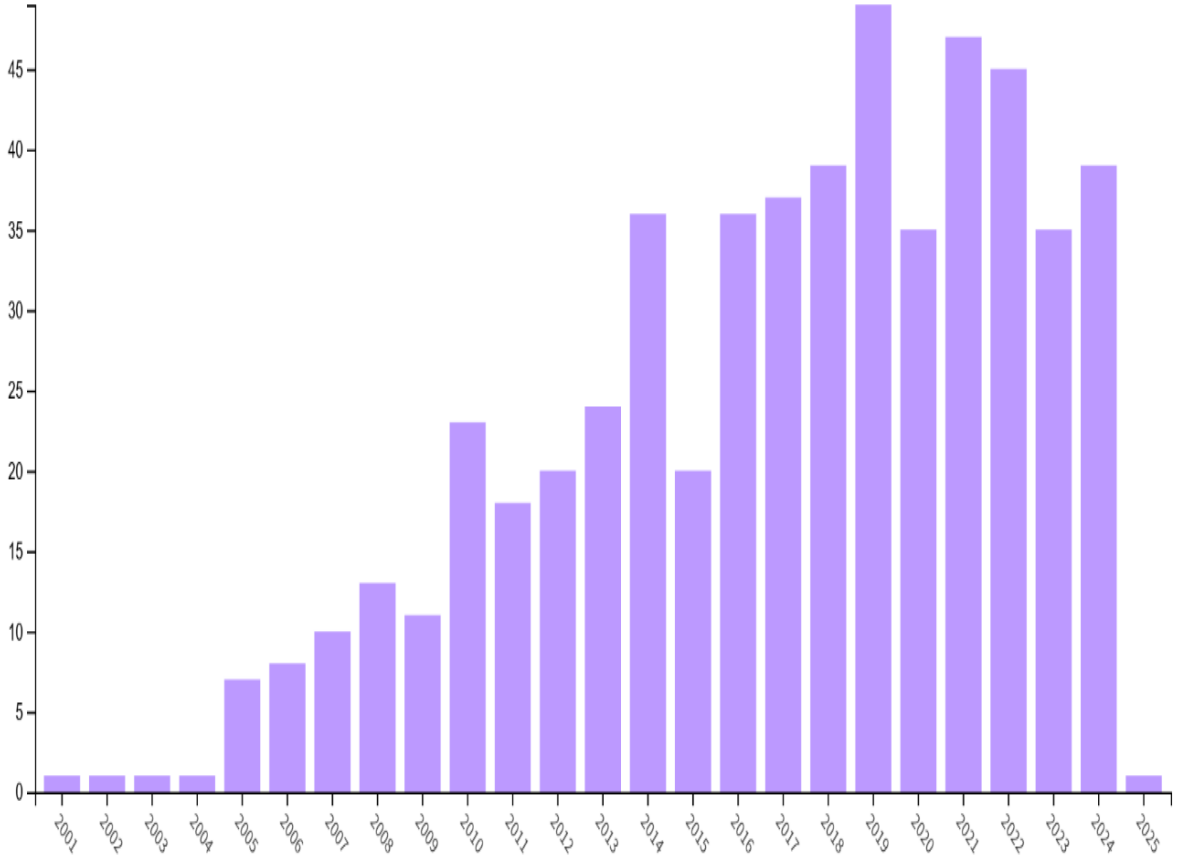

Figure 2. The number of publications which are about motivational interviewing in nursing in the WoS database, in English, per year.

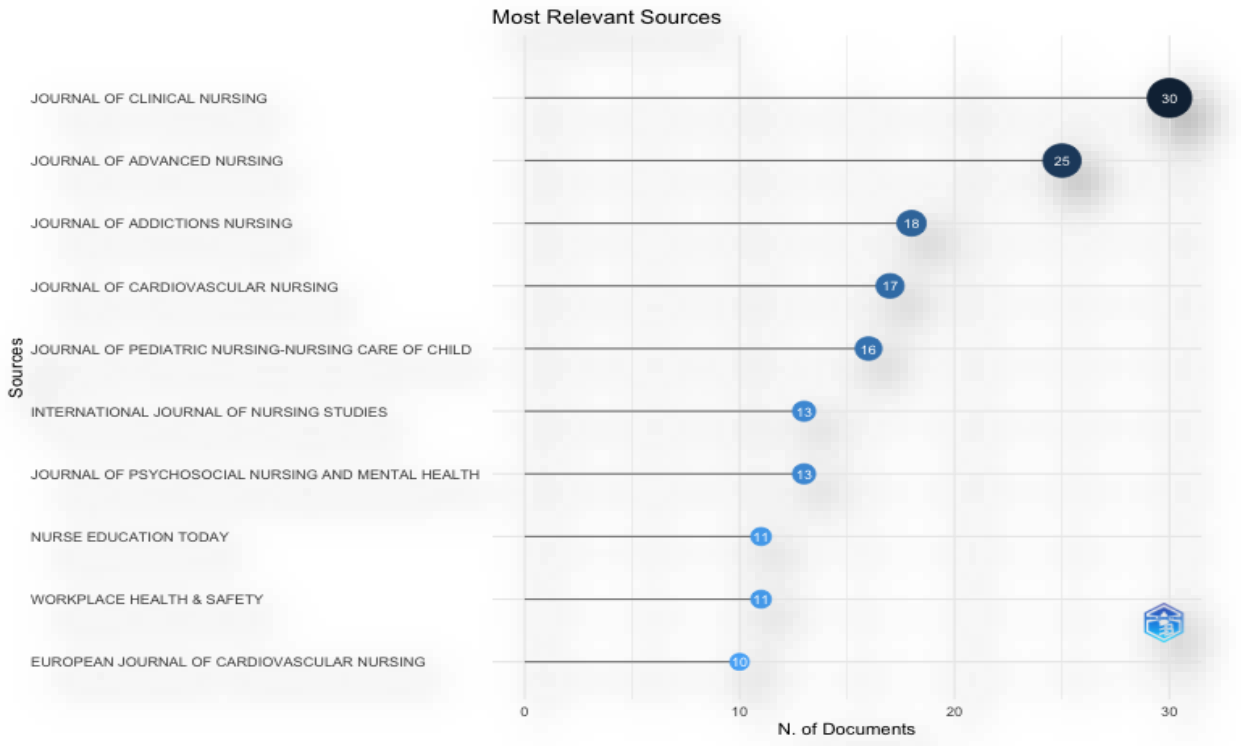

Figure 3. Most published journals which are about motivational interviewing in nursing in the WoS database, in English, between 1998 and 2025.

Figure 4. Word cloud of publications which are about motivational interviewing in nursing in the WoS database, in English, between 1998 and 2025.

Table 1. Most cited articles. *

Author(s) and year of publication	Publication Title	Journal name	Total citation
Bennett, J. A., Lyons, K. S., Winters-Stone, K., Nail, L. M., & Scherer, J. (2007)	Motivational Interviewing to Increase Physical Activity in Long-Term Cancer Survivors: A Randomized Controlled Trial	Nursing Research	155
Whittemore, R., Melkus, G., Wagner, J., Dziura, J., Northrup, V., & Grey, M. (2009)	Translating the Diabetes Prevention Program to Primary Care: A Pilot Study	Nursing Research	131
Chen, S. M., Creedy, D., Lin, H. S., & Wollin, J. (2012)	Effects of Motivational Interviewing Intervention on Self-management, Psychological and Glycemic Outcomes in Type 2 Diabetes: A Randomized Controlled Trial	International Journal of Nursing Studies	121
Brodie, D. A., & Inoue, A. (2005)	Motivational Interviewing to Promote Physical Activity for People with Chronic Heart Failure	Journal of Advanced Nursing	120
Chang, S. J., Choi, S., Kim, S. A., & Song, M. (2014)	Intervention Strategies Based on Information-Motivation- Behavioral Skills Model for Health Behavior Change: A Systematic Review	Asian Nursing Research	112
Thomas, M.L. RN, Elliott, J.E., Rao, S.M., Fahey, K.F., Paul, S.M., and Miaskowski, C. (2012)	A Randomized, Clinical Trial of Education or Motivational- Interviewing- Based Coaching Compared to Usual Care to Improve Cancer Pain Management	Oncology Nursing Forum	104
Levensky, E. R., Forcehimes, A., O'Donohue, W. T., & Beitz, K. (2007)	Motivational Interviewing	The American Journal of Nursing	99
Brodie, D. A., Inoue, A., & Shaw, D. G. (2008)	Motivational Interviewing to Change Quality of Life for People with Chronic Heart Failure: A Randomized Controlled Trial	International Journal of Nursing Studies	88
McDowell, M., Cain, M.A., & Brumley, J. (2019)	Excessive Gestational Weight Gain	Journal of Midwifery & Women's Health	87
Zhang, Q., Li, F., Zhang, H., Yu, X., & Cong, Y. (2018)	Effects of Nurse-Led Home-Based Exercise & Cognitive Behavioral Therapy on Reducing Cancer-Related Fatigue in Patients with Ovarian Cancer During and After Chemotherapy: A Randomized Controlled Trial	International Journal of Nursing Studies	86
Thompson, D. R., Chair, S. Y., Chan, S. W., Astin, F., Davidson, P. M., & Ski, C. F. (2011).	Motivational Interviewing: A Useful Approach to Improving Cardiovascular Health?	Journal of Clinical Nursing	85

**It was conducted by considering English studies between 1998-2025.*

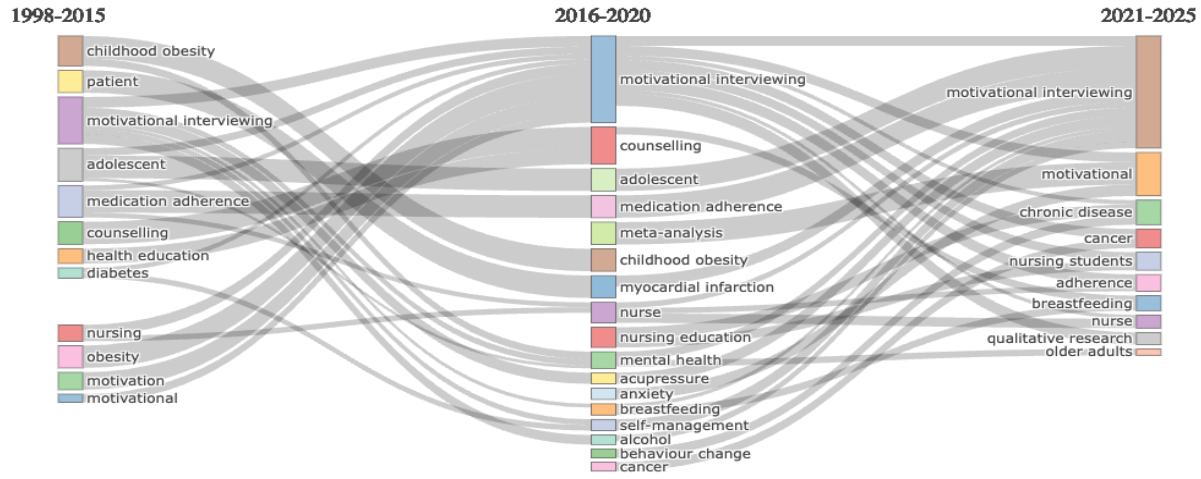

Figure 5. Thematic evaluation of publications which are about motivational interviewing in nursing in the WoS database, in English, between 1998 and 2025.

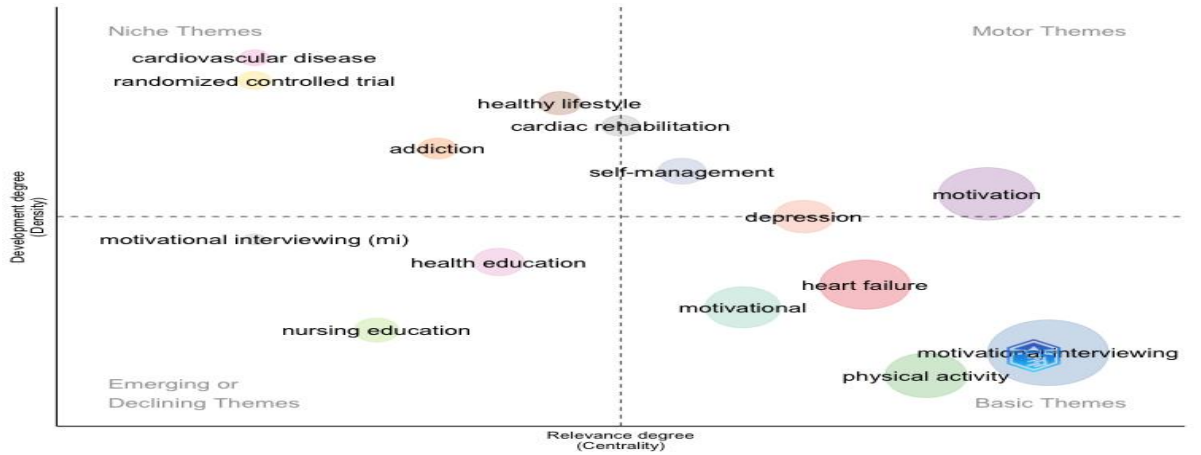

Figure 6. Thematic map of publications which are about motivational interviewing in nursing in the WoS database, in English, between 1998 and 2025.

The unit of analysis for a common word, one of the science mapping techniques, is "words." Unlike other bibliometric techniques, common word analysis examines the actual content of the publication (Baker, Pandey, Kumar, & Haldar, 2020). The use of word clouds in common word analysis shows in which areas most of the studies are concentrated. In addition, words written in smaller letters are important for further research as they indicate potential study directions (Mulay, Joshi, & Chaudhari, 2020). A word cloud visualization of author keywords (50) that are frequently and repeatedly used in motivational interviewing research in nursing is presented in Figure 4. As the frequency of words increases, they appear bigger in the word cloud. As indicated in Figure 4, the most frequent author keywords were motivational nursing (134 times), nursing (45 times), motivational (32 times), heart failure and motivation (21 times), nurses and physical activity (18 times), obesity and smoking cessation (17 times), communication, exercise and health promotion (16 times) (Figure 4).

Figure 5 shows the thematic evolution of keywords in three stages. The number of studies was taken into account when determining the year ranges. Thematic evolution analysis was used to explore the evolutionary relationships and trends of the thematic context. In this way, it allows us to explore the evolutionary trends of the studies and constructs considered in the Thematic evolution analysis (Guleria & Kaur, 2021). Figure 5 shows the correlation between different themes and their evolution, with a time span of approximately 28 years divided into three phases: 1998-2015, 2016-2020, and 2021-2025. The number of studies was taken into account when determining the stages. The most

frequently used keywords are "motivational interviewing," "nursing," "motivational," and "smoking cessation" between 1998-2015; "motivational interviewing," "motivational," "nursing," and "physical activity" between 2016-2020; "motivational interviewing," "nursing," "motivational," and "heart failure" between 2021-2025. In recent years, such keywords as "chronic disease," "cancer," "nursing students, "adherence" and "breastfeeding" were growing gradually popular (Figure 5).

The clouds in the above-mentioned Figure 6 represent a network cluster. The centrality and density of the themes are taken as a basis when determining the location of the cloud. During the analysis, in the edge betweenness clustering algorithm, one label was determined for each cluster, the minimum cluster frequency was seven, and the label size was 0.6. The 100 most frequently used author keywords were included in the analysis. As shown in Figure 6, the thematic map was constructed based on author keywords and was mapped into four themes: niche (left top), motor (top right), emerging or declining (left bottom), and basic themes (right bottom). Motor themes show the higher centrality and most relevant and include self-management and motivation. Niche themes that are not centralized but studied intensively include cardiovascular disease, randomized controlled study, healthy lifestyle, and addiction. In addition, emerging and declining foundations reflect themes that have just emerged or disappeared. These themes include motivational interviewing, health education, and nursing education. Basic themes show a higher intensity, but in terms of development level, it is behind motor themes. These themes include motivational interviewing, motivational, heart failure, and physical activity (Figure 6).

DISCUSSION

In order to assess the efficiency of care, the process of nursing focuses on individuals' behavioral changes. Therefore, there is a correlation between motivational interviewing techniques and the process of nursing. This study examined the scientific works published within the nursing category related to motivational interviewing via the bibliometric analysis method. Thus, the study intended to create a database for further research related to motivational interviewing in nursing areas and to identify gaps in the literature.

The results of the study demonstrated the scientific works were most frequently published on the dates 1998-2025. Motivational interviewing was first developed by Rollnick and Miller in 1995 on addicts' resistance to classical approaches (Rollnick & Miller, 1995). In this regard, the fact that the first study was published in 1998 indicates motivational interviewing techniques were rapidly put into practice. In addition, studies started to increase in 2005 and peaked in 2019. However, the decline in 2020 is noticeable. This may be due to the impact of the Covid-19 pandemic on academic studies.

Articles published in WoS were mostly published in 2019 (48 articles) and 2021 (47 articles). Number of publications is a significant indicator of scientific productivity (Scott, Profetto-McGrath, Estabrooks, Winther, Wallin, & Lavis, 2010). The fact that the number of scientific articles regularly escalates in a field helps enrich the literature and adds to the formation of extensive literature related to the field (Tekneci, 2013). This might refer to an increase in the use of motivational interviewing in the field of nursing, which can be interpreted as a significant finding for enrichment of the field.

The results of our study demonstrated countries that publish the biggest number of scientific works are consecutively the USA, Australia, Sweden, Iran, and Canada. However, it was seen that these works could not be disseminated worldwide and remained limited. Thus, conducting these studies in more countries is recommended, which would provide cultural variety for the use of motivational interviewing in the field of nursing.

The number of citations also provides significant data for the contribution of a study to the scientific field and its academic effect (Ahmad, Dummer, Chaudhry, Rashid, Saif, & Asif, 2019). A high number of citations of a study is usually considered to be a sign of better quality (Bornmann, Schier, Marx, & Daniel, (2012). Hack, Crooks, Plohman, & Kepron (2010) assert while a study receiving more than 100 citeds can be labeled as a "perfect article" a study that receives more than 159 citeds should be considered an "extraordinary article" (Hack et al., 2010). It is presently clear that in nursing, there are six articles about motivational interviewing that received more than 100 citations. Thus, it can be suggested that more qualitative studies regarding motivational interviewing are needed in the field of nursing. Our study demonstrated the articles receiving the biggest number of citations were on increasing physical activity (Brodie & Inoue, 2005; Bennet et al., 2007) and patients of diabetes (Whittemore et al., 2009; Chen et al., 2012). It is stated that motivational interviewing techniques are used in children, adolescents, and adult groups for the management of diabetes (including diet, physical activity, pharmacological compliance, and blood glucose control) (Salimi, Momtazi, & Zenuzian, 2016).

It was found in our study that most of the ten articles that received the biggest number of citeds consisted of randomized controlled studies and systematic reviews. Tahamtan, Safipour Afshar, & Ahamdzadeh (2016) suggested as methodology and study design affect the number of citations, the number of citations of randomized controlled studies with meta-analysis and systematic reviews is even higher. Conducting studies with case control, randomized control and meta-analysis in the future will increase level of evidence regarding motivational interviewing.

Moreover, it was seen that the journals possessing the biggest number of publications related to motivational interviewing is Journal of Clinical Nursing. This journal, whose impact factor is very high, is one that publishes evidence-based nursing articles in the field of practical nursing training. The second of those publishing the biggest number of articles is Journal of Advanced Nursing. This is a journal with high sphere of SJCR (Scimago Journal & Country Rank) where clinical nursing studies are published. This finding can be interpreted as motivational interviewing is popular in the field of nursing.

Keywords used in scientific works give clues about the research topic. Their use in scientific works gives clues about the topics concentrated in the literature (Kantek et al., 2019). The most frequently used keywords in our study are "nursing," and "motivational interview". In addition to these, the other most frequently used keywords are "motivational," "heart failure," "obesity," and "physical activity." Motivational interviewing, which was first developed by Rollnick and Miller in 1995 on the resistance of addicted people to classical approaches, uses effective communication techniques to promote health (Dashti, Yousefi, Maghsoudi, & Etemadifar, 2016; McCambridge & Cunningham, 2013; Rollnick & Miller, 1995). In the reviewed literature, it is seen that motivational interviewing techniques are also effectively applied to health issues such as alcohol and drug adherence, increasing exercise, smoking cessation, and weight loss (Kızılırmak & Demir, 2018). This is thought to be due to the structure of motivational interviewing techniques focusing on behavioral change.

Motivational interviewing is a person-centered, guiding method to increase intrinsic motivation for change by exploring and resolving ambivalence. In this way, it increases the patient's self-confidence in their ability to cope with obstacles and succeed in change (Rollnick & Miller, 1995; Miller & Rollnick, 2002). In our research, it was concluded that the themes of 'self-management' and 'motivation' are one of the main focus points of motivational interviewing. The results that motivational interviewing is effective in improving self-efficacy and self-management in some chronic diseases support our findings (Evcimen, Uncu, & Esen, 2021; Song, Xu, & Sun, 2014). This is due to the fact that the individual's effort to discover his/her internal self-efficacy and self-management in problematic behavior or disease overlaps with the nature of motivational interviewing.

When the studies on motivational interviewing in nursing are examined by years, the themes of "childhood obesity" and "drug addiction" come to the fore in the first years. In the following years, the theme of "counseling", and in recent years, the themes of "chronic diseases", "nursing students", "pregnant women" and "cancer" have been studied more. In recent years, it has been reported that the disease management of individuals with chronic diseases has become difficult and psychological stress levels have increased with the effect of the pandemic period (İncirkuş & Altan Sarıkaya, 2023). The use of some educational intervention methods (psychoeducation, etc.) in motivational interviewing is ideal for a solution-oriented approach (Dicle, 2021). The change in themes is thought to be due to the increasing importance of educational approaches to chronic diseases in recent years. In addition, the increase in the themes of "breastfeeding" and "nursing students" in recent years can be interpreted as the fact that motivational interviewing has started to be studied not only on pathologies but also on healthy individuals. This shows that the areas of use of motivational interviewing are expanding. In addition, it can be said that the acceleration of clinical research in recent years will contribute to future studies with the high level of evidence in the field of motivational interviewing.

When the themes that maintain the centrality of motivational interviewing techniques, although not intensively studied, are examined, cardiovascular diseases, randomized controlled trials, healthy lifestyle, and addiction themes draw attention. According to the results of the National Survey on Substance Use and Health, it is reported that smoking, alcohol and substance use are increasing. Therefore, combating addiction and treatment methods for addiction gain importance, which confirms our findings (Substance Abuse and Mental Health Services Administration, 2021). It is thought that studies on these themes will fill the gap in the literature. In addition, the trend of decreasing or increasing use of health education and nursing education themes should be investigated. Using motivational interviewing techniques in nursing education and teaching this method to future nurses is effective in gaining professional care behavior (Kahraman & Malak Akgün, 2022). Therefore, it is thought that applying nursing education and health education themes in motivational interviewing techniques with different methods in different samples will increase the quality of nursing care.

Study Limitations and Strengths

Although the study is highly significant for it was the first research that examined motivational interviewing in the category of nursing, it also has certain limitations. The limitations of the research are that no other database other than the WoS database was analyzed, only research and review articles were taken, and SSCI, SCIE and ESCI indexes were included. Another limitation of the study is that only articles published in English were included.

CONCLUSION

This study portrayed a data network of studies related to motivational interviewing in the field of nursing. It was found that compared to 1998, when publications first emerged, their number is on the rise and

scientific works were most published on the dates 2019-2021. It is seen that motivational interviewing studies in the field of nursing are mostly used in nursing education and health education. While motivational interviewing was applied in cases of illness and problematic behavior in previous years, today it is also applied in breastfeeding and healthy individuals. It was also found that in the field of nursing, there were only six articles related to motivational interviewing which cited more than 100. Therefore, it can be asserted more qualified works on motivational interviewing in the field of nursing are needed. Moreover, it is essential that nurses and nurse researchers recognize and apply motivational interviewing techniques.

Acknowledgement
None

Conflict of Interest
The author declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Author Contributions
Plan, design: SCO, FSK; **Material, methods, and data collection:** SCO, FSK; **Data analysis and comments:** SCO, FSK; **Writing and corrections:** SCO, FSK.

Funding
The author(s) received no financial support for the research.

Ethical Approval
Since the study is in the literature review model, it has no direct effect on humans and/or animals. Therefore, an ethics committee approval decision is not required.

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ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1651227

Evaluation of Orthodontic Treatment Needs and Dental Aesthetic Appearance of Individuals with Periodontal Disease According to DAI, ICON, IOTN Indices

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Geliş Tarihi / Received: *04.03.2025,* ***Kabul Tarihi / Accepted:*** *10.05.2025*

ABSTRACT

Objective: Malocclusion is a condition that negatively affects individuals' quality of life and is characterized by deviations in the ideal alignment of the teeth. Orthodontic anomalies and periodontal diseases can interact with each other. This study aims to evaluate the need for orthodontic treatment in individuals with periodontal disease.

Materials and Methods: The study included 150 patients who presented with periodontal disease complaints at the Department of Periodontology, Faculty of Dentistry, Atatürk University. Participants' periodontal status was assessed using the bleeding index, pocket depth, and DMFT index. Orthodontic treatment need was determined using the ICON (Index of Complexity, Outcome and Need), DAI (Dental Aesthetic Index), and IOTN (Index of Orthodontic Treatment Need) indices.

Results: Among the patients, 36.7% were classified as having severe malocclusion according to the ICON index, 60.7% according to the DAI index, and 38.6% according to the IOTN index. Additionally, gingivitis was detected in 82.7% of the participants. A statistically significant correlation was found between age and bleeding index, DMFT, DAI, and IOTN indices, as well as between DMFT and ICON indices ($p<0.05$).

Conclusion: Orthodontic problems were found to be prevalent among patients seeking periodontal treatment. This finding highlights the importance of considering orthodontic evaluation alongside periodontal health and underscores the need to raise awareness in society regarding this relationship.

Keywords: Index of orthodontic treatment need, Malocclusion, Periodontal diseases.

Periodontal Hastalığı Olan Bireylerde Ortodontik Tedavi İhtiyacının ve Diş Estetik Görünümünün DAI, ICON, IOTN İndekslerine Göre Değerlendirilmesi

ÖZ

Amaç: Maloklüzyon, bireylerin yaşam kalitesini olumsuz etkileyen ve dişlerin ideal dizilimden sapmasıyla karakterize edilen bir durumdur. Ortodontik anomaliler ve periodontal hastalıklar karşılıklı etkileşim gösterebilir. Bu çalışmada, periodontal hastalığı olan bireylerde ortodontik tedavi ihtiyacının değerlendirilmesi amaçlanmıştır.

Gereç ve Yöntemler: Çalışmaya, Atatürk Üniversitesi Diş Hekimliği Fakültesi Periodontoloji Anabilim Dalı'na periodontal hastalık şikayetiyle başvuran 150 hasta dahil edildi. Katılımcıların periodontal durumu; kanama indeksi, cep derinliği ve DMFT indeksi ile değerlendirildi. Ortodontik tedavi ihtiyacı ise ICON (Index of Complexity, Outcome and Need), DAI (Dental Aesthetic Index) ve IOTN (Index of Orthodontic Treatment Need) indeksleri kullanılarak belirlendi.

Bulgular: Hastaların %36,7'si ICON, %60,7'si DAI ve %38,6'sı IOTN indeksine göre şiddetli maloklüzyon grubunda yer aldı. Ayrıca, %82,7'sinde gingivitis saptandı. Yaş ile kanama indeksi, DMFT, DAI ve IOTN indeksleri arasında ve DMFT ile ICON arasında istatistiksel olarak anlamlı korelasyon bulundu ($p<0.05$).

Sonuç: Periodontal tedaviye başvuran hastalarda ortodontik problemlerin yaygın olduğu tespit edilmiştir. Bu bulgu, ortodontik değerlendirme ve periodontal sağlığın birlikte ele alınmasının önemini vurgulamakta, toplumun bu konuda bilinçlendirilmesi gerektiğini göstermektedir.

Anahtar Kelimeler: Ortodontik tedavi ihtiyacı indeksi, Malokluzyon, Periodontal hastalıklar.

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Bu makaleye atıf yapmak için / Cite this article: Özen, G. Y., Özen, A. K., Özgenç, G., Özkan Karasu, Y., & Kasali, K. (2025). Evaluation of orthodontic treatment needs and dental aesthetic appearance of individuals with periodontal disease according to DAI, ICON, IOTN Indices. *BAUN Health Sci J, 14*(2), 352-356. https://doi.org/10.53424/balikesirsbd.1651227

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

While the World Health Organization (WHO) defines health as 'a state of complete physical, social and mental well-being, not merely the absence of disease or infirmity', if malocclusion prevents the individual from being peaceful due to psychosocial (dentofacial aesthetics or impairment of self-esteem) or physical reasons (functional impairment), the individual cannot be considered healthy (Bellot-Arcís et al., 2012). Malocclusion can be defined as the deviations of the teeth located in the upper and lower jaw bone from the ideal both within the jaw in which they are located and mutually (between the jaws), being located outside the arch, being cramped and / or crowded (Ülgen, 2001). Together with genetic and environmental factors, malocclusions can affect the development and appearance of the jaw and facial area. Malocclusions can be seen as an important public health problem because they negatively affect the social and psychological well-being and quality of life of individuals.

Orthodontics is the branch of science that analyses the dental, maxillofacial and facial system and makes diagnosis and treatment planning by taking into account growth and development (Gülyurt, 1984). The aim of this treatment is to provide a permanent and balanced occlusal relationship and harmonious facial aesthetics (Hassan, 2006). Orthodontic malocclusions were first studied by Angle in 1899 (Angle, 1899). Many studies have been conducted on malocclusions, their prevalence, treatment needs and/or priorities (Ackerman & Proffit, 1969; Angle, 1899; Frankel, 1951; Gravely & Johnson, 1974; Katz, 1978).

The need for orthodontic treatment has been an important factor in the development of orthodontic indices (Hamdan, 2004). These indices have been developed to be used in classification according to the level of treatment need, in the post-treatment follow-up process and in various epidemiological studies (Kazancı & Ceylan, 2010).

Periodontology is a branch of science that studies the surrounding tissues of the tooth, the diseases of these tissues and their treatment methods (Ansari et al., 2018; Hoffman, 1966). Periodontal health is defined as the absence of inflammatory periodontal disease and/or clinical signs of these diseases (Tonetti & Sanz, 2019). Gingivitis is the mildest course and is caused by microbial dental plaque (Newman et al., 2011), while periodontitis is the state of advanced periodontal destruction (Kinane, 2001).

Patients presenting to the clinic for orthodontic treatment do not always have ideal periodontal health. These patients have many periodontal problems ranging from mild to severe (Uludağ & Çağla, 2014). Periodontal problems may occur during and after orthodontic treatment (Murakami et al., 1989), and an existing orthodontic problem may cause periodontal problems without treatment (El-Mangoury et al., 1987). Malocclusions may cause individuals to be unable to establish adequate oral hygiene, no matter how much attention they pay to their oral hygiene. In this case, periodontal problems may occur, sometimes with or without being aware of the malocclusion.

In our study, we aimed to determine whether there is a relationship between the need for orthodontic treatment and periodontal problems of patients who applied to the clinic for the treatment of periodontal problems.

MATERIALS AND METHODS

Study type

This study was conducted in the clinic of the Department of Periodontology, Clinical Sciences Division, Faculty of Dentistry, Atatürk University, through patient evaluations during December 2024 and January-February 2025.

Study group

Our study was carried out on 150 patients who applied to Atatürk University Faculty of Dentistry, Department of Periodontology for the treatment of periodontal problems.

As inclusion criteria;

- Not having orthodontic treatment,
- Not having any systemic disease,
- Not having undergone any periodontal treatment,
- To have received oral hygiene training,
- Having a daily tooth brushing habit was determined.

Dependent and independent variables

ICON, DAI, IOTN, DMFT, periodontal disease, bleeding index and pocket depth records were obtained from each patient before starting periodontal treatment.

Procedures

Indices used in our study;

Index of Complexity, Outcome and Need (ICON): It is an index developed by Daniels and Richmond (Daniels & Richmond, 2000) to evaluate treatment difficulty, need and results.

Index of Orthodontic Treatment Need (IOTN): The index developed by Brook and Shaw (Brook & Shaw, 1989) is a combination of the Swedish (Linder-Aronson, 1974) and SCAN (Evans & Shaw, 1987) indices.

Dental Aesthetic Index (DAI): Cons et al. (Cons et al., 1989) It is an orthodontic index based on socially aesthetic perception.

DMFT Index (Decayed, Missing, and Filled Permanent Teeth): It is defined as the total number of decayed, missing, and filled teeth (Petersen et al., 2005).

Periodontal Disease: As a result of clinical examination by the periodontologist, the disease present in individuals will be determined. e.g. gingivitis, peridontitis

Bleeding Index: It is the index formed by evaluating the bleeding that occurs as a result of gingival probing with the help of periodontal probe.

Age: The chronological age of the individuals will be taken as basis.

Statistical analysis

Statistical analyses were performed with IBM SPSS 20 statistical analysis programme. Data were presented as mean, standard deviation, median, minimum, maximum, percentage and number. In the comparison of two quantitative variables, Pearson correlation was used if the normal distribution condition was met and Spearman correlation test was used if not. Statistical significance level was taken as $p<0.05$.

Ethical approval

Our study was accepted in accordance with the ethical rules with the letter numbered 80576354-050-99/597 of Kafkas University Faculty of Medicine Ethics Committee.

RESULTS

In the demographic analysis of our study, 54% of the randomly selected patients were female and 46% were male (Table 1).

Table 1. Gender grouping.

Gender Grouping	n	Column N %
Female	81	54.00%
Male	69	46.00%

n: Count, **%:** Column percentage.

Gingivitis was present in 82.7% and periodontitis in 17.3% of the randomly selected patients (Table 2).

A statistically significant and low power positive correlation was found between age and bleeding index and DMFT index ($p<0.05$), a statistically significant and low power negative correlation was found between ICON and IOTN index ($p<0.05$) (Table 3).

Table 2. Gingival disease status.

Gingival Disease Status	n	Column N %
Gingivitis	124	82.70%
Periodontitis	26	17.30%

n: Count, **%:** Column percentage.

There was a statistically significant and low strength negative correlation between DMFT index and ICON index ($p<0.05$) (Table 3).

There was a statistically significant and positive (medium-high power) correlation between ICON index and DAI and IOTN indices ($p<0.05$) (Table 3).

There was a statistically significant and positive correlation between DAI index and IOTN index ($p<0.05$) (Table 3).

According to the ICON index, 63.3% of the patients did not require treatment, while 36.7% required orthodontic treatment (Table 4).

According to the IOTN index, 19.3% of the patients did not need treatment, 16% needed little treatment, 26% were borderline cases, 33.3% needed treatment and 5.3% needed serious treatment (Table 5).

According to the DAI index, 27.3% of the patients had normal or minor malocclusion, 12% had definite malocclusion, 16.7% had severe malocclusion and 44% had obstructive malocclusion (Table 6).

Table 3. Correlation analysis between the measurements used.

Correlations		Periodontal pocket depth	Bleeding Index	DMFT Index	ICON Index	DAI Index	IOTN Index
Age	r	0.221**	0.230**	0.234**	-0.274**	-0.104	-0.256**
	p	0.007	0.005	0.004	0.001	0.206	0.002
Periodontal pocket depth	r	1	0.534**	-0.036	0.016	-0.003	0.036
	p		0.000	0.660	0.842	0.970	0.662
Bleeding Index	r		1	0.145	-0.045	-0.052	0.038
	p			0.076	0.583	0.531	0.647
DMFT Index	r			1	-0.163*	-0.066	-0.043
	p				0.046	0.425	0.602
ICON Index	r				1	0.604**	0.715**
	p					0.000	0.000
DAI Index	r					1	0.643**
	p						0.000

** Correlation is significant at the 0.01 level (2-tailed), * Correlation is significant at the 0.05 level (2-tailed).

Table 4. Treatment necessity according to ICON index.

Necessity of treatment according to ICON index	Count	Column N%
No need for treatment	95	63.30%
Need for treatment exists	55	36.70%

Table 5. Treatment grading according to IOTN index.

Rating according to the IOTN index	Count	Column N %
1	29	19.30%
2	24	16.00%
3	39	26.00%
4	50	33.30%
5	8	5.30%

1: No need for treatment 2: Little need 3: Borderline case 4: Treatment required 5: Treatment required (severe).

Table 6. Malocclusion grading according to the DAI index.

Rating according to the DAI index	Count	Column N %
1	41	27.30%
2	18	12.00%
3	25	16.70%
4	66	44.00%

1: 25 and below; normal or minor malocclusion. No need for treatment
2: 26-30; definite malocclusion. Optional need for treatment
3: 31-35; severe malocclusion. Treatment need
4: 36 and above; disabling malocclusion. Great need for treatment.

DISCUSSION

Due to the insufficient number of dentists per capita in our society in spite of the increasing population, it is necessary to use the available resources correctly, carefully and diligently. This situation becomes even more evident when it comes to specialised procedures and main branches of science.

Gum disease is a common problem that causes aesthetic and functional problems affecting the oral health of the individual. It is thought that this situation may have an effect on dental aesthetic perception and orthodontic treatment.

While tooth position distortions and occlusal distortions lead to deterioration of periodontal health and thus increase the need for orthodontic treatment, globally validated indices such as ICON, IOTNI DAI play an important role in objectively determining the need for treatment.

According to the results of our study, significant and positive correlations were found between DAI, IOTN and ICON indices; the need for orthodontic treatment was determined as 63.30% according to ICON index, 38.6% according to IOTN index, while the rate of severe and obstructive malocclusion was determined as 60.7% according to DAI index.

Zhang et al. showed that the rate of orthodontic treatment need evaluated by using different occlusion indices varied and this suggests that the rate of individuals determined to need orthodontic treatment will vary depending on the occlusion indices used (Zhang et al., 2009).

Perillo et al. reported that the need for treatment was 27% according to the IOTN index in a patient population with an age group of 12 years (Perillo et al., 2010), while Ferreria reported that the need for treatment was 75% according to the ICON index and 94% according to the IOTN index (Ferreira, 2005).

In general, it can be concluded that it is acceptable to have different results due to the different age distribution of the study groups and the indices used. Kerosuo et al. reported that the need for orthodontic treatment was low when the age groups were different, but the need for treatment was high in patients who applied for orthodontic treatment (Kerosuo et al., 2004).

Individuals may not perceive the need for treatment as much as a periodontist or orthodontist. In some cases, they may feel periodontal and orthodontic problems more severe than they are psychologically. In this regard, Helm et al. reported that the anxiety of individuals increased especially with disorders in the anterior region teeth (Helm et al., 1986), while Sheats et al. reported that the rate of discomfort from dental appearance was higher in women than in men (Sheats et al., 1998).

Akpınar et al. reported that 51.9% of patients applying to periodontology clinic had gingivitis and 47.8% had periodontitis (Akpınar et al., 2012). In our study, the proportion of patients with gingivitis was determined as gingivitis in 82.7% and periodontitis in 17.3%. The different results may be attributed to the difference in the number of people in the studies.

Vidaković et al. reported that DAI and ICON indices showed moderate agreement in the evaluation of malocclusion severity scores and the assessment of the severity of malocclusion (Vidaković et al., 2018).

Farahani et al. reported that, in general, ICON has a lower need for treatment compared to IOTN (Farahani & Eslamipour, 2010).

Study Limitations and Strengths

One of the limitations of the study is the cross-sectional design. Another limitation of the study is the small patient sample. The main strengths of this study are that pre-validated survey instruments were used to measure the study outcomes and the data analysis technique used addressed the clustered nature of the data and controlled for potential confounders.

CONCLUSION

It was determined that 36.70% of the randomly selected patients had gingivitis according to the ICON index, 60.7% of the group with severe malocclusion (3-4) according to the DAI index, and 38.60% of the group requiring orthodontic treatment (4-5) according to the IOTN index. 82.70% of the patients had gingivitis. Statistically significant correlations were determined between age and bleeding index, DMFT index, DAI and IOTN indexes, and between DMFT index and ICON index ($p<0.05$). According to the results obtained, it was determined that the majority of the patients who applied to the periodontology department with the need for treatment had orthodontic problems and the society should be more aware of this issue.

Acknowledgement

The authors would like to extend their sincere thanks to anyone who contributed to this study.

Conflict of Interest

The author declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Author Contributions

Plan, design: GYÖ, AKÖ, YÖK; **Material, methods and data collection:** GYÖ, GÖ, YÖK; **Data analysis and comments:** KS; **Writing and corrections:** GYÖ, AKÖ.

Funding
None.

Ethical Approval
Institution: Kafkas University Faculty of Medicine Ethics Committee
Date: 27.11.2024
Approval no: 80576354-050-99/597

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ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1664226

The Effect of Motivational Interviewing Counselling on Smoking Urge and Cessation Success Prediction in Teachers

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Geliş Tarihi / Received: *24.03.2025,* ***Kabul Tarihi / Accepted:*** *21.05.2025*

ABSTRACT
Objective: Smoking remains one of the greatest public health threats facing the world. The aim of the study was to assess the impact of Motivational Interviewing on the desire to smoke and prediction of quit success in teachers. **Materials and Methods:** This study was a randomized controlled trial. Participants consisted of 61 teachers. Motivational interviewing was conducted with 30 smoking teachers in the experimental group and 31 smoking teachers in the control group received no intervention. The Desire to Smoke Scale, Prediction of Smoking Cessation Success Scale and Sociodemographic Data Form were used as data collection tools. **Results:** In the analyses related to the Determination and Readiness Subdimension and Health Perception and Appropriate Environment Subdimension of the Smoking Cessation Success Prediction Scale, it was found that the individuals in the experimental group had higher scores than the control group ($p<0.05$). After the intervention, it was found that the scores of the individuals in the experimental group on the Desire to Smoke Scale were lower than those in the control group ($p<0.05$). **Conclusion:** Motivational Interviewing-based counseling practices should be used in routine practices in smoking cessation outpatient clinics to ensure and maintain behavioral changes. It is recommended that school health studies be conducted to increase the awareness of teachers, who are role models for healthy behaviours, about the consequences of smoking. **Trial Registration:** ClinicalTrials.gov (**Identifer** NCT05374707)
Keywords: Nursing, Smoking, Health Risk Management, Public Health Nursing.

Motivasyonel Görüşme Danışmanlığının Öğretmenlerde Sigara İçme Dürtüsü ve Bırakma Başarısı Tahmini Üzerine Etkisi

ÖZ
Amaç: Sigara, dünyanın karşı karşıya olduğu en büyük halk sağlığı tehditlerinden biri olmaya devam etmektedir. Çalışmanın amacı, öğretmenlerde Motivasyonel Görüşmenin sigara içme arzusu ve bırakma başarısı tahmini üzerindeki etkisini değerlendirmektir. **Gereç ve Yöntem**: Bu çalışma randomize kontrollü bir çalışmadır. Katılımcılar 61 öğretmenden oluşmaktadır. Deney grubundaki 30 sigara içen öğretmen ile motivasyonel görüşme yapılmış ve kontrol grubundaki 31 sigara içen öğretmene müdahalede bulunulmamıştır. Veri toplama aracı olarak Sigara İçme Arzusu Ölçeği, Sigara Bırakma Başarısı Öngörü Ölçeği ve Sosyodemografik Veri Formu kullanılmıştır. **Bulgular**: Sigara Bırakma Başarısı Öngörü Ölçeği Kararlılık ve Hazır Oluş Alt Boyutu ile Sağlık Algısı ve Uygun Ortam Alt Boyutu'na ilişkin analizlerde, deney grubundaki bireylerin kontrol grubuna göre daha yüksek puanlara sahip olduğu saptanmıştır ($p<0.05$). Müdahalenin ardından deney grubundaki bireylerin Sigara İçme Arzusu Ölçeği'ndeki puanlarının kontrol grubuna göre daha düşük olduğu saptanmıştır ($p<0.05$). **Sonuç**: Davranış değişikliklerinin sağlanması ve sürdürülmesi için sigarayı bırakma polikliniklerinde rutin uygulamalarda Motivasyonel Görüşme temelli danışmanlık uygulamaları kullanılmalıdır. Sağlıklı davranışlar konusunda rol model olan öğretmenlerin sigara kullanımının sonuçları konusunda farkındalıklarının artırılması için okul sağlığı çalışmalarının yapılması önerilmektedir. **Deneme Kaydı**: ClinicalTrials.gov (NCT05374707).
Anahtar Kelimeler: Hemşirelik, Sigara, Sağlık Risk Yönetimi, Halk Sağlığı Hemşireliği.

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Bu makaleye atıf yapmak için / Cite this article: Pasaoglu Ozturk, E., & Acil, D. (2025). The effect of motivational interviewing counselling on smoking urge and cessation success prediction in teachers. *BAUN Health Sci J, 14*(2), 357-365. https://doi.org/10.53424/balikesirsbd.1664226

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

Tobacco use the causes of preventable diseases, disabilities, premature deaths worldwide (World Health Organization [WHO], 2024). It is responsible for over eight million deaths annually, making it public health challenges of our time (WHO, 2021). Currently, there are approximately 1.1 billion smokers globally, with an estimated 19.2 million smokers in Turkey alone (Turkish Health Institutes Presidency [TÜSEB], 2021).

Initiating smoking at an early age significantly increases the likelihood of long-term nicotine dependence (Ariani et al., 2019; The Tobacco Atlas, 2021). Early smoking initiation remains a major concern, with approximately 38 million adolescents aged 13–15 worldwide using tobacco products (The Tobacco Atlas, 2021). In Turkey, over 186,000 children aged 10–14 smoke cigarettes (The Tobacco Atlas, 2021). These figures highlight the urgent need for effective smoking prevention and cessation strategies, particularly targeting key influencers such as teachers.

Teachers have a significant impact on their students' attitudes and behaviors, serving as both educators and role models (Appiah et al., 2024; Ariani et al., 2019; Perincek, 2021). Adolescents are highly impressionable, and behaviors observed in significant adults—such as parents and teachers can directly influence their decisions regarding smoking (Bobo et al., 2018). Research suggests that students who perceive smoking as socially acceptable or as a status-enhancing behavior are more likely to initiate smoking (Ariani et al., 2019; Bobo et al., 2018). Therefore, teachers who smoke may inadvertently normalize tobacco use, reinforcing permissive attitudes toward smoking among students (Perincek, 2021).

Schools are not only institutions of education but also key settings for promoting public health initiatives (Dhiman, 2023; Sağlan and Bilge, 2018). Given the influence of school staff on student health behaviors, smoking cessation interventions targeting teachers could yield substantial benefits in reducing adolescent smoking rates and fostering a smoke-free school environment (Appiah et al., 2024). However, traditional smoking cessation approaches—such as providing information and general health advice—often fail to produce long-term behavioral changes (Centers for Disease Control and Prevention [CDC], 2020).

Motivational Interviewing (MI) has emerged as an effective intervention for smoking cessation, particularly in healthcare and educational settings (Harder et al., 2020). Unlike directive counseling methods, MI is a client-centered approach that helps individuals explore their intrinsic motivations for change, increase their self-efficacy, and resolve ambivalence about quitting smoking (Arkowitz et al., 2015; Bischof et al., 2021). MI enables individuals to recognize the risks of smoking, identify the personal benefits of quitting, and develop strategies to overcome behavioral barriers (Kızılırmak and Demir, 2018).

Studies have demonstrated that MI-based smoking cessation interventions, particularly when implemented by healthcare professionals such as nurses, significantly improve cessation outcomes (Caponnetto et al., 2019a; Lavilla-Gracia et al., 2023; Lindson et al., 2019). Given the potential of MI to enhance smoking cessation success, this study intends to assess the impact of MI on smoking urges and the likelihood of quitting success among teachers.

Research Hypotheses

H1: Teachers who received Motivational Interviewing will have lower mean scores on the Questionnaire on Smoking Urges compared to the control group.

H2: Teachers who received Motivational Interviewing will have higher mean scores on the Smoking Cessation Success Prediction Scale compared to the control group.

- **H2a:** Teachers who received Motivational Interviewing will have higher mean scores on the Determination and Readiness subscales of the Smoking Cessation Success Prediction Scale compared to the control group.
- **H2b:** Teachers who received Motivational Interviewing will have higher mean scores on the Health Perception and Favorable Environment subscales of the Smoking Cessation Success Prediction Scale compared to the control group.

MATERIALS AND METHODS

Study design

This research was established as a randomized controlled trial and was done between September 2020 and September 2021. Data collection took place between May and June 2021 in secondary schools located in Yunusemre and Şehzadeler, the central districts of Manisa, Turkey. The study population consisted of all teachers working in state secondary schools within these districts (N = 1,572).

Inclusion criteria

Volunteering to participate in the research, not to have malignant disease and psychiatric problems, being a smoker, being a teacher in the schools included in the research.

Exclusion criteria

Being a teacher in schools not included in the study, having a malignant disease or psychiatric problem, not smoking, being from a profession other than teaching.

Participants

The study sample comprised teachers from six state secondary schools that had the highest number of teachers and granted permission for participation. Recruitment began in May 2021, and participants were followed for one month.

Since schools were used as the unit of randomization, three schools were designated to the experimental

group and three to the control group using Research Randomizer software. In total, 37 teachers from the experimental group schools and 39 teachers from the control group schools reported being smokers. The final study sample included 61 teachers who met the inclusion criteria, with 30 in the experimental group and 31 in the control group. A randomization scheme was created following the Consolidated Standards of Reporting Trials (CONSORT) standards (Figure 1), and teachers were assessed for eligibility. While the researcher was aware of the group assignments, a single-blind design was implemented by not informing the participating teachers of their assigned groups or the intervention status of their respective schools.

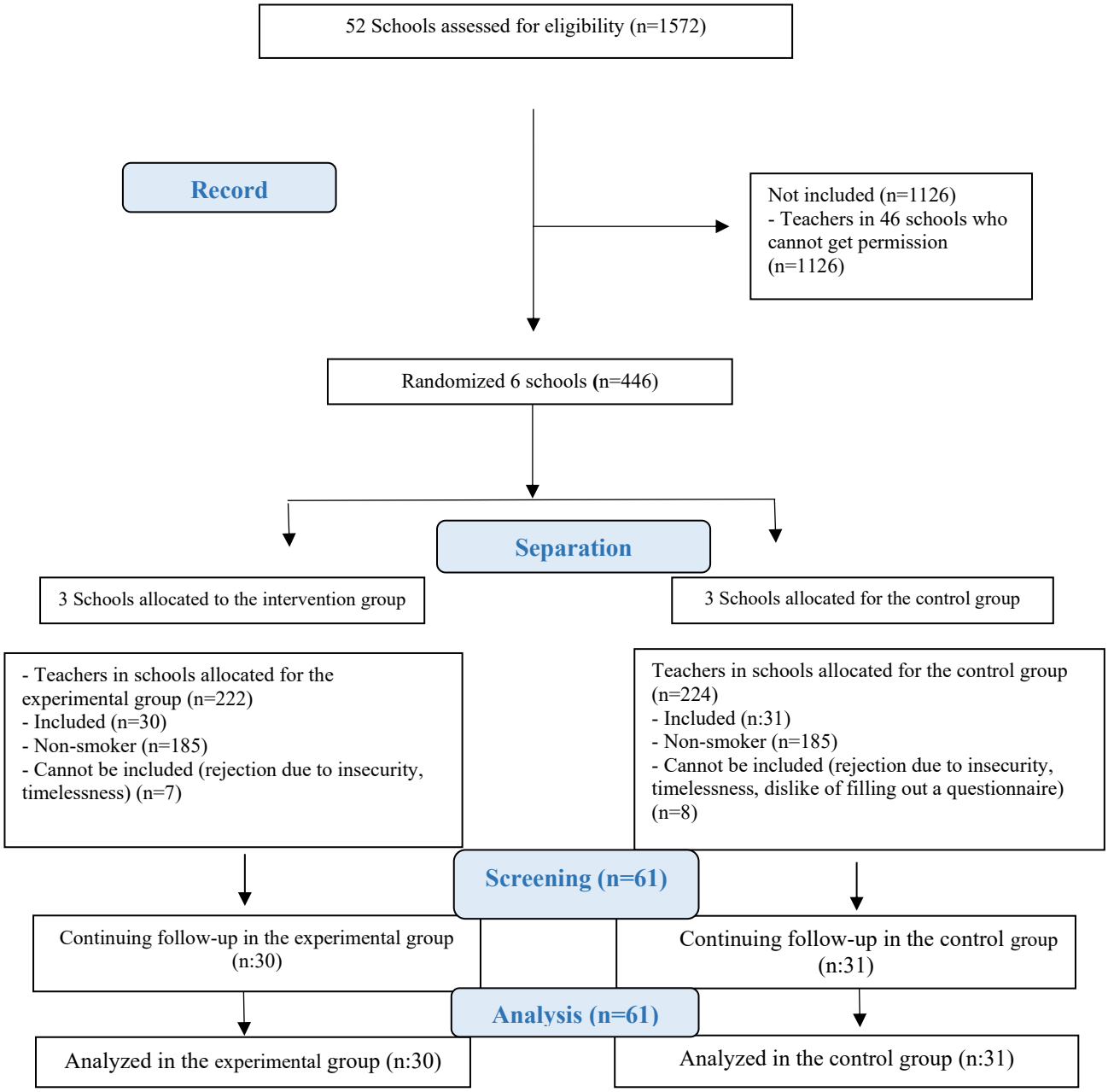

Figure 1: Randomization scheme

Using the G*Power program, the power analysis was performed, found that the study's significance level was set at p = 0.05, and its power was 0.84 at a 95% CI.

Data collection

The study utilized the Sociodemographic Form, the Questionnaire on Smoking Urges (QSU), and the Smoking Cessation Success Prediction Scale (SCSPS) to collect data from both the experimental and control groups.

Sociodemographic form

Developed by the researchers based on relevant literature, this form collected personal and smoking-related information, including gender, age, the age of

first smoking experience, reasons for initiating smoking, daily cigarette consumption, previous quit attempts, motivations for quitting, and the longest duration of abstinence (Thomeer et al., 2019).

Questionnaire on smoking urges (qsu)

tiffany and drobes (1991) created this 10-item scale is structured on a seven-point Likert scale, with ratings between 10 and 70. Higher scores indicate stronger urges to smoke, while lower scores reflect weaker urges. The original scale reported a Cronbach's alpha of 0.97 (Tiffany and Drobes, 1991). The Turkish adaptation, validated by Demirezent and Kurçer, had a Cronbach's alpha of 0.92 (Demirezent and Kurçer, 2017). In this study, The QSU's Cronbach's alpha for the was found to be 0.89.

Smoking cessation success prediction scale (SCSPS)

Developed by Aydemir et al. (2019), this scale measures the likelihood of smoking cessation success. The original version comprised 15 items, but after validity and reliability analyses, it was refined to 10 items. It includes two subscales: Determination and Readiness (items 1, 2, 6, 8, 9, and 10) and Health Perception and Favorable Environment (items 3, 4, 5, and 7)**.** Scores range from 10 to 50, with higher scores indicating a greater probability of successful smoking cessation. The original Cronbach's alpha was 0.782 (Aydemir et al., 2019), and in this study, it was found to be 0.74.

The data were collected via online questionnaires. Participants in the experimental group received a 30-minute Motivational Interviewing (MI) session**,** conducted both online and face-to-face by a single nurse researcher. A structured MI protocol was followed.

To reinforce the intervention, four reminder text messages were sent to the experimental group over one month. These messages served as motivational prompts aligned with the MI protocol.

One month after the initial MI session, participants in the experimental group completed the QSU and SCSPS post-test assessments**,** which were compared with their pre-test results. No interventions were used to the control group, who only completed the QSU and SCSPS assessments at baseline and after one month**.**

Ethical approval

The Declaration of Helsinki's guiding principles were followed in the conduct of this study, ensuring ethical integrity in all experimental protocols and methodologies.

The ethical clearance was acquired from the Manisa Celal Bayar University Faculty of Medicine Ethics Committee (Decision No: 20.478.486/545; Date: 14.10.2020) and the Provincial Directorate of National Education (Decision No: 23147942; Date: 26.03.2021). All participants provided written informed consent.

To address ethical concerns, the control group received an information booklet on smoking cessation**,** prepared by the researchers, after data collection was completed.

Data analysis

Version 26.0 of the Statistical Package for the Social Sciences (SPSS) was used to analyze the study data. Using the Kolmogorov-Smirnov test, the data distribution's normality was evaluated, along with skewness and kurtosis analyses. For statistical analyses, the Mann-Whitney U test, Wilcoxon signed-rank test, chi-square test, and independent t-tests were employed.

RESULTS

The experimental group's average age was 40.56±6.07 years, while the control group's was 42.12±6.81 years. The experimental group's mean age at smoking initiation was 19.23±3.33 years, while the control group's was 20.67±5.72 years. The average number of years smoked was 19.96±6.99 years and 20.60±5.75 years, respectively. In the experimental group, the average daily cigarette consumption was 15.83±6.05, while in the control group, it was 17.83±9.36. The experimental group's mean number of prior quit attempts was 2.16±1.30, while the control group's was 1.85±0.67. The experimental group's self-reported abstinence duration was 17.83±23.48 months, while the control group's was 20.36±35.65 months (Table 1).

Table 1. Characteristics of individuals in the experimental and control groups (n=61).

Characteristics	Experimental (n=30)	Control (n=31)	t	p
	Mean±SD	Mean±SD		
Age	40.56±6.07	42.12±6.81	-0.94	0.34
Age of starting smoking	19.23±3.33	20.67±5.72	-0.63	0.23
Duration of smoking (years)	20.60±5.75	19.96±6.99	0.38	0.70
Number of cigarettes smoked daily	15.83±6.05	17.83±9.36	-0.99	0.32
Number of attempts to quit smoking	2.16±1.30	1.85±0.67	1.30	0.30
Longest time being able to quit smoking (months)	17.83±23.48	20.36±35.65	-0.28	0.77

t: t test

In the experimental group, the mean total QSU score significantly decreased from 35.16±11.01 (pre-test) to 31.23±11.20 (post-test) (z=2.58, p=0.015), indicating a reduction in smoking urges following motivational interviewing (MI). In contrast, the control group exhibited no significant change (pre-test: 36.22±11.92; post-test: 36.80±10.84; t=-0.35, p=0.72). The experimental and control groups' pre-test QSU scores did not differ significantly (t=-0.36, p=0.72), but the experimental group's post-test QSU scores showed a statistically significant difference (U=-2.19, p=0.028) (Table 2).

Table 2. Comparison of experimental and control groups' questionnaire on smoking urges mean scores (n=61).

QSU	Experimental (n:30) mean±SD	Control (n:31) mean±SD	Test Statistics
Pre-test	35.16±11.01	36.22±11.92	**t****=-0.36 **p****=0.72
Post-test	31,23±11.20	36.80±10.84	**U****=-2.19 **p****=0.028
Test Statistics	**z***=2.58 **p*=0.015**	**t***=-0.35 **p***=0.72	

t: t test, U: Mann Whitney u test, , z: Wilcoxon Signed Ranks test, *: intragroup comparison, **: intergroup compariso

The mean total score on the Smoking Cessation Success Prediction Scale (SCSPS) increased significantly in the experimental group, rising from 32.23±6.24 (pre-test) to 35.63±5.83 (post-test) **(**t=-3.57, p=0.001**).** However, no significant difference was observed in the control group **(**pre-test: 31.70±5.62; post-test: 32.41±5.20; t=-1.24, p=0.22**).** While the pre-test SCSPS scores showed no significant difference between the experimental and control groups **(**t=0.73, p=0.46), a statistically significant difference emerged in the post-test scores (t=2.27, p=0.02) (Table 3).

In the experimental group, the mean score on the Determination and Readiness subscale of the SCSPS increased from 17.60±3.67 (pre-test) to 19.63±3.70 (post-test), demonstrating a statistically significant improvement (t=-3.60, p=0.001). In contrast, the control group did not show a significant change (pre-test: 17.29±4.06; post-test: 17.74±3.83; z=-0.94, p=0.34). No significant difference was found between the experimental and control groups' pre-test scores (t=0.31, p=0.75), but a statistically significant difference was noted in the post-test scores (U=-2.00, p=0.045) (Table 3).

In the experimental group, the mean score on the Health Perception and Favorable Environment subscale of the SCSPS increased from 15.23±3.11 (pre-test) to 16.00±2.58 (post-test), but the change was not statistically significant (z=-1.97, p=0.058). Similarly, no significant change was found in the control group (pre-test: 14.41±2.83; post-test: 14.67±2.49; z=-0.80, p=0.42). However, the experimental and control groups' post-test results showed a statistically significant difference (U=-2.17, p=0.03) (Table 3).

Table 3. Comparison of experimental and control groups' smoking cessation success prediction scale mean scores (n=61).

SCSPS	Experimental (n:30) mean±SD	Control (n:31) mean±SD	Test Statistics
Total-Pre-test	32.23±6.24	31.70±5.62	**t****=0.73 **p****=0.46
Total-Post-test	35.63±5.83	32.41±5.20	**t****=2.27 **p**=0.02**
Test Statistics	**t***=-3.57 **p*=0.001**	**t***=-1.24 **p***=0.22	
Determination and Readiness- Pre-test	17.60±3.67	17.29±4.06	**t****=0.31 **p****=0.75
Determination and Readiness- Post-test	19.63±3.70	17.74±3.83	U**=-2.00 **p****=0.045
Test Statistics	**t***=-3.60 **p*=0.001**	**z***=-0.94 **p***=0.34	
Health Perception and Favourable Environment-Pre-test	15.23±3.11	14.41±2.83	**U****=-1.17 **p****=0.23
Health Perception and Favourable Environment-Post-test	16.0±2.58	14.67±2.49	**U****=-2.17 **p**=0.03**
Test Statistics	t*=-1.97 **p***=0.058	**z***=-0.80 **p***=0.42	

t: t test, U: Mann Whitney u test, z: Wilcoxon Signed Ranks test, *: intragroup comparison, **: intergroup comparison

A regression analysis was conducted to assess the impact of smoking urge on smoking cessation success. The regression model was statistically significant (**F=10.18, p=0.002**), indicating that smoking urge negatively influences smoking cessation success. The variable of smoking urge explained 14.7% of the variation in the success rate of quitting smoking (**R^2=0.147; β=-0.38, p<0.05**) (Table 4).

Table 4. Relationship Between the Questionnaire on Smoking Urges and Smoking Cessation Success Prediction Scale (n=61).

Smoking Cessation Success					
	B	**SE**	**B**	**t**	**p**
Constant	40.61	2.18	-	18.62	0.00
Smoking Urge	-0.19	0.06	-0.38	-3.19	0.02
		R2=0.147	**F**=10.18	**p**=0.002	**Durbin-Watson**=2.116

B: beta, SE: standard error for unstandardized beta, β: standardized beta, t: t test statistic, p: probability value

DISCUSSION

The results of this investigation indicate that teachers in the experimental group, who received Motivational Interviewing (MI), exhibited significantly lower Questionnaire on Smoking Urges (QSU) mean scores following the intervention in comparison to the control group. This result supports the H1 hypothesis, which states that "Teachers who received motivational interviewing had lower mean scores on the Questionnaire on Smoking Urges compared to the control group." Given that reducing or eliminating smoking urges is a crucial factor in smoking cessation, assessing these urges is essential for all individuals undergoing smoking cessation treatment (Demirezent and Kurçer, 2017). Prior research has consistently demonstrated the effectiveness of MI in reducing smoking urges (Demirezent and Kurçer, 2017; Kutlu et al., 2021; Manuel, 2013). More recent studies further validate these findings, showing that MI-based interventions significantly reduce smoking-related cravings and increase abstinence rates in both clinical and community settings (Lindson et al., 2021; Miller and Rollnick, 2023).

The efficacy of MI in reducing smoking urges can be attributed to its structured and individualized approach. MI sessions help individuals identify their motivations for quitting and address barriers to change through cognitive-behavioral techniques (Apodaca and Longabaugh, 2009; Martino et al., 2008). In this study, MI sessions were structured around the participants' personal reasons for quitting, utilizing cognitive-behavioral strategies to address suppressed thoughts about smoking and increase self-awareness (Şengezer, 2016). Previous studies suggest that suppressing thoughts about smoking can paradoxically intensify cravings and reduce self-regulation (Bricker et al., 2013; Erskine et al., 2012; Farris, 2015). Consistent with these findings, the significant decrease in QSU scores among the experimental group in this study suggests that MI serves as an effective strategy for managing smoking urges, supporting behavioral change, and preventing relapse in individuals attempting to quit smoking.

Furthermore, teachers in the experimental group exhibited significantly higher mean scores on the Smoking Cessation Success Prediction Scale (SCSPS) compared to the control group, confirming the H2 hypothesis, which states that "Teachers who received motivational interviewing had higher mean scores on the Smoking Cessation Success Prediction Scale compared to the control group." Similar findings have been reported in previous research, demonstrating that MI increases self-efficacy and confidence in quitting smoking (Caponnetto et al., 2019b). However, the effectiveness of MI varies depending on factors such as the number of MI sessions, follow-up duration, and the presence of additional supportive interventions (Lindson et al., 2021; Miller and Rollnick, 2023).

For instance, recent research suggests that MI combined with digital interventions (e.g., mobile apps and text-based support) enhances long-term cessation success (Haskins et al., 2022). A systematic review by Lindson et al. (2021) found that MI increased the likelihood of quitting smoking by 25% compared to standard treatments. Similarly, a meta-analysis by Hettema et al. (2023) indicated that MI was most effective when integrated into multi-session programs rather than delivered as a single session. In this study, even a single MI session significantly improved SCSPS scores in the experimental group, suggesting that increasing the number of MI sessions and extending follow-up durations could further enhance smoking cessation success.

Regarding the Determination and Readiness subscale of SCSPS, teachers in the test group had considerably higher post-intervention scores than the control group, supporting the H2a hypothesis. Determination is a key factor in behavioral change, and MI is specifically designed to resolve ambivalence and

strengthen motivation for quitting smoking (Miller and Rose, 2015; Miller and Rollnick, 2023). Research has shown that individuals with greater determination to quit smoking experience fewer cravings and have higher long-term abstinence rates (Bani-Yaghoub et al., 2018). Additionally, LaBrie et al. (2022) found that MI significantly improved motivation and readiness for behavioral change in individuals struggling with addiction. Similar results were reported in a study by Grimolizzi-Jensen (2018), where three MI sessions over one month led to a significant increase in readiness to quit smoking. Erol (2023) also demonstrated that MI increased decision-making balance scores and led 43.1% of smokers to the preparation stage at a six-month follow-up. These findings support the present study's results, suggesting that MI has a lasting impact on sustaining commitment to smoking cessation.

Additionally, teachers in the experimental group exhibited higher scores on the Health Perception and Favorable Environment subscale of SCSPS compared to the control group, supporting the H2b hypothesis. Health perception, defined as an individual's subjective assessment of their overall health, is closely linked to smoking behavior. Individuals with a more positive perception of their health are more likely to quit smoking (Can, 2021). Research has shown that MI fosters a supportive environment for quitting smoking by reinforcing self-efficacy and addressing environmental triggers (Doğru et al., 2019; Mülhauser et al., 2018).

Recent studies suggest that MI can improve health perception by integrating technology-based interventions. For example, digital MI platforms and AI-driven chatbots have been found to enhance smoking cessation outcomes by providing real-time motivational support and reinforcing positive health behaviors (Haskins et al., 2022). According to the current study, there was no statistically significant difference between the experimental group before and after MI, even though the experimental group scored higher on health perception and favorable environment than the control group. This may be due to the MI sessions avoiding direct emphasis on health risks to prevent psychological resistance, as recommended in MI protocols (Ögel, 2009). Instead, the sessions focused on reinforcing participants' existing concerns about smoking. However, some participants may have lacked sufficient knowledge about the health effects of smoking, suggesting that supplementing MI with targeted health education could further enhance its effectiveness.

Finally, regression analysis in this study indicated that smoking urge negatively impacted smoking cessation success by 14%, consistent with previous findings that reducing cravings significantly increases the likelihood of successful smoking cessation (Aytemur, 2016; Kutlu et al., 2021). Recent meta-analyses confirm that craving intensity is a significant predictor of relapse, emphasizing the need for interventions that specifically target smoking urges (Lindson et al., 2021).

Limitations

A few limitations should be noted. First, the research was carried out in six public schools affiliated to the Manisa Provincial Directorate of National Education located in Manisa due to difficulties in permit processes. For this reason, the findings of the study can be generalized to the universe in which the research was conducted. Second, due to the fact that some teachers in the schools assigned to the experimental group did not want to conduct online interviews, some of the interviews scheduled online were conducted face-to-face in schools. To increase the generalizability of the findings, future studies should expend the examination of the motivational interview to different sizes and types of population.

CONCLUSION

The findings of this study provide strong evidence supporting the effectiveness of Motivational Interviewing (MI) in reducing smoking urges, increasing determination and readiness to quit, and enhancing perceptions of success in smoking cessation. MI's personalized approach, which focuses on motivation and ambivalence resolution, appears to be a key mechanism underlying these positive outcomes. However, the effectiveness of MI may be further enhanced by increasing the number of sessions, integrating digital health interventions, and incorporating targeted health education to address knowledge gaps. Future research should explore longitudinal follow-ups and multi-session MI programs to assess the long-term effects on smoking cessation success.

Acknowledgement

The authors would like to extend their sincere thanks to anyone who contributed to this study.

Conflict of Interest

No conflict of interest has been declared by the authors.

Author Contributions

Plan, design: EPO, DA; **Material, methods and data collection:** EPO, DA; **Data analysis and comments:** EPO, DA; **Writing and corrections:** EPO, DA.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Ethical Approval

Institution: Manisa Celal Bayar University Faculty of Medicine Ethics Committee
Date: 14.10.2020
Approval no: 20.478.486/545

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ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1685174

Muscle Strength, Mobility, Activities of Daily Living and Depression in Relation to Frailty in Older Adults

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Geliş Tarihi / Received: *29.04.2025,* ***Kabul Tarihi / Accepted:*** *26.05.2025*

ABSTRACT

Objective: Examining the relationship between frailty and lower extremity muscle strength, functional mobility, activities of daily living (ADL), and depression in older adults was the goal of this study. **Materials and Methods:** There were 69 older adults in the cross-sectional study (35 male and 34 female). The Clinical Frailty Scale (CFS), 5-Repetition Sit-to-Stand (STS) Test, Timed Up and Go (TUG) Test, Lawton Instrumental Activities of Daily Living (L-IADL) Scale and Geriatric Depression Scale-Short Form (GDS-SF) were used for evaluations. **Results:** The mean and standard deviation age value of the older adults was 85.48±3.67 years and the body mass index was 25.73 ± 3.01 kg/m^2. In older adults, the CFS was positively and moderately associated with the 5-STS Test (rho=0.418, $p < 0.001$) and TUG Test (rho=0.573, $p < 0.001$), negatively associated with the L-IADL Scale at good level (rho=-0.637, $p < 0.001$), and positively correlated with GDS-SF at fair level (rho=0.281, p=0.019) in older adults. **Conclusion:** Our research shows that frailty is associated with lower extremity muscle strength, functional mobility, ADL and depression in older adults. Therefore, even in the absence of frailty symptoms, lower extremity muscle strength, functional mobility, instrumental-ADL, and depression should be evaluated at regular intervals in order to prevent the emergence of frailty or stop its progression in older adults, and we think that treatment approaches to improve these parameters should be included in geriatric rehabilitation practices.

Keywords: Muscle Strength, Walking Speed, Depression, Elderly, Frail.

Yaşlı Yetişkinlerde Kas Kuvveti, Mobilite, Günlük Yaşam Aktiviteleri ve Depresyonun Kırılganlıkla İlişkisi

ÖZ

Amaç: Bu çalışmanın amacı yaşlı bireylerde kırılganlık ile alt ekstremite kas kuvveti, fonksiyonel mobilite, günlük yaşam aktiviteleri (GYA) ve depresyon arasındaki ilişkiyi incelemektir. **Gereç ve Yöntem:** Bu kesitsel çalışmaya 69 yaşlı birey (34 kadın ve 35 erkek) dahil edildi. Değerlendirmeler için Klinik Kırılganlık Ölçeği (KKÖ), 5-Tekrarlı Otur-Kalk Testi (5-OKT), Süreli Kalk ve Yürü (TUG) Testi, Lawton Enstrümantal Günlük Yaşam Aktiviteleri (L-EGYA) Ölçeği ve Geriatrik Depresyon Ölçeği-Kısa Formu (GDÖ-KF) kullanıldı. **Bulgular:** Yaşlı bireylerin ortalama ve standart sapma yaş değeri 85.48±3.67 ve vücut kütle indeksi 25.73 ± 3.01 kg/m^2 idi. Yaşlı bireylerde KKÖ, 5-OKT (rho=0.418, $p < 0.001$) ve TUG Testi (rho=0.573, $p < 0.001$) ile pozitif yönde ve orta düzeyde ilişkili, L-EGYA Ölçeği ile iyi düzeyde ve negatif yönde ilişkili (rho=-0.637, $p < 0.001$) ve GDÖ-KF ile orta düzeyde ve pozitif yönde ilişkili (rho=0.281, p=0.019) bulunmuştur. **Sonuç:** Çalışmamız, yaşlı bireylerde kırılganlığın alt ekstremite kas kuvveti, fonksiyonel mobilite, GYA ve depresyon ile ilişkili olduğuna dair kanıtlar sunmaktadır. Bu nedenle, yaşlı bireylerde kırılganlık belirtileri olmasa bile, kırılganlığın ortaya çıkmasını önlemek veya ilerleyişini durdurmak amacıyla, yürüyüş, alt ekstremite kas kuvveti, depresyon ve enstrümental günlük yaşam aktiviteleri düzenli aralıklarla değerlendirilmelidir ve bu parametreleri iyileştirmeye yönelik tedavi yaklaşımlarının geriatrik rehabilitasyon uygulamalarına dahil edilmesi gerektiğini düşünmekteyiz.

Anahtar Kelimeler: Kas Kuvveti, Yürüyüş Hızı, Depresyon, Yaşlı, Kırılgan.

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Bu makaleye atıf yapmak için / Cite this article: Ozkan, T., Şahin, Ü. K., Ayraler, A., & Yılmaz, A. (2025). Muscle strength, mobility, activities of daily living and depression in relation to frailty. *BAUN Health Sci J, 14*(2), 366-373. https://doi.org/10.53424/balikesirsbd.1685174

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

The aging process leads to deterioration across all bodily systems, resulting in numerous adverse effects in older adults. One of the systems impacted by this decline is the balance control system (Baysal & Saka, 2024; Navarrete-Villanueva et al., 2021). Balance disorders that may occur due to deterioration of afferent and efferent pathways affect the mobility of older adults. As people age, their balance often deteriorates, increasing the risk of falls, fractures, and a significant reliance on daily tasks (ADL) (Baysal & Saka, 2024; Provencher et al., 2017; Tornero-Quiñones, Sáez-Padilla, Espina Díaz, Abad Robles, & Sierra Robles, 2020). Another problem, older adults deal with issues related to psychological and physical changes caused by aging (Buigues et al., 2015). Depressed older adults have rapid deterioration in function due to a lack of motivation to engage in particular activities and socialize, leading to loss of ADL. At the same time, ADL reduced with age, caused by difficulties such as diminished function and increasing difficulty integrating into surroundings that change over time (Baysal & Saka, 2024; Soysal et al., 2017). Furthermore, it is known that with advancing age, muscle strength in the lower extremities diminishes more significantly than in the upper extremities (Batista et al., 2014; Navarrete-Villanueva et al., 2021). Mentioned dysfunctions in several physiological systems that occur with aging cause geriatric syndromes, which can be difficult to treat effectively.

Geriatric syndrome refers to a group of health issues that are widespread in older persons but cannot be categorized clearly into illness categories. The most common geriatric symptoms are falls, urinary incontinence, delirium, dizziness, and frailty (Navarrete-Villanueva et al., 2021; Provencher et al., 2017).

Frailty syndrome represents a condition of susceptibility to stressors resulting from diminished physiological reserves, necessitating a comprehensive assessment that encompasses psychological, social, and functional dimensions (Batista et al., 2012). Frailty causes many health problems. The risk of depression is known to be high in frail older people, suggesting an association between frailty and depressive symptoms (Soysal et al., 2017). Additionally, another study discovered that pre-frail older adults walked more slowly than non-frail elderly individuals and that frail older adults had poorer balance (Hartley, Keevil, & Romero-Ortuno, 2017; Navarrete-Villanueva et al., 2021; Papiol et al., 2016). Frailty are highly associated with healthcare burdens, such as increased falls and comorbidities, polypharmacy, hospital readmissions, falls, and the need for caregivers. As older population increases, the need to protect and improve health, functionality and quality of life and reduce health care costs becomes more evident. Identifying factors related with frailty is important to prevent functional loss due to frailty, maintain independence, and plan geriatric care programs (Provencher et al., 2017; Tornero-Quiñones et al., 2020). Therefore, determining the relationship between frailty and lower extremity muscle strength, functional mobility, ADL, and depression was aimed at in this study.

MATERIALS AND METHODS

Study design and participants

This cross-sectional study was conducted in the Giresun Training and Research Hospital Healthy Aging Center. The older adults were recruited in March and April of 2025. The study adhered to the intent and principles of the Helsinki Declaration. We obtained written informed consent from all participants.

Inclusion criteria were: (1) Being 65 years of age or older, (2) Mini Mental State Examination score ≥ 24 points (Folstein, Folstein, & McHugh, 1975) (3) Being able to walk with an assistive device or independently.

Exclusion criteria were: (1) Having serious neurological, orthopedic or cardio-pulmonary findings that may adversely affect balance and gait, (2) Taking medication such as benzodiazepines, psychotropic drugs that may adversely affect balance and gait.

Measurements

Age, height, and weight were recorded. Assessments were performed in collaboration with physicians, physiotherapists and gerontologists. Two-minute rest breaks were given during the evaluation. During the tests, the patient was stood next to for safety.

The most widely used test for dementia screening is the Standardized Mini-Mental State Examination, which was created in 1975 by Folstein and associates. This test is scored out of 30 points and has eleven questions. Normal is between 24 and 30 points; mild dementia is between 18 and 23 points; and severe dementia is compatible with 17 points or less. It has the benefit of being simple and quick to administer and assesses memory, orientation, attention, recall, calculation, motor function, language, perception, and visuospatial ability. Although the test has limited specificity in terms of distinguishing clinical syndromes, it is a brief, convenient and standardized method that can be used to determine cognitive level globally (Folstein et al., 1975).

Frailty of older adults was assessed with the Clinical Frailty Scale (CFS). The CFS, developed in 2305 patients enrolled in the Canadian Health and Aging Study, is a scale in which the dependency of patients' daily activities is questioned. The Clinical Frailty Scale is a 9-point scale ranging from “very fit” to “terminal illness”. It is one of the most commonly used frailty assessment tools. The CFS allows healthcare providers to quickly categorize older patients with the help of visuals and clinical descriptors. The CFS takes less than one minute to complete and is simple and easy to use (Church,

Rogers, Rockwood, & Theou, 2020; Rockwood et al., 2005).

Lower extremity muscle strength was evaluated with 5-Repetition Sit-to-Stand (STS) Test. The 5-Repetition STS Test is a performance test in which a person's ability to sit and stand on a chair 5 times serially is recorded in terms of time. The test is considered unsuccessful if five repetitions cannot be completed without help or upper extremity support. The test is started with the start command and ended when the hip completely touches the chair after the 5th repetition. The test's duration is measured from the beginning to the end and recorded with a stopwatch (Tsekoura, Anastasopoulos, Kastrinis, & Dimitriadis, 2020; Muñoz-Bermejo et al., 2021).

Functional mobility assessment was conducted using the Timed Up and Go (TUG) Test. For the test, a regular chair is utilized. The older adults are instructed to get up, walk a set three meters in normal steps, and then return to the chair after the three meters. The time started with the command "get up" is stopped when the patient sits on the chair. During the test, the patient's walking time is measured in seconds with a stopwatch (Beauchet et al., 2011; Rydwik, Bergland, Forsén & Frändin, 2011).

In instrumental-ADL, functional independence was evaluated using the Lawton Instrumental Activities of Daily Living (L-IADL) Scale. Eight items make up the questionnaire, which asks about using the telephone, shopping, doing laundry, doing daily household chores, preparing food, managing money, using drugs, and using transport. The overall score ranges from 0 (dependent) to 8 (independent), with each item receiving a value of "0-not independent" or "1-independent." (Graf, 2009; Pashmdarfard, & Azad, 2020).

Older adults' depression levels were measured using the Geriatric Depression Scale-Short Form (GDS-SF). There are fifteen items on the GDS-SF that ask about the patient's mood. Responses are based on how you felt during the previous week; they are in the form of "yes" or "no," just like in the long form, and depending on the question, one point is awarded for each response. In scoring the questions, scores of 0-4 are interpreted as the absence of depressive symptoms, 5-8 as mild depression, 9-11 as moderate depression and 12 and above as severe depression. The Turkish validity and reliability study was conducted by Durmaz et al. (Durmaz, Soysal, Ellidokuz, & Isik, 2018).

Statistical analysis

To determine the necessary sample size for the investigation, authors utilized the G*Power software program (Faul, Erdfelder, Buchner, & Lang, 2009). As a result of the calculation made using research data which the total number of samples is 69, for the correlation analysis, the research's correlation value was determined to be 0.573 (coefficient of correlation between the CFS and TUG), and its power (1-β) was assessed to be 0.99 with a 5% margin of error (a= 0,05).

The data was statistically analyzed using the Statistical Package for Social Sciences (SPSS) Version 22 statistical software program. Utilizing the Kolmogorov-Smirnov test, data normality was examined. The median (IQR25–75) represents data that is non-normally distributed, whereas the mean and standard deviation reflect data that is normally distributed. The gender variable is shown as percentages (%) and frequencies. Since the data were not normally distributed, the relationship between variables in older adults was determined using Spearman correlation analysis. Alpha was set at <0.05 for statistical significance.

Ethical approval

The Scientific Research Ethics Committee of Giresun Training and Research Hospital gave its approval to the study (Date: 19.02.2025, Approval no: 09).

RESULTS

A total of 69 older adults, 34 female and 35 male, were included in the study. The age of the older adults was 86 ± 4 years, their body mass index was 25.73 ± 3.01 kg/m2 and Standardized Mini-Mental State Examination score was 28 ± 2. Table 1 lists the clinical and demographic traits of older persons.

When frailty, lower extremity muscle strength, functional mobility, ADL and depression levels were examined, it was found that CFS was positively correlated with 5-Repetition STS Test and TUG Test at moderate level, negatively correlated L-IADL Scale at good level and positively correlated with GDS-SF at fair level in older adults (p<0.05, Table 2).

Table 1. Demographic and clinical characteristics.

Characteristics	Older adults (n = 69)
Age (y) X±S	86 ± 4
Gender, n (%) Female Male	 34 (% 49.3) 35 (% 50.7)
Body Mass Index (kg/m^2) X±S	25.73 ± 3.01
Standardized Mini-Mental State Examination, score X±S	28 ± 2

Table 1. (Continue) Demographic and clinical characteristics.

Clinical Frailty Scale, n (%)	
1	9 (13)
2	10 (14.5)
3	14 (20.3)
4	11 (15.9)
5	19 (29.5)
6	6 (8.7)
Median (IQR25-75)	4 (2-5)
Timed Up and Go Test, s Median (IQR25-75)	14 (12-17)
5-Repetition Sit-to-Stand Test, s Median (IQR25-75)	15 (13-19)
Lawton Instrumental Activities of Daily Living Scale, score Median (IQR25-75)	6 (4-8)
Geriatric Depression Scale-Short Form, score Median (IQR25-75)	1 (0-3)

s: second; y: year, kg: kilogram; m: meter, SD: Standard deviation; X: Mean; IQR: Interquartile range

Table 2. Correlation analysis.

		Clinical Frailty Scale
Timed Up and Go Test	**rho**	0.573
	p	**<0.001***
5-Repetition Sit-to-Stand Test	**rho**	0.418
	p	**<0.001***
Lawton Instrumental Activities of Daily Living Scale	**rho**	-0.637
	p	**<0.001***
Geriatric Depression Scale-Short Form	**rho**	0.281
	p	**0.019***

rho: Spearman's rank correlation coefficient, *p<0.05.

DISCUSSION

In this study, which was planned to investigate the relationship between frailty and lower extremity muscle strength, functional mobility, ADL, and depression in older adults AD, we found that frailty was associated with lower extremity muscle strength, functional mobility, ADL, and depression in older adults.

In their study in which they evaluated lower extremity muscle strength with 5-Repetition STS Test, Batista et al. showed that older individuals with 1 or 2 frailty criteria exhibited higher lower extremity strength outcomes than older individuals with 3 or more frailty criteria, and that individuals with higher lower extremity muscle strength exhibited better functional independence (Batista et al., 2014). Another study by Batista et al. found that older age and the presence of more frailty symptoms were related to reduced lower limb muscle strength levels (Batista et al., 2012). Purser et al. evaluated 309 elderly individuals and concluded that the 5-Repetition STS Test alone can detect frailty (Purser et al., 2006). Lower extremity muscle strength, as determined by manual dynamometry, is a powerful indicator of frailty according to the findings of a study by Ottenbacher et al. (Ottenbacher et al., 2005). These findings demonstrate the importance and feasibility of identifying groups at risk of frailty with an easy-to-administer lower extremity muscle strength test. According to Papiol et al., the two most common frailty factors among older persons living in the community are a lack of physical exercise and poor muscle strength (Papiol et al., 2016). Theo and colleagues demonstrated that the best performance measures for predicting frailty in older women were ambulatory mobility and muscle endurance (Theou, Jones, Jakobi, Mitnitski, & Vandervoort, 2011). In a systematic review and meta-analysis by Navarrete Villanueva et al. lower body muscle strength may be a more accurate indicator of frailty than hand grip strength (Navarrete-Villanueva et al., 2021). Buckinx et al. examined the relationship between frailty and various muscle groups, particularly the hip abductors, hip extensors, ankle extensors, ankle flexors, knee flexors, elbow extensors, and elbow flexors. In comparison to pre-frail and frail people, these authors reported that robust older adults had much higher scores on all of these assessments (Buckinx et al., 2016). In a study conducted by Aslan and colleagues on 115 elderly patients who were able to walk without assistance and had no neurological diseases or visual and/or auditory impairments, the average time to complete the 5-

repetition STS test was found to be 14.4 ± 6.88 seconds (Aslan, Cavlak, Yagci, & Akdag, 2008). This value is compatible with the median score of the 15-second sit and stand test found in our study. The results of all these studies are important in terms of showing relationship between frailty and lower extremity muscle strength in health older adults and supporting our results. Our study's findings indicate that muscle strength may have significant effects on the development of frailty even in early frailty periods. These findings can aid in the development of practical plans to lessen or avoid frailty in older adults.

It is widely acknowledged that aged individuals who are frail frequently have impaired mobility and balance, which is, of course, essential to the phenotypic definition of frailty. Similar to the phenotypic definition, which qualifies a person as frail if three of the five characteristics - including slowing - are present. Our study's findings in healthy older persons are consistent with other research that links functional mobility, walking, and balance impairments to frailty. Hartley et al. observed a strong association between lower discharge usual walking speed and higher admission Clinical Frailty Scale (Hartley et al., 2017). In their study comparing clinical evaluations and performance measures of impaired balance and mobility with frailty, they found that patients with higher scores on the Frailty Index - Comprehensive Geriatric Assessment performed worse on performance measures (the Functional Reach Test and TUG) and were more likely to have a history of falls or low mobility (Davis, Rockwood, Mitnitski, & Rockwood, 2011). People 75 years of age and older who walk less than 0.8 m/s are at significant risk of frailty, according to Castell et al. (Castell et al., 2013). Shimada and colleagues examined the individual contributions of frailty phenotype components to the development of disability over a 30-month period in community-dwelling individuals aged 65 and older. It was founded that slow walking speed was a powerful indicator of disability in both prefrail and frail people (Shimada, Makizako, Doi, Tsutsumimoto, & Suzuki, 2015). Kawai et al. showed that walking speed during daily life is associated with physical function and pre-frailty in older adults (Kawai et al., 2020). Daily walking features were found to be related to frailty, according to Kumar et al. (Pradeep Kumar et al., 2020). Walking speed can be regarded as a clinical sign of frailty because it is a powerful indicator of declining physical and cognitive reserve. Our results suggest that gait may be affected from the early stages of frailty, which may play a role in the increase in frailty. Therefore, we suggest that gait and functional mobility should be evaluated at regular intervals and treatment approaches to improve these parameters should be included in geriatric rehabilitation practices in order to prevent the occurrence of frailty even in the absence of frailty symptoms in older adults.

Activities of daily living are broad in scope and fall into different categories, and instrumental-ADL is one of them. Instrumental-ADL are the more complex level of actions required to maintain independent living in society (e.g. cooking, grocery shopping and managing finances). Instrumental-ADL are more prone to early cognitive and functional decline than basic ADL. As a result, the first limitations in ADL are seen in instrumental-ADL. Our findings are consistent with studies on older individuals which indicated that the frailty and ADL are related. Baysal et al. investigated how depression, balance issues, and frailty affected older persons' ability to execute ADL. They found that depression, frailty, and balance were related to ADL performance, and that frail older persons were more dependent on ADL than normal or pre-frailty adults (Baysal & Saka, 2024). Tornero et al. have shown that frailty is a significant factor of independence in ADL (Tornero-Quiñones et al., 2020). According to Theou et al., the frail group had the most severe limitations in ADL. They also found that frailty was a significant determinant of independence in ADL and that the categories of medication management, cooking, financial affairs, driving, cleaning, and shopping had the greatest impairments in instrumental-ADL (Theou, Rockwood, Mitnitski, & Rockwood, 2012). All frailty components-aside from weight loss-were related to handicap in the physical aspects of instrumental-ADL (transportation, housekeeping, meal preparation, shopping, and food preparation) in a research by Provencher et al. (Provencher et al., 2017). Frailty and fall risk are important predictors of autonomy in basic ADL (15%), according to Tornero-Quiñones et al. (Tornero-Quiñones et al., 2020). According to Ji et al., among community-dwelling older persons, frailty was related to recent falls, positive cognitive impairment screening, and difficulties in both basic ADL and instrumental-ADL (D. Ji et al., 2024). Considering the multifactorial nature of frailty, our results showing an association between frailty and ADL are not surprising given the need for balance, lower extremity muscle strength and functional mobility to perform many instrumental-ADL. This evidence demonstrates the importance of better understanding the relationship between instrumental-ADL and frailty in order to provide early, targeted and individualized interventions.

In older adults, depression is a major health issue. Despite the fact that depression affects people of all ages, geriatric depression is related to severe outcomes like sleep disturbances, falls, cognitive impairments, a lack of self-care, malnourishment, a lower quality of life, and an increased risk of morbidity and death. According to Yin et al., geriatric depressive symptoms were substantially inversely connected with non-frailty and good

walking abilities (Yin, Gao, Quan, & Zhang, 2023). In a research of 1789 older adults, Ji et al. found a strong correlation between depression symptoms and frailty (L. Ji et al., 2020). Cristina et al. investigated whether depression contributes to the vulnerability syndrome or whether the two conditions occur independently and found a significant causal relationship between them (Buigues et al., 2015). In their systematic review and meta-analysis, Soysal et al. reported a consistent reciprocal relationship between depression and frailty in older adults (Soysal et al., 2017). According to a paper released as part of the Aging and Dementia Study, depression was significantly correlated with pre-frailty and frailty, and 23% of frail people exhibited clinically severe symptoms (Buigues et al., 2015). It is evident that the findings of our study are in line with those of all these investigations. In the longitudinal process, depression is related to frailty, and the likelihood of developing depression is four times higher for frail people. Similarly, depressed individuals were similarly likely to be frail, suggesting an interaction between frailty and depression. Additionally, burnout, poor energy expenditure, weight loss, and slow walking speed- possibly as a result of a lack of motivation - are important phenotypic components of frailty that overlap with the clinical symptoms of depression (Soysal et al., 2017). When combined, these findings imply that treating depressive symptoms may be a useful strategy for postponing or lowering the risk of frailty progression in older adults.

There are some limitations to our study. Our first limitation is that individuals with advanced frailty were not included in the study. Therefore, the results of our study cannot be generalized to patients with advanced frailty. Although the sample size was calculated, the relatively small sample size is the second limitation of our study. Correlation analyses with larger samples may yield more robust results.

CONCLUSION

Our study provides evidence that frailty was associated lower extremity muscle strength, functional mobility, ADL and depression in older adults. Therefore, even in the absence of frailty symptoms, lower extremity muscle strength, functional mobility, instrumental-ADL, and depression should be evaluated at regular intervals in order to prevent the emergence of frailty or stop its progression in older adults, and we think that treatment approaches to improve these parameters should be included in geriatric rehabilitation practices.

Acknowledgements

The authors thank all participants who participated in this study.

Conflict of Interest

No conflicts of interest were reported by the authors for this study.

Author Contributions

Plan, design: TÖ, ÜKŞ, AA; **Material, methods and data collection:** TÖ, ÜKŞ, AA, AY; **Data analysis and comments:** TÖ; **Writing and corrections:** TÖ, ÜKŞ.

Funding

No funding was received for the support of this study.

Ethical Approval

Institution: Giresun Training and Research Hospital Scientific Research Ethics Committee
Date: 19.02.2025
Approval no: 09

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ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1667963

Competency in Liver Transplant Nursing: A Qualitative Study

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Geliş Tarihi / Received: *29.03.2025,* ***Kabul Tarihi / Accepted:*** *27.05.2025*

ABSTRACT
Objective: The number of organ transplants is constantly increasing. Nurses have a key role in the achievement of a successful transplant. For this reason, they need to have the competency to manage every stage of the transplantation process. The purpose of this study is to identify the perceptions of nurses regarding their competency as transplant nurses. **Materials and Methods:** This descriptive qualitative study was carried out between October and December 2023. The purposive sampling method was used to select participants. Semi-structured interviews were conducted to collect data. The data collection process was completed when data saturation was reached. Thematic analyses were carried out. The Guba and Lincoln criteria were followed to ensure reliability. **Results:** The study was completed with 12 nurses. As a result of the analyses, a total of 4 themes consisting of 12 categories were obtained. The themes were "competency in transplant nursing", "problem-solving skills", "research and development", and "team collaboration". **Conclusion**: Nursing competencies are very important for a successful transplantation process. A transplant nurse should have knowledge, skills, experience, and competency in problem-solving and crisis management. Nurses should also be more adaptive, hardworking, attentive, and empathetic. Transplant units require profound coordination and team collaboration. Nurses should follow new transplant-related diagnosis and treatment methods, as well as scientific and technological developments, closely.
Keywords: Clinical competence, Qualitative study, Surgical nursing, Transplantation.

Karaciğer Transplantasyon Hemşireliğinde Yetkinlik: Nitel Bir Çalışma

ÖZ
Amaç: Organ nakillerinin sayısı sürekli artmaktadır. Hemşireler başarılı bir nakil elde etmede kilit bir role sahiptir. Bu nedenle, nakil sürecinin her aşamasını yönetebilecek yetkinliğe sahip olmaları gerekir. Bu çalışmanın amacı, hemşirelerin nakil hemşireliği yetkinliklerine ilişkin algılarını belirlemektir. **Gereç ve Yöntem:** Bu tanımlayıcı nitel çalışma Ekim-Aralık 2023 tarihleri arasında gerçekleştirilmiştir. Katılımcıları seçmek için amaçlı örnekleme yöntemi kullanılmıştır. Veri toplamak için yarı yapılandırılmış görüşmeler yapılmıştır. Veri doygunluğuna ulaşıldığında veri toplama süreci tamamlanmıştır. Tematik analizler yapılmıştır. Güvenilirliği sağlamak için Guba ve Lincoln kriterleri takip edilmiştir. **Bulgular:** Çalışma 12 hemşire ile tamamlanmıştır. Analizler sonucunda 12 kategoriden oluşan toplam 4 tema elde edilmiştir. Temalar "nakil hemşireliğinde yetkinlik", "problem çözme becerileri", "araştırma ve geliştirme" ve "takım iş birliği"dir. **Sonuç:** Başarılı bir nakil süreci için hemşirelik yetkinliği çok önemlidir. Bir nakil hemşiresi sorun çözme ve kriz yönetimi konusunda bilgi, beceri, deneyim ve yetkinliğe sahip olmalıdır. Hemşireler ayrıca daha uyumlu, çalışkan, dikkatli ve empatik olmalıdır. Nakil üniteleri derin koordinasyon ve ekip iş birliği gerektirir. Hemşireler nakil ile ilgili yeni tanı ve tedavi yöntemlerini ve bilimsel ve teknolojik gelişmeleri yakından takip etmelidir.
Anahtar Kelimeler: Klinik yetkinlik, Nitel çalışma, Cerrahi hemşireliği, Organ nakli.

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Bu makaleye atıf yapmak için / Cite this article: Meşe, S., & Harmancı, P. (2025). Competency in liver transplant nursing: a qualitative study. *BAUN Health Sci J, 14*(2), 374-382. https://doi.org/10.53424/balikesirsbd.1667963

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

Organ transplantation involves the transplantation of a part of an organ, or an entire organ, collected from a live or cadaveric donor to a recipient in cases where the organ functions of the recipient are not adequate to meet their vital requirements (International Transplant Nurses Society, 2011). According to the Global Observatory on Donation and Transplantation (GODT) data, 144,302 organ transplants were performed in 2021 (GODT, 2021). In Turkey, a total of 5,277 organ transplantations were performed in 2023, including 1,768 liver transplantations (GODT, 2021). Liver transplantation is a complex procedure in modern surgery. The successful outcome of this intricate liver transplantation process depends on the collaboration of a multidisciplinary team (Negreiros et al., 2017). Nurses play a vital role within the multidisciplinary team. Accordingly, they need to reach a certain level of competency to manage different stages of the perioperative period (Negreiros et al., 2017; Fernández-Alonso et al., 2020).

Defined as the integration of knowledge, skills, and attitudes that enable individuals to perform their duties effectively, competency is fundamental to the delivery of high-quality nursing care (Negreiros et al., 2017). In transplant nursing, achieving competency is particularly critical due to the complexity and sensitivity of the perioperative care process. Competent transplant nurses are expected to manage intricate clinical situations, educate patients and their families, and ensure continuity of care both in hospital and home settings. Competency in transplant nursing not only enhances patient care outcomes but also contributes significantly to the overall success of transplantation procedures (Fernández-Alonso et al., 2020; Arıburnu et al., 2022).

In transplant nursing, the complexity of the care process increases. Thus, nurses are required to provide both patients and their families with excellent care by ensuring the continuation of care in the hospital and at home (Negreiros et al., 2017). Nurses have an extremely important role in caring for pre-operative and post-operative transplant patients. They take part at the bedside as case managers, discharge planners, clinic support staff, and coordinators. They are responsible for education, transplant patients, and their families. But their scope of practice is limited by education and licensure. They need more education, practice, and competency (Fernández-Alonso et al., 2020). The growing number of transplant patients and advanced care requirements create the need for competent transplant nursing (Chambers et al., 2021). The characteristics sought in a competent transplantation nurse are defined as knowledge, skills, management, critical decision-making, ethics, complication management, wound care, discharge, and home care (Chaney & Yataco, 2019). The American Association of Critical Care Nursing suggests that the best patient outcomes are achieved when transplant nurses' competencies align with their patients' needs (Swickard et al., 2014).

Transplantation requires high-level nursing care involving the monitoring of graft vascularization, rejection, and infection, the initiation and follow-up of immunosuppressive treatment, pain management, the monitoring of bleeding, complication management, and psychosocial care. In transplantation procedures, it is important to not only transplant the organ but also provide the best care to both the donor and the recipient and educate their families to optimize their quality of life in the following period. (Negreiros et al., 2017; Barnard et al., 2016). However, research studies on transplant nurses' clinical competency and individualized care are limited. Therefore, assessing the perceived competency level and individualized care provided by transplant nurses is essential for an effective transplantation process.

Organ transplantation involves a complex process that requires a multidisciplinary approach, and nurses have important roles and responsibilities in this process. In order to increase the quality of patient care at every stage of the transplantation process, prevent complications, and improve patient outcomes, nurses need to have certain competencies. However, the scope of competencies for transplantation nursing and nurses' perceptions on this issue have not been sufficiently investigated.

By looking at how competent liver transplantation nurses think they are, this study will help figure out what professional development transplantation nurses need and how to come up with solutions in this area.

In conclusion, this study is an important source of information that will contribute to the development of nurse education programs to increase competency in transplant nursing and improve the quality of health services.

MATERIALS AND METHODS

Design

This study was carried out with a descriptive qualitative design (Vaismoradi et al., 2014). The most suitable research method to determine the experiences and views of nurses who provide care for organ transplant patients is the qualitative method (Creswell & Poth, 2018). In this study, the Consolidated Criteria for Reporting Qualitative Research (COREQ), a 32-item checklist, was used for reporting.

Sample selection and participants

The study was carried out with the voluntary participation of nurses who had been working at the Liver Transplant Institute of a University Hospital in Türkiye for at least a year. The Institute employs a total of 110 nurses. Its total patient capacity is 116. By 1 September 2023, the Institute had performed 3550 liver transplantation procedures, including 506 transplants from cadaveric donors and 3044 transplants from live donors. The purposive sampling method was used in this study to represent the population sufficiently.

Data collection

The data were collected between October and December 2023 using a 'Sociodemographic Information Form' that was prepared by the researchers to obtain information on the sociodemographic characteristics of the participants and a 'Semi-Structured Interview Form' to obtain information about their competencies regarding the transplantation process (Table 1). The questions on the Semi-Structured Interview Form were developed based on the review of the literature (American Nurses Association (ANA), 2013; Chang et al., 2011; Köse Tosunöz et al., 2021).

Table 1. Semi-structured interview form.

What is competency, being competency, and competency in clinical nursing? How would you describe competency in the transplantation process?
Do you think you have the knowledge to provide the optimum care to a transplant patient?
Do you find yourself competent in terms of the care of transplant patients, your problem-solving skills regarding potential problems in care, and your nursing interventions?
What do you think about team collaboration and your communication during the transplant process?
Would you define yourself as a leader?
Do you do research and read up-to-date information about transplant nursing?

After obtaining ethics committee approval and the hospital's institutional permission, the first author contacted the head nurses of the liver transplant clinic, intensive care units, and operating room. The time and place of the interviews were planned with nurses who agreed to make appointments after being provided information about the purpose of the study. The data were collected by the first author in the meeting room of the Liver Transplant Institute in face-to-face semi-structured interviews held with each participant. Each participant was interviewed only once. Audio recordings were taken with the permission of the participants. Each interview lasted 17 to 42 minutes. To protect the anonymity of the participants, each participant was given an alphanumeric code (e.g., P1). To confirm the accuracy of the representation of their views, each participant was allowed to listen to the audio recording of their interview at the end of the interview. The researcher informed the participants that their data would be kept confidential. In qualitative studies, data collection takes place until data saturation is reached, that is, when no new themes or categories can be reached during thematic analyses (Hennink et al., 2017). The collected information started to repeat after the interviews held with 11 participants. Therefore, it was decided that data saturation was reached in the interview held with the 12th participant, and no more interviews were conducted.

Data analysis

The first and second authors listened to the audio recordings of the interviews within 24 hours after the interviews, and they transcribed the content verbatim. The interview transcripts and field notes were stored in the electronic environment. The noteworthy observations and experiences of the participants were written down word by word. Both researchers read the interview transcripts three times and confirmed their accuracy.

The thematic analysis method was used to analyze the collected data (Braun & Clarke, 2021). Within the scope of thematic analysis, to familiarize themselves with the data, both researchers read the individual transcripts a few times and took short notes. The transcripts were then transferred to the NVivo software. This way, coding was performed, direct quotes were obtained from the statements of the participants, and the source of each view was specified. Using the obtained codes, potential themes were identified, and the compatibility of the themes with the entire dataset was checked. Codes with similar meanings were gathered to create categories and themes. Finally, the themes and categories were named and defined. After the completion of all steps, the dataset was reported based on the model outputs of the NVivo software (Braun & Clarke, 2021). The report was translated into English by a translator with linguistics education, and the translated text was individually read and confirmed by the researchers.

Reliability

To define different aspects of reliability in the study, the concepts of credibility, transferability, trustworthiness, and confirmability were used (Lincoln & Guba, 1985). For credibility, the data were independently analyzed by the two researchers, and their findings were compared. The participants were asked to confirm the data obtained during the data collection process. For transferability, in-depth information is given in the text about the details of the study, researchers, participants, sampling method, and data collection and analysis procedures. For trustworthiness, two researchers who were not involved in the study evaluated the research protocol by focusing on issues about the methods that were implemented and the design of the study. For confirmability, the views of the participants are presented in the results section.

Ethical approval

The study was carried out in line with the principles of the Declaration of Helsinki. Before the study, ethical committee approval and written permission were obtained from the Noninvasive Clinical Research Ethics Committee of the XXX University (31.08.2023, E-23430505-050.01.04-20482) and the hospital administration, respectively. Participants were informed about the purpose of the study. They were then asked for their verbal and written consent based

on the principle of voluntariness. Consent from each participant was obtained.

RESULTS

The 12 nurses who participated in the study (until data saturation was achieved) had been working at the Liver Transplant Institute of a University Hospital in Türkiye for at least a year. Ten of the participants were women. The mean age of the participants was 32.08±4.64. All participants had at least Bachelor's degrees. The sociodemographic characteristics of the participants are shown in Table 2.

Table 2. Participants characteristic.

	N (%)	Mean±SD
Mean age		32.08±4.64
Gender		
Female	10 (83.3%)	
Male	2 (16.7%)	
Service		
Operating room service	2 (16.7%)	
İntensive care service	3 (25.0%)	
Transplantation service	7 (58.3%)	
Experience as a nurse in general (year)		9.50±4.68
Experience as a nurse in the field of organ transplantation (year)		6.66±4.31
Education level		
Bachelor's degree	10 (83.3%)	
Master's degree	2 (16.7%)	
PhD degree	-	

In the analyses of the data, 4 themes consisting of 12 categories were obtained. The themes were "competency in transplant nursing", "problem-solving skills", "research and development", and "team collaboration" (Table 3).

Table 3. Themes and Categories.

Theme	Category
Competency in Transplant Nursing	Competency in decision-making
	Competency in patient care
	Experience
	Information
Problem-Solving Skills	Calculating possible risk
	Crisis management
	Interpreting patient findings
Research and Development	Scientific activity
	Technological development
Team Collaboration	Communication
	Coordination
	Characteristics of nurses

Competency in transplant nursing

This theme included competency in decision-making, competency in patient care, experience, and information subthemes. This theme highlights the necessity for competent transplant nurses to possess critical decision-making skills, deliver optimal patient care, and demonstrate sufficient knowledge, expertise, and experience.

Competency in decision-making

In this study, the theme of transplantation competency emerged as a significant finding, with most participants expressing confidence in their skills and knowledge within this specialized field. Participants described feeling proficient in handling complex aspects of transplantation, including patient assessment, surgical procedures, and postoperative care management.

In my opinion, competency means making decisions about things and being able to make suggestions.(P4)

Competency in patient care

Almost all participants stated that transplant patients are special patients and that they provided them with the optimum care.

We, of course, provide the optimum care in the intensive care unit. From clipping their nails to washing their hair… We administer narcotics, and of course, the patient's creatinine values are important. We start immunosuppressive agents. Mobilization is

very important to us. We perform pressure sore care. (P3)
... we do everything perfectly. We're knowledgeable about self-care, administering drugs, mobilization, complication management, and laboratory findings. (P4)
The participants reported that home care is very important, as immunosuppressive drugs are used in the treatment of these patients.
We provide education about diet and drug usage. I've made a table about drug usage at home, and I educate them [the patients]. We need an educator nurse. They [an educator nurse] could teach drug side effects, eating, and mobilization better. (P1)

Experience

The participants highlighted the importance of experience in transplant-related competency.
I think I have competency because I've worked in transplantation for a long time; there are always new things. Various cases are encountered. (P6)

Information

They said there is no limit to what can be learned, and the transplant unit is a suitable place for encountering new diagnoses.
There is always something new. We research. We sometimes discuss [things] with our friends, like 'what was this? You researched it…' (P6)
Some participants thought in-service training was necessary.
The clinic itself should have an education program. This [transplant unit] is a more specialized place. (P10)

Problem-solving skills

This theme included calculating possible risks, crisis management, and interpreting patient findings as subthemes. Problem-solving skills are essential in transplant nursing, where complex and unexpected clinical scenarios often arise.

Calculating possible risks

According to the participant, transplant nurses should be able to foresee potential risks.
When the person arrives [at the unit] in the postoperative period, we check all, including ammonia, biochemistry, and hemogram. After this, if there's any problem, if there's any bleeding, that is, when the output of their drain is high, we check their blood values again. If there's no problem, we draw blood in the morning for an examination that we call 'complete results'.(P 2)

Crisis management

Risks in transplant patients, such as rejection and bleeding were emphasized by the participants.
Before a patient shows rejection, their clinical, biochemical, and tomographic findings provide information for us. We immediately let the physician know. We then make a decision and move fast with everything needed: biopsy, imaging… We can't [do not want to] lose patience. (P1)

Interpreting patient findings

The laboratory test results, vital signs, and drain output values of transplant patients are highly important for diagnosis and treatment.
Someone who can't interpret laboratory test results can't manage treatment anyway. We start a drug and monitor its effects accordingly. Drug doses and albumin values are important. (P5)
…we closely monitor everything including vital signs, hemogram, drain outputs… (P2)
Nurses are active in the management of patient resources as they have roles in patient care throughout the entire day. Pharmaceutical services, medical devices and equipment, and surgical materials are managed by nurses.
I want everything next to me during surgery. My table [equipment on the table] should be complete, my suture materials should be complete, and my sponge should be near. I want to have control and not manage lacking materials. (P8)
The participants complained about the insufficiency of human resources. They said they experienced many challenges, especially because there were no on-call doctors in clinics. They were racing against time in the management of acute situations. In addition to these issues, they stated that there was no educator nurse, and the number of clinic nurses was not enough.
I think we have problems, like there are not enough nurses. The level of experience is substantial, but some things turn out to be inadequate as our numbers are low. (P6)

Research and development

The research and development theme comprised the subthemes of scientific activity and technological development. It highlights the importance of transplant nurses staying up to date with evolving practices, contributing to evidence-based care, and fostering innovation in patient management.

Scientific activity

While some of the participants had bachelor's degrees, others were taking part in master's or doctoral studies. This is why they were participating in scientific activities and performing scientific research.
I follow it [scientific developments] and, I attend conferences. I submit manuscripts, write articles… I'm already interested. I do this because I like it. (P1)
Some participants had a consensus that transplantation is a field that is suitable for researching and learning up-to-date information.
We see new diagnoses and learn novel things here. For example, there was once a case of antibody-mediated rejection. I saw it for the first time. We prepared a chemotherapeutic drug suitable for it to prevent rejection. We can encounter different treatment and care [procedures]. (P5)

Technological development

Technological developments are effective in transplant surgery. Some participants thought following technological developments would

strengthen their team. Some stated that technology is effective for cross-transplantation surgeries.

... we are never complete. ...because technology advances. We need to improve ourselves. I believe the more we improve and gain knowledge, the stronger we'll become. (P2)

Science and technology resulted in the development of cross-transplantation. Fellows [surgeons] favor performing cross-transplantation surgeries. (P11)

Team collaboration

This theme included the sub-themes of communication, coordination and characteristics of nurses. Successful transplantation undoubtedly relies on effective communication and coordination among multidisciplinary teams.

Communication

Team communication is important for the conduct of patient care processes with the appropriate steps. An interruption in communication in the team risks the patient. Nurses who cannot adapt to the team in specialized units like transplant units are transferred to other units.

Team collaboration is important. My team is selfless, and this is important. This is a special place; we can't manage it without team collaboration. (P7)

I think the communication here is very good. We haven't experienced any problems since I started working here. (P12)

Coordination

Head nurses in transplant centers have roles and responsibilities in coordination with the patient, within the team, and with other units. The participants stated that head nurses displayed leadership qualities, and they were effective in the coordination of the clinic.

We are a team here. I'm only one link in the chain. It's important to be a good member of the team. (P6)

I think this is good, you know: we can cover for each other only by collaborating as a team. We already have a heavy workload, and our head nurse is working as if he/she is an assistant doctor. He/she follows referrals, supervises blood collection procedures, monitors orders, CVs… He/she can do this through team collaboration. (P10)

Characteristics of nurses

The characteristics of the nurses who work in transplant clinics are also highly important. According to the participants, the team members with whom they work in the transplant clinic should be hardworking, attentive, experienced, and adaptive.

The team is very important. There is a hardworking and helpful team [here]. It's very difficult to work with people who don't do their jobs. (P3)

Team collaboration is a phenomenon in the profession of nursing. ...because we can't do half a job. There's no stalling, slacking off, neglecting the tasks here. (P11)

DISCUSSION

Competency in nursing requires the knowledge, skills, and analytical mindset to perform nursing responsibilities (Ribeiro et al., 2024). Nursing is considered a complex combination of professional capacity, professional reasoning in general, skills, values, attitudes, and knowledge (Meyer et al., 2011). The transplant nurses who participated in this study defined competency as the capacity to make decisions, qualification in patient care, experience, and knowledge. The themes of a similar qualitative study are consistent with our study (Ribeiro et al., 2024).

Competency in transplantation nursing requires advanced clinical skills, specialized knowledge, and the ability to make decisions in critical moments (Meyer et al., 2011). In our study, nurses emphasized the significance of experience in decision-making, analytical thinking, and coordination. They highlighted that intensive care nurses, in particular, deliver care to transplant patients using advanced knowledge and skill. It was also noted that there is a rotation between clinics, ensuring that transplantation nurses gain essential experience in intensive care settings. In a previous study, which provided results that supported the statements of the participants of this study, transplant intensive care unit nurses had the highest nursing competency scale scores (Meyer et al., 2011). Intensive care nurses provide holistic care, they make decisions in the interests of their patients, and they have sufficient levels of medical knowledge in terms of interpreting patient findings (Taşkıran & Türk, 2023). Moreover, transplant intensive care units are known as specialized units where nursing interventions involving early complications, monitoring, immunosuppressive drugs, fluid-electrolyte balance, infection, and rejection cases are coordinated (Negreiros et al., 2017; Aued et al., 2016). In a study comparable to ours, knowledge was identified as the cornerstone of nursing competency. Specifically, a comprehensive understanding of medical and technical information was highlighted as essential for preventing complications (Henriksen et al., 2021). The other study stated that nursing assistants identified previous clinical experience as one of the ways to acquire competencies (Aued et al., 2016).

Problem-solving skills are fundamental to patient care as; they enable nurses to effectively address complex situations. Anticipating potential complications, making decisions, and taking risks are critical, especially for transplant nursing (Barnard et al., 2016; Ying et al., 2020). In this study, nurses stated that patient findings in transplant units differ from findings in other surgical units. They require transplantation-specific treatment and care procedures, including initiation of immunosuppressive drug therapy, laboratory tests, rejection, susceptibility to infection, and metabolic problems.

Nurses explained that complications such as bleeding, biochemical parameters, rejection, graft failure, and obstruction are situations that nurses should carefully interpret and intervene in. A study developed a protocol to identify and prevent early signs and symptoms of urinary tract infection in patients following kidney transplantation. With this protocol, nurses' ability to diagnose and intervene in urinary tract infections positively affects patient outcomes. This context highlights the nurses' competency in interpreting patient findings (Ma et al., 2021). A competent transplant nurse can interpret patient findings carefully, calculate potential risks preemptively, and manage crises (Henriksen et al., 2021). A study on the organ donation process explained the importance of crisis management by nurses for optimum performance in the organ donation process (Negreiros et al., 2017).

As in every field, technology and scientific research in transplantation are rapidly advancing. These developments affect transplant nursing, increasing patient outcomes and clinical efficiency. Hezer et al. (2024) discuss innovations in immunosuppressive therapy and telemedicine to reduce complications and provide optimal care (Hezer et al., 2024). Another systematic review study states that health information technologies support clinical decision-making systems in complex transplantation care (Niazkhani et al., 2017). These developments emphasize the importance of continuing education, and technological adaptation in transplant nursing, ensuring that healthcare professionals remain at the forefront of innovation in providing high-quality patient care. Similar to the literature, nurses emphasized the importance of education in transplantation, scientific research and close monitoring of developments. Nurses continue their master's and doctoral education, participate in congresses and contribute to the current literature. In addition to this, approximately 3,500 liver transplantation procedures have been performed at the Liver Transplant Institute, where the study was conducted. Additionally, as a first in the world, a 6-cross liver transplant was achieved (Republic of Türkiye Ministry of Health, 2024). The participants specified that novel diagnoses, information, and practices were contributed to the literature as a consequence of the research conducted at the clinic in question. Indeed, such research and transplant surgeries are possible thanks to technological developments (Akbulut & Yilmaz, 2015).

Organ transplantation procedures that are the first examples of their category in the world require successful team collaboration, coordination, and communication. Nurses are seen as linkage points among healthcare professionals and in the communication and coordination between healthcare professionals and patients (Arıburnu et al., 2022). They are at the center of communication and play a very significant role in the facilitation of professional communication (Hoy et al., 2017). On the other hand, inadequate professional communication may jeopardize the quality of care (Etheredge et al., 2017; Negreiros et al., 2017). The participants of this study emphasized that personnel with advanced communication skills who can adapt to the transplantation process will have a permanent place in the field. Additionally, administrators need to employ nurses with suitable characteristics at transplant units (Fernández-Alonso et al., 2020). The participants revealed that nurses who were unable to adapt to the clinic left the clinic by their own accord or were let go with the advice of head nurses. Head nurses are leaders in the coordination of the clinic, and they are competent in decision-making roles. The participants also reported that their head nurses were experienced and competent in transplantation procedures.

Study Limitations and Strengths

The study was conducted in a single center. It is recommended that similar studies be conducted as multicenter research. Also, the responses of the participants to the semi-structured questions evaluating their perceived competency may have limited generalizability. However, the results of this study are important in that they present the optimum outcomes

CONCLUSION

The literature contains a limited number of studies addressing the competency of transplant nursing. As consistent with the literature, competencies such as advanced problem-solving skills, effective crisis management, and adaptability are crucial for ensuring positive patient outcomes. Furthermore, the results underscore the importance of continuous professional development, including staying updated on advancements in medical science and technology. Team collaboration and interdisciplinary coordination continue to be crucial for the optimum functioning of the transplant unit. The increase in the number of transplants in recent years and the implementation of crossover transplants highlight the need for competent nurses. Transplant nurses have important roles and responsibilities in successful transplantation processes in our country. Therefore, it is important to highlight the competency of nurses.

Acknowledgement

The authors would like to extend their sincere thanks to anyone who contributed to this study.

Conflict of Interest

The author declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Author Contributions
Plan, design: SM, PH; **Material, methods and data collection:** SM, PH; **Data analysis and comments:** SM, PH; **Writing and corrections:** SM, PH.

Funding
The authors report no funding.

Ethical Approval
Institution: Kahramanmaraş İstiklal University Ethics Committee
Date: 31.08.2023
Approval no: E-23430505-050.01.04-20482

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ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1653258

Does Being a Healthcare Professional Affect Death Literacy?

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Geliş Tarihi / Received: *07.03.2025,* ***Kabul Tarihi / Accepted:*** *29.05.2025*

ABSTRACT
Objective: The aim of this study is to assess the level of knowledge and awareness regarding death literacy in Turkish society and to identify differences in knowledge levels between healthcare professionals and non-healthcare individuals. **Materials and Methods:** This study was conducted using a comparative descriptive design. Since the population size was unknown, a sample size calculation was performed, and a total of 418 participants (200 healthcare professionals and 218 non-healthcare individuals) were recruited through snowball sampling. The data collection tool consisted of a questionnaire including sociodemographic characteristics and items from the Death Literacy Scale. The data were analyzed using SPSS 21.0 software through descriptive statistics, independent samples t-tests, and ANOVA. **Results:** The overall level of death literacy among participants was found to be moderate (93.11 ± 13.93). Healthcare professionals had significantly higher levels of practical knowledge ($p \leq 0.001$), experiential care ($p \leq 0.001$), factual knowledge ($p \leq 0.001$), community knowledge ($p = 0.047$), and overall death literacy ($p \leq 0.001$) compared to non-healthcare individuals. However, there were no statistically significant differences between the two groups in terms of conversational support ($p = 0.828$), experiential knowledge ($p = 0.224$), community support groups ($p = 0.199$), and access to help ($p = 0.066$). **Conclusion:** Comprehensive educational programs that incorporate both theoretical knowledge and practical support systems are needed to improve death literacy. Efforts to enhance death literacy should be emphasized not only among healthcare professionals but also throughout the general population.
Keywords: Death, Literacy, Palliative Care, Health Personel

Sağlık Profesyoneli Olmak Ölüm Okuryazarlığını Etkiler mi?

ÖZ
Amaç: Bu çalışmanın amacı, Türk toplumunda ölüm okuryazarlığına ilişkin bilgi ve farkındalık düzeyini değerlendirmek ve sağlık çalışanları ile sağlık çalışanı olmayan bireyler arasındaki bilgi düzeyi farklarını belirlemektir. **Gereç ve Yöntem:** Araştırma, karşılaştırmalı betimsel desen kullanılarak yürütülmüştür. Bilinmeyen evrende örneklem hesaplaması yapılmış ve kartopu örnekleme yöntemi kullanılarak toplam 418 katılımcıya (200 sağlık çalışanı ve 218 sağlık çalışanı olmayan birey) ulaşılmıştır. Veri toplama aracı, katılımcıların sosyodemografik özelliklerini ve Ölüm Okuryazarlığı Ölçeği'ne ait soruları içeren bir formdan oluşmuştur. Veriler, SPSS 21.0 programı kullanılarak sayı, yüzde, bağımsız gruplarda t-testi ve ANOVA testleri ile analiz edilmiştir. **Bulgular:** Katılımcıların genel ölüm okuryazarlığı düzeyinin orta seviyede olduğu saptanmıştır (93,11±13,93). Sağlık çalışanlarının, sağlık çalışanı olmayan bireylere kıyasla daha yüksek düzeyde pratik bilgi ($p \leq 0,001$), uygulamalı bakım ($p \leq 0,001$), olgusal bilgi ($p \leq 0,001$), toplum bilgisi ($p = 0,047$) ve genel ölüm okuryazarlığı ($p \leq 0,001$) düzeyine sahip oldukları belirlenmiştir. Buna karşın, konuşma desteği ($p = 0,828$), deneyimsel bilgi ($p = 0,224$), toplum destek grupları ($p = 0,199$) ve yardıma erişim ($p = 0,066$) alt boyutlarında iki grup arasında anlamlı bir fark bulunmamıştır. **Sonuç:** Ölüm okuryazarlığını geliştirmeye yönelik eğitim programlarının hem teorik bilgileri hem de pratik destek sistemlerini içerecek şekilde bütüncül olarak tasarlanması gerekmektedir. Özellikle sağlık çalışanlarına yönelik olmak üzere, toplum genelinde ölüm okuryazarlığını artırmaya yönelik çalışmaların önemi vurgulanmalıdır.
Anahtar Kelimeler: Ölüm, Okuryazarlık, Palyatif Bakım, Sağlık Personeli

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Bu makaleye atıf yapmak için / Cite this article: Coskun, S., & Bagcivan, G. (2025). Does being a healthcare professional affect death literacy?. *BAUN Health Sci J, 14*(2), 383-390. https://doi.org/10.53424/balikesirsbd.1653258

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

Death is an integral part of the life process, and it is perceived as a mysterious and universal phenomenon, the how and when people have always been intrigued by and uncertain about it (Akyol, 2010). Throughout history, in all societies, efforts have been made to respect the sick and the deceased and to provide adequate care and support (Yorulmaz, 2020). The aging population is rapidly increasing worldwide, leading to an increase in deaths and a growing demand for end-of-life care, which is an essential component of palliative care services (Che et al., 2023). However, there are several barriers to end-of-life care, including lack of awareness among the community and healthcare personnel, inadequate education, clinical resources, and insufficient economic support, as well as disparities in resource allocation and the lack of legal regulation related to end-of-life care within the national healthcare system (Aslan, 2020). Through comprehensive research conducted with individuals who have experience caring for someone who died at home, it has been suggested that they develop the necessary knowledge, skills, and abilities to provide end-of-life care (Horsfall, 2018; Leonard et al., 2020). This capacity developed by individuals has been termed "death literacy." Death literacy is the knowledge and skills individuals need to access end-of-life and death care options, understand them, and make informed choices about them (Leonard et al., 2021). Individuals with high levels of death literacy possess specialized knowledge about the death system and the ability to apply this knowledge. Such skills strengthen the individual's and society's capacity to act through experiences of dying, death, loss, and mourning (Semerci et al., 2024). Therefore, an individual's knowledge and skills are not only for their benefit but also for the ability to support a broader population of individuals affected by dying and death (Harrison et al., 2022). Efforts to enhance death literacy emphasize the role of social support for the dying, professionalizing end-of-life care (Johansson et al., 2023) and determining the social impact of public health initiatives (Semerci et al., 2024). Death literacy is a new concept in Turkish society. In addition to limited research on determining the level of death literacy in our country, there is also insufficient data in the international literature regarding comparisons of death literacy among the community and healthcare personnel, as well as factors influencing death literacy. This study aimed to determine the level of death literacy in the Turkish population and whether there is a difference between healthcare professionals and those who are not. In this context, the research questions are as follows:

- What is the participants' death literacy level?
- Is there a difference in death literacy between individuals who are healthcare professionals and those who are not?
- Do individuals' sociodemographic characteristics affect their death literacy?

MATERIALS AND METHODS

Study type

This is a descriptive study.

Study group

The study sample consisted of 418 individuals, including 200 healthcare workers and 218 non-healthcare workers, who were selected using the snowball sampling method between November 2023 and February 2024.The sample calculation was based on the unknown population using the mean and standard deviation values obtained from a previous study on death literacy. In Türkiye, the only study determining death literacy is the validity and reliability study of the "Death Literacy Index." However, this study did not provide information on the relevant scale's mean and standard deviation values. Therefore, the mean and standard deviation values obtained from the study by Graham-Wisener et al. (2022), which used the "Death Literacy Index", were considered for sample calculation. Accordingly, with a power of 95%, alpha and beta error values of 0.05 were used for sample calculation, and the sample size was calculated as a total of 405 individuals. However, considering the possibility of missing or incorrect data entries by participants, the research was completed by reaching 418 individuals. The inclusion criteria for the study were as follows: being over 18 years of age, being able to read and understand Turkish, having access to the internet and a smartphone or computer to fill out the online survey, being willing to participate in the research.

Dependent and independent variables

The independent variables of this study are age, gender, income, education level, witnessing the death or terminal illness of a family member or close relative, and the difficulty of discussing death with individuals in the terminal stages of life or their relatives. The dependent variable is the death literacy index and its subdimensions.

Procedures

Before starting data collection, the comprehensibility of the data collection forms was evaluated by conducting a pilot study with ten individuals to ensure clarity of all parts. Individuals who participated in the pilot study were not included in the real data. The data collection form was implemented using the snowball sampling method via the Google Forms platform online. In the snowball sampling method, initially, contact was made with one unit of the population, and with the help of this unit, contact was made with a second unit, and so on, until the desired sample size was reached, resembling the growth of a snowball (Parker et al., 2019). The survey was distributed to participants through social media and individual connections. Data collection took approximately 10-15 minutes.

Data collection instruments

The "Personal Information Form" and “Death Literacy Scale” were used to collect data.

Personal information form

The form, created by researchers following a review of the literature, includes questions about participants' sociodemographic characteristics (age, gender, income, education level), as well as whether they have witnessed the death or terminal illness of a family member or close relative. Additionally, it inquires whether participants find it challenging to discuss death with individuals or their relatives who are in the terminal stages of life.

Death literacy index

The scale was developed in Australia by Leonard et al. in 2020 and adapted into Turkish by Semerci et al. in 2024. The scale consists of 29 items and four subscales. The first and fourth subscales are divided into two sub-dimensions each. The subscales are as follows: 1. Practical knowledge (8 items): a) Talking support (4 items) pertains to the ease or difficulty an individual perceives when discussing death, dying, and grieving with friends and family. b) Hands-on care (4 items) concerns the ease or difficulty an individual perceives when providing physical care to someone dying. 2. Experiential knowledge (5 items): This relates to how accurately a person perceives their experiences of death, bereavement, and other life-threatening situations. 3. Factual knowledge (7 items): This refers to a person's understanding of and involvement in death-related issues and the necessary steps to be taken after someone's passing. 4. Community knowledge (9 items): a) Accessing help (5 items): Knowing how to access community services and support systems to seek help for dying individuals, caregivers, and those grieving. b) Community groups (4 items): This indicates whether any support groups are available to provide physical or emotional support for dying individuals, caregivers, and those grieving. The items in the scale are rated on a five-point Likert scale. There are no reverse-coded items in the scale-scores on the scale range from a minimum of 29 points to a maximum of 145 points. An increase in the total score obtained from the Death Literacy Scale indicates a higher level of death literacy among individuals. The Cronbach's alpha value of the adapted scale in Turkish was 0.90 (Semerci et al., 2024). In the present study, the internal consistency coefficient was calculated as 0.85, indicating high reliability.

Statistical analysis

The data were analyzed using the SPSS Windows 21.0 software package. Descriptive statistics were used for descriptive variables: frequency, percentage, mean ± standard deviation, and minimum-maximum values. Kurtosis and skewness values were used to determine whether the data were normally distributed, with values between +2 and -2 considered suitable for normal distribution (George & Mallery, 2019). Pearson correlation was used to assess the relationship between the Death Literacy Scale and its subscale scores with independent variables. Independent sample t-test and one-way analysis of variance (ANOVA) tests were performed to compare participants' Death Literacy Scale and its subscale scores by sociodemographic characteristics. A significance level of $p<0.05$ was accepted for statistical significance.

Ethical approval

The research was conducted following ethical principles based on the Helsinki Declaration. Ethical approval was obtained from a University's Non-Interventional Research Ethics Committee. Participants were provided with necessary information about the research topic, purpose, and process on the first page of the online survey, and their consent to participate in the research was obtained.

RESULTS

Four hundred eighteen individuals (200 healthcare professionals and 218, not healthcare professionals) participated in this study. Of those, 74.6% are female, 73.4% have bachelor's or graduate degrees, and 35.6% have lower incomes than their expenses. The average age of the participants is 33.94±9.62 years. Of the participants, 74.2% have witnessed the death and final stages of illness of a family member or close relative, 72.0% have difficulties discussing death with terminally ill individuals, and 63.9% struggle to talk about death with relatives of patients (Table 1).

Although not depicted in the table, 16.0% of healthcare professionals have expressed difficulties in providing care for dying patients and touching them. Among healthcare professionals, 78.0% are nurses/midwives, and 26.0% work in intensive/palliative care, with an average professional experience of 13.16±9.2 years. Furthermore, 52.7% of non-healthcare professionals are civil servants.

Participants' mean total DLI and subscale scores were as follows: the mean total DLI score is 93.11±13.93; the practical knowledge subscale score is 22.07±6.19; the communication support subscale score is 10.43±3.41; the applied care subscale score is 11.65±4.35; the experiential knowledge subscale score is 20.01±3.26; the factual knowledge subscale score is 21.89±5.81; the community knowledge subscale score is 29.13±5.92; the access to assistance subscale score is 17.78±3.89, and the community groups subscale score is 11.35±3.59 (Table 2).

The results of comparing the total DLI and subscale scores between individuals who are healthcare professionals and those who are not show that there are statistically significant differences in practical knowledge ($p\leq0.001$), applied care ($p\leq0.001$), factual knowledge ($p\leq0.001$), community knowledge ($p=0.047$) subscales and the total DLI score ($p\leq0.001$). However, no statistically significant differences were found between healthcare professionals and non-healthcare professionals in speech support ($p=0.828$), experiential knowledge ($p=0.224$), community support groups ($p=0.199$), and access to assistance ($p=0.066$) subscales scores.

Table 1. Sociodemographic characteristics of the participants (n=418).

Variables		
Age (years) (Mean±SD)		33.94±9.62 (min:20- max:64)
	n	**(%)**
Gender		
Woman	312	74.6
Man	106	25.4
Perceived income status		
Income is less than expenses	149	35.6
Income equals expenses	198	47.4
Income exceeds expenses	71	17.0
Educational status		
Primary school	10	2.4
Middle school	5	1.2
High school	67	16.0
Associate's degree	29	6.9
Bachelor's or graduate degree	307	73.4
Witnessing her death and the last stages of her illness from her family/relatives		
Yes	310	74.2
No	108	25.8
Difficulty talking about death with individuals at the end of life		
Yes	301	72.0
No	117	28.0
Individuals in the last period of life have difficulty talking about death with their relatives		
Yes	267	63.9
No	151	36.1
Total	418	100.0

While no significant relationship was found between participants' age and the mean total score of DLI, speech support, applied care, community knowledge, access to assistance, and community support groups subscales mean score (p>0.05), there was a negative, low-level significant correlation between experiential knowledge (r=-0.101, p=0.039) and factual knowledge sunscales mean score (r=-0.106, p=0.031) and age. No significant relationship was found between healthcare professionals' years of work experience and the mean total DLI and subscales scores (p>0.05).

Table 2. Distribution of participants' death literacy total and sub-scale mean scores (n=418).

Variables	Mean±SD	Median	Min	Max
Practical Knowledge	22.07 ±6.19	22.00	8	40
Talking support	10.43±3.41	10.00	4	20
Doing hands-on care	11.65±4.35	11.00	4	20
Experiential knowledge	20.01±3.26	20.00	5	20
Factual Knowledge	21.89±5.81	22.00	7	35
Community Knowledge	29.13±5.92	30.00	9	45
Accessing help	17.78±3.89	19.00	5	25
Community support groups	11.35±3.59	12.00	4	20
DLI Total	93.11±13.93	93.00	40	129

Abbreviations: DLI, Death Literacy Index

Additionally, it was found that the mean total DLI and subscales scores among healthcare professionals did not significantly differ by the department they work in (p>0.05). The mean DLI and subscales scores were not significantly different by participants' education level, income status, or whether they witnessed the death and final stages of illness of a family member or close relative (p>0.05).

However, the mean speech support (t=-3.098, p=0.002) and experiential knowledge (t=2.489, p=0.013) subscale scores were significantly differed by the gender.

When the mean total DLI and subscale scores were compared by participants' difficulty in discussing death with individuals in the final stages of life, statistically significant differences were found in total DLI (t=-5.308, p=0.001), practical knowledge (t=-6.772, p=0.001), speech support (t=-6.613, p=0.001), applied care (t=-4.229, p=0.001), and factual knowledge (t=-3.927, p=0.001) subscale scores. Additionally, regarding participants' difficulty in discussing death with relatives of individuals in the final stages of life, statistically significant differences were found in practical knowledge (t=-6.123, p=0.001), speech support (t=-5.513, p=0.001), applied care (t=-4.256, p=0.001), factual knowledge (t=-3.494, p=0.004) subscales and the total DLI mean score (t=-4.981, p=0.001) (Table 3).

Table 3. Comparison of Death Literacy Index total and subscales score by sociodemographic characteristics (n=418)

Variables	Practical knowledge Mean (SD)	Talking support Mean (SD)	Doing hands-on care Mean (SD)	Experiential knowledge Mean (SD)	Factual knowledge Mean (SD)	Community knowledge Mean (SD)	Community support groups Mean (SD)	Accessing help Mean (SD)	DLI Mean (SD)
Gender									
Woman	21.91±6.30	10.13±3.29	11.78±4.43	20.24±3.25	21.96±5.79	29.26±6.11	11.34±3.60	17.93±3.97	93.37±14.13
Male	22.56±5.85	11.31±3.61	11.25±4.11	19.33±3.18	21.69±5.90	28.75±5.33	11.41±3.56	17.35±3.62	92.33±13.36
	t*=-0.937	t=-3.098	t=1.070	t=2.489	t=0.407	t=0.772	t=-.0.171	t=1.335	t=0.639
	p=0.349	**p=0.002**	p=0.285	**p=0.013**	p=0.684	p=0.440	p=0.864	p=0.183	p=0.509
Education									
Primary school	18.10±4.28	8.80±2.48	9.30±3.09	20.20±3.58	19.70±6.01	26.30±7.46	11.50±4.47	14.80±4.75	84.30±13.52
Middle school	19.80±6.14	10.80±2.28	9.00±4.35	22.60±1.81	20.60±7.82	30.40±3.04	12.60±1.67	17.80±3.03	93.40±13.52
High school	21.98±5.69	10.36±3.24	11.63±3.79	20.63±2.79	21.75±5.15	30.00±5.89	11.60±3.61	18.40±3.61	94.35±12.36
Associate's degree	22.72±5.27	10.10±4.20	12.62±3.90	21.17±3.83	24.17±6.34	29.20±6.13	10.97±3.73	18..24±4.15	97.27±14.03
Bachelor's or graduate degree	22.20±6.40	10.53±3.41	11.68±4.52	19.71±3.26	21.79±5.84	29.01±5.88	11.31±3.58	17.70±3.88	92.72±14.18
	F**=0.320	F=0.719	F=0.320	F=3.009	F=1.571	F=1.019	F=0.324	F=2.046	F=1.854
	p=0.262	p=0.579	p=0.262	**p=0.018**	p=0.181	p=0.397	p=0.862	p=0.087	p=0.118
Occupation									
Health personnel	23.54±6.36	10.40±3.47	13.15±4.33	20.21±3.01	23.24±5.30	29.74±5.94	11.59±3.54	18.15±3.71	96.73±13.24
Non-medical personnel	20.73±5.72	10.47±3.36	10.27±3.90	19.82±3.46	20.65±6.00	28.58±5.86	11.14± 3.63	17.45±4.02	89.79±13.75
	t=-4,755	t=0.218	t=-7.156	t=-1.219	t=-4.646	t=-1.995	t=-1.287	t=-1.843	t=-5.242
	p=0.001	p=0.828	**p=0.001**	p=0.224	**p=0.001**	**p=0.047**	p=0.199	p=0.066	**p=0.001**
Income status									
Income is less than expenses	21.31±5.84	10.17±3.28	11.14±4.29	19.95±3.27	21.51±6.21	28.44±6.51	11.09±3.66	17.36±4.30	91.22±14.60
Income equals expenses	22.70±6.61	10.55±3.56	12.15±4.53	20.05±3.28	22.16±5.44	29.49±5.69	11.51±3.52	17.99±3.74	94.40±13.82
Income exceeds expenses	21.94±5.53	10.65±3.26	11.30±3.86	20.01±3.20	21.92±6.00	29.59±5.15	11.48±3.67	18.11±3.32	93.46±12.48
	F=2.164	F=0.684	F=2.583	F=0.034	F= .533	F=1.578	F= .607	F=1.435	F=2.249
	p=0.116	p=0.505	p=0.077	p=0.966	p=0.587	p=0.208	p=0.546	p=0.239	p=0.107
Witnessing his death and the last period of his illness from his family/relatives									
Yes	22.19±6.10	10.56±3.19	10.63±4.39	20.02±3.25	21.91±5.76	29.09±6.08	11.29±3.56	17.81±3.92	93.21±13.76
No	21.75±6.44	10.06±3.79	10.70±4.26	19.97±3.28	21.81±6.00	29.25±5.47	11.25±3.68	17.71±3.81	92.80±13.77
	t=0.623	t=1.336	t=-0.160	t=.129	t=0.151	t=-0.245	t=-0.645	t=.222	t= .265
	p=0.534	p=0.182	p=0.873	p=0.897	p=0.880	p=0.806	p=0.519	p=0.824	p=0.791
Difficulty talking about death with individuals at the end of life									
Yes	20.36±5.71	9.78±3.09	11.09±4.19	19.99±3.20	21.20±5.92	28.87±6.03	11.15±3.63	17.73±4.03	90.92±14.03
No	25.20±6.30	12.12±3.62	13.09±4.46	20.06±3.40	23.65±5.13	29.82±5.14	11.89±3.43	17.93±3.51	98.73±12.03
	t=-6.772	t=-6.613	t=-4.229	t=-.206	t=-3.927	t=-1.469	t=-1.903	t=-.481	t=-5.308
	p=0.001	**p=0.001**	**p=0.001**	p=0.837	**p=0.001**	p=0.143	p=0.058	p=0.631	**p=0.001**
Individuals in the last period of life have difficulty talking about death with their relatives.									
Yes	20.74±5.60	9.76±3.12	10.98±4.09	19.87±3.32	21.15±5.67	28.87±6.16	11.24±3.66	17.63±4.00	90.62±13.67
No	24.44±6.49	11.62±3.59	12.83±4.57	20.26±3.14	23.19±6.42	29.60±4.89	11.56±3.46	18.05±3.69	97.50±13.34
	t=-6.123	t=-5.513	t=-4.256	t=-1.184	t=-3.494	t=-1.122	t=-0.865	t=-1.060	t=-4.981
	p=0.001	**p=0.001**	**p=0.001**	p=0.237	**p=0.001**	p=0.222	p=0.388	p=0.290	**p=0.001**

DISCUSSION

In this study, the level of death literacy among adult individuals was examined, and whether being a healthcare professional is a factor affecting death literacy and other factors influencing individuals' death literacy levels were examined. The results of this study showed that the participants have a moderate level of death literacy. Participants who were healthcare professionals had significantly higher levels of practical knowledge, applied care, factual knowledge, community knowledge, and overall death literacy level. However, there was no significant difference in death literacy levels between healthcare professionals and other participants regarding speech support, experiential knowledge, community support groups, and access to assistance. In this study, it is unsurprising that healthcare workers have higher general death literacy levels than other participants. This includes their ability to discuss death with friends or family, provide physical care to dying individuals, understand death-related topics, and know what needs to be done after someone passes away. Additionally, they are more aware of the need for assistance and support for caregivers and individuals in the grieving process and how to access this support. These topics are typically within the scope of healthcare professionals' job descriptions, which could explain their higher scores in death literacy in these areas. Consistent with our findings, a study by Johansson et al. (2023) also found that working in healthcare is significantly associated with death literacy (Johansson et al., 2023). However, general aspects of death literacy, such as discussing death and mourning with one's own family and friends, perceptions and experiences regarding death, mourning, and other life-threatening situations, as well as accessing support groups for individuals who have passed away in the area (including the mourning process), were not found to differ between healthcare professionals and non-healthcare professional participants significantly. These results indicate that professional roles and responsibilities, such as providing care for the dying and counseling for the families of patients, which are inherent to healthcare professionals, do not necessarily influence individual experiences related to death literacy. Consistent with our findings, other studies have also shown that healthcare professionals struggle with end-of-life decisions and discussions about death with patients and their families (Gül et al., 2022; Brown, 2019). This may be due to healthcare workers' fears, lack of experience, training deficiencies, individual experiences, and communication issues related to discussing death (Brown, 2019). Furthermore, the level of talking support score, which pertains to the ease or difficulty an individual perceives when discussing death, dying, and grieving with friends and family, was the lowest area of death literacy among all participants. Future qualitative studies may help to explore the reasons behind lower death literacy regarding talking about death and further interventions developed with public and healthcare professionals can be used to improve death literacy especially regarding talking about death. With the increase in life expectancy, the quality of end-of-life care has become a significant public health issue in recent years (Ceylan et al., 2022). Death literacy stands out as one of the crucial factors influencing the quality of end-of-life care (Li et al., 2023). Providing care to dying patients is emotionally challenging for healthcare professionals, as well as for the patients and their families. However, healthcare professionals, who have been primarily trained to sustain life throughout their professional education, often find themselves ill-equipped to assist patients in the dying process.

Consequently, they may struggle to establish supportive relationships with patients and their families. Furthermore, healthcare workers often feel unprepared and inadequate in providing care for patients nearing death (Bal, 2018). It is noted that significant barriers to providing care to terminally ill patients include the distance of terminal care from the community and healthcare workers, inadequate training on end-of-life care and communication during their schooling, and feelings of helplessness experienced by healthcare workers when faced with death (Karakaya, 2019). A high level of death literacy among healthcare professionals helps alleviate feelings of inadequacy, helplessness, anxiety, guilt, failure, and grief when caring for dying patients and communicating with them. This contributes positively to the working lives of healthcare professionals and, consequently, benefits society as a whole. Therefore, incorporating death literacy content into pre-graduate curricula and including it as part of in-service training as continuous education after graduation is crucial to enhancing the death literacy level among healthcare professionals. In addition to being healthcare professionals, when examining other factors influencing death literacy, it has been found that men have a higher awareness of death, dying, and mourning discussions, while women have a better understanding of death, mourning, and other life-threatening situations. In the study where the Death Literacy Index was developed, it was revealed that certain sociodemographic variables, such as advanced age, having children, and religious beliefs, are associated with death literacy (Leonard et al., 2021, 2020). Johansson et al. (2023) found that age, gender, education, marital status, spiritual beliefs, experience in caring for patients in the end-of-life period, and experience in providing support to bereaved relatives after death influence death literacy among adult individuals. Death literacy competency is a public health issue requiring all individuals' participation, particularly healthcare professionals. Developing death literacy is of great importance for promoting dignified end-of-life care and ensuring a sustainable healthcare system

(Sallnow et al., 2022). The aim of enhancing death literacy is to empower individuals to recognize and manage the suffering of dying individuals. This contributes to reducing mental health issues associated with the grieving process, such as depression. Additionally, it allows individuals to learn where and when they can seek support when they have a dying loved one. Increasing awareness of access to end-of-life healthcare services helps patients spend their final moments pain-free, peacefully, and comfortably (Noonan et al., 2016; Laranjeira et al., 2022).

Study Limitations and Strengths

This study employs a descriptive design; therefore, the causal relationship between the variables could not be examined. In the future, different types of studies should be conducted to understand the causal relationships between the variables. To expedite and streamline participant recruitment for the study, the snowball sampling method, a non-probability sampling technique, was employed. Nevertheless, the generalizability of this sampling method is comparatively lower than that of studies employing probability sampling methods. Additionally, although the instruments used in this study had good reliability and validity, self-reporting has been considered a limitation.

CONCLUSION

The study concludes that adults have a moderate level of death literacy, with healthcare professionals showing a much stronger factual and practical understanding regarding death literacy. The results imply that professional experience improves death literacy in some ways, but it has little effect in other areas, such as community support and speech support. This suggests that there are various factors associated with death literacy. Future studies should examine how community resources and individual experiences influence death literacy in various demographic groups. Developing comprehensive educational programs that cover theoretical knowledge and practical support systems is essential to improving death literacy across all communities.

Acknowledgements

We would like to thank all participants who contributed to the study.

Conflict of Interest

None

Author Contributions

Plan, design: SC; **Material, methods and data collection:** SC; **Data analysis and comments:** SC, GB; **Writing and corrections:** SC, GB.

Funding

None

Ethical Approval

Institution: Koç University Ethics Committee
Date: 06.10.2022
Approval no: 2022.334.IRB3.150

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ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1607005

Factors Affecting Colleague Solidarity and Job Satisfaction in Midwifery

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Geliş Tarihi / Received: *27.12.2024,* ***Kabul Tarihi / Accepted:*** *04.06.2025*

ABSTRACT

Objective: This study was conducted to determine the factors affecting colleague solidarity and job satisfaction in midwives working in public hospitals in Türkiye. **Materials and Methods:** This cross-sectional descriptive study was conducted between 02.12.2020 and 02.06.2021 by applying an online survey to midwives. Data were collected with a personal information form, Colleague Solidarity Among Nurses Scale, and the Minnesota Satisfaction Scale. The study included 411 midwives. **Results:** It was found that 56.4% of the midwives participating in the study scored higher than the mean score (100.23±8.0) on the Colleague Solidarity Among Nurses Scale, suggesting that there was colleague solidarity among them. It was determined that intrinsic satisfaction (3.47±0.7) and general job satisfaction (3.24±0.7) of the participants were high, while their extrinsic job satisfaction score (2.90±0.7) was at a low level. Age and the average number of patients given daily care affected the total colleague solidarity score, while age, marital status, midwifery experience period, reason for choosing the unit, choosing the profession willingly, and workload levels were the factors affecting job satisfaction. **Conclusion:** The study found that there was high colleague solidarity among midwives, and a significant positive relationship between colleague solidarity and work solidarity. Midwives received the highest score in the emotional solidarity dimension. Improving the working conditions of midwives, who have an important role in the development of women's and community health, strengthening their relations with managers and colleagues, and developing strategies to increase job satisfaction can increase the quality of midwifery services and the welfare level of community well being.

Keywords: Midwife, Midwifery, Job satisfaction, Colleague solidarity.

Ebelikte Meslektaş Dayanışması ve İş Doyumunu Etkileyen Faktörler

ÖZ

Amaç: Bu araştırma, Türkiye'deki kamu hastanelerinde çalışan ebelerde meslektaş dayanışması ve iş doyumunu etkileyen faktörlerin belirlenmesi amacı ile yapılmıştır. **Gereç ve Yöntem:** Tanımlayıcı, kesitsel tipte olan bu çalışma, 02.12.2020 ile 02.06.2021 tarihleri arasında, ebelere online anket uygulanarak gerçekleştirilmiştir. Veriler kişisel bilgi formu, Hemşirelerde Meslektaş Dayanışması Ölçeği ve Minnesota İş Doyumu Ölçeği kullanılarak toplanmıştır. Araştırmaya 411 ebe dahil edilmiştir. **Bulgular:** Araştırmaya katılan ebelerin %56.4'ü Hemşirelerde Meslektaş Dayanışması Ölçeği'nden (100.23±8.0) yüksek puan almıştır ve bu durum aralarında meslektaş dayanışmasının olduğunu göstermektedir. Katılımcıların içsel doyum (3.47±0.7) ve genel iş doyumunun (3.24±0.7) yüksek olduğu, dışsal iş doyum puanının (2.90±0.7) ise düşük olduğu belirlenmiştir. Yaş ve günlük bakım verilen ortalama hasta sayısı toplam meslektaş dayanışması puanını etkilerken, yaş, medeni durum, ebelik deneyim süresi, birimi seçme nedeni, mesleği isteyerek seçme ve iş yükü düzeyleri iş doyumunu etkileyen faktörler olmuştur. **Sonuç:** Çalışmada, ebeler arasında yüksek meslektaş dayanışması olduğu ve meslektaş dayanışması ile iş dayanışması arasında anlamlı pozitif bir ilişki olduğu belirlenmiştir. Ebeler, duygusal dayanışma boyutunda en yüksek puanı almıştır. Kadın ve toplum sağlığının gelişmesinde önemli rolü olan ebelerin çalışma koşullarının iyileştirilmesi, yönetici ve meslektaşları ile ilişkilerinin güçlendirilmesi ve iş doyumunun artırılmasına yönelik stratejiler geliştirilmesi, ebelik hizmetlerinin kalitesini ve toplumun refah düzeyini artırabilir.

Anahtar Kelimeler: Ebe, Ebelik, İş doyumu, Meslektaş dayanışması.

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Bu makaleye atıf yapmak için / Cite this article: Çatalgöl, Ş., Ergin, A., & Babadağlı, B. (2025). Factors affecting colleague solidarity and job satisfaction in midwifery. *BAUN Health Sci J, 14*(2), 391-399. https://doi.org/10.53424/balikesirsbd.1607005

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

Midwifery, a profession as old as human history, is a discipline that combines science and art and provides high-quality health care to mothers and newborns (Sönmez et al., 2023). In establishing the standards of the occupation and providing quality care, continuous cooperation of colleagues and workplace employees, and their being in solidarity and communication are highly important (Rezaee et al., 2023).

In the ethics codes recognized universally, an emphasis is based on the statement, "Midwives support each other in their professional roles and maintain this, and they actively nurture their own and others' self-value emotions"(International Confederation of Midwives, 2019). Harmony and colleague solidarity among employees in the workplace is important in terms of solving problems and increasing work efficiency (Kristoffersen et al., 2021).

Feeling that it is valued and supported by colleagues and managers can increase the job satisfaction of midwives (Evans et al., 2020). Determining workload problems, patient safety, and care quality and developing colleague relations can also increase employees' job satisfaction (Karlsson et al., 2019).

Although there has been an increase in the number of studies conducted on the job satisfaction of physicians and nurses among health professionals, very few studies on the job satisfaction of midwives have been encountered in the literature (Hampton & Peterson, 2012). High job satisfaction among midwives can ensure that in addition to the women they provide services for, pregnant women, puerperal, and neonates receive quality care (Yalnız & Saydam, 2015). In this research, we assumed a positive and significant relationship between colleague solidarity and job satisfaction in midwives, and we conducted to determine the factors affecting colleague solidarity and job satisfaction in midwives.

MATERIALS AND METHODS

Research type

This study was designed as a cross-sectional descriptive study. The survey design adhered to the Checklist for Reporting Results of Internet E-Surveys (CHERRIES) (Eysenbach, 2004).

Research sample

The research sample consisted of 411 midwives working in inpatient healthcare institutions across Türkiye. The study was carried out in 75 public hospitals (state hospitals, university hospitals, training and research hospitals) located in 50 provinces representing all seven geographical regions of Türkiye. To ensure regional representation, hospitals were selected from the Marmara, Aegean, Mediterranean, Central Anatolia, Black Sea, Eastern Anatolia, and Southeastern Anatolia regions. The sampling was designed to reflect a broad geographical distribution across the country.

We conducted this research with a simple random sampling method. The Turkish Statistical Institute (TUIK) reported that the number of midwives in Türkiye was 55,972, according to the 2021 data (TUIK,2021). The sample size was calculated as a minimum of 382 with 95% confidence interval and 5% error using Open Epi software Version 3 Instruments (Dean et al. 2013). Considering data loss, 478 midwives were reached. Due to inconsistent data submission, 67 participants were excluded and the study was completed with 411 midwives.

Inclusion criteria

Midwives were included in the study if they met all of the following conditions:

- Had at least one year of professional experience (to support the development of colleague solidarity and job satisfaction),
- Were between the ages of 18 and 60,
- Were actively working in inpatient healthcare institutions,
- Provided electronic informed consent to participate in the study.

Exclusion criteria

The following individuals were excluded from the study:

- Midwives who were not actively working during the data collection period (e.g., on leave, medical leave, or assigned to administrative duties),
- Those working in private hospitals or primary healthcare centers,
- Those who declined to provide informed consent,
- Those who submitted incomplete or inconsistent data.

Data collection

Research data were collected between December 2, 2020, and June 2, 2021, through an online survey administered via Google Forms. The survey link was distributed via email to midwives registered with professional midwifery associations.

Data tools

Data were collected with a personal information form, Colleague Solidarity Scale among Nurses (CSNS), and Minnesota Satisfaction Scale (MSQ).

Colleague Solidarity Among Nurses Scale

The scale developed by Uslusoy and Alpar in (2013a) to measure solidarity among nurses has 23 items and a 5-point Likert type. The scale has three subscales: "emotional solidarity", "academic solidarity" and "negative views on solidarity " (Uslusoy & Alpar, 2013a). Expert opinion was obtained that the scale could be used on midwives. The Cronbach's alpha reliability coefficients for the CSNS in this study were found to be: CSNS-Emotional Solidarity 0.78, CSNS-Academic Solidarity 0.76, CSNS-Negative Opinions About Solidarity 0.73, and CSNS-General Solidarity 0.82.

Minnesota Satisfaction Questionnaire

The scale developed by Weiss et al. (1967) (Weiss et al., 1967) was adapted into Turkish by Baycan (1985) by conducting validity and reliability studies (Baycan,

1985). MSQ is a 20-item scale that determines intrinsic, extrinsic and general satisfaction levels. Scores range from 1.0 to 5.0. The Cronbach's alpha reliability coefficients for the MSQ in this study were found to be: MSQ-Intrinsic Satisfaction 0.88, MSQ-Extrinsic Satisfaction 0.84, and MSQ-General Satisfaction 0.92.

Data analysis

All statistical analyses were conducted using SPSS 25.0. Descriptive statistics (mean, standard deviation, median, quartiles, frequency, percentage, min, max) were used for data analysis. Cronbach's alpha assessed internal consistency. Normality was tested with the Shapiro-Wilk test and graphical methods. For normally distributed data, independent t-tests were used for two-group comparisons and ANOVA with Bonferroni-adjusted pairwise comparisons for more than two groups. For non-normally distributed data, Kruskal-Wallis and Dunn-Bonferroni tests were applied.

Pearson correlation analysis was used to assess relationships between quantitative variables. Multivariable linear regression analyses were performed to identify the factors influencing the total scores of the MSQ and the CSNS. The statistical significance level was set as $p<0.05$.

Ethical approval

Ethics committee approval was received for this study from the ethics committee of Kocaeli University (Date: November 30, 2020, Number: 2020/20.16 2020/333). We conducted this research in accordance with the guidelines in the Declaration of Helsinki. We obtained permission from the authors to use the scales. Electronic informed consent was obtained from the participants in the study.

RESULTS

The mean age of the midwives was found to be 30.4 ±7.81 with a range of 18-58 years, and the other descriptive characteristics are given in Table 1.

A statistically significant negative relationship was found between participants' age and the CSNS Negative opinions subscale scores, with a correlation of -0.289 (r=-0.289, p<0.001).

CSNS negative opinions scores of the midwives with high school and associate degree were lower compared to those of the midwives with bachelor's degrees and graduate degrees (p=0.001) (Table 2).

The academic solidarity scores of those with midwifery experience of 21 years or more (p=0.010) and the CSNS negative opinion scores of those with 1-5 years of seniority were higher than the other groups (p=0.001). The negative opinion scores of midwives caring for 1-4 patients per day were lower than the other groups (p=0.01), and the total CSNS scores were higher than the other groups (p=0.049).

The participants had an average of MSQ intrinsic (3.47±0.7), extrinsic (2.90±0.7), and general job satisfaction score (3.24±0.7). We found that CSNS emotional solidarity score (40.29±3.3), academic solidarity score (39.51±3.8), negative thoughts score (20.43±33), and total scores (100.23±8.0) (Table 3).

A statistically significant negative relationship was found between participants' age and the MSQ subscale scores, with a correlation of -0.118 for intrinsic satisfaction (r=-0.118, p=0.017), -0.156 for extrinsic satisfaction (r=-0.156, p=0.002), and -0.142 for general satisfaction (r=-0.142, p=0.004).

Table 1. Socio-demographic Characteristics of the Midwives (n=411).

	Min-Max (Median)	Mean ± SD
Age	18-58 (27)	30.04±7.81
	n=411	**%**
Marital status		
Married	201	48.9
Single	210	51.1
Education level		
High school/Associate degree	22	5.3
Bachelor's degree	333	81.0
Graduate degree	56	13.6
Midwifery experience period (year)		
1-5	246	59.8
6-10	59	14.3
11-15	32	7.7
16-20	15	3.6
21 year and above	59	14.3
Average number of patients given daily care		
1-4	66	16.1
5-10	128	31.1
11-20	115	28.0
21-40	102	24.8
Choice of unit		
Due to assignment	184	44.8
Own choice	199	48.4
Various reason	28	6.8
Choosing the profession willingly		
Yes	341	83.0
No	70	17.0
Workload levels		
Light workload	6	1.5
Balanced workload	128	31.1
Heavy workload	277	67.4

MSQ intrinsic, extrinsic, and general satisfaction scores of the single midwives were higher than the scores of those who were married (p=0.001, p=0.001, p=0.001). MSQ intrinsic (p=0.001), MSQ extrinsic (p=0.008), and MSQ general satisfaction (p=0.001) scores of the midwives with 1-5 years of experience were higher than the the other groups. Midwives working in the unit due to the assignment had a higher average of MSQ intrinsic (p=0.001), extrinsic

(p=0.007) and general satisfaction (p=0.001) scores (Table 4).

MSQ intrinsic, extrinsic, and general satisfaction scores of the midwives who chose their profession willingly were higher (p=0.001, p=0.001, p=0.001). The intrinsic satisfaction score averages of midwives with a light workload were higher than those of midwives with a balanced and heavy workload (p=0.001). The MSQ extrinsic and general satisfaction scores were higher in the participants with a balanced workload than those with a light and heavy workload (p=0.001, p=0.001).

Table 2. Comparison of the Nurses' Colleague Solidarity Scale mean scores according to some sociodemographic characteristics of midwives.

CSNS	n	Emotional Solidarity Mean ± SD	Academic Solidarity Mean ± SD	Negative opinions on Solidarity Mean ± SD	Total Mean ± SD
Age	r	0.017	0.095	-0.289	-0.081
	p	0.725	0.054	0.001*	0.100
Marital Status					
Married	201	40.06±3.41	39.57±3.87	20.09±4.02	99.72±8.3
Single	210	40.51±3.34	39.45±3.81	20.76±3.43	100.71±7.8
[a]p		0.178	0.743	0.070	0.212
Educational Level					
High school/Associate degree	22	41.32±3.11	39.55±4.82	16.77±5.2	97,64±8,64
Bachelor's degree	333	40.2±3.43	39.3±3.9	20.57±3.55	100.07±8.13
Graduate degree	56	40.41±3.16	40.75±2.73	21.04±3.41	102.2±7.05
[b]p		0.269	0.057	0.001*	0.051
Midwifery experience period (year)					
1-5	246	40.37±3.34	39.38±3.84	21.21±2.90	100.96±7.64
6-10	59	39.51±3.48	39.24±3.51	20.27±3.65	99.02±8.20
11-15	32	40.38±3.38	39.25±4.48	18.5±4.43	98.13±9.66
16-20	15	39.80±2.60	38.00±3.02	19.67±3.98	97.47±6.61
≥21	59	40.80±3.57	40.85±3.73	18.58±5.24	100.22±8.72
bp		0.197	0.010*	0.001**	0.131
Average number of patients given daily care					
1-4	66	39.7±4.1	38.7±4.4	19.5±4	98±9.9
5-10	128	40.2±3.1	39.6±3.7	19.9±4.2	99.8±7.2
11-20	115	40.5±2.9	39.4±3.8	21.1±3.1	101.1±7.3
21-40	102	40.4±3.6	39.9±3.5	20.7±3.3	101.1±8.3
[c]p		0.518	0.299	0.010*	0.049*
Reason for choosing the unit					
Due to assignment	184	40.7±3.14	39.66±3.81	20.72±3.69	101.08±7.32
Own choice	199	40.03±3.39	39.3±3.87	20.33±3.77	99.65±8.43
Various reason	28	39.46±4.45	40±3.83	19.29±3.69	98.75±9.57
[c]p		0.060	0.519	0.145	0.136
Choosing the profession willingly					
No	70	39.63±3.18	38.91±3.91	20.29±3.49	98.83±7.89
Yes	341	40.43±3.41	39.63±3.82	20.46±3.79	100.52±8.07
[a]p		0.072	0.155	0.722	0.110
Workload levels					
Light workload	6	39 (38, 40)	39.5 (36, 42)	20 (19, 24)	99 (96, 100)
Balanced workload	128	41 (39, 43)	40 (36.5, 43)	21 (18, 23)	101(93.5,107)
Heavy workload	277	41 (38, 43)	40 (37, 43)	22 (19, 23)	102 (95, 107)
[b]p		0.178	0.986	0.172	0.536

r= Pearson correlation coefficient a: Independent samples t test, b:Kruskal-Wallis test, c: One-way analysis of variance ,*p<0.05 Workload levels results presented as median.

We identified a positive and significant relationship between the midwives' MSQ intrinsic satisfaction and CSNS emotional solidarity scores (r=0.35, p<0.001), and between MSQ intrinsic satisfaction and CSNS academic solidarity scores (r=0.20, p<0.001). There was a positive and significant relationship between the participants' MSQ intrinsic satisfaction and CSNS negative opinions scores (r=0.11, p=0.026) and between their MSQ intrinsic satisfaction and CSNS total mean scores (r=0.29, p<0.001), (Table 5).

We determined a positive and significant relationship between the participants' MSQ general satisfaction and CSNS emotional solidarity scores (r=0.35, p=0.001), between extrinsic satisfaction and CSNS academic solidarity scores (r=0.15, p=0.001), and between MSQ extrinsic satisfaction and CSNS total scores (r=0.25, p=0.001). There was a positive and significant relationship between the participants' MSQ general satisfaction and CSNS emotional solidarity scores (r=0.37, p=0.001), between MSQ general satisfaction and CSNS academic satisfaction scores (r=0.19, p=0.001), and between MSQ general satisfaction and CSNS total scores (r=0.29, p=0.001).

Table 3. Distribution of sub-dimensions and total scores of the Minnesota Job Satisfaction and Colleague Solidarity Nurses' Scales in midwives (n=411).

	Number of items	Min-Max (Median)	Mean ± SD	Internal consistency
MSQ-Intrinsic Satisfaction	12	1-4.92 (3.58)	3.47±0.7	0.88
MSQ–Extrinsic Satisfaction	8	1-4.75(3)	2.90±0.7	0.84
MSQ–General Satisfaction	20	1-4.8(3.3)	3.24±0.7	0.92
CSNS–Emotional Solidarity	9	23-45(41)	40.29±3.3	0.78
CSNS–Academic Solidarity	9	26-45(40)	39.51±3.8	0.76
CSNS– Negative Opinions About Solidarity	5	5-25(21)	20.43±3.7	0.73
CSNS–General Solidarity	23	65-115(101)	100.23±8.0	0.82

Regression analysis for CSNS total score

In order to determine the factors effective on CSNS total score, linear regression analysis was performed. Age, educational status, midwifery experience period, average number of patients given daily care, reason for choosing the unit, choosing the profession willingly, which were observed to have a significant and close to significant effect (p<0.200) on general satisfaction score in the univariate analyses, were included in the multivariate analysis as independent variables. Dummy variables were created for the subcategories of the categorical variables. Due to the high Variance Inflation Factor (VIF) value of educational level obtained as a result of the primary evaluation, this variable was excluded from the analysis.

As a result of the analysis, the model was found to be statistically significant, with an adjusted R^2 value of 0.028.(F=2.16, p<0.019, R2adj=0.028).

This indicates that the model accounted for approximately 2.8% of the total variance in CSNS scores. Although the proportion of explained variance was relatively low, the model still provides valuable insight into the predictors of CSNS.

It was determined that the midwives providing care to an average number of 11 to 20 patients per day led to an increase by 2.874 points in CSNS total score [Beta (%95 CI) = 2.87 (0.5, 5.3), p=0.020]. The midwives' providing care to an average number of 21 to 40 patients per day was determined to lead to an increase by 2.8 points in CSNS total score [Beta (%95 CI) = 2.8 (0.28, 5.32), p=0.020].

Regression analysis for MSQ general satisfaction score

A linear regression analysis was conducted to identify the factors influencing the overall satisfaction score on the MSQ. In the univariate analyses, variables that showed significant or near-significant associations with overall satisfaction (p<0.200), including age, marital status, midwifery experience period, reason for choosing the unit, choosing the profession willingly, and workload levels, were included as independent variables in the multivariate analysis. Dummy variables were created for the subcategories of categorical variables. Based on the initial evaluation, age and workload levels were excluded from the analysis due to high VIF values. The regression model was found to be statistically significant, with an adjusted R^2 of 0.090 (F = 5.042, p < 0.001, R^2adj = 0.090).

It was determined that being single led to an increase by 0.362 point in MSQ general satisfaction score [Beta (%95 CI) = 0.36 (0.18, 0.54), p<0.001]. Working in the current unit due to other causes was determined to cause a decrease by 0.47 in MSQ general satisfaction score [Beta (%95 CI) =-0.47 (-0.74, -0.20), p=0.001]. Having chosen the profession willingly was found to lead to an increase by 0.34 point in MSQ general satisfaction score [Beta (%95 CI) = 0.34 (0.17, 0.52), p<0.001].

The model was found to be statistically significant and explained approximately 9% of the variance in the overall MSQ satisfaction score (Adjusted $R^2 = 0.090$). This indicates that the independent variables included in the model collectively account for about 9% of the variation in the general satisfaction levels reported by participants.

Table 4. Comparison of Minnesota Job Satisfaction Scale Scores and Some Variables in Midwives (n=411).

MSQ	n	Intrinsic Satisfaction Mean ± SD	Extrinsic Satisfaction Mean ± SD	General Satisfaction Mean ± SD
Age				
	r	-0.118	-0.156	-0.142
	p	0.017*	0.002*	0.004*
Marital Status				
Married	201	3.34±0.6	2.73±0.7	3.09±0.7
Single	210	3.6±0.6	3.07±0.7	3.39±0.67
[a]p		0.001*	0.001*	0.001*
Educational Level				
High school/Associate degree	22	3.42±0.58	2.82±0.76	3.18±0.59
Bachelor's degree	333	3.48±0.71	2.92±0.81	3.25±0.71
Graduate degree	56	3.46±0.67	2.84±0.71	3.21±0.64
[b]p		0.724	0.597	0.575
Midwifery experience period (year)				
1-5	246	3.56±0.72	3.01±0.81	3.34±0.72
6-10	59	3.24±0.62	2.67±0.73	3.01±0.62
11-15	32	3.29±0.73	2.84±0.74	3.11±0.71
16-20	15	3.48±0.48	2.78±0.49	3.2±0.41
≥21	59	3.42±0.62	2.76±0.79	3.15±0.66
[b]p		0.001*	0.008*	0.001*
Average number of patients given daily care				
1-4	66	3.44±0.7	2.96±0.7	3.25±0.7
5-10	128	3.52±0.6	2.91±0.7	3.28±0.6
11-20	115	3.44±0.6	2.88±0.7	3.22±0.6
21-40	102	3.47±0.7	2.88±0.8	3.23±0.7
[c]p		0.790	0.899	0.914
Reason for choosing the unit				
Due to assignment	184	3.58±0.6	2.96±0.7	3.33±0.6
Own choice	199	3.43±0.6	2.91±0.7	3.22±0.6
Various reason	28	3.06±0.9	2.46±0.8	2.82±0.8
[c]p		0.001*	0.007*	0.001*
Choosing the profession willingly				
No	70	3.2±0.7	2.57±0.8	2.95±0.7
Yes	341	3.53±0.6	2.97±0.7	3.3±0.6
[a]p		0.001*	0.001*	0.001*
Workload levels				
Light workload	6	3.83 (3.4, 4.2)	2.69 (2.3, 3.2)	3.4 (3, 3.9)
Balanced workload	128	3.75 (3.4, 4)	3.25 (2.7, 3.7)	3.6 (3.2, 3.9)
Heavy workload	277	3.42 (3, 3.8)	2.75 (2.1, 3.3)	3.15 (2.7, 3.6)
[b]p		0.001*	0.001	0.001*

r: Pearson correlation coefficient, a: Independent samples t test, b: Kruskal-Wallis test,
c: One-way analysis of variance, *p<0.05 Workload levels results are presented as median.

Table 5. Relationship levels between Colleague Solidarity Nurses' Scale and Minnesota Job Satisfaction Scale scores in midwives (n=411).

MSQ		Intrinsic Satisfaction	Extrinsic Satisfaction	General Satisfaction
CSNS Emotional Solidarity	r	0.35	0.35	0.37
	p	0.001*	0.001*	0.001*
CSNS Academic Solidarity	r	0.20	0.15	0.19
	p	0.001*	0.001*	0.001*
CSNS Negative Opinions About Solidarity	r	0.11	0.05	0.09
	p	0.026*	0.277	0.067
CSNS Total Solidarity	r	0.29	0.25	0.29
	p	0.001*	0.001*	0.001*

r: Pearson correlation coefficient, *p<0.05

DISCUSSION

This study is, to the best of our knowledge, the first to use the CSNS which measures solidarity among nurses in Türkiye on midwives. The same scale was previously used in 2021 on pharmacists in Türkiye (Şahne et al. 2021).

In our study, 56.4% of the 411 midwives scored above the total mean score of the CSNS, while 43.6% scored below it. Similarly, in the study conducted by Uslusoy and Alpar (2013b), 53.6% of the 300 nurses scored above the mean score, 40% scored below the mean score, and 6.4% scored equal to the mean score (Uslusoy & Alpar, 2013b). This finding is similar to our study, and it is seen that a significant portion of the participants in both studies exhibited different levels of colleague solidarity. This situation shows that collegiality among health professionals is not always homogeneous, that this solidarity is shaped by individual and group dynamics, and that it has a significant effect on job satisfaction. In addition, it was observed in both studies that groups with high collegiality had higher levels of job satisfaction. This finding reveals that collegiality is not only a "support" element, but also an important factor that increases job satisfaction and general happiness levels in the workplace.

In the present study, a negative relationship was found between the participants' ages and their CSNS negative opinion scores. Based on the research findings, it can be stated that older midwives held fewer negative opinions about their profession.

Our study results indicate that midwives with a high school/associate degree scored lower on the CSNS negative opinions subscale related to solidarity compared to those with a bachelor's or graduate degree. Similarly, Uslusoy and Alpar (2013b) also reported lower scores on this subscale among high school graduates compared to other educational groups (Uslusoy & Alpar, 2013b).

According to the results of the study, midwives with 21 years or more of experience had higher CSNS academic solidarity scores, while those with 1-5 years of seniority had higher CSNS negative opinion scores compared to the other groups. This finding indicates that as the duration of experience increases, academic solidarity strengthens and negative professional opinions decrease. Experienced midwives may be less affected by negative opinions because they have more confidence in their profession. Additionally, extensive experience may enhance their ability to cope with professional challenges, allowing them to build more positive relationships with colleagues and increase solidarity.

In the present study, it was determined that midwives who provided care to an average of 1-4 patients per day had lower CSNS negative opinion scores and total solidarity scores compared to those who cared for more patients daily. This may suggest that the midwives with less workload had fewer negative opinions.

It was revealed in the study that the intrinsic satisfaction scores and general job satisfaction scores of the midwives were high, and their extrinsic satisfaction scores were low. The components of the extrinsic satisfaction dimension are made up of various elements related to work environments such as business policy and management, managers, relations with colleagues and subordinates, working conditions, and salary. The dissatisfaction of the midwives in this dimension may have resulted from factors such as heavy working conditions, a decrease in resting periods, and fear of infection experienced during the pandemic period. Khavayet et al. (2018) found that the job satisfaction levels of midwives working in hospitals are low (Khavayet et al., 2018). Ertekin-Pınar et al. (2017) reported that the extrinsic and general satisfaction of nurses and midwives was moderate (Ertekin-Pinar et al., 2017).

The similarities and differences between the studies carried out on the national and international scale can be thought to have resulted from the countries' healthcare systems, the features of the study samples, and conditions specific to the pandemic.

When the job satisfaction scores of the participants were analyzed in terms of some descriptive variables, significant differences were observed. Participants with 1–5 years of professional experience reported the

highest intrinsic, extrinsic, and overall job satisfaction scores compared to other experience groups.

The findings suggest that the relationship between job satisfaction and professional experience may follow a non-linear trajectory. Participants with lower levels of experience reported higher job satisfaction, possibly due to reduced exposure to burnout and work-related fatigue. In contrast, Jarosova et al. (2016) found that midwives with 26–30 years of experience had higher job satisfaction compared to other groups, which may reflect increased professional stability, role clarity, and adaptation over time. (Jarosova et al., 2016). In our study, single participants were determined to have higher job satisfaction scores compared to married ones. Jung and Kim (2020) reported comparable results in their study (Jung & Kim, 2020).Higher job satisfaction among single participants may be due to fewer family responsibilities and reduced work-life conflict compared to their married counterparts.

In our study, the job satisfaction scores of the midwives who chose the unit they worked on due to assignment and who chose the profession willingly were found to be higher. Similarly, in Şahan's study (2021), the job satisfaction scores of the midwives who chose their profession willingly were determined to be significantly high (Şahan, 2021). The individual's conscious and willing choice of their profession is an important factor that increases job satisfaction (Evans et al., 2020). In our study, the extrinsic and general satisfaction scores of the midwives who had a balanced workload and the intrinsic satisfaction scores of those who had a light workload were found to be high. Working at organizations that have heavy workload will diminish the midwives' ability to provide quality care or to reflect their philosophy of care. Therefore, appropriate planning of the midwives' working hours, shift systems, and cases and workload is important in terms of the efficient provision of midwifery services (Matthews et al., 2022).

The study found that there was high colleague solidarity among midwives, and a significant positive relationship between colleague solidarity and work solidarity. Midwives received the highest score in the emotional solidarity dimension. This result supported our hypothesis that "there is a positive and significant relationship between colleague solidarity and job satisfaction in midwives." In all studies reviewed, it has been emphasized that midwives who feel supported well by their colleagues have an increased level of job satisfaction (Rezaee et al., 2023; Sheehy et al., 2021; Bloxsome et al., 2019; Jasiński & Derbis, 2023).

Limitations of the Study

This research was limited to midwives working in public hospitals in Türkiye; therefore, the findings cannot be generalized to midwives working in private hospitals or different healthcare institutions. The use of the online survey method for data collection may have limited the participation of individuals without internet access or those with low motivation to complete the survey. Additionally, since the study has a cross-sectional design, it is not possible to establish cause-and-effect relationships.

CONCLUSION

It was revealed that approximately 56.4% of the participants scored above the average on the CSNS, indicating a notable level of colleague solidarity among them. In general, it was determined that the participants' intrinsic job satisfaction and general job satisfaction levels were high, but their extrinsic job satisfaction scores were low. Age and the average number of patients given daily care affected the total colleague solidarity score, while age, marital status, midwifery experience period, reason for choosing the unit, choosing the profession willingly, and workload levels were the factors affecting job satisfaction. There was a positive and significant relationship between job satisfaction and colleague solidarity, and emotional solidarity ranked first in providing job satisfaction. According to the results of the study, it would be useful to improve the working conditions of midwives, strengthen their relationships with managers and colleagues, and develop strategies to increase job satisfaction.

Acknowledgment

We would like to thank the midwives who participated in the study.

Conflict of Interest

The authors have no conflicts of interest to declare.

Author Contributions

Plan, design: ŞÇ, AE, BB; **Material, methods and data collection:** ŞÇ, AE; **Data analysis and comments:** ŞÇ, AE **Writing and corrections:** ŞÇ, AE, BB.

Funding

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

Ethical Approval

Institution: Ethics committee approval was received for this study from the Ethics Committee of Kocaeli University

Date: November 30, 2020,

Approval no: GOKAEK- 2020/20.16 2020/333

We conducted this research in accordance with the guidelines in the Declaration of Helsinki.

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ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1646830

The Relationship between Nurses Nepotism Perceptions and Job Motivation*

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Geliş Tarihi / Received: *27.02.2025,* ***Kabul Tarihi / Accepted:*** *09.06.2025*

ABSTRACT
Objective: This study aimed to determine the relationship between nurses' perceptions of nepotism and their job motivation. **Method:** A descriptive and correlational design was applied for the study. The sample size was calculated as 198 with a confidence level of 95% and a margin of error of 5%. The data of this study were collected by the researcher from 266 nurses between January 2023 and September 2023. Personal Information Form"," Nepotism Scale" and "Nurse Job Motivation Scale "were used as data collection tools. In order to conduct the research, ethics committee approval and informed voluntary consent form were obtained from the participants. **Results:** When the findings are examined, the Nepotism Scale scores of the participants in the study are 4.75±1.07. Nurse Job Motivation Scale scores are 61.38±9.58. When the relationships between the two scales are examined, there is a statistically significant low level negative relationship between the Nepotism Scale general scores, Promotion Nepotism, Transactional Nepotism subscale: According to the results of the findings in this study, reducing nepotism in the nursing profession will increase the job motivation of nurses.es scores and Nurse Job Motivation Scales scores. **Conclusion:** According to the results of the findings in this study, reducing nepotism in the nursing profession will increase the job motivation of nurses. Nurse managers should create a merit-based work environment for nurses and conduct transparent processes especially during promotion stages.
Keywords: Nepotism, Job Motivation, Nurse.

Hemşirelerin Nepotizm Algılarının İş Motivasyonları ile İlişkisi

ÖZ
Amaç: Bu çalışmada hemşirelerin nepotizm algılarının iş motivasyonları ile ilişkinin belirlenmesi amaçlandı. **Gereç ve Yöntem:** Çalışma, tanımlayıcı-ilişki arayıcı tasarımdadır. Örneklem büyüklüğü %95 güven düzeyi ve %5 hata payı ile 198 olarak hesaplandı. Bu araştırmanın verileri Ocak 2023/Eylül 2023 tarihleri arasında araştırmacı tarafından 266 hemşireden toplandı. Veri toplama aracı olarak "Kişisel Bilgi Formu", "Nepotizm Ölçeği" ve "İş Motivasyon Ölçeği" kullanıldı. Araştırmayı gerçekleştirebilmek için etik kurul onayı ve katılımcılardan bilgilendirilmiş gönüllü onam formu alındı. **Bulgular:** Bulgular incelendiğinde çalışmaya katılan kişilerin Nepotizm Ölçeği puan ortalaması 4,75±1,07'dir. Hemşire İş Motivasyonu Ölçeği toplam puan ortalaması ise 61,38±9,58'dir. İki ölçek arasındaki ilişkiler incelendiğinde ise Nepotizm Ölçeği genel puanları, Terfide Nepotizm İşlem Nepotizmi alt boyut puan ortalamaları ile Hemşire İş Motivasyonu Ölçeği puanları arasında istatistiksel olarak anlamlı düşük düzeyde negatif yönlü ilişki bulunmaktadır. **Sonuç:** Bu çalışmadaki elde edilen bulguların sonuçlarına göre, nepotizmin hemşirelik mesleğinde azaltılması hemşirelerin iş motivasyonlarını artıracaktır. Yönetici hemşireler, hemşirelerin çalışma ortamlarını liyakat temelli oluşturmalı ve özellikle terfi aşamalarında şeffaf süreçler yürütmelidirler.
Anahtar Kelimeler: Nepotizm, İş Motivasyonu, Hemşire.

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Bu makaleye atıf yapmak için / Cite this article: Sumer, M. A., & Ozen Bekar, E. (2025). The relationship between nurses nepotism perceptions and job motivation. *BAUN Health Sci J, 14*(2), 400-405. https://doi.org/10.53424/balikesirsbd.1646830

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

In order for hospitals, which are one of the most important service organisations of society, to job efficiently and effectively, it is important that they are managed by professional managers with a corporate culture that is far from individualism. Executive nurses who act in accordance with ethical principles should be involved in the management of nursing services, which are the foundation service area of hospitals. It is known that the unethical behaviour of executive nurses negatively affects patient care and nurses' job performance (Keselman, 2012; Öztürk, 2018). One of the most important concepts shown amongst unethical managerial behaviours in the literature is nepotism (Çetin, 2019; Öztürk, 2018). Favouritism is defined as "the employer's or manager's preferential treatment of certain people due to emotional commitments and obligations" (Öztürk, 2018). Nepotism, on the other hand, can be defined as exhibiting favouritism and behaviour to other people whom the person in authority feels close to, such as family members, relatives, fellow citizens, etc., in matters such as recruitment, promotion and distribution of tasks (Biber, 2016). Although there are many types of favouritism, one of the most important is nepotism. Nepotism is "the provision of privileged opportunities at job by a person based solely on kinship ties or people he/she is close to, regardless of factors such as talent, skill, educational status and success (Özler and Gümüştekin, 2007). Although nepotism can be seen in all countries, it is more common in countries where traditional relations and ties are intense (Bolat et al., 2017). When the international literature is examined it can be seen that nursing studies on this subject are generally carried out in countries like Saudi Arabia, Iran and Egypt (Hosseinabadi-Farahani et al., 2023, Abdelghany Mohamed and Hosny Abdel-Hafez., 2021, Shubayra et al., 2022).

Working people want to be managed with justice, they evaluate the reward they receive at the end of their efforts and reflect it positively or negatively on individuals and managers. It is known that nepotism has negative effects in many areas, such as organisational commitment and organisational justice in all organisations (Alper Ay and Oktay, 2020; Serfraz et al., 2022). There are studies revealing the relationship between nepotism and job satisfaction in nurses (Abdelghany Mohamed and Hosny Abdel-Hafez, 2021; Shubayra et al., 2022). In addition, there are non-nursing studies showing that favouritism causes serious harm not only to employees but also to businesses and the economy and may relate to job satisfaction (Abdalla et al., 1998; Daskin et al., 2015; Wibawanto et al., 2020).

Motivation is defined as individuals acting voluntarily and making efforts to achieve a goal. Motivation is related to the individual's desire and effort to do work, to work, to get results (Koçel, 2020). There are many factors which affect employees' motivation. One of the most important factors affecting the motivation of working people can be defined as economy and other socio-psychological factors such as authority, unity of purpose, communication and physical working conditions (Özcan et al., 2023). In studies examining the factors affecting the motivation levels of nurses, their participation in managerial decisions (Uğur and Duz, 2017), appreciation of job done, understanding of fair discipline, adequacy of knowledge and experience for the job (Hakmal et al, 2012). Powerlessness and lack of authority, violence, lack of support for nurses, centralised management in hospitals, physician-centred culture, lack of facilities and a lack of a clear nursing job have been found to be related to nurses' job motivation. Nurses' motivation levels must be high in order to provide quality health services (Gümüş and Eryiğit, 2023). There are studies in the literature showing that nepotism affects work motivation (Wibawanto et al., 2020). But no study revealing this relationship specifically for the nursing profession has been found. For this reason, the study was conducted to determine the relationship between nurses' nepotism perception levels and their job motivation.

MATERIALS AND METHODS

Study type

The research was conducted as a descriptive and relationship-seeking study to determine the relationship between nurses' perceptions of nepotism and their job motivation.

Setting and sampling

The research was conducted in two hospitals, a training and research hospital and a state hospital, located in a province in Duzce, between January 2023 and September 2023 (N:404). When the sample calculation was made, the sample size was calculated as 198 with a 95% confidence level and a 5% margin of error. No sample selection was made in the research and the study was completed with 266 nurses who agreed to participate in the study working in two hospitals between January and September 2023. In this research 65.84% of the area was reached. The strength of the study, which was completed with 266 people, was calculated using the G*Power package program from the hypothesis of the relationship between Nurse Job Motivation Scale scores and Nepotism Scale scores. The effective width of this study was found to be 0.162. Accordingly, the strength of the study completed with 266 people was found to be 84.75% with an effective width of 0.162 and a significance level of 0.05.

Data collection tools

Personal data form

It is a 7-question form that includes the Individual and professional characteristics of the participants (age, gender, education, type of hospital, work department, length of service in the profession, length of service in current department) (Alper Ay and Oktay; 2020 Daskin et al., 2015; Orhan and Ergeç, 2021).

Nepotism scale

The 'Nepotism Scale' was developed by (Abdalla et al., 1998) to measure employees' perceptions of

nepotism. It was later adapted to Turkish by (Asunakutlu and Avcı, 2010). The scale consists of three subscales: Nepotism in Promotion, Nepotism in Transactions and Nepotism in the Recruitment Process, and includes fourteen questions. The scale is seven-point Likert type. The scale is evaluated in the following manner; 'Totally Disagree' is 1 point, 'Mostly Disagree' is 2 points, 'Partly Disagree 'is 3 points, 'Undecided' is 4 points, 'Partly Agree' is 5 points, 'Mostly Agree' is 6 points and 'Totally Agree' is 7 points. Questions numbered 1-5 on the scale are Nepotism in Promotion, questions 6-11 are Transaction Nepotism and question 14 is regarding Nepotism in the Recruiting Process. The Cronbach alpha reliability value of is 0.86. The Cronbach alpha reliability value of this study is 0.95.

Nurse job motivation scale

'Nurse Job Motivation Scale' is a scale developed by (Engin, 2016) to measure the job motivation of nurses. The scale is triple Likert type and consists of 25 questions in total. The scale has no sub dimensions.' I agree' statement is evaluated as 1 point, 'Partly Agree' is evaluated as 2 points and 'I Agree" is evaluated as 3 points. The maximum obtainable score from the scale is 75 and the minimum is 25. The Cronbach alpha reliability value of is 0.85. The Cronbach alpha reliability value of this study is 0.91.

Data collection method

Before collecting the research data, the purpose of the study was explained to the participants by the researcher, general necessary information was given and both verbal and written consent was obtained. The data of the study was collected from nurses who agreed to participate in the study between January 2023 and September 2023, using the Personal Information Form, Nepotism Scale and Nurses Job Motivation Scale. The data collection process was carried out by the researcher during the nurses' rest hours and whenever they were available. Nurses who did not want to participate in the study during the data collection phase and who were on sick leave or other leave were not included in the study.

Analysis of data

The study data consists of information from 266 people. Analyses were made using the IBM SPSS Statistics 26 package programme. When evaluating the study data, frequencies were given for categorical variables, and descriptive statistics were given numerical variables.

Kolmogorov–Smirnov test results were examined for normality assumptions of numerical variables and it was seen that the variables were not normally distributed. For this reason, non-parametric statistical methods were used in the study. Relationships between two independent numerical variables were interpreted with Spearman's Rho Correlation Coefficient. In the analyses, statistical significance was interpreted at the 0.05 level.

Ethical Approval

Institution: Duzce University Faculty of Medicine Non-Interventional Health Research Ethics Committee
Date: 20.10.2022
Approval no: 2022/421

RESULTS

The personal and professional characteristics of nurses who participated in the study are listed (Table 1). It can be seen in Table 1 that 79.7% of the people who participated in the study are female and 75.2% have a bachelor's degree.56.8% job in state hospitals and 43.2% in training and research hospitals. The average and standard deviation of people's age 31.45±8.08, occupation length 8.97±8.63 and years in present department 4.41±5.48.

Table 1. Individual and professional characteristics (n=266).

		(n)	(%)
Gender	Male	54	20.3
	Female	212	79.7
Education	Health High School	13	4.9
	Assc.degree	42	15.8
	Bachelor's degree	200	75.2
	Masters /PhD.	11	4.1
Type of hospital	Teaching and Research hospital	115	43.2
	State Hospital	151	56.8
Work department	Operating theatre	32	12.1
	Emergency	54	20.3
	Wards	67	25.2
	Intensive Care Unit	69	25.9
	Other departments	44	16.5
		(Mean.±SD)	
Age		31.45±8.08	
Length of service in the profession		8.97±8.63	
Length of service in current department		4.41±5.48	

SD: Standard deviation.

When Table 2 is examined, the Nepotism Scale scores of the participants in the study are 4.75±1.07. The mean and standard deviation of the Nepotism in Promotion subscale scores are 4.05±1.67, while the Transactional Nepotism subscale is 3.65±1.55 and the Recruitment

Nepotism subscale is 3.63±1.90. The mean and standard deviation of Nurses Job Motivation Scale scores are 61.38±9.58. (Table 2)

Table 2. Descriptive findings regarding the nepotism scale and nurse job motivation scale (n=266).

	Mean	SD	Median	Min	Max
Nepotism Scale	4.75	1.07	4.85	2.1	6.3
Promotion Nepotism	4.05	1.67	4.40	0.0	6.0
Transactional Nepotism	3.65	1.55	3.83	0.0	6.0
Recruitment Nepotism	3.63	1.90	3.83	0.0	6.0
Nurse Job Motivation Scale	61.38	9.58	63.00	28	75

Min: Minimum Max: Maximum SD: Standard Deviation

There is a statistically significant, low level negative relationship between Nepotism Scale scores and Nurse Job Motivation Scale scores (r=-0.162, p<0.01) in Table 3. There is a statistically significant low level negative relationship between Promotion Nepotism scores and Nurse Job Motivation Scale scores (r=-0.228, p<0,01). There is a statistically significant low level negative relationship between Transactional Nepotism scores and Nurse Job Motivation Scale scores (r=-0.132, p<0,01). There is no statistically significant relationship between Nurse Job Motivation Scale scores and Nepotism in Recruitment process scores (r=-0.099) (Table 3).

Table 3. Examination of the relationship between nepotism scale scores and nurse job motivation scale scores (n=266).

		Nurse job motivation scale
Nepotism Scale	r	-.162**
	p	0.008
Promotion Nepotism	r	-.228**
	p	0.000
Transaction Nepotism	r	-.132*
	p	0.031
Recruitment Nepotism	r	-0.099
	p	0.108

r: Spearman's Rho Correlation Coefficient
*: p<0.05 **: p<0.01

DISCUSSION

According to the findings of this study, nurses in the hospital where this study was conducted perceive above-average nepotism. When national literature was examined, two studies investigating this issue were found (Orhan and Ergeç, 2021, Alper Ay and Oktay, 2020). In these two studies, it was determined that nurses' perceptions of nepotism were at an average level. It can be seen from the international literature that nepotism studies are examined more in developing countries (Hosseinabadi-Farahani et al., 2023, Abdelghany Mohamed and Hosny Abdel-Hafez., 2021). In a qualitative study with nurses in Saudi Arabia, stated that nurses experienced nepotism (Shubayra et al., 2022). In study conducted with nurses in Iran (Hosseinabadi-Farahani et al., 2023), that nurses stated they had experienced nepotism, in study with Egyptian nurses also stated that the majority of nurses perceive a high level of favouritism (Abdelghany Mohamed and Hosny Abdel-Hafez, 2021). Although favouritism can be seen in all countries, it is more common in countries where traditional relationships and ties are intense (Bolat et al., 2017). In study, nepotism rates were above average and this suggests that hospital managements engage in career management that is far from professional.

Additionally, nurses in this study perceived nepotism in promotion, nepotism in transactions and recruitment nepotism at an average level. When the results are examined, it is seen that favouritism is most perceived in promotion processes. In a study conducted in Turkey, nurses stated that the most important criterion taken into consideration in the promotion of nurses is having an acquaintance (Özlük and Ay, 2024). In another study, it was determined that one of the problems encountered by nurses in the promotion process was the lack of importance given to merit (Kahraman et al, 2020).

Motivation levels of nurses are important in order to provide nursing services at the desired standard and quality and to achieve the desired efficiency from nurses. In this study, the mean scores of the Nurse Job Motivation Scale is high. When the national literature is examined, there are many studies revealing the job motivation of nurses. When we look at the studies using the same scale as this study, the results can be said that they are similar to this study (Göktepe et al., 2020; Semerci and Seven, 2023). When the international literature is examined, there are many studies investigating the job motivation of nurses. In some studies, the level of work motivation has been shown to be high (Ayalew et al., 2021), while in others it has been shown to be at a moderate level (Abu Yahya et al., 2019).

Job motivation refers to an activity that can produce the best results and the driving force required for the individuals to achieve the results they want. This power can be affected by many factors (Ashmanand Gillies, 2023). In this study, where the relationship between nurses' perceptions of nepotism and their job motivation is examined, there is a statistically significant, low level negative relationship between 'Nepotism Scale' and the 'Nurse Job Motivation

Scale'. Moreover, there is a statistically significant low level negative relationship between Promotion Nepotism and Transactional Nepotism and the Nurse Job Motivation Scale. On the other hand, there is no statistically significant relationship between Nurse Job Motivation Scale and Nepotism in Recruitment Process scores.

When the national and international literature was examined, no study was found that revealed the relationship between nurses' perceptions of nepotism and their job motivation. However, in (Shurbayra et al., 2022)'s qualitative study with nurses, participants stated that favouritism affected their job motivation. Aside from nursing, different results are seen in studies conducted with other professional groups. While no relationship was found between nepotism and job satisfaction in the study by (Wibawanto et al., 2020), there are also studies that found a relationship between nepotism and motivation (Büte, 2015; Güneş and Akif, 2021).

This study showed that there was a low relationship between nurses' general nepotism perceptions, promotion and transaction nepotism perceptions and their job motivation. Although other studies show different results, there are studies similar to study which support that nepotism causes negative psychological and economic consequences on employees, prevents the institutionalisation of organisations and has negative effects on society (Karahan and Yılmaz, 2014). It is thought that the lack of a statistically significant relationship between Nepotism and Job Motivation in the Recruitment Processes may be due to the fact that this study was conducted in state hospitals where recruitment processes are carried out with a central examination.

Limitations

Since the research was conducted with nurses working in two state hospitals. Province, the data obtained is limited and cannot be generalised to all institutions and regions. Another limitation of the study is that the nepotism scale used in the study was not developed for health institutions.

CONCLUSION

According to the research results; there is a low level negative relationship between the nepotism perceptions of nurses and their work motivation. In line with these results; it is recommended that arrangements be made in health institutions in order to decrease the nepotism perceptions of nurses and increase their work motivation. Especially nurse managers should establish a promotion system that emphasizes merit in the management of nursing services. In addition, it is recommended that studies be conducted to develop nepotism or favouritism scales for nursing services in order to conduct more detailed studies in this area.

Acknowledgement

None

Conflict of interest

The authors declare that there is no conflict of interests.

Author contributions

Plan, design: MS, EB; **Material, methods and data collection:** MS, EB; **Data analysis and comments:** MS, EB; **Writing and corrections:** MS, EB.

Funding

This study received no external funding.

Ethical Approval

Institution: Duzce University Faculty of Medicine Non-Interventional Health Research Ethics Committee
Date: 20.10.2022
Approval no: 2022/421

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ORİJİNAL MAKALE / ORIGINAL ARTICLE

Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1678999

The Mediating Role of Psychological Resilience in the Relationship Between High School Students' Emotional Eating and Emotional Appetite

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Geliş Tarihi / Received: *18.04.2025,* ***Kabul Tarihi / Accepted:*** *11.06.2025*

ABSTRACT

Objective: This study examines the mediating role of psychological resilience in the relationship between emotional appetite and emotional eating among high school students. **Materials and Methods:** This correlational study was conducted in two Anatolian high schools located in the city center of Balıkesir, with the participation of 683 high school students. Data were collected using the Emotional Eating Scale, the Emotional Appetite Questionnaire, the Child and Youth Resilience Measure, and a sociodemographic information form. Data were analyzed using SPSS 26.0, through which Pearson correlation analysis, hierarchical regression analysis, and Hayes' Process macro were applied. **Results**: Psychological resilience was found to have a partial mediating role in the relationship between emotional appetite and emotional eating. Additionally, female students had higher emotional eating scores compared to male students; however, no significant gender differences were observed in emotional appetite or psychological resilience. **Conclusion:** It was found that the effect of emotional appetite on emotional eating among high school students was weakened by psychological resilience. Therefore, psychological resilience may be considered a protective factor in preventing emotional eating behavior.

Keywords: Psychological Resilience, Emotional Appetite, Emotional Eating, Mediating Role.

Lise Öğrencilerinde Duygusal Yeme ve Duygusal İştah Arasındaki İlişkide Psikolojik Sağlamlığın Aracı Rolü

ÖZ

Amaç: Bu araştırma, lise öğrencilerinde duygusal yeme ile duygusal iştah arasındaki ilişkide psikolojik sağlamlığın aracı rolünü incelemektedir. **Gereç ve Yöntem:** Bu ilişkisel araştırma, Balıkesir il merkezindeki iki Anadolu Lisesinde yürütülmüştür. Araştırmaya 683 lise öğrencisi katılmıştır. Veriler; Duygusal Yeme Ölçeği, Duygusal İştah Anketi ve Çocuk ve Genç Psikolojik Sağlamlık Ölçeği, sosyodemografik bilgi formu ile toplanmıştır. Veriler SPSS 26.0 programıyla analiz edilmiş; Pearson korelasyon analizi, hiyerarşik regresyon analizi ve Hayes'in Process makrosu uygulanmıştır. **Bulgular:** Psikolojik sağlamlığın duygusal iştah ve duygusal yeme arasındaki ilişkide kısmi bir aracı rol oynadığını bulunmuştur. Ayrıca, kız öğrencilerin duygusal yeme puanlarının erkeklere kıyasla daha yüksek olduğu, ancak duygusal iştah ve psikolojik sağlamlık açısından cinsiyetler arasında anlamlı bir fark olmadığı belirlenmiştir. **Sonuç:** Lise öğrencilerinde duygusal iştahın duygusal yeme üzerindeki etkisinin psikolojik sağlamlık tarafından zayıflatıldığı, dolayısıyla psikolojik sağlamlığın duygusal yeme davranışını önlemede koruyucu bir faktör olabileceği düşünülmektedir.

Anahtar Kelimeler: Psikolojik Sağlamlık, Duygusal İştah, Duygusal Yeme, Aracı Rolü.

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Bu makaleye atıf yapmak için / Cite this article: Bayram Saptır, A. (2025). The mediating role of psychological resilience in the relationship between high school students' emotional eating and emotional appetite. *BAUN Health Sci J, 14*(2), 406-417. https://doi.org/10.53424/balikesirsbd.1678999

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

Nutrition is an essential tool to ensure the continuity of life. However, even though the behavior of feeding seems to have a physiological background, it has a complex structure shaped by the effect of affective and social factors (Macht & Simons, 2011). While nutrition is a behavioral pattern learned from a young age, it might become a problematic behavior at later stages, with the impact of certain emotional fluctuations. These fluctuations of emotions emerging during adolescence, in particular, might gradually increase the possibility of turning nutrition behaviors into eating disorders. In addition, in high school, which is a part of the adolescence period, eating disorders are known to occur at high rates (Sönmez, 2017). Emotional eating behavior that is seen as the basis of eating disorders dependent upon anxiety and stress especially due to high academic expectations is reported to be seen frequently (Chamberlin et al., 2018a).

Emotional eating is defined as an eating behavior that occurs to regulate emotion as a result of all kinds of positive and negative affect that is outside the tolerance window of the individual (Arnow et al., 1995), while emotional appetite is defined as biologically based appetite fluctuations that occur as a result of positive or negative affect (Van Strien, 2018). The interaction between emotional eating and emotional triggers has been theoretically conceptualized in the Affect Regulation Model (Heatherton & Baumeister, 1991). According to this model, individuals use food as a distraction tool to tolerate or suppress the emotional discomfort they experience. People who have difficulties in regulating their emotions are more likely to adopt maladaptive coping strategies such as emotional eating. In addition, the Dual-Pathway Model of Disordered Eating (Stice, 2001) suggests that psychosocial factors such as body image concerns and emotional distress may open two distinct pathways leading to disordered eating. The first of these is dietary restraint, and the second is negative affect. Within the framework of this model, the interaction between emotional appetite and emotional eating can be understood through the negative affect pathway. That is, any form of emotional distress may activate biological signals related to survival, which, in turn, may stimulate emotional appetite and create a cognitive urge to eat. Consequently, if the individual lacks sufficient coping mechanisms, this internal appetite signal may manifest as emotional eating behavior.

Emotional eating and emotional appetite are frequently associated with concepts such as stress, anxiety, and depression (Yau & Potenza, 2013). Especially the high school period is known to be a period in which stress and anxiety are experienced intensely because it is a period in which the biological, psychological, and social development of the individual accelerates (Eryılmaz, 2009). People may see emotional eating behavior as a coping mechanism for the stress and anxiety experienced in this process. Studies report that emotional eating is a defense mechanism used to cope with stress (Spoor et al., 2007; Yönder Ertem & Karakaş, 2021). In addition, it is known that the emotional changes that occur with the intense biological factors that occur during adolescence, the future concerns that develop with academic expectations, and the stress caused by the identity development process lead young people to emotional eating as a defense mechanism against these situations (Nguyen-Rodriguez et al., 2009).

In the literature, there are studies on the risk of emotional eating and emotional appetite that the situations may cause during adolescence. In a study conducted on adolescents, it was revealed that academic concerns and social pressure experienced in this process had a significant relationship with emotional eating (Chamberlin et al., 2018b). In another study, this situation was evaluated within the framework of eating disorders, and it was stated that the stress experienced in this process causes emotional eating behavior and may even cause eating disorders in the future (Nguyen-Rodriguez et al., 2009). In addition, it is stated that emotional eating is associated with factors such as lack of self-confidence, body dissatisfaction, depression, low academic achievement, and exclusion in relationships that may be experienced during adolescence, and this relationship carries the risk of causing obesity in the future (Kösem et al., 2024). These studies may show that high school students are vulnerable to threats to emotional eating and eating disorders due to the biological, psychological, and social changes experienced during adolescence. From this point of view, it is thought that it is important to investigate and reveal some preventive factors for these challenging situations. This concept, which is thought to be preventive or even protective, maybe the psychological resilience feature that can enable people to cope with challenging situations more easily.

Psychological resilience is defined as the ability to cope with and adapt to any negative situation and even to become stronger by coping with this experience (Connor & Davidson, 2003). In other words, it can be said that individuals with high psychological resilience can show flexibility while coping with the difficulties of life and recovering themselves despite adversities. The mediating effect of psychological resilience between emotional appetite and emotional eating can be explained by Masten's (2014) Resilience Framework model. According to this model, psychological resilience is not only about resistance to difficult life events, but also is framed as a dynamic adaptation process in which the capacity to cope with these situations expands and becomes stronger with this expansion. In addition, this model states that psychological resilience, which is shaped by the influence of a

number of environmental, psychological and relational situations, makes it easier for individuals to resort to more effective and functional mechanisms in coping with challenging situations. In this context, it can be said that an adolescent with strong psychological resilience is more equipped to resort to different strategies (social support, peer support, functional defense mechanisms) in the face of negative emotional states they experience. Therefore, these individuals can recognize and tolerate the emotional discomfort they experience; thus, they are less likely to resort to maladaptive coping strategies such as emotional eating in order to suppress these feelings. On the other hand, individuals with low psychological resilience may experience negative life events such as academic stress and social exclusion more intensely and may lack the emotional regulation tools necessary to cope with these situations. This may increase the risk of emotional appetite directly turning into emotional eating behavior. Therefore, it may be possible that psychological resilience functions as a buffering mechanism that weakens the relationship between emotional appetite and emotional eating. Studies indicate that individuals exhibiting strong psychological resilience are generally more capable of managing stress and anxiety, whereas those with lower resilience levels may adopt emotional eating as a basic coping strategy in the face of such challenges (Robert et al., 2022; Önçel & Şenel, 2024). There are studies that psychological resilience is a mediator in many negative situations. A study conducted with university students illustrated that this form of resilience contributes to reducing the impact of stress on maladaptive eating behaviors (Demir, 2021). In line with this, findings from adult populations revealed that resilience may serve as a buffer, mitigating the influence of psychological distress on emotional eating tendencies (Sucuk, 2022). Some relational findings support the argument in the study. For example, studies show that emotional eating and emotional appetite are negatively related to psychological resilience (Gouveia et al., 2019; Yi et al., 2020). In light of all these, it can be thought that psychological resilience can play a mediating role in the relationship between emotional eating and emotional appetite.

To sum up, adolescence can be defined as a period when individuals have difficulty managing stress and anxiety and may resort to some undesirable defense mechanisms to manage this anxiety. During this period, negative or positive emotions that are difficult to tolerate may create some changes in appetite and cause emotional eating. Indeed, studies have shown that appetite increases or decreases as a result of emotions that are difficult to tolerate, whether positive or negative (Macht, 2008; Kuckuck et al., 2023). Although there are relational studies in the literature between psychological resilience, emotional eating, and emotional appetite, no research has been found on how psychological resilience plays a role between these two concepts. In this context, it is aimed to examine the relationship between psychological resilience, which acts as a preventive and protective mechanism against situations that cause stress and anxiety, within the scope of various variables. It is thought that the role that psychological resilience can play here will provide a different perspective on eating disorders, which are quite common nowadays.

MATERIALS AND METHODS

Study type

This study was designed based on quantitative research methods and conducted using a correlational survey model. According to Karasar (2010), the correlational survey model refers to a quantitative research approach that identifies whether a relationship exists between two or more variables, and if so, to what extent they vary together.

Study group

The research included 683 individuals from two Anatolian High Schools located in Balikesir city center, 356 of which were women (52.1%) and 327 of which were men (47.9%). Three hundred eighty-seven of the participants (56.7%) joined the study from a Vocational High School (A) located in Karesi District, while the remaining 296 individuals (43.3%) were students in another Anatolian High School (B) in Altıeylül District.

Data collection tools

Demographic information form: For the study, a Demographic Information Form was used to identify the basic characteristics of the participants. This form was prepared by the researcher and included questions to determine participants' basic level demographic variables such as gender, age, and grade.

Emotional eating scale (EES: The scale developed by Bilgen (2018) aims to measure emotional eating. The scale consists of 4 sub-dimensions (Eating in Stressful Situations, Eating to Cope with Negative Emotions, Self-Control, and Control in the Face of Stimuli). The scale, which is structured as a five-point Likert-type scale, includes options ranging from "Never (1)" to "Always (5)". In this scale, which consists of 30 items in total, three items are scored in reverse. The scale consists of 30 items, yielding total scores ranging from 30 to 150. While the original version of the scale demonstrated a Cronbach's Alpha reliability coefficient of .96, the current study found an internal consistency coefficient of .89.

Emotional appetite questionnaire (EAQ): The scale, which was developed by Nolan et al. (2010) to examine the effects of emotional states on individuals' appetite levels, was adapted to Turkish by Demirel et al. (2014). The scale aims to measure the effects of both positive and negative emotions on appetite. This nine-point Likert-type scale consists of a total of 22 items. Fourteen of these items evaluate

the effects of positive or negative situations on appetite, while the remaining eight items are aimed at measuring the effects of positive or negative emotions on appetite. No item is reversed within the scope of the scale, and there is no cut-off score. As a result of the construct validity and reliability analyses, Cronbach's alpha internal consistency coefficient of the scale was determined as .73 in the original study, while the said value was calculated as .76 in this study. This finding shows that the scale has sufficient internal consistency within the scope of the research.

Child and youth psychological resilience scale (CYPRS): The aim of the scale, developed by Liebenberg et al. (2012) and adapted to Turkish by Aslan (2015), is to determine the level of psychological resilience of individuals. The scale items have a structure scored on a five-point Likert-type scale ranging from "Does not describe me at all" (1) to "Describes me completely" (5). It is one-dimensional and consists of 12 items. Although there is no reverse-coded item, it shows that as the scores obtained from the scale increase, the level of psychological resilience of individuals also increases. While Cronbach's alpha internal consistency coefficient was reported as .91 in the original study, the value obtained within the scope of this study is .89. This result shows that the reliability of the scale is high.

Data collection

In the research, six hundred eighty-three students were included for data collection. These students were from an Anatolian high school in the Altıeylül district and a vocational high school in the Karesi district, both of which are central city districts. During the research process, scientific ethical principles were followed, and relevant permission processes were meticulously carried out. First of all, after determining the schools where the research would be conducted, official permission was obtained from the Balıkesir Provincial Directorate of National Education, and then the necessary institutional approval was obtained from the relevant school administrations. Parental consent forms were distributed for the inclusion of the participating students in the study, and only students whose parents gave written consent were included in the study. In addition, the voluntary participation of the students was taken as a basis, and the students were informed in detail about the purpose and processes of the research. Special attention was paid to the privacy of the participants and the protection of personal data, and the names and identity information of the participants were kept confidential. The data collection process was carried out in the fall semester of the 2024-2025 academic year, and the scales were administered in the schools where the students were studying under the supervision of the researcher and classroom teachers. To ensure that the participants could answer the questions easily, the applications were planned so as not to disrupt the students' class hours and lasted approximately 20-30 minutes. During the study, the participants were assured of anonymity and confidentiality by adhering to ethical rules, and it was explained that the data obtained would be used only for scientific purposes. It was stated that students' participation in the study was entirely voluntary, and it was emphasized that there was no obligation. In addition, the students were informed that they could withdraw from the study at any point in the study. Following the completion of data collection, data were meticulously reviewed, and forms with missing or faulty items were not involved in the analysis procedure. All these procedures were conducted to increase the reliability and validity of the study.

Data analysis

As the initial step, to determine whether the parametric or nonparametric measures would be used, collected data were examined to see if they fit normality assumptions. In the measurements made within the scope of normality, it was observed that skewness values ranged between -0.62 and 0.00, and kurtosis values ranged between -0.21 and 1.2. When these values were evaluated, it was revealed that they were within the range of reference values (Pallant, 2010; Tabachnick & Fidell, 2013), and the data showed a normal distribution. In the next step, it was examined whether there was a multicollinearity problem that may affect the validity within the scope of regression analysis. In this direction, the VIF and tolerance values of the data were examined. In these measurements, it was determined that the VIF value was below 10, and the tolerance values were above 0.10. The findings demonstrated that multicollinearity was not a concern among the variables (Midi et al, 2010). To explore the associations between variables, Pearson correlation analysis was conducted. This analysis focused on identifying the relationships among emotional eating, emotional appetite, and psychological resilience. Additionally, an independent samples t-test was employed to test whether these variables showed significant gender-based differences. In the next stage of the study, hierarchical regression analysis was applied to examine whether psychological resilience plays a mediating role in the relationship between the independent variable of emotional eating and the dependent variable of emotional appetite. Finally, to determine the mediating effect of psychological resilience between emotional eating and emotional appetite, the SPSS-macro software developed by Preacher and Hayes (2004, 2008), and 10.000 repeated analyses were performed through the bootstrapping method.

Ethical approval

The author has received written ethical approval from Düzce University Scientific Research and Publication Ethics Committee (Date: 22.03.2023, Approval no: E-92112801-100-278593).

RESULTS

This section presents the results reached after the statistical analyses conducted for the research. In the study, an independent samples T-test was applied to determine whether there was a significant difference in emotional eating, emotional appetite, and psychological resilience variables according to gender, and the results are presented in Table 1.

Table 1. Independent samples T-test for differences in emotional eating, emotional appetite, and psychological resilience scores based on gender.

Variable	Gender	n	X̄	SD	df	t	p
Emotional Eating	Women	356	28.47	6.83	682	2.74	0.006*
	Men	327	26.92	6.45			
Emotional Appetite	Women	356	21.18	5.92	682	1.30	0.193
	Men	327	20.62	6.14			
Psychological Resilience	Women	356	45.72	8.24	682	0.98	0.326
	Men	327	44.98	8.47			

*p<0.05

Upon examination of Table 1, it was seen that only emotional eating scores indicated a statistically significant difference in the comparison of genders (t(682)=2.74, p=0.006). It was determined that women participants' mean scores (X̄=28.47, SS=6.83) were higher than men's (X̄=26.92, SS=6.45) scores. As opposed to this, in terms of emotional appetite scores, no statistically significant difference was found between women's (X̄=21.18, SS=5.92) and men's (X̄=20.62, SS=6.14) scores (t(682)=1.30, p=0.193). Similarly, no statistically significant difference was detected between women (X̄=45.72, SS=8.24) and men (X̄=44.98, SS=8.47) regarding psychological resilience (t(682)=0.98, p=0.326).

To review the linear relationship between variables in terms of direction and strength, the Pearson correlation analysis was used. Table 2 presents the analysis results.

Table 2. Correlations between emotional eating, emotional appetite, and psychological resilience.

Variables	Emotional Eating	Emotional Appetite	Psychological Resilience
Emotional Eating	1		
Emotional Appetite	0.424***	1	
Psychological Resilience	-0.473***	-0.311***	1

***p<0.001

According to the correlation results presented in Table 2, a positive and statistically significant correlation was found between emotional eating and emotional appetite (r=0.424, p<0.001). These results indicated that emotional eating scores would increase as the emotional appetite scores elevated. Additionally, psychological resilience showed negative correlations with both emotional eating (r=–0.473; p<0.001) and emotional appetite (r=–0.311; p<0.001). These findings reveal that individuals with high

levels of psychological resilience are less prone to both emotional appetite and emotional eating. They constitute one of the prerequisites for psychological resilience to play a mediating role in the relationship between emotional eating and emotional appetite, and therefore, hierarchical regression analysis was conducted to test the role of psychological resilience. The results are given in Table 3.

Table 3. Hierarchical regression analysis examining mediating role of psychological resilience in the relationship between emotional eating and emotional appetite.

Variables	R^2	ΔR^2	B	SE	β	t	p	F
Step 1	0.18							92.312***
Emotional Appetite			0.41	0.045	0.43	9.12	0.000	
Step 2	0.59	0.41						243.873***
Emotional Appetite			0.21	0.039	0.19	5.98	0.000	
Psychological Resilience			-0.97	0.049	-0.55	-18.72	0.000	

***p<0.00

The results of the hierarchical regression analysis reveal the effect of psychological resilience on emotional eating and emotional appetite, and the analyses regarding this effect are explained in detail below, step by step.

Step 1: The effect of emotional appetite on emotional eating

In the first model, emotional eating was only predicted by the emotional appetite variable, and the model's explanatory power was calculated as R^2 =.18. This result indicates that 18% of the total variance in emotional eating behavior was explained by the emotional appetite variable. According to the analysis results, the effect of emotional appetite on emotional eating was statistically significant (B=0.41, β=0.43, t=9.12, p<0.001). The obtained standardized beta coefficient (β=0.43) showed that there was a moderately positive correlation between variables. Moreover, the value of (F=92.312, p<0.001) was obtained as a result of the model's general significance test, indicating that the model was generally significant and that the increase in emotional appetite levels led to an elevation in emotional eating levels, as well.

Step 2: Strengthening the model through the addition of psychological resilience

In the second model, the variable of psychological resilience was integrated into the equation, and the model's explanatory strength considerably increased, reaching the level of R^2=0.59. This ensured that 59% of the total variance in emotional eating variable was explained with emotional appetite and psychological resilience collectively. The model's ΔR^2=0.41, p<0.001 value showed that the explained variance increased by 41% with the addition of psychological resilience, and the model significantly improved. With the addition of psychological resilience, it was seen that the effect of emotional appetite on emotional eating decreased (B=0.21, β=0.19, t=5.98, p<0.001). Although this indicated a decrease in emotional appetite's effect on emotional eating, the effect did not entirely disappear. On the other hand, it can be noted that psychological resilience's effect on emotional eating was strong and on the negative side (B=-0.97, β=-0.55, t=-18.72, p<0.001). In general, the model appeared to be significant (F=243.873, p<0.001), which supports the idea that it possessed a strong predictiveness. These results indicate that psychological resilience may have a mediating variable role in the relationship between emotional appetite and emotional eating. In this case, to confirm the mediating effect, an evaluation was made based on the conditions of Baron and Kenny (1989). Accordingly, some basic conditions must be met to determine whether a variable plays a mediating role. First, it is expected that the independent variable (emotional appetite in this case) has a significant effect on the mediating variable, psychological resilience. Second, emotional appetite must be a significant predictor of the directly dependent variable, emotional eating. In the third and final stage, when both the mediator and the independent variable are included in the same regression model, psychological resilience should continue to have a significant effect on emotional eating. In the meantime, if the effect of emotional appetite decreases, partial mediation can be mentioned, and full mediation can be achieved if its effect disappears completely.

In the context of this study, the findings revealed that the second and third of the three mediation conditions determined by Baron and Kenny (1986) were met. However, to determine whether the first condition was met, a separate regression analysis was conducted to test the effect of emotional appetite on psychological resilience. As a result of this analysis, it was seen that emotional appetite had a significant and negative effect on psychological resilience (F (1,564)=135.93, p<0.001; β=–0.54, p<0.001). These results indicate that psychological resilience plays a partial mediating role in the relationship between emotional appetite and emotional eating. In other words, it was observed that emotional eating behavior was more common in individuals with high emotional appetite levels, but this effect weakened when psychological resilience was included in the model. This mediation model is visually presented in Figure 1.

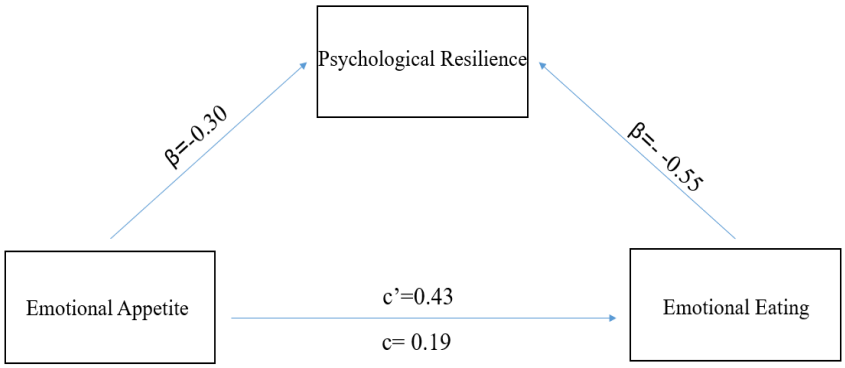

Figure 1. Psychological resilience's mediating role in the relationship between emotional eating and emotional appetite

Considering the standardized values obtained in Figure 1, the effect of emotional appetite on psychological resilience (β=-0.30), the effect of psychological resilience on emotional eating (β=-0.55), and total (c=0.19) and direct (c'=0.43) effects of emotional appetite on emotional eating can be examined. The obtained results portrayed that an increase in emotional appetite can be associated with a decrease in psychological resilience. This suggests that individuals with high emotional appetites may have a lower capacity to cope with stress and emotions. In connection, as psychological resilience increases, a significant decrease in the tendency to emotional eating was found, suggesting that individuals with high psychological resilience are less likely to use food as a tool to regulate their emotions.The impact of emotional appetite over emotional eating was found to be statistically significant and positive (c=.43). However, with the addition of psychological resilience to the model, this direct effect showed a decrease and lowered to β=.19 level. This outcome shows that psychological resilience functioned as a partial mediating variable in this correlation. Furthermore, the significance of the mediatory effect is supported when the 95% confidence interval was taken into consideration (CI=[–0.02, –0.01]) since the interval did not include zero value. However, considering that the direct effect of emotional appetite was not entirely removed, it is necessary to describe this relationship as a partial mediation model, rather than a full one.

DISCUSSION

In the study, the relationships between emotional eating behavior, emotional appetite level and psychological resilience were evaluated.

According to the research findings, a significant difference was observed in emotional eating levels depending on the gender factor; it was seen that female students had higher emotional eating scores. While there are studies in the literature with similar results in emotional eating measurements conducted on adolescents (Snoek et al., 2013; Simmons & Limbers, 2019; Mougharbel et al., 2020). Many studies in the literature have shown that girls have higher levels of emotional eating during adolescence (Snoek et al., 2013; Simmons & Limbers, 2019; Mougharbel et al., 2020). On the other hand, some studies have reported that boys have higher emotional eating scores (Larsen et al., 2006). The fact that girls have higher emotional eating scores than boys can be understood more clearly within the framework of Emotion Regulation Theory (Heatherton & Baumeister, 1991).When looking at adolescence from this perspective, it can be thought that girls have more difficulty regulating their emotions due to the fact that adolescence is more difficult than boys, and therefore they are more prone to emotional eating. The reason why girls experience adolescence more intensely and emotionally challenging than boys is due to both biological and psychosocial factors. From a biological perspective, girls enter puberty at an earlier age than boys, and rapid changes in hormones such as estrogen can increase emotional fluctuations (Angold, Costello, & Worthman, 1998). On a psychosocial level, while gender roles encourage girls to express their emotions more, the development of strategies to cope with these emotions may not always be as strong as this expression (Nolen-Hoeksema & Girgus, 1994). In addition, factors such as body image, seeking social acceptance, and peer pressure may cause girls to experience more stress during adolescence. This may increase the risk that individuals who are unable to cope with emotions will resort to maladaptive coping strategies such as emotional eating.

On the other hand, it was observed that the emotional appetite variable did not differ significantly in terms of gender. While there are studies in the literature where there is no significant difference (Dinçer, 2019; Dalbudak-Sansar & Dinçer, 2023), there are studies where there is a significant difference against females (Bédard, 2015), and there are studies where there is a significant difference against males (Nolan et al., 2010; Bourdier et al., 2017). When the results of this study are evaluated specifically, this result can

be explained by the view that emotional appetite can occur similarly in both female and male individuals due to the greater influence of certain biological mechanisms (Van Strien, 2018).

Similarly, it was observed that the psychological resilience variable did not differ significantly in terms of gender. There are studies in the literature that are consistent with the research results (Gündaş & Koçak, 2015; Bindal, 2018; Işık & Çelik, 2020), and there is also a study in which the psychological resilience of boys is higher than girls (Çelik et al., 2019) and another one indicating that the psychological resilience of girls is higher than boys (Önder & Gülay, 2009). When the results of this study are evaluated specifically, Rew & Horner (2003) stated that the levels of psychological resilience in individuals during adolescence are shaped by individual differences, but gender is not a direct determining factor. Adolescence is a period in which many factors affecting the psychological resilience of individuals (family, friends, education, emotional development) are shaped. Due to the multidimensional structure of psychological resilience (emotional regulation, social support, optimism, self-efficacy), gender differences may not have become apparent yet.

The research results show that there is a significant and positive relationship between emotional eating and emotional appetite. This finding supports the hypothesis that emotional appetite (i.e., the tendency of emotions to increase the desire to eat) can directly affect emotional eating. When the literature is examined in terms of the relationship between these two concepts, there are similar research results (Bourdier et al., 2018; Tanrıverdi, 2020; Bullock et al., 2021) and no significant difference (Karabacak, 2023). In addition, some studies show that negative emotional states can reduce appetite, which can affect emotional eating behavior (Macht, 2008; Ackermans et al., 2022). This result of the research can be explained from several perspectives. The first is the reward system and brain chemistry. Foods containing high sugar and fat activate the brain's reward system, causing dopamine secretion (Arslan et al., 2020). This causes the individual to feel good for a short time. High emotional appetite, which is associated with pleasure-focused internal drives, may make individuals more prone to repeat emotional eating behavior. Second, advertisements and social media perception: Advertisements, social media, and cultural habits can strengthen emotional ties to food. For instance, the perception that "happiness is associated with chocolate" may lead individuals to eat when their emotional appetite increases. Third, classical conditioned learning: Some individuals learn to eat as a method of coping with stress or sadness since childhood. For example, compensating for negative emotions experienced in childhood with foods such as sweets may cause the individual to develop a tendency to manage similar emotional states through food at later ages; this learned behavior may form one of the foundations of the strong relationship between emotional appetite and emotional eating. A significant and negative relationship was found between emotional eating, emotional appetite, and psychological resilience. This finding shows that individuals with high psychological resilience have lower emotional eating tendencies and emotional appetites. It is known that there are similar research results in the literature (Lee et al., 2016; Robert et al., 2022; Önçel & Şenel, 2024). These research results can be explained from different perspectives. The first can be explained by the fact that individuals with high psychological resilience are better witnesses of themselves, that is, their conscious awareness is higher (Okan et al., 2020). These skills can make it easier for people to take precautions against this behavior by allowing them to understand the difference between emotional hunger and physical hunger that occurs as a result of any emotion. The second can be attributed to the higher emotion regulation skills of individuals with high psychological resilience (Ateş & Sağar, 2021). Emotion regulation skills can increase people's awareness of the increase in appetite in response to this emotion as a result of any emotion and prevent this from turning into emotional eating.

This study's key outcome points to psychological resilience as a mediating variable linking emotional appetite to emotional eating behaviors. The result suggests that higher resilience may reduce the direct translation of emotional appetite into eating responses. This relationship weakens as the level of psychological resilience increases, and it can be said that psychological resilience acts as a buffer on this tendency. It is known that individuals have difficulty regulating their emotions as a result of hormonal changes during adolescence (Alloy et al., 2016). This difficulty in regulating emotions may cause students to resort to emotional eating behavior by increasing their emotional appetite, especially during periods of stress. On the other hand, it is known that psychological resilience is positively correlated with emotion regulation skills (Polizzi & Lynn, 2021). Therefore, although psychological resilience does not have a direct effect on appetite that may occur due to emotion in this process, it may have a preventive effect on emotional eating behavior that may occur as a result of appetite. In another respect, the high school process within adolescence is a stressful period when academic expectations and future concerns are intense. While stress-related weight gain can be seen in students who have difficulty coping with future concerns and academic pressures (Starr & Zurbriggen, 2019), it is known that individuals with high psychological resilience have more effective coping mechanisms against such negative emotional situations (Booth & Neill, 2017). Therefore, students with high psychological resilience may be using several functional mechanisms such as more

functional (walking, peer support, teacher-family support) instead of emotional eating behavior, which is considered one of the primitive defense mechanisms in this process.

CONCLUSION

As a result, the research results show that emotional appetite can turn into emotional eating behavior, but this relationship weakens when the individual's level of psychological resilience is high. This shows that psychological resilience plays an important role in individuals gaining the ability to manage their emotional hunger. Considering that factors such as hormonal changes, academic pressures, and the social environment shape the individual's psychological resilience and eating habits, especially during adolescence, these results have important implications at both the individual and societal levels. In this context, it is of great importance to implement intervention programs in schools that will primarily strengthen students' psychological resilience. In particular, guidance services that will improve emotion regulation skills should be increased, awareness-based (mindfulness) practices and stress management programs should be expanded and students' ability to cope with negative emotions should be supported. In addition, awareness-raising activities should be carried out to help students understand the difference between physical and emotional hunger, and emotional eating prevention training should be provided in cooperation with nutrition and psychology experts. To reduce the negative impact of academic expectations on emotional eating, guidance and counseling services that support students in coping with their anxieties should be strengthened, and academic stress levels should be reduced by creating more flexible and student-centered learning environments.

On another note, strengthening social support mechanisms can help students regulate emotional appetite and eating behaviors. In this direction, communication within the family should be strengthened, ensuring that parents are more sensitive to their children's emotional states, and student-peer support groups should be created to encourage the expression of challenging emotions in healthy ways. Finally, regular physical activity and healthy eating habits should be instilled. Since exercise contributes to both controlling emotional appetite and increasing psychological resilience, in-school sports activities should be encouraged, and conscious eating habits should be supported by encouraging students to eat healthy snacks. Overall, this research suggests that psychological resilience is a critical buffering mechanism in reducing the impact of emotional appetite on emotional eating. Therefore, holistic approaches should be adopted to increase students' psychological resilience, and individual and social interventions to prevent emotional eating should be developed.

Acknowledgement

The author would like to extend their sincere thanks to anyone who contributed to this study.

Conflict of Interest

The author declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Author Contributions

Plan, design: ABS; **Material, methods and data collection:** ABS; **Data analysis and comments:** ABS; **Writing and corrections:** ABS.

Funding

None.

Ethical Approval

Institution: Düzce University Ethics Committee
Date: 23.03.2023
Approval no: E-92112801-100-278593

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ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1664035

Assessing Intensive Care Nurses' and Physicans' Proficiency in Ante-Post Mortem Changes: A Comprehensive Evaluation

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Geliş Tarihi / Received: *24.03.2025,* ***Kabul Tarihi / Accepted:*** *19.06.2025*

ABSTRACT
Objective: This study aims to evaluate the knowledge levels of intensive care nurses and physicians regarding the natural and unnatural changes that occur before and after death. **Materials and Methods:**. This descriptive study was conducted from March-May 2024, in the intensive care units of three hospitals in northern Türkiye. The participants included healthcare professionals from these units. Data were collected through a 32-question questionnaire developed by the researchers, based on a literature review. **Results:** The study found that 78.4% of the participants were female, and 93.3% were nurses. On average, the participants reported encountering 4.9 ± 0.2 deaths per month. In the questionnaire, the highest correct answer rate (81.35%) was observed for questions related to brain death, while the lowest correct answer rate (45.95%) was for questions about post-mortem changes. **Conclusion:** Correctly interpreting the changes that occur before and after death requires both knowledge and experience. Understanding these changes is critical to medical, legal and ethical decision-making processes. In order to improve the quality of care, basic education programs for health professionals need to be updated. It is important that these trainings are integrated into continuous professional development programs with an interdisciplinary approach and based on current scientific evidence.
Keywords: Death, Intensive care, Post mortem changes**.**

Yoğun Bakım Hemşireleri ve Hekimlerinin Ölüm Öncesi ve Sonrası Değişiklikler Konusundaki Yeterliliklerinin Değerlendirilmesi: Kapsamlı Bir İnceleme

ÖZ
Amaç: Bu çalışma, ölüm öncesi ve sonrası meydana gelen doğal ve doğal olmayan değişikliklere ilişkin yoğun bakım hemşireleri ve hekimlerinin bilgi düzeylerini değerlendirmeyi amaçlamaktadır. **Gereç ve Yöntem:** Araştırma, Mart-Mayıs 2024 tarihleri arasında Türkiye'nin kuzeyindeki üç hastanenin yoğun bakım ünitelerinde gerçekleştirilmiştir. Çalışmaya, bu ünitelerde görev yapan sağlık çalışanları katılmıştır. Veriler, araştırmacılar tarafından literatür taramasına dayanarak geliştirilen 32 soruluk bir anket aracılığıyla toplanmıştır. **Bulgular:** Araştırmaya katılanların %78.4'ünün kadın, %93.3'ünün hemşire olduğu belirlenmiştir. Katılımcılar, ayda ortalama 4.9 ± 0.2 ölüm vakasıyla karşılaştıklarını bildirmiştir. Anket sonuçlarına göre en yüksek doğru yanıt oranı (%81.35) beyin ölümü ile ilgili sorularda, en düşük doğru yanıt oranı ise (%45.95) post-mortem değişikliklere ilişkin sorularda belirlenmiştir. **Sonuç:** Ölüm öncesi ve sonrası meydana gelen değişikliklerin doğru şekilde yorumlanması hem bilgi hem de deneyim gerektirmektedir. Bu değişikliklerin anlaşılması, tıbbi, hukuki ve etik karar alma süreçleri açısından kritik öneme sahiptir. Bakım kalitesinin artırılabilmesi için sağlık profesyonellerine yönelik temel eğitim programlarının güncellenmesi gerekmektedir. Bu eğitimlerin disiplinlerarası bir yaklaşımla, güncel bilimsel kanıtlara dayalı olarak sürekli mesleki gelişim programlarına entegre edilmesi önem arz etmektedir.
Anahtar Kelimeler: Ölüm, Yoğun bakım, Ölüm sonrası değişiklikler.

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Bu makaleye atıf yapmak için / Cite this article: Özkan, E., & Aydoğdu, H. İ. (2025). Assessing intensive care professionals' proficiency in ante-post mortem changes: a comprehensive evaluation. *BAUN Health Sci J, 14.*(2), 418-425. https://doi.org/10.53424/balikesirsbd.1664035

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

Intensive care units (ICUs) are specialized areas in hospitals equipped with complex devices, and they differ from other clinics in terms of overall appearance, operations, and atmosphere. Due to the severe clinical conditions of patients admitted to these units and their need for prolonged medical support and interventions, mortality rates in ICUs are significantly higher compared to other clinical departments (de Takao Kaneko-Wada et al., 2015). In this context, intensive care physicians and nurses frequently provide care and treatment to patients in critical condition and near death, and they often encounter death as well (Ceyhan, Özen, Zincir, Şimşek, & Başaran, 2018). Some studies conducted in intensive care units have focused on healthcare professionals' practices regarding death and the dying process (Boissier et al., 2020; Gerritsen et al., 2013; Kentish-Barnes et al., 2016; Osborn et al., 2012). Witnessing death in the Intensive Care Unit, caring for a patient who is dying or has experienced brain death, informing patient families, and accurately interpreting medical findings can often be challenging. Particularly for newly graduated healthcare professionals, who have limited practical experience and inadequate knowledge about the dying process, they may not be sufficiently prepared for these situations (Caton & Klemm, 2006; Sherman, Matzo, Pitorak, Ferrell, & Malloy, 2005). Brain death is a relatively rare condition in intensive care units, but healthcare professionals may encounter ethically complex cases involving brain death. Continuing medical care for patients diagnosed with brain death, up to and including organ donation, poses one of the most significant challenges. Brain death typically results in changes in cardiovascular, respiratory, endocrine, and metabolic systems, often leading to pronounced hemodynamic instability. Therefore, caring for and monitoring these patients can be highly demanding (Gordon & McKinlay, 2012). Healthcare professionals working in intensive care units should have detailed knowledge about agonal phase (the dying process), rare findings about to death, brain death, early and late post-mortem natural changes, and rare conditions related to death. This is crucial because certain death-related situations can bring complex legal questions and issues. For example, the agonal phase can sometimes last hours and culminate in death, during which there may be variability in mental activity alongside organ function deterioration, potentially leading individuals to disclose significant information (such as estate matters or confessions). Legally deemed invalid, reports from healthcare personnel who observe the ante-mortem period regarding whether the patient was in the agonal phase are significant evidence concerning such information and actions (Ersoy, 2024). With all these reasons in mind, this study aimed to determine the knowledge levels of healthcare professionals working in intensive care regarding ante-mortem and post-mortem changes, assess their frequency of encountering death, identify any educational needs they may have, and contribute to the literature on this topic.

MATERIALS AND METHODS

Study type

The study was designed as a descriptive design to assess the knowledge of healthcare professionals working in intensive care units regarding ante and post-mortem changes. The study adhered to the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines. The study was carried out in the intensive care units of three hospital's located in northern Türkiye, within the period from March -May 2024.

Study group

The study population consisted of nurses and doctors working in intensive care units of 3 different hospitals in a province in the north of Türkiye between March and May 2024 (N=210); The population was calculated as 134 participants in the study using the known sampling method with a standard error 0.05, a confidence interval of 95% and a type 2 error of 20%. Ultimately, the study was completed with 134 participants.

Dependent and independent variables

Procedures

The data were collected by a questionnaire form that was prepared by the researchers the literature review (Koç, 2016). The form consists of two sections and 32 questions. The questionnaire included questions related to the descriptive characteristics of healthcare professionals (age, gender, educational background, profession, years of working in the profession, prior training on forensic cases, frequency of death) and their knowledge regarding ante-and post-mortem changes (25 questions). Participants were informed that their involvement was entirely voluntary and that the data would only be used for scientific research purposes. The questions are responded to as "True", "False", and "I don't know" and are Those who answered the question correctly were given 1 point, those who did not know were given and those who answered incorrectly were given 0 points in the knowledge question form. The lowest score that can be obtained from the ante- and post-mortem changes questionnaire varies between 0 and 25. The survey does not have a cut-off score. High score indicates a high level of knowledge about the changes before and after death. After the survey form was prepared, opinions were received from three experts (Forensic medicine specialist). After receiving information about the study's scope, the questionnaire forms were distributed to those who agreed to participate, including healthcare professionals. Participants were given a specific time to respond to the survey questions and filled out the form face-to-face. Once they completed the questionnaires, they were directed to designated collection points in each intensive care

unit. The researchers made regular visits to these areas to gather the completed questionnaires. It took participants approximately 3-5 minutes to complete the questionnaire. Cronbach Alpha reliability coefficient of the questions was calculated as 0.836.

Statistical analysis

Statistical analysis was conducted using the IBM SPSS 25.0 (IBM Corp., Armonk, NY, USA) software package. In the evaluation of the data, Nonparametric categorical data were compared using X2 (chi-square) analysis, descriptive statistical methods such as percentage, mean, standard deviation, and Kolmogorov-Smirnov distribution test were used for the normal distribution. For the two-group comparison of quantitative variables, independent group t-test, and correlation analysis were used. Statistical significance was accepted at the level of $p<0.05$.

Ethical approval

Ethics committee approval was obtained from the Ethics Committee of Giresun University Hospital (Date:21/02/2024, Issue No:02). Additionally, written permission was obtained from the relevant hospital after explaining the scope of the study. Once volunteers were informed and had filled out the voluntary consent form, the study was initiated. The study was conducted in accordance with the principle of voluntary participation as outlined in the Helsinki Declaration.

RESULTS

The average age of healthcare professionals is 33.7±0.7, and 78.4% of them are female. The average length of service is 10.6±0.8 years. It was determined that 85.8% of healthcare professionals did not receive forensic event training (Table 1).

Table 1. Descriptive information (n =134).

Descriptive Information	n	%
Gender		
Female	105	78.4
Male	29	21.6
Education		
High school	7	5.2
Bachelor	114	85.1
Master	13	9.7
Occupation		
Physician	9	6.7
Nurse	125	93.3
Receiving Forensic Medicine Training		
Yes	19	14.2
No	115	85.8
Years of experience in the profession		10.6±0.8
Age		33.7±0.7
The frequency of encountering death cases (per month)		4.9±0.2

In Table 2, numerical and percentage values for the responses provided by healthcare professionals to the questions are presented. The average knowledge scores regarding ante- and post-mortem changes among intensive care healthcare professionals participating in the study were determined to be 13.5±3.9 (Minimum=1, Maximum=23) (Table-2).

Table 3 presents the status of forensic event training among healthcare professionals working in intensive care, as well as a comparison of their ante- and post-mortem knowledge levels and the impact of forensic training on these knowledge levels, along with statistical analyses and comparison results. It was determined that 8.9% of the nurses participating in the study had received forensic medicine training, whereas this rate was 88.9% among physicians. A statistically significant difference was found between nurses and physicians regarding their attendance in forensic medicine courses ($P<0.00$). When ante- and post-mortem knowledge scores were analyzed by profession, it was found that nurses had an average score of 13.4±4.1, while physicians had an average score of 16.0±2.8. A statistically significant difference was observed between the two professional groups in terms of their ante- and post-mortem knowledge scores ($p<0.05$). Furthermore, when knowledge levels were examined based on whether participants had received forensic case training, the average score of those who answered "yes" was 15.2±3.0, whereas the average score of those who answered "no" was 13.3±4.2. A statistically significant difference was found between the average scores of those who had received forensic case training and those who had not (Table 3).

Table 2. Ante-Post mortem information.

	Yes n (%)	No n (%)	Don't know n (%)
Ante-Post Mortem Information Mean Score	13.5±3.9		(Min=1, Max=23)
1. The agonal (death throes) period is a process that always accompanies deterioration in the clinic, lasting seconds and minutes.	*119(88.8)	2 (1.5)	13 (9.7)
2. Among the symptoms of agonal (death throes), the most misleading are those related to mental activity.	*77 (57.5)	6(4.5)	51(38.1)
3. During the agonal (death throes) period, a person can provide legally valid significant information.	44(32.8)	*47(35.1)	43(32.1)
4. The consciousness of a person during the agonal (death throes) period is completely closed.	21(15.7)	*95(70.9)	18(13.4)
5. Spontaneous movement in the arms and legs can be observed in a subject where death has occurred.	*77(57.5)	43(32.1)	14(10.4)
6. When a person's respiration, circulation, and central nervous system functions have not yet ceased and a detailed examination has not been performed, the incorrect diagnosis of death.	*68 (50.7)	22 (16.4)	44 (32.8)
7. A patient who does not respond to resuscitation after arrest is considered dead, but circulation and respiration can spontaneously return in the patient after resuscitation.	*58(43.3)	57(42.5)	19(14.2)
8. If a patient is in a coma, it means that brain death has occurred.	10(7.5)	*115(85.8)	9(6.7)
9. In cases where brain death has occurred, recovery can occur after many years, and consciousness can return.	10(7.5)	*103(76.9)	21(15.7)
10. Unresponsiveness of the pupils to bright light, being in the midline, and being dilated (4-9mm) are criteria for brain death.	*115(85.8)	7(5.2)	12(9.0)
11. Normothermia, normovolemia, and normotension are ensured as prerequisites for the apnea test applied in brain death.	*103(76.9)	6(4.4)	25(18.7)
12. Immediately upon death, all striped, smooth, and sphincter muscles relax.	*77(57.5)	44(32.8)	13(9.7)
13. With the muscle relaxation that occurs with death, urination, defecation, and ejaculation can occur. Gastric contents can come into the mouth.	*130(97.0)	-	4(3.0)
14. In the state of cadaveric spasm, the tiny muscles and muscle movements at the moment of death can remain fixed due to intense psychological impact.	*76(56.7)	6(4.5)	52(38.8)
15. Brown parchment plaques develop due to dehydration. Especially in men, brown-colored plaques are seen in the scrotum, and in women, they are seen in the labia. It is a late sign of death.	57(42.5)	*5(3.7)	72(53.7)
16. Facial hair and nails continue to grow after death.	37(27.6)	*62(46.3)	35(26.1)
17. Cooling of the dead body is called Algor Mortis and is an early sign of death.	*92(68.7)	15(11.2)	27(20.1)
18. The thrombus formed postmortem is a late sign of death.	57(42.5)	*32(23.9)	45(33.6)
19. The thrombus formed postmortem is called aleka. It occurs after death and is highly likely to be confused with thrombosis.	*51(38.1)	3(2.2)	80(59.7)
20. Hemolysis and autolysis are early signs of death.	*57(42.5)	13(9.7)	64(47.8)
21. Livor mortis, rigor mortis, and decomposition are late signs of death.	*87(64.9)	18(13.4)	29(21.6)
22. Livor mortis begins to appear around the 2nd hour after death, occurring passively in body areas close to the ground.	*77(57.5)	9(6.7)	48(35.8)
23. Rigor mortis begins to appear immediately after death.	68(50.7)	*53(39.6)	13(9.7)
24. Decomposition usually begins with a green color change in the lower right abdomen.	*32(23.9)	12(9.0)	90(67.2)
25. Decomposition may not occur in all deaths.	*31(23.1)	35(26.1)	68(50.7)

*The correct answers.

Table 3. Comparisons between descriptive factors and ante-postmortem knowledge scores (n=134)

Receiving Forensic Case Training		
	Yes	**No**
Occupation	**n (%)**	**n (%)**
Nurse	11 (8.9)	113 (91.1)
Physician	8 (88.9)	1 (11.1)
	X^2=43.87	**P=0.00**
	Knowledge (Mean±SD)	
Occupation		
Nurse	13.4±4.1	
Physician	16.0±2.8	
	t=2.53	**P=0.02**
	Knowledge (Mean±SD)	
Receiving Forensic Case Training		
Yes	15.2±3.0	
No	13.3±4.2	
	t=2.37	**P=0.02**

Table 4 shows a positive but low-level statistically significant correlation between the frequency of encountering death and the knowledge score (r=0.28, P< 0.00) (Table-4).

Table 4. The relationship between frequency of encountering death and knowledge score.

		Frequency of encountering death
Knowledge	**r**	**0.28**
	p	**0.00**
	n	134

*r:pearson correlation p<0.05.

Table 5. Correct Answer Rates by Survey Sections.

Correct Answer Rates by Survey Sections	
Agonal phases and ante-mortem changes	63.07%
Rare findings about to death	50.5%
Brain death	81.35%
Post-mortem changes	45.95%

DISCUSSION

In intensive care units, healthcare professionals are routinely confronted with patient deaths; in this study, participants reported experiencing an average of 4.9 deaths per month. These professionals play a vital role in diagnosing death, recognizing ante- and post-mortem changes, managing special conditions such as brain death, and providing care to patients nearing the end of life (Can et al., 2020). A strong knowledge base regarding ante- and post-mortem changes is essential for nursing and intensive care practices. Post-mortem care, in particular, requires an ethical and professional approach, and adequate knowledge in this area enables healthcare professionals to provide higher-quality care to both patients and their families. Low knowledge scores highlight the need for education and awareness programs on this subject (Çelik, 2004) Similar studies have shown that insufficient knowledge of post-mortem changes among healthcare professionals can negatively impact patient care and lead to ethical challenges. When compared with existing literature, the findings of this study appear to be consistent (Uzun & Cerit, 2024). However, the wide variation in participants' knowledge levels suggests that factors such as professional experience, educational background, and work environment may significantly influence knowledge acquisition. Therefore, further research is needed to examine these factors in greater detail. In this study aimed at assessing healthcare professionals' knowledge levels of ante-mortem and post-mortem phenomena, the first four questions addressed agonal phases and ante-mortem changes, questions 5-7 focused on rare findings about to death, questions 8-11 covered brain death, and questions 12-25 were

related to understanding post-mortem changes. The percentages of correct answers provided by section are presented (Table-5). In questions related to agony, the lowest correct answer pertains to the legal validity of information provided by a person during the agonal phase. There is a misconception that individuals might make significant confessions or disclose important information due to their psychological state just before death (Ersoy, 2024). However, due to metabolic changes and impaired cerebral blood flow during the agonal phase, the person's capacity for rational thought is compromised. Therefore, any information provided during this phase is not legally considered valid (Koç, 2016). Looking at the overall participant scores, it is observed that questions related to brain death received the highest correct answer rate. This could be attributed to increased awareness stemming from frequent in-service training sessions and seminars on organ transplantation and brain death. Brain death is a topic that requires specialized knowledge, including technical details. It is still not fully understood by the general public, which can lead to social and ethical challenges when providing temporary care or deciding to withdraw medical support for patients diagnosed with brain death (Russell et al., 2019). In a study, it was found that some nurses did not know the difference between medical treatment and care they should provide to patients diagnosed with brain death who are still being sustained. Additionally, they were unsure how to communicate the condition to family members of patients diagnosed with brain death, which is a significant issue (Joffe, Anton, Duff, & deCaen, 2012). Despite the optimistic results regarding brain death in our study, It was observed that participants' knowledge levels were insufficient regarding rare findings related to death and post-mortem changes. This situation can be attributed to participants not receiving training in "forensic medicine" and likely never encountering this rare results in their clinical experiences. Furthermore, the rapid removal of patients from the intensive care unit after death (transfer to the morgue) may contribute to the lack of post-mortem observation opportunities, which is another reason for the clinical experience and knowledge gaps regarding post-mortem changes. Similar studies measuring knowledge levels like ours have not been found in the literature. However, there are studies on healthcare professionals' attitudes towards death and the dying process. It has been reported that alongside the lack of knowledge on death-related topics, there is also confusion among healthcare professionals regarding end-of-life care and management (Ferrand et al., 2008, 2003). In a meta-synthesis study, it was found that newly graduated nurses express that witnessing death and the experience of death are complex and challenging processes (Zheng, Lee, & Bloomer, 2018). Many intensive care professionals do not receive specific training on death and post-mortem changes(Allen, 2018) In our country, while "forensic medicine" courses are included in medical education, nursing and other healthcare personnel typically lack formal training in this field. In this context, consistent with the literature, only 14.2% of the participants in our study were found to have received forensic medicine training (Köktürk Dalcali & Taş, 2021). Our findings highlight a significant disparity in forensic medicine education among intensive care healthcare professionals, particularly between nurses and physicians. The lower rate of forensic training among nurses suggests a critical gap in educational exposure to forensic-related topics. This discrepancy may stem from differences in undergraduate curricula, limited professional development opportunities, or institutional policies that prioritize forensic training for physicians over nurses. Given the frequent occurrence of forensic cases in intensive care units, it is essential to ensure that all healthcare professionals, including nurses, receive adequate forensic medicine training. Enhancing educational programs in this area is necessary for accurate documentation, legal compliance, and ethical patient care. The statistically significant difference in ante- and post-mortem knowledge scores between nurses and physicians reinforces the impact of formal education on professional competency in forensic-related matters. Physicians' higher average scores compared to nurses likely reflect their greater exposure to forensic topics during medical training. However, given nurses' critical role in patient care and post-mortem procedures, their limited forensic knowledge may present challenges in effectively recognizing, documenting, and managing forensic cases. This gap highlights the need for integrating forensic education into nursing curricula and providing continuing professional development programs tailored to nurses working in intensive care settings. Additionally, the impact of forensic case training on knowledge levels is noteworthy. Participants who had received forensic training had significantly higher knowledge scores than those who had not, indicating that targeted training programs effectively enhance competency in ante- and post mortem care. This finding underscores the necessity of structured forensic training programs for all healthcare professionals in intensive care settings. Implementing standardized training sessions, workshops, and simulation-based learning opportunities could help bridge knowledge gaps and ensure that nurses and other healthcare professionals are well-equipped to handle forensic cases. (Köktürk Dalcalı, Can, & Durgun, 2022; Kudubes, Akıl, Bektas, & Bektas, 2021; Smith et al., 2018). The positive, low significant relationship found between the frequency of encountering death and knowledge scores can be interpreted in several ways. Healthcare professionals working in intensive care units and other high-acuity settings may become more attuned to the processes surrounding death, such as post-mortem care and documentation, simply due to the

frequency of these encounters. Repeated exposure to situations involving death could provide informal learning opportunities, prompting professionals to seek additional knowledge or improve their understanding of the ethical, legal, and medical aspects of death and post-mortem care. However, as suggested by previous studies, the frequency of exposure alone may not be enough to ensure a thorough understanding (Çelik, 2004). The American Association of Colleges of Nursing (AACN) developed a statement in 2004 outlining essential care competencies for undergraduate nursing students, which include areas such as population dynamics, comfort care, communication, cultural diversity, collaboration, symptom management, holistic care, and ethical and legal issues (Schwill et al., 2020). However, a systematic review highlights that many nursing students are often academically and experientially unprepared to handle the complexities of end-of-life care, which involves providing compassionate and emotionally supportive care to patients nearing death. These experiences can be emotionally challenging and traumatic for nurses, who frequently encounter death and dying patients in their professional roles. To address this gap, nursing education curricula should be revised to strengthen knowledge and skills related to end-of-life care, including effective communication, collaboration, and ethical decision-making (Zheng et al., 2018). Moreover, death-related issues are critical both medically and legally, necessitating that healthcare professionals, including nurses, possess a thorough understanding of death and its associated processes. Specialized fields such as forensic nursing, forensic midwifery, and forensic pathology are particularly important in addressing legal aspects of death, as they play a vital role in forensic case examinations and death investigations (De Vries, Dorn, Eppink, & Reijnders, 2019; Drake, Tabor, Hamilton, & Cannon, 2020). The findings of our study further emphasize the need to integrate end-of-life care regulations and training into undergraduate education and/or in-service training programs for intensive care professionals, ensuring they are better equipped to manage these sensitive and complex situations.

Limitations of the research

The form used to assess the knowledge level of healthcare professionals consists of basic knowledge questions and questions related to rarely encountered scenarios, but it is not standardized. There is no similar knowledge assessment tool found in the literature; hence it was developed with input from Forensic Physicians working in the field. In addition, the relatively low number of physicians participating in the study may be considered a limitation in terms of generalizability of the findings.

CONCLUSION

Death holds a special place in medicine as a philosophical concept, and all healthcare professionals may find themselves managing the dying process. Especially prevalent in intensive care settings, death is a comprehensive area of study encompassing subtopics such as cellular death, somatic death, brain death, and post-mortem changes. The agonal process preceding death and the natural or unexpected changes following it can only be accurately interpreted with knowledge and experience. Therefore, considering the medical, legal, and ethical aspects of death, we believe that all healthcare professionals should have their basic training programs appropriately structured to address this issue. Additionally, some individuals within this profession should receive advanced specialized training (such as Forensic Nursing) in this area.

Acknowledgments

We thank the healthcare professionals who voluntarily participated in our research.

Conflict of Interest

There is no conflict of interest in the study.

Author Contributions

Plan, design: E.Ö, H.İ.A; **Material, methods and data collection:** E.Ö, H.İ.A; **Data analysis and comments:** E.Ö, H.İ.A; **Writing and corrections:** E.Ö, H.İ.A**.**

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Ethical Approval

Institution: Giresun Training and Research Hospital Scientific Research Ethics Committee
Date: 21.02.2024
Approval no: BAEK-02

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ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1675952

The Impact of the COVID-19 Pandemic Process on Patient-Centered Care Competence and Mental Health of Pediatric Nurses

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Geliş Tarihi / Received: *14.04.2025,* ***Kabul Tarihi / Accepted:*** *23.06.2025*

ABSTRACT
Objective: This cross-sectional study examined the impact of the COVID-19 pandemic on pediatric nurses' patient-centered care competence and mental health. **Materials and Methods:** Introductory Experiences in the COVID-19 Pandemic Process, Patient-Centered Care Competence (PCCC) Scale and Depression Anxiety Stress Scale Short Form (DASS-21) were used as data collection tools in the survey. **Results:** Working in a COVID-19 service, increased workload, contact with the materials which were infected or at risk of transmitting infection, being infected or family members' having diagnosis of COVID-19 infection and thinking that their physical health deteriorated raised depression, anxiety, and stress and lowered PCCC total mean score ($p<0.05$). As the depression, anxiety, and stress of the nurses increased, their patient-centered care competence scores decreased ($p<0.05$). **Conclusion:** Interventions and programs should be implemented to develop skills in coping with difficult emotions in crises such as pandemics.
Keywords: COVID-19, Pediatric Nurse, Care, Mental Health.

COVID-19 Pandemi Sürecinin Çocuk Hemşirelerinin Hasta Merkezli Bakım Yeterliliği ve Ruh Sağlığı Üzerindeki Etkisi

ÖZ
Amaç: Bu kesitsel çalışma, COVID-19 pandemisinin çocuk hemşirelerinin hasta merkezli bakım yeterliliği ve ruhsal sağlığı üzerindeki etkisini incelemek amacıyla yürütülmüştür. **Gereç ve Yöntem:** Veri toplama araçları olarak COVID-19 Pandemi Sürecinde Giriş Deneyimleri, Hasta Merkezli Bakım Yeterliliği (HMBY) Ölçeği ve Depresyon Anksiyete Stres Ölçeği Kısa Formu (DASS-21) kullanılmıştır. **Bulgular:** COVID-19 servisinde çalışmak, iş yükünün artması, enfekte veya enfeksiyon bulaştırma riski taşıyan malzemelerle temas, enfekte olmak veya aile bireylerinde COVID-19 enfeksiyonu tanısı olması ve fiziksel sağlıklarının kötüleştiğini düşünme depresyon, anksiyete ve stresi artırmış ve HMBY toplam puan ortalamasını düşürmüştür ($p<0,05$). Hemşirelerin depresyon, anksiyete ve stres düzeyleri arttıkça hasta merkezli bakım yeterlilik puanları azalmıştır ($p<0.05$). **Sonuç:** Pandemi gibi kriz dönemlerinde zor duygularla başa çıkma becerilerini geliştirmek için müdahaleler ve programlar uygulanmalıdır.
Anahtar Kelimeler: COVID-19, Çocuk Hemşiresi, Bakım, Ruh Sağlığı.

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Bu makaleye atıf yapmak için / Cite this article: Ustuner Top, F., Topan, A., Kuzlu Ayyildiz, T., & Kurt, A. (2025). The impact of the COVID-19 pandemic process on patient-centered care competence and mental health of pediatric nurses. *BAUN Health Sci J, 14*(2), 426-434. https://doi.org/10.53424/balikesirsbd.1675952

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

The COVID-19 pandemic has caused an unprecedented crisis, profoundly affecting people's lives worldwide. A multitude of measures have been implemented to combat the virus, including isolation and restrictions, which have precipitated profound alterations in the psychosocial domain within the affected nations (Fegert et al., 2020). In this regard, healthcare professionals have played a pivotal role in diagnosing, treating, and monitoring patients infected with the virus. They have thus emerged as a distinct occupational category, deserving of distinction from other professional groups (Bi et al., 2020). Because of the historical precedents set by wars, disasters, and pandemics, nurses have assumed a pivotal role in addressing the healthcare requirements of communities during the present pandemic. Since the onset of the pandemic, nurses have demonstrated unwavering dedication in providing healthcare services. During their duties, these professionals have been exposed to the pathogen that causes the disease, as well as the risk of contamination. Nurses have experienced elevated mortality risks in some countries during the pandemic (Jackson et al., 2020). The pandemic has not only resulted in significant morbidity and mortality but also the emergence of psychological and social problems (Qin et al., 2021). A comparative analysis reveals that healthcare professionals are more prone to encounter mental health challenges during the pandemic, a phenomenon attributable to elevated workloads and the inherent risk of contamination (An et al., 2020; Roberts et al., 2021). A notable finding is that nurses working in areas outside their usual scope of practice during the pandemic are more susceptible to mental health challenges (Sampaio et al., 2020). During the pandemic, pediatric nurses were among the frontline workers not engaged in their usual specialities. These nurses worked in units dedicated to adult patients or units with adult patients. This situation has been observed to result in elevated levels of stress and depression among nurses (Katran et al., 2021). This situation is believed to contribute to an increase in stress and depression levels among pediatric nurses, potentially impeding their ability to provide patient-centered care. It is imperative to assess the patient care competencies of nurses, particularly in the context of their multifaceted roles and the challenges posed by extended work hours and the dual demands of combating the pandemic and fulfilling their professional duties (Cabarkapa et al., 2020). This situation is particularly salient in the context of the high prevalence of psychological distress among healthcare professionals, which has been shown to impact patient care adversely (Góes et al., 2020). The present study was thus conceived to ascertain the impact of the pandemic on the patient-centered care competence and mental health (i.e., depression, anxiety, and stress) of pediatric nurses.

Despite the growing body of research on the psychological effects of the COVID-19 pandemic on healthcare workers, studies focusing specifically on pediatric nurses remain limited (Jackson et al., 2020). This study offers novel insights by examining not only their mental health outcomes but also how these outcomes intersect with their ability to provide patient-centered care during a global health crisis. By identifying specific risk factors such as perceived safety, workload increase, and direct contact with COVID-19 cases, the study highlights actionable areas for institutional and policy-level interventions (Qin et al., 2021). These results can inform the development of targeted support mechanisms aimed at sustaining both nurse well-being and care quality in pediatric settings.

MATERIAL AND METHODS

Study design and population

This cross-sectional descriptive study was conducted between April 15 and September 15, 2021. The number of pediatric nurses working in hospitals in the city center where the study was conducted was 290 in that timeline. Assuming a population of 290, it was determined that a data collection phase with 166 nurses would be adequate, with a 5% margin of error and 95% confidence interval. A total of 269 nurses were contacted, representing 93% of the target population. However, 21 nurses were excluded from the study due to their refusal to participate or failure to answer the survey questions completely. The inclusion criteria for the study were as follows: First, the nurses had to be pediatric nurses. Second, they had to be willing to participate in the study. Third, they had to be able to read and write Turkish.

Data collection tools

A web-based questionnaire was used to collect data. Introductory Information Form, Experiences in the COVID-19 Pandemic Process Form, Patient-Centered Care Competence Scale and Depression Anxiety Stress Scale Short Form were included in the survey.

Introductory information form: The form, prepared by the researchers, included information about the age, gender, education, marital status, current working unit of the nurses, and their experience in the nursing and child-related units.

Experiences in the COVID-19 pandemic process: The researchers developed the instrument based on the extant literature (Huang et al., 2020; Leng et al., 2021; Xu et al., 2020). The form examined the experiences of nurses during the pandemic. The instrument comprised 13 questions, 12 of which employed a "yes-no" response format, and one of which solicited a self-rated estimation of risk for the respondents, on a scale ranging from 1 to 10, regarding the probability of their contamination by the virus and its potential impact on their families. Examples: Did you work in a COVID-19 polyclinic or service during the pandemic? Did your workload

increase due to the COVID-19 pandemic?, During the pandemic, did you feel safe and secure in your work environment?, Have you had close contact with someone who was confirmed to be infected with COVID-19?, Have you had contact with potentially infected materials or persons suspected of having COVID-19?, Have you or any family member you live with been diagnosed with COVID-19?, Do you think your physical health was negatively affected during the pandemic?

Patient-centered care competence (PCCC) Scale: The scale was developed by Jee-In Hwang in 2015 to measure nurse patient-centered care competencies. The validity and reliability study of the scale in our country was carried out by Arslanoğlu and Kırılmaz (Arslanoğlu & Kırılmaz, 2019). The scale comprises 17 items and 4 sub-dimensions, with the sub-dimensions of the scale including "Respecting patient's point of view (perspective)," with five statements, "Ensuring patient comfort," with three statements, and "Defending patient rights," with three statements. The reliability coefficient of the original scale, as measured by Cronbach's alpha, was 0.85 (14). In this study, the internal consistency coefficient (Cronbach's alpha) was found to be 0.78 for the sub-dimension of "Respecting the patient's point of view (perspective)," 0.86 for the sub-dimension of "Encouraging patient participation in care processes," 0.82 for the sub-dimension of "Ensuring patient comfort," 0.82 for the sub-dimension of "Defending patient rights," and 0.92 for the total scale.

Depression anxiety stress scale short form (DASS-21): The DASS scale, initially developed by Lovibond as DASS-42 in 1995, is a tool designed to assess the levels of depression, anxiety, and stress in individuals. It comprises 42 questions, addressing these three aspects of emotional experience (Lovibond & Lovibond, 1995). After this development, Antony and colleagues created a 21-item condensed version of the scale, designated as DASS-21. It was asserted that the scale's convergent validity, defined as the degree to which scores from the DASS-21 scale align with those from the Beck Anxiety and Beck Depression scales, was examined (Antony et al., 1998). The DASS-21 is a 4-point Likert-type scale, with each subscale comprising seven items, designed to assess the depression, anxiety, and stress levels of individuals over the past week, employing clinical and non-clinical samples. Responses to the scale are scored as follows: "never" = 0 points, "sometimes" = 1 point, "quite often" = 2 points, and "always" = 3 points. Scores within each sub-dimension range from 0 to 21, with elevated scores indicating heightened symptoms of depression, anxiety, or stress. The Turkish validity and reliability study of the Depression Anxiety Stress Scale - short form (DASS-21) was conducted by Yılmaz and colleagues (Yılmaz et al., 2017) in 2017. The internal consistency coefficient (Cronbach's alpha) was reported to be 0.75 for the stress sub-dimension, 0.81 for the anxiety sub-dimension, and 0.82 for the depression sub-dimension. The study reported an internal consistency coefficient (Cronbach's alpha) of 0.87 for the stress sub-dimension, 0.89 for the anxiety sub-dimension, and 0.90 for the depression sub-dimension.

Data collection

The data were collected via an online form link. The researcher shared the link to the online questionnaire with the participants in the selected sample group. The participants completed the online questionnaire in an average of 10 minutes after reading the informed consent form and giving explicit consent to participate in the questionnaire.

Statistical analysis: The IBM SPSS 22.0 package program evaluated the data. Descriptive statistics, including percentages, means, and standard deviations, were employed to analyze the data. The Kolmogorov–Smirnov test was employed to ascertain whether the data originated from a normal distribution. When a normal distribution was not achieved, the Mann-Whitney U test was employed to assess the significance of the observed differences between groups. The relationship between the variables was examined using the Spearman correlation test. The results were evaluated at the 95% confidence interval.

Ethical approval

Prior to the initiation of the research, ethical approval was obtained from the Human Research Ethics Committee of a university (Date: 03/25/2021 - No: 113). Additionally, written consent was obtained from the nurses who consented to participate in the study using the 'Informed Volunteer Consent Form'.

RESULTS

The study revealed that 84.4% of the nurses were female, 15.6% were male, and the mean age was 32.30±6.36 (22-48). Of the nurses, 10.0% had an associate degree (2 years), 67.7% had a bachelor's degree (4 years), and 22.3% had a postgraduate degree. The data further reveals that 59.9% of the nurses were married, 40.1% were single, 56.1% had children, and 43.9% had no children. The distribution of nurses by service area is as follows: 51.6% were recruited in the pediatric service, 19.3% in the pediatric intensive care unit, 15.2% in the pediatric surgery service, and 13.7% in the neonatal intensive care unit. The mean period of working in the profession of nursing was 10.53 ± 7.13 years, and the duration of working in a unit related to children was 7.79 ± 5.48 years (Table 1).

Table 1. Demographic features of nurses (n=269).

Features	n	%	
Gender			
Female	227	84.4	
Male	42	15.6	
Educational status			
Associate degree (2 years)	27	10.0	
Bachelor's degree (4 years)	182	67.7	
Postgraduate degree	60	22.3	
Marital Status			
Married	161	59.9	
Single	108	40.1	
Having any children			
Yes	151	56.1	
No	118	43.9	
Unit of work			
Pediatric Service	139	51.6	
Pediatric Surgery	41	15.2	
Pediatric Intensive Care	52	19.3	
Neonatal Intensive Care	37	13.7	
	Mean ± SD	**Lower**	**Upper**
Age	32.30±6.36	22	48
Length of working time (years)	10.53±7.13	1	29
Length of working time in the pediatric unit (years)	7.79±5.48	1	25

The mean total score of the PCCC scale for pediatric nurses was 70.87 ± 0.71, and the sub-dimension of respecting patients' perspectives had the highest score (24.47 ± 2.84). Conversely, the depression subscale of the DASS-21 instrument exhibited the highest mean score (6.79 ± 4.48) (Table 2).

Pediatric nurses working in the outpatient clinic or service due to the epidemic had higher rates of depression ($p<0.01$), anxiety ($p<0.01$), and stress ($p=0.02$) than those who were not working in these services. In addition, their PCCC ($p=0.008$) total score means were lower. Furthermore, pediatric nurses who reported an increase in their workload due to the pandemic exhibited heightened anxiety ($p<0.01$) and stress ($p=0.01$) compared to their counterparts. Additionally, their PCCC ($p<0.001$) total score means were lower. Furthermore, pediatric nurses who reported feeling safe and secure during the pandemic exhibited lower mean scores in the PCCC ($p<0.001$), depression ($p=0.003$), anxiety ($p<0.001$), and stress ($p<0.001$) categories. Pediatric nurses who had close contact with a person diagnosed with COVID-19 reported significantly lower mean scores on the PCCC ($p = 0.031$), anxiety ($p < 0.001$), and stress ($p = 0.034$) scales. Conversely, pediatric nurses who had contact with individuals suspected of having COVID-19 or with contaminated materials exhibited significantly higher levels of anxiety ($p < 0.001$) and stress ($p = 0.034$), as well as significantly lower mean total scores on the PCCC ($p = 0.031$), compared to those without such exposure. Furthermore, pediatric nurses with a confirmed diagnosis of or whose family members were diagnosed with a case of the novel strain of the virus had higher rates of depression ($p<0.001$), anxiety ($p<0.001$), and stress, as well as lower PCCC ($p=0.025$) total score means. Morever, pediatric nurses who perceived a deterioration in their physical health during the pandemic exhibited lower PCCC total score means ($p=0.002$) and higher levels of depression ($p=0.001$), anxiety ($p=0.001$), and stress ($p=0.004$) compared to those who did not perceive such deterioration (Table 3).

A positive correlation was identified between nurses' perceptions of risk for themselves and their families regarding the transmission of the novel coronavirus infection and the anxiety sub-dimension of the Depression, Anxiety and Stress Scale (DASS-21) ($r=0.335$, $p=0.01$) (Table 4).

Table 2. The distribution of nurses' scores obtained from the Patient-Centred Care Competence Scale, Depression Anxiety Stress Scale Short Form and its sub-dimensions.

	Median	Mean±SD	Lower	Upper
Patient-Centred Care Competence Scale				
Respecting patients' perspectives	24	24.47±2.84	19	30
Encouraging patient participation in care processes	20	20.82±2.39	16	25
Ensuring patient comfort	12	12.97±1.44	10	15
Defending patient rights	12	12.60±1.43	10	15
Total score	68	70.87±0.71	58	85
Depression Anxiety Stress Scale Short Form				
Stress	6	6.64±3.47	0	15
Anxiety	5	6.27±4.41	0	17
Depression	7	6.79±4.48	0	18
Total score	20	20.92±11.82	0	52

Table 3. Differences between the mean scores of the Patient-Centered Care Competence Scale and the Depression Anxiety Stress Scale Short Form according to the nurses' experiences in the COVID-19 pandemic.

Questions about nurses' experience in the COVID-19 pandemic		n	%	Patient-Centered Care Competence	Depression	Anxiety	Stress
				Mean±SD	Mean±SD	Mean±SD	Mean±SD
Working in a COVID-19 polyclinic or service due to the COVID-19 pandemic	**Yes**	166	61.7	69.91±0.66	7.81±4.30	7.04±4.44	7.16±3.62
	No	103	38.3	71.46±0.57	5.16±4.30	5.03±4.08	5.81±3.06
	U			2.652	4.907	3.702	3.142
	p			0.008	<0.001	<0.001	0.002
Increased workload due to the COVID-19 pandemic	**Yes**	236	87.7	67.18±1.07	6.93±4.59	6.79±4.41	6.90±3.58
	No	33	12.3	71.38±0.46	5.81±3.53	2.54±1.95	4.81±1.66
	U			4.184	1.344	5.452	3.286
	p			<0.001	0.180	<0.001	0.001
Feeling safe/secure due to the COVID-19 pandemic	**Yes**	43	16.0	70.12±0.45	6.81±4.49	7.14±4.65	7.06±3.39
	No	226	84.0	74.79±1.12	3.41±2.48	4.97±2.85	4.46±3.08
	U			4.053	2.949	4.817	4.663
	p			<0.001	0.003	<0.001	<0.001
Close contact with a person whose COVID-19 infection was confirmed	**Yes**	236	87.7	68.42±1.06	6.91±4.62	6.63±4.53	7.84±4.50
	No	33	12.3	71.21±0.47	5.93±3.26	3.69±2.17	6.47±3.28
	U			2.161	1.177	3.664	2.135
	p			0.031	0.240	<0.001	0.034
Contact with an infected material and with a person suspected of having COVID-19 disease	**Yes**	205	76.2	66.15±0.77	7.25±2.90	6.38±4.66	7.48±3.20
	No	64	23.8	72.34±0.47	6.65±4.87	5.93±3.50	6.38±3.52
	U			6.875	0.921	0.700	2.225
	p			<0.001	0.358	0.484	0.027
Diagnosis of COVID-19 infection in you or any family member you live with	**Yes**	135	50.2	69.78±0.60	7.47±4.91	6.94±5.14	7.70±3.94
	No	134	49.8	71.97±0.61	6.12±3.91	5.61±3.43	5.60±2.54
	U			2.240	2.496	2.486	5.195
	p			0.025	<0.001	<0.001	<0.001
State of your physical health's being affected in the pandemic process	**Yes**	222	82.5	70.13±0.47	7.21±4.73	6.68±4.42	6.92±3.67
	No	47	17.5	74.36±0.97	4.82±2.13	4.34±3.85	5.34±4.83
	U			3.090	3.378	3.370	2.876
	p			0.002	0.001	0.001	0.004

Table 4. Correlation matrix between nurses' thinking that they and their families are at risk for COVID-19 infection and mean scores of the Patient-Centered Care Competency Scale and the Depression Anxiety Stress Scale Short Form.

	1	2	3	4	5	6	7	8	9
1. Nurses' thinking that they and their families are at risk for COVID-19 infection	-								
2. Respecting patient perspectives (PCCC)	0.13	-							
3.Encouraging patient participation in care processes (PCCC)	-0.008	0.690**	-						
4. Ensuring patient comfort (PCCC)	0.074	0.638**	0.784**	-					
5. Defending patient rights (PCCC)	0.430	0.650**	0.695**	0.784**	-				
6. PCCC total score	0.044	0.861**	0.906**	0.883**	0.830**	-			
7. Stress (DASS-21)	0.027	-0.153**	-0.279**	-0.036**	-0.084**	-0.178**	-		
8. Anxiety (DASS-21)	0.335**	-0.045	-0.144*	0.112	0.078	-0.013	0.722**	-	
9. Depression (DASS-21)	0.097	-0.197**	-0.274**	0.100	-0.035	-0.121*	0.682**	0.685**	-

PCCC: Patient-Centered Care Competency Scale; DASS-21: Depression Anxiety Stress Scale Short Form; *Correlation is significant on the level of 0.05 (two-tailed); **Correlation is significant on the level of 0.01 (two-tailed).

DISCUSSION

The present study was conducted to examine the impact of the process of the pandemic caused by the novel coronavirus (SARS-CoV-2) on the mental health of pediatric nurses, including depression, anxiety, and stress, as well as their competence in providing patient-centered care. The depression subscale of the Depression, Anxiety and Stress Scale (DASS-21) exhibited the highest mean score (6.79 ± 4.48). As the nurses perceived themselves to be at elevated risk of contracting the infection and transmitting it to themselves and their families, their anxiety levels increased. The study found no significant differences in pediatric nurses' patient care competencies based on their risk perceptions regarding the transmission of the infection to themselves and their families.

Pediatric nurses who perceived themselves to be at high risk of contracting the virus exhibited elevated levels of anxiety. Furthermore, a comparative analysis of the DASS-21 total score means of pediatric nurses who had contracted the infection or whose family members had been diagnosed with it revealed elevated means. The most salient factor that pressured on healthcare workers during the pandemic was the risk of transmitting the infection to their family members and relatives (Smith et al., 2020). Furthermore, nurses who had children or elderly relatives, and who were therefore compelled to avoid contact with their family and friends due to the pandemic, were found to experience elevated levels of anxiety and depression (Han et al., 2020).

This study found that pediatric nurses who experienced an increase in their workload due to the pandemic had higher levels of stress, anxiety, and depression, and exhibited a decrease in their level of patient-centered care. In the context of the pandemic, the mental workload of nurses increased in conjunction with their physical workload. The present study hypothesizes that an increased mental workload may have an adverse effect on nurses' behavior and performance (Pourteimour et al., 2021; Rodríguez-López et al., 2021). Research has demonstrated a direct correlation between increased workload and reduced nurse performance (Baethge et al., 2016). Internal initiatives and organizational incentives are crucial to enhance nurses' performance and promote a positive outlook during crises, such as pandemics (Pourteimour et al., 2021).

The results indicated that pediatric nurses who had contact with infected materials or a person suspected of being infected with SARS-CoV-2 experienced elevated levels of stress, depression, and anxiety, and exhibited diminished levels of patient-centered care. Extended exposure to patients with confirmed or suspected cases of the disease has been demonstrated to engender significant levels of anxiety and depression (Arnetz et al., 2020). It is imperative for nurses to adhere to infection control protocols while caring for patients infected with SARS-CoV-2 (Choi et al., 2020; Huang et al., 2020). In this period of widespread fear, it is essential for nurses to be able to perform their duties with satisfaction n and to interact with patients and provide care while feeling secure (Hachisu & Suzuki, 2018; Pedrazza et al., 2018).

Pediatric nurses who reported feelings of uncertainty or insecurity due to the pandemic experienced elevated levels of stress, depression, and anxiety, and

exhibited diminished levels of patient-centered care. One of the most significant factors that fosters professional motivation is the sense of safety and security that professionals experience in their respective fields. However, nurses have encountered occupational hazards during the pandemic while delivering care in clinics or public health facilities (Choi et al., 2020; Huang et al., 2020). This risk includes the possibility of infection and subsequent transmission to their family members. The consequences of contracting the infection can be profound, leading to a various physical and psychological health challenges (Xia et al., 2020). Nurses have described their experiences during the pandemic as feeling "betrayed" and "left alone" (Iheduru-Anderson, 2021).

The present study found that pediatric nurses who believed their physical health worsened during the pandemic experienced elevated levels of stress, depression, and anxiety, and exhibited diminished levels of patient-centered care. The study identified factors contributing to the physical health challenges of nurses during the pandemic, including extended work hours, fatigue, inaccurate triage decisions, the provision of care without adequate protective equipment, and prolonged use of personal protective equipment. The most prevalent adverse health effects associated with protective equipment included headache (73.4%), excessive sweating (59.6%), and difficulty breathing (36.7%), as well as scars on the bridge of the nose (76.64%) and pain behind the ears (66.42%), skin wetting due to wearing latex gloves (70.07%), and skin irritation (19%) (Jose et al., 2021). Furthermore, it has been documented that nurses who utilize protective equipment for extended periods, exceeding four hours, encounter a range of adverse effects, including dizziness, shortness of breath, nausea, urgency to urinate, pain behind the ear, thirst, and discomfort at work. Additionally, these nurses have experienced pressure sores (Xia et al., 2020).

Recommendations for future research or policy

In line with the findings of this study, policies are needed to support the mental well-being of pediatric nurses during the pandemic. Future studies should examine the long-term mental health effects and evaluate the effectiveness of psychological support interventions. Additionally, organizational arrangements that reduce workloads and provide safe working environments can improve the psychological health of nurses and the quality of patient-centered care. Healthcare institutions should develop preparedness plans that strengthen nurses' perceptions of safety in crisis situations and include support mechanisms.

CONCLUSION

In the present study, it was observed that nurses who believed themselves and their families to be at high risk of contracting the novel strain of the influenza virus known as severe acute respiratory syndrome (SARS-CoV-2), commonly referred to as "COVID-19," exhibited elevated levels of anxiety. To address this heightened anxiety, the study recommends the implementation of interventions that prioritize risk reduction and bolster nurses' self-efficacy. These interventions enhance nurses' engagement and facilitate their transition to a patient-centered care model. Interventions and programs should be implemented to develop skills in coping with difficult emotions in crises such as pandemics. The implementation of such interventions and programs necessitates adaptation to suit individual needs. Support can be structured as individualized phone calls, web-based training, or consultancy services.

This study is among the few that concurrently examine pediatric nurses' mental health and their competence in delivering patient-centered care during the COVID-19 pandemic. The identification of specific pandemic-related stressors that adversely affect both psychological well-being and care quality adds practical value by guiding tailored interventions. These findings contribute to the growing need for evidence-based strategies that support pediatric nurses not only emotionally but also professionally during public health crises. As such, the study provides a foundation for developing structured support mechanisms that integrate psychological resilience with clinical competency in pediatric nursing practice.

Acknowledgement

The authors would like to extend their sincere thanks to anyone who contributed to this study.

Conflict of Interest

The authors declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Author Contributions

Plan, design: FUT, AT, TKA, AK; **Material, methods and data collection:** FUT, AT, TKA, AK; **Data analysis and comments:** FUT, AT, TKA, AK; **Writing and corrections:** FUT, AT, TKA, AK.

Funding

None

Ethical Approval

Institution: Zonguldak Bülent Ecevit University Human Research Ethics Committee
Date: 03/25/2021
Approval no: 113

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ORİJİNAL MAKALE / ORIGINAL ARTICLE

Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1669728

Top 50 Articles on Clear Aligner Treatment: Annual Citation-Based Bibliometric Analysis

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Geliş Tarihi / Received: *03.04.2025,* ***Kabul Tarihi / Accepted:*** *25.06.2025*

ABSTRACT

Objective: This study aims to identify the most influential articles on orthodontic clear aligners based on annual citation rates. Citation performance and trends in the field were evaluated through bibliometric analysis. **Materials and Methods:** A search in Scopus on September 15, 2024, yielded 54,988 articles and reviews, with the top 50 selected. Two authors independently reviewed the articles, resolving any disagreements with a third author. VOSviewer and Biblioshiny R-package were used for bibliometric analysis and visualization. Data were processed and visualized, with Excel used for data tabulation. **Results:** In the ranking based on annual citation rates, Italy was the leading country, while The Angle Orthodontist emerged as the top-ranked journal. Among institutions, the University of Turin ranked first. Among the authors, Castroflorio T. and Deregibus A. stood out. Invisalign was the most frequently used keyword, and systematic reviews were the most common type of study. **Conclusion:** The annual citation rate provides a more dynamic measure of an article's scientific potential and impact compared to traditional total citation counts. This metric is particularly important for assessing the immediate influence of studies on rapidly advancing technologies and innovative treatment methods, as it reflects the speed at which research contributes to literature and gains attention in the short term.

Keywords: Bibliometrics, Clear Aligner Appliances, Orthodontics.

Şeffaf Plak Tedavilerinde En Etkili 50 Makale: Yıllık Atıf Tabanlı Bibliyometrik Analiz

ÖZ

Amaç: Bu çalışma, ortodontide şeffaf plaklarla ilgili en etkili makaleleri yıllık atıf oranlarına göre belirlemeyi amaçlamaktadır. Alandaki atıf performansı ve eğilimler, bibliyometrik analiz yoluyla değerlendirilmiştir. **Gereç ve Yöntem:** 15 Eylül 2024 tarihinde Scopus veri tabanında yapılan aramada 54.988 makale ve derleme elde edilmiş, bunlardan en çok yıllık atıf alan ilk 50'si çalışmaya dahil edilmiştir. İki araştırmacı makaleleri bağımsız olarak incelemiş, görüş ayrılıkları üçüncü bir yazar aracılığıyla çözülmüştür. Bibliyometrik analiz ve görselleştirme için VOSviewer ve Biblioshiny R paketi kullanılmıştır. Veriler işlenmiş, görselleştirilmiş ve tablo haline getirmek için Excel programı kullanılmıştır. **Bulgular:** Yıllık atıf oranlarına göre yapılan sıralamada İtalya en önde gelen ülke olarak öne çıkarken, The Angle Orthodontist en üst sıradaki dergi olmuştur. Kurumlar arasında Torino Üniversitesi birinci sırada yer almıştır. Yazarlar arasında ise Castroflorio T. ve Deregibus A. dikkat çekmiştir. En sık kullanılan anahtar kelime "Invisalign" olurken, sistematik derlemeler en yaygın çalışma türü olmuştur. **Sonuç:** Yıllık atıf oranı, bir makalenin bilimsel potansiyelini ve etkisini geleneksel toplam atıf sayısına kıyasla daha dinamik bir şekilde yansıtmaktadır. Bu metrik, özellikle hızla gelişen teknolojiler ve yenilikçi tedavi yöntemlerine ilişkin çalışmaların anlık etkisini değerlendirmede önemlidir; çünkü araştırmanın literatüre katkı sağlama ve kısa vadede dikkat çekme hızını ortaya koymaktadır.

Anahtar Kelimeler: Bibliometri, Şeffaf Plak Apareyleri, Ortodonti.

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Bu makaleye atıf yapmak için / Cite this article: Yıldırım, A., Erdem, R., Genç, Y.S., & İşler Atasever, A.A. (2025). A bibliometric analysis of clear aligner articles by annual citation rates. *BAUN Health Sci J, 14*(2), 435-449. https://doi.org/10.53424/balikesirsbd.1669728

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

Clear Aligner Therapy (CAT) has a long history in orthodontics. Clear aligners were first introduced by Kesling in 1946 (Kesling, 1946) In 1999, Align Technology® (Santa Clara, California) developed the modern clear aligner treatment protocol by integrating advanced technology. Recent developments in applied biomechanics and successes in biomaterial design and engineering have led to the adoption of this treatment as a suitable technique for addressing various clinical conditions (Bruni et al, 2021). The advantages of clear aligner therapy, such as patient comfort and acceptance (Cardoso et al, 2020), maintenance of oral hygiene (Jiang et al, 2018), aesthetics (Alansari et al, 2019) and clinician convenience, have contributed to a significant increase in publications and research activities in this field in recent years (Bruni et al, 2021). Keeping up with current developments in orthodontics is crucial for enhancing the quality of clinical practice and meeting patients' increasing expectations by effectively adapting to rapidly advancing technologies. However, the ever-increasing number of published articles (Adobes Martin et al, 2020) presents a significant challenge for both researchers and clinicians in identifying studies of the highest quality and greatest clinical effectiveness. Therefore, systematically evaluating the existing literature and providing comprehensive insights to readers through bibliometric analyses are becoming increasingly important (Papadopoulos and Gkiaouris 2007; Gandedkar et al, 2019). Bibliometrics is widely used to evaluate scientific research both quantitatively and qualitatively. Bibliometric analysis involves collecting, obtaining, and analyzing measurable information related to published scientific articles. Bibliometric analyses evaluate the citation performance, impact, and contributions of scientific publications within a specific field, thereby facilitating the identification of exemplary studies and thematic trends. They also uncover connections between authors, research groups, research topics, and countries (Charalampakis et al, 2018). Analyzing high-impact publications is particularly crucial for understanding advancements in clear aligner therapy, as well as for identifying studies that significantly influence the direction of future research (Gutiérrez-Salcedo et al, 2018). A common approach in the existing literature is to evaluate the most impactful articles in orthodontics based on their total citation counts (Hui et al, 2013; Fernandes et al, 2022). Nevertheless, it is expected that older publications will accumulate a higher number of citations. The annual citation rate provides a more dynamic measure of an article's scientific potential and impact than traditional total citation counts. This study aims to identify the most influential articles related to orthodontic clear aligners by ranking them based on their annual citation rates. To date, no study has evaluated publications on orthodontic clear aligners by ranking them according to their annual citation rate. Using bibliometric analysis, the study examines the citation performance of these publications, author contributions, and trends in research areas. This analysis provides a comprehensive method for evaluating the scientific impact of research on orthodontic clear aligners and highlights the most significant studies in literature.

MATERIALS AND METHODS

In the Scopus database, a search was conducted on September 15, 2024, using the query ALL ("aligner*") AND (LIMIT-TO (DOCTYPE , "ar") OR LIMIT-TO (DOCTYPE , "re")) AND (EXCLUDE (PUBYEAR , 2025)), including articles and reviews and excluding publications from 2025, with the search performed in all fields. There are no linguistic constraints. A total of 54,988 publications were exported. An Excel formula was developed to calculate the annual citation rate, and the publications were ranked accordingly [Total number of citations of the article / (2024 – publication year of the article +1)]. Specifically, approximately 99.11% of journals indexed in Web of Science are also included in Scopus, whereas only 33.93% of Scopus-indexed journals appear in Web of Science (Singh et al, 2021). Given that our study focuses specifically on identifying the top 50 influential publications, the Scopus database was preferred due to its broader coverage. To identify relevant articles, two researchers independently reviewed the publications ranked according to their annual citation rates. Initially, articles were evaluated based on their titles and abstracts. In cases of uncertainty, the full texts were examined to determine relevance to the study topic. The lists compiled by both researchers were subsequently compared by a third researcher. Any discrepancies were discussed and resolved through an online meeting involving all three researchers, resulting in the final selection of the top 50 articles. Following this selection, the two researchers conducted an additional online meeting to classify the articles according to topic areas and study types. The titles, abstracts, and, when necessary, the full texts of the articles were thoroughly examined to ensure accurate identification of the topic areas and study types. In this study, VOSviewer (Center for Science and Technology Studies, Leiden University) and Bibliometrix Biblioshiny R-package software programs were used to perform the bibliometric analysis and visualization of the obtained data. VOSviewer was utilized to create maps for authors or journals based on co-citation data and for keywords based on co-occurrence data. The software provides an advanced viewer that enables a detailed examination of the bibliometric maps (Van Eck and Waltman, 2010). VOSviewer version 1.6.20 was downloaded from the official website of the program. To prevent the software from misreading the exported .csv data set, the data were opened and adjusted using Microsoft Excel (Microsoft, Inc., Redmond, Washington). For example, the name “Vaid N.” was corrected to “Vaid N.R.” resulting in an increase in the author’s publication count from 2 to 3. Biblioshiny R-package is a unique open-

source tool designed for conducting scientific mapping analyses. It supports the recommended workflow for performing bibliometric analyses. Programmed in the R language, this tool is flexible, easily upgradable, and works seamlessly with other statistical R packages, making it particularly valuable in the continuously evolving field of bibliometrics (Aria and Cuccurullo, 2017). Data were exported in ".bib" format for use in this software, processed by the program, and visualizations were generated. Microsoft Excel was used for the preparation of data tables. As the research did not involve clinical studies or patient data, ethical approval was not required. Titles and abstracts were read for the correct identification of the thematic field, and in cases where it was necessary, the full article was reviewed.

Ethical approval

Since no human or animal materials were used in the study, ethical approval was not required.

RESULTS

Based on annual citation rates, examines articles published between 2009 and 2024. The highest number of articles was published in 2017, with a noticeable decline observed in 2023 (Figure 1).

The top 50 most influential articles ranked by annual citation rate are shown in Table 1.

Among the journals with the most published articles, the American Journal of Orthodontics and Dentofacial Orthopedics ranks first (11 articles, 1,580 citations), followed by Angle Orthodontist (10 articles, 1,367 citations), and Progress in Orthodontics (6 articles, 611 citations). In terms of the total annual citation rates, the journals were ranked as follows: The Angle Orthodontist (150.36), American Journal of Orthodontics and Dentofacial Orthopedics (121.07), and Progress in Orthodontics (101.75) (Table 2).

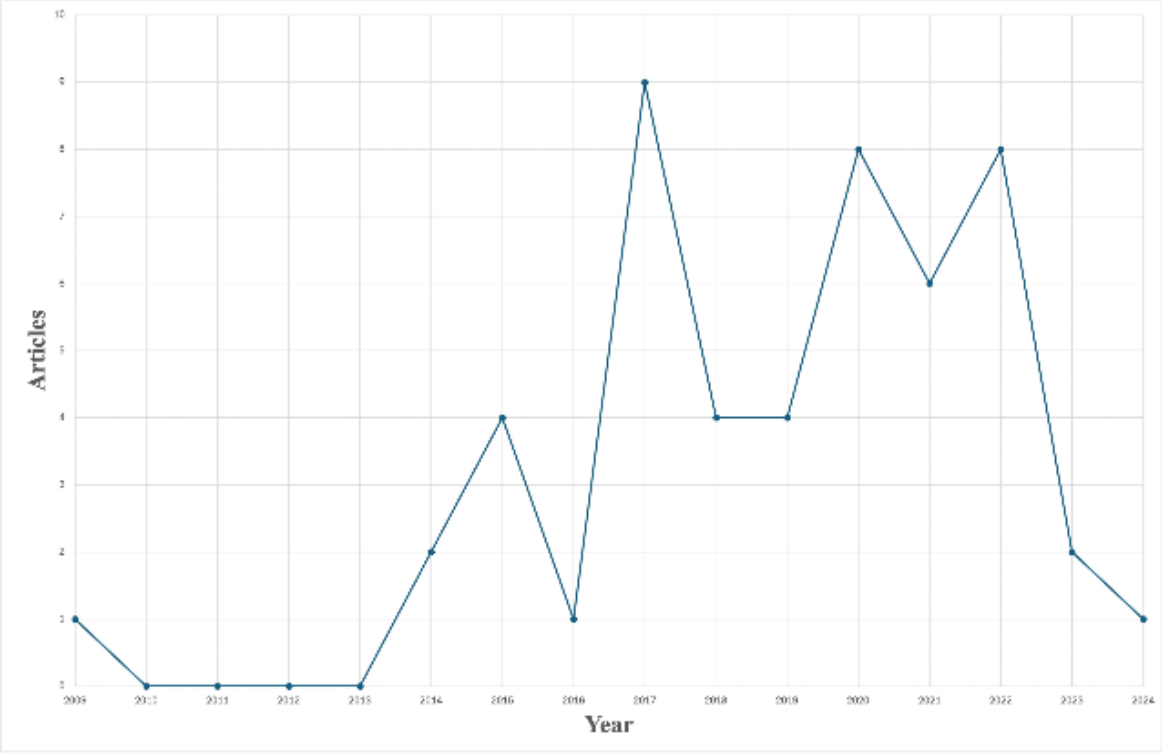

Figure 1. Distribution of the top 50 articles ranked by annual citation rate by year.

Table 1. Top 50 most cited articles ranked by annual citation rate.

No	Title	Authors	Year of Publications	Total Citations	Citations Per Year	Thematic Fields	Type of Studies	Source Title	Correspond Author's Country
1	Efficacy of clear aligners in controlling orthodontic tooth movement: A systematic review	Rossini G., Parrini S., Castroflorio T., Deregibus A., Debernardi C.L.	2015	448	44.8	The Effectiveness of Clear Aligners	Systematic review	Angle Orthodontist	Italy
2	Advances in orthodontic clear aligner materials	Bichu Y.M., Alwafi A., Liu X., Andrews J., Ludwig B., Bichu A.Y., Zou B.	2023	79	39.5	Comparison of the Different Clear Aligner Materials	Narrative literature review	Bioactive Materials	Canada
3	Has Invisalign improved? A prospective follow-up study on the efficacy of tooth movement with Invisalign	Haouili N., Kravitz N.D., Vaid N.R., Ferguson D.J., Makki L.	2020	196	39.2	The Effectiveness of Clear Aligners	Prospective study	American Journal of Orthodontics and Dentofacial Orthopedics	USA
4	Effectiveness of clear aligner therapy for orthodontic treatment: A systematic review	Robertson L., Kaur H., Fagundes N.C.F., Romanyk D., Major P., Flores-Mir C.	2020	159	31.8	The Effectiveness of Clear Aligners	Systematic review	Orthodontics and Craniofacial Research	Canada
5	Clear aligners in orthodontic treatment	Weir T.	2017	210	26.25	Comparison of the Different Clear Aligner Products	Narrative literature review	Australian Dental Journal	Australia
6	Clinical effectiveness of Invisalign® orthodontic treatment: a systematic review	Papadimitriou A., Mousoulea S., Gkantidis N., Kloukos D.	2018	183	26.14	The Effectiveness of Clear Aligners	Systematic review	Progress in Orthodontics	Switzerland
7	Direct 3D printing of clear orthodontic aligners: Current state and future possibilities	Tartaglia G.M., Mapelli A., Maspero C., Santaniello T., Serafin M., Farronato M., Caprioglio A.	2021	104	26	Comparison of the Different Clear Aligner Materials	Narrative literature review	Materials	Italy
8	How well does Invisalign work? A prospective clinical study evaluating the efficacy of tooth movement with Invisalign	Kravitz N.D., Kusnoto B., BeGole E., Obrez A., Agran B.	2009	399	24.94	The Effectiveness of Clear Aligners	Prospective clinical study	American Journal of Orthodontics and Dentofacial Orthopedics	USA
9	A comparison of treatment effectiveness between clear aligner and fixed appliance therapies	Ke Y., Zhu Y., Zhu M.	2019	143	23.83	The Effectiveness of Clear Aligners	Systematic review	BMC Oral Health	China

Table 1. (Continued). Top 50 most cited articles ranked by annual citation rate.

10	Treatment outcome and efficacy of an aligner technique - regarding incisor torque, premolar derotation and molar distalization	Simon M., Keilig L., Schwarze J., Jung B.A., Bourauel C.	2014	253	23	The Effectiveness of Clear Aligners	Prospective study	BMC Oral Health	Germany
11	Biomechanics of clear aligners: hidden truths & first principles	Upadhyay M., Arqub S.A.	2022	68	22.67	Drawbacks of Clear Aligners	Narrative literature review	Journal of the World Federation of Orthodontists	USA
12	Efficiency, effectiveness and treatment stability of clear aligners: A systematic review and meta-analysis	Zheng M., Liu R., Ni Z., Yu Z.	2017	167	20.88	Comparison of the Effectiveness of Clear Aligners and Conventional Systems	Systematic review	Orthodontics and Craniofacial Research	China
13	Clinical effectiveness of clear aligner treatment compared to fixed appliance treatment: an overview of systematic reviews	Yassir Y.A., Nabbat S.A., McIntyre G.T., Bearn D.R.	2022	62	20.67	The Effectiveness of Clear Aligners	Systematic review	Clinical Oral Investigations	Iraq
14	Mechanical and geometric properties of thermoformed and 3D printed clear dental aligners	Jindal P., Juneja M., Siena F.L., Bajaj D., Breedon P.	2019	122	20.33	Comparison of the Different Clear Aligner Materials	Comparative experimental study	American Journal of Orthodontics and Dentofacial Orthopedics	United Kingdom
15	Treatment outcome with orthodontic aligners and fixed appliances: A systematic review with meta-analyses	Papageorgiou S.N., Koletsi D., Iliadi A., Peltomaki T., Eliades T.	2020	101	20.2	Comparison of the Effectiveness of Clear Aligners and Conventional Systems	Systematic review	European Journal of Orthodontics	Switzerland
16	A systematic review of the accuracy and efficiency of dental movements with invisalign®	Galan-Lopez L., Barcia-Gonzalez J., Plasencia E.	2019	118	19.67	Comparison of the Effectiveness of Clear Aligners and Conventional Systems	Systematic review	Korean Journal of Orthodontics	Spain
17	Accuracy of clear aligners: A retrospective study of patients who needed refinement	Charalampakis O., Iliadi A., Ueno H., Oliver D.R., Kim K.B.	2018	136	19.43	The Effectiveness of Clear Aligners	Retrospective study	American Journal of Orthodontics and Dentofacial Orthopedics	USA
18	Association of orthodontic force system and root resorption: A systematic review	Roscoe M.G., Meira J.B.C., Cattaneo P.M.	2015	189	18.9	Root Resorption	Systematic review	American Journal of Orthodontics and Dentofacial Orthopedics	Denmark

Table 1. (Continued) Top 50 most cited articles ranked by annual citation rate.

19	Predictability of orthodontic tooth movement with aligners: effect of treatment design	Castroflorio T., Sedran A., Parrini S., Garino F., Reverdito M., Capuozzo R., Mutinelli S., Grybauskas S., Vaitiekūnas M., Deregibus A.	2023	37	18.5	The Effectiveness of Clear Aligners	Prospective study	Progress in Orthodontics	Italy
20	Comparison of pain perception, anxiety, and impacts on oral health-related quality of life between patients receiving clear aligners and fixed appliances during the initial stage of orthodontic treatment	Gao M., Yan X., Zhao R., Shan Y., Chen Y., Jian F., Long H., Lai W.	2021	73	18.25	Comparison of the Effectiveness of Clear Aligners and Conventional Systems	Comparative cohort study	European Journal of Orthodontics	China
21	Prevalence of temporomandibular disorders in clear aligner patients using orthodontic intermaxillary elastics assessed with diagnostic criteria for temporomandibular disorders (DC/TMD) axis II evaluation: A cross-sectional study	Uzunçıbuk H., Marrapodi M.M., Meto A., Ronsivalle V., Cicciù M., Minervini G.	2024	18	18	İntermaxillary Elastics and Temporomandibular Disorder Symptoms in Clear Aligner Patients	Cross-sectional study	Journal of Oral Rehabilitation	Türkiye-Italy
22	Treatment of Class III Malocclusion and Anterior Crossbite with Aligners: A Case Report	Inchingolo A.D., Patano A., Coloccia G., Ceci S., Inchingolo A.M., Marinelli G., Malcangi G., Di Pede C., Garibaldi M., Ciocia A.M., Mancini A., Palmieri G., Rapone B., Piras F., Cardarelli F., Nucci L., Bordea I.R., Scarano A., Lorusso F., Giovanniello D., Costa S., Tartaglia G.M., Di Venere D., Dipalma G., Inchingolo F.	2022	50	16.67	The Effectiveness of Clear Aligners	Case report	Medicina (Lithuania)	Romania-Italy
23	Effect of clear aligner wear protocol on the efficacy of tooth movement: A randomized clinical trial	Al-Nadawi M., Kravitz N.D., Hansa I., Makki L., Ferguson D.J., Vaid N.R.	2021	66	16.5	The Effectiveness of Clear Aligners	Randomized clinical trial	Angle Orthodontist	South Africa
24	Thermo-mechanical properties of 3D printed photocurable shape memory resin for clear aligners	Lee S.Y., Kim H., Kim H.-J., Chung C.J., Choi Y.J., Kim S.-J., Cha J.-Y.	2022	48	16	Comparison of the Different Clear Aligner Materials	Comparative experimental study	Scientific Reports	South Korea
25	Stress relaxation properties of four orthodontic aligner materials: A 24-hour in vitro study	Lombardo L., Martines E., Mazzanti V., Arreghini A., Mollica F., Siciliani G.	2017	126	15.75	Comparison of the Different Clear Aligner Materials	Experimental study	Angle Orthodontist	Italy

Table 1. (Continued) Top 50 most cited articles ranked by annual citation rate.

26	Maxillary molar distalization with aligners in adult patients: A multicenter retrospective study	Ravera S., Castroflorio T., Garino F., Daher S., Cugliari G., Deregibus A.	2016	141	15.67	The Effectiveness of Clear Aligners	Retrospective study	Progress in Orthodontics	Italy
27	Clear aligner orthodontic therapy of rotated mandibular round-shaped teeth: A finite element study	Cortona A., Rossini G., Parrini S., Deregibus A., Castroflorio T.	2020	78	15.6	Finite Element Method	Methodological study	Angle Orthodontist	Italy
28	Forces and moments generated by removable thermoplastic aligners: Incisor torque, premolar derotation, and molar distalization	Simon M., Keilig L., Schwarze J., Jung B.A., Bourauel C.	2014	171	15.55	The Effectiveness of Clear Aligners	Experimental study	American Journal of Orthodontics and Dentofacial Orthopedics	Germany
29	Comparison of achieved and predicted tooth movement of maxillary first molars and central incisors: First premolar extraction treatment with Invisalign	Dai F.-F., Xu T.-M., Shu G.	2019	93	15.5	The Effectiveness of Clear Aligners	Retrospective study	Angle Orthodontist	China
30	The oral microbiota changes in orthodontic patients and effects on oral health: An overview	Contaldo M., Lucchese A., Lajolo C., Rupe C., Di Stasio D., Romano A., Petruzzi M., Serpico R.	2021	62	15.5	Microbiological Changes that Accompany Orthodontic Treatment	Narrative literature review	Journal of Clinical Medicine	Italy
31	Effects of Composite Attachments on Orthodontic Clear Aligners Therapy: A Systematic Review	Nucera R., Dolci C., Bellocchio A.M., Costa S., Barbera S., Rustico L., Farronato M., Militi A., Portelli M.	2022	46	15.33	The Effectiveness of Clear Aligners	Systematic review	Materials	Italy
32	How accurate is Invisalign in nonextraction cases? Are predicted tooth positions achieved?	Grünheid T., Loh C., Larson B.E.	2017	121	15.13	The Effectiveness of Clear Aligners	Clinical study	Angle Orthodontist	USA
33	The predictability of transverse changes with Invisalign	Houle J.-P., Piedade L., Todescan R., Pinheiro F.H.S.L.	2017	119	14.88	The Effectiveness of Clear Aligners	Retrospective study	Angle Orthodontist	Canada
34	Predictability of orthodontic movement with orthodontic aligners: a retrospective study	Lombardo L., Arreghini A., Ramina F., Huanca Ghislanzoni L.T., Siciliani G.	2017	114	14.25	The Effectiveness of Clear Aligners	Retrospective study	Progress in Orthodontics	Italy

Table 1. (Continued) Top 50 most cited articles ranked by annual citation rate.

35	Outcomes of clear aligner treatment with and without Dental Monitoring: A retrospective cohort study	Hansa I., Katyal V., Ferguson D.J., Vaid N.	2021	57	14.25	The Effectiveness of Clear Aligners	Retrospective study	American Journal of Orthodontics and Dentofacial Orthopedics	United Arab Emirates
36	Initial force systems during bodily tooth movement with plastic aligners and composite attachments: A three-dimensional finite element analysis	Gomez J.P., Peña F.M., Martínez V., Giraldo D.C., Cardona C.I.	2015	142	14.2	Finite Element Method	Methodological study	Angle Orthodontist	Colombia
37	Efficiency of upper arch expansion with the Invisalign system	Zhou N., Guo J.	2020	71	14.2	The Effectiveness of Clear Aligners	Retrospective study	Angle Orthodontist	China
38	Management of overbite with the Invisalign appliance	Khosravi R., Cohanim B., Hujoel P., Daher S., Neal M., Liu W., Huang G.	2017	113	14.13	The Effectiveness of Clear Aligners	Retrospective study	American Journal of Orthodontics and Dentofacial Orthopedics	USA
39	Pain level between clear aligners and fixed appliances: a systematic review	Cardoso P.C., Espinosa D.G., Mecenas P., Flores-Mir C., Normando D.	2020	69	13.8	Comparison of the Effectiveness of Clear Aligners and Conventional Systems	Systematic review	Progress in Orthodontics	Brazil
40	Class II malocclusion correction with Invisalign: Is it possible?	Patterson B.D., Foley P.F., Ueno H., Mason S.A., Schneider P.P., Kim K.B.	2021	55	13.75	The Effectiveness of Clear Aligners	Retrospective study	American Journal of Orthodontics and Dentofacial Orthopedics	USA
41	'Invisible' orthodontics by polymeric 'clear' aligners molded on 3D-printed personalized dental models	Yu X., Li G., Zheng Y., Gao J., Fu Y., Wang Q., Huang L., Pan X., Ding J.	2022	41	13.67	Comparison of the Different Clear Aligner Materials	Experimental study	Regenerative Biomaterials	China
42	Periodontal health during orthodontic treatment with clear aligners and fixed appliances: A meta-analysis	Jiang Q., Li J., Mei L., Du J., Levrini L., Abbate G.M., Li H.	2018	95	13.57	Comparison of the Effectiveness of Clear Aligners and Conventional Systems	Systematic review	Journal of the American Dental Association	China
43	Accuracy of interproximal enamel reduction during clear aligner treatment	De Felice M.E., Nucci L., Fiori A., Flores-Mir C., Perillo L., Grassia V.	2020	67	13.4	The Effectiveness of Clear Aligners	Retrospective study	Progress in Orthodontics	Italy
44	Accuracy of orthodontic models prototyped for clear aligners therapy: A 3D imaging analysis comparing different market segments 3D printing protocols	Venezia P., Ronsivalle V., Rustico L., Barbato E., Leonardi R., Lo Giudice A.	2022	40	13.33	Comparison of the Different Clear Aligner Materials	Experimental study	Journal of Dentistry	Italy

Table 1. (Continued) Top 50 most cited articles ranked by annual citation rate.

45	Evaluation of Invisalign treatment effectiveness and efficiency compared with conventional fixed appliances using the Peer Assessment Rating index	Gu J., Tang J.S., Skulski B., Fields H.W., Beck F.M., Firestone A.R., Kim D.-G., Deguchi T.	2017	104	13	Comparison of the Effectiveness of Clear Aligners and Conventional Systems	Retrospective study	American Journal of Orthodontics and Dentofacial Orthopedics	USA
46	Effects of thermoforming on the physical and mechanical properties of thermoplastic materials for transparent orthodontic aligners	Ryu J.-H., Kwon J.-S., Jiang H.B., Cha J.-Y., Kim K.-M.	2018	91	13	Comparison of the Different Clear Aligner Materials	Systematic multiscale analysis	Korean Journal of Orthodontics	South Korea
47	Clear aligners for maxillary anterior en masse retraction: a 3D finite element study	Jiang T., Wu R.Y., Wang J.K., Wang H.H., Tang G.H.	2020	65	13	Finite Element Method	Methodological study	Scientific Reports	China
48	Braces versus Invisalign®: Gingival parameters and patients' satisfaction during treatment: A cross-sectional study	Azaripour A., Weusmann J., Mahmoodi B., Peppas D., Gerhold-Ay A., Van Noorden C.J.F., Willershausen B.	2015	129	12.9	Oral Hygiene During Clear Aligner Treatment	Methodological study	BMC Oral Health	Germany
49	Discomfort associated with Invisalign and traditional brackets: A randomized, prospective trial	White D.W., Julien K.C., Jacob H., Campbell P.M., Buschang P.H.	2017	103	12.88	Comparison of the Effectiveness of Clear Aligners and Conventional Systems	Prospective trial	Angle Orthodontist	USA
50	The effects of aligner overtreatment on torque control and intrusion of incisors for anterior retraction with clear aligners: A finite-element study	Liu L., Song Q., Zhou J., Kuang Q., Yan X., Zhang X., Shan Y., Li X., Long H., Lai W.	2022	38	12.67	The Effectiveness of Clear Aligners	Methodological study	American Journal of Orthodontics and Dentofacial Orthopedics	China

Table 2. Ranking of the journals contributing the most according to the total annual citation rate (with more than two publications).

Source	Number of articles	Total annual citations rates	Number of citations
Angle Orthodontist	10	150.36	1367
American Journal of Orthodontics and Dentofacial Orthopedics	11	121.07	1580
Progress in Orthodontics	6	101.75	611
BMC Oral Health	3	59.73	525

The countries with the most published articles are Italy (14 articles, 1,426 citations), the USA (12 articles, 1,597 citations), and China (11 articles, 956 citations) (Figure 2). The leading institutions are the University of Milan (4 articles, 314 citations), University of Campania Luigi Vanvitelli (4 articles, 197 citations), and University of Turin (3 articles, 667 citations). In terms of total annual citation rates, the countries were ranked as follows: Italy (255.95), the USA (220.8), and China (198.4) (Table 3).

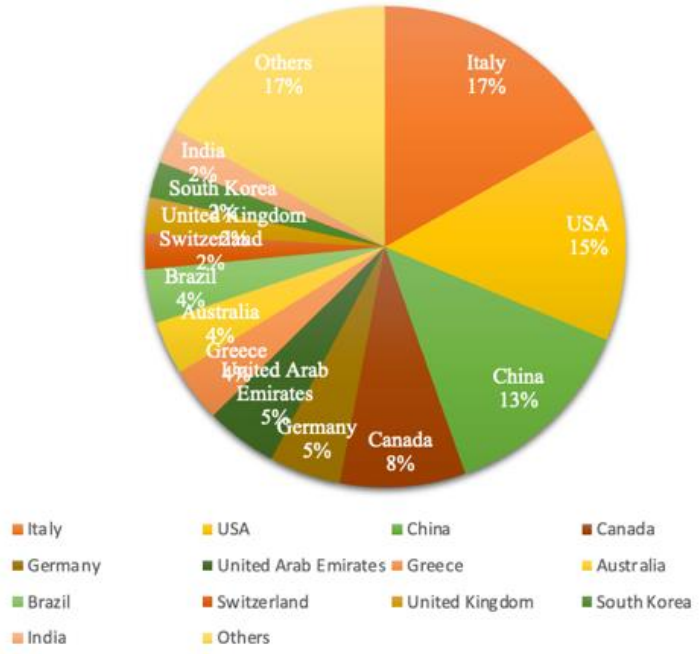

Figure 2. The contributing countries with more than two publications.

Table 3. Ranking of the countries contributing the most according to the total annual citation rate (with more than two publications).

Country or Region	Number of articles	Total annual citations rates	Number of citations
Italy	14	255.95	1426
USA	12	220.8	1597
China	11	198.4	956
Canada	7	142.61	727
United Arab Emirates	4	109.45	398
Germany	4	90.94	632
Australia	3	80	346
Greece	3	65.76	420
Brazil	3	46.45	313

Regarding institutions, the highest total annual citation rates were recorded by the University of Turin (76.06), the University of Milan (72.24), and the European University College (69.95), respectively (Table 4).

Table 4. Ranking of the institutions contributing the most according to the total annual citation rate (with more than two publications).

Source Title	Number of articles	Total annual citations rates	Number of citations
University of Turin	4	76.06	667
University of Milan	4	72.24	314
European University College	3	69.95	319
University of Campania Luigi Vanvitelli	3	63.56	197
University of Alberta	3	59	295
Shanghai Jiao Tong University	3	50.49	249
University of Ferrara	3	48.5	277

The most prolific authors include Castroflorio T. and Deregibus A., each with 4 articles and 704 citations, followed by Kravitz N.D. with 3 articles and 661 citations. In terms of total annual citation rates, the authors were identified as follows: Castroflorio T. (94.56), Deregibus A. (94.56), and Kravitz N.D. (80.63) (Table 5).

Table 5. Ranking of the authors contributing the most according to the total annual citation rate (with more than two publications).

Authors	Number of articles	Total annual citation rates	Number of citations
Castroflorio T.	4	94.56	704
Deregibus A.	4	94.56	704
Kravitz N.D.	3	80.63	661
Parrini S.	3	78.9	563
Ferguson D.J.	3	69.95	319
Vaid N.R.	3	69.95	319
Flores-Mir C.	3	59	295

The most common author keywords were Invisalign, Orthodontics, and Clear aligners (Figure 3).

Figure 3. Word cloud of keywords. In the word cloud, the size of each word represents its frequency of occurrence in the analyzed articles; larger words appeared more frequently among the author keywords.

The author keyword network is visualized in Figure 4.

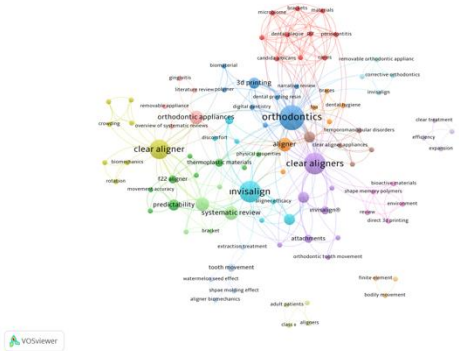

Figure 4. Network structure of the author's keywords. Node size reflects the frequency of occurrence; larger nodes indicate more frequently used keywords. Lines represent co-occurrence relationships.

The most common study types were systematic reviews (12 articles), followed by retrospective studies (11 articles) and narrative literature reviews (5 articles) (Table 6).

Table 6. Study types of the top 50 most cited articles ranked by annual citation rate.

Type of study	Number of articles
Systematic review	12
Retrospective study	11
Narrative literature review	5
Methodological study	5
Experimental study	4
Prospective study	3
Comparative experimental study	2
Cross-sectional study	1
Systematic multiscale analysis	1
Randomized clinical trial	1
Prospective clinical study	1
Comparative cohort study	1
Case report	1
Prospective Trial	1
Clinical study	1

The most frequent thematic fields were "The Effectiveness of Clear Aligners" (25 articles) and "Comparison of the Effectiveness of Clear Aligners and Conventional Systems" (8 articles) (Table 7).

Table 7. Thematic fields of the top 50 most cited articles ranked by annual citation rate.

Thematic Field	Number of articles
The effectiveness of clear aligners	25
Comparison of the effectiveness of clear aligners and conventional systems	8
Comparison of the different clear aligner materials	8
Finite element method	3
Intermaxillary elastics and temporomandibular disorder symptoms in clear aligner patients	1
Microbiological changes that accompany orthodontic treatment	1
Comparation of the different clear aligner products	1
Oral hygiene during clear aligner treatment	1
Drawbacks of clear aligners	1
Root resorption	1

DISCUSSION

Three major databases—Google Scholar, Scopus, and Web of Science (WoS)—are commonly utilized for bibliometric analyses. Among these, Scopus is the most widely employed database due to its reliable information collection and advanced analytical tools (Martínez et al, 2008). The utilization of the Scopus database in our study ensured reliable data collection and provided a robust foundation for the analysis. These databases have been extensively compared through direct coverage comparisons (Gavel & Iselid, 2008; Mongeon & Paul-Hus, 2016) as well as citation-based comparative studies (Martín-Martín et al, 2018). In studies comparing the two databases, it has been shown that while Scopus offers broader journal coverage, Web of Science is more selective in the journals it indexes. Specifically, approximately 99.11% of journals indexed in Web of Science are also included in Scopus, whereas only 33.93% of Scopus-indexed journals appear in Web of Science (Singh et al, 2021). The average annual citation rate is an essential metric, accurately reflecting the scientific potential of newer articles that have not yet accumulated high total citation counts (Bruni et al, 2021; Seglen, 1998). It is widely recognized that influential articles typically reach their peak recognition within 10-20 years of publication (Seglen, 1998). This phenomenon often leads to the underestimation of the potential impact of newly published studies. While evaluations based on total citation counts generally highlight classical, well-established areas, our study, utilizing annual citation rates, better reflects current trends in orthodontics literature and emphasizes the increasing importance of innovative treatment methods. The annual citation rate is a critical bibliometric indicator that can reveal the future scientific potential of a paper, even if it has not yet received significant citations in its early stages. This metric highlights how quickly a paper contributes to the literature and the level of attention it garners in the short term. Unlike the traditional total citation count, the annual citation rate dynamically measures a paper's influence from the time of publication, which is especially crucial in evaluating the impact of new research in rapidly advancing fields (Bruni et al, 2021; Seglen, 1998; Montori et al, 2003). The data reveal a notable distinction between the American Journal of Orthodontics and Dentofacial Orthopedics (AJO-DO) and the Angle Orthodontist. Although AJO-DO appears to lead in terms of volume and overall impact, with 11 articles and a total of 1,580 citations, its annual citation average of 121.07 suggests that while some of its publications received considerable attention at the time of release, their scientific influence may have diminished over time. In contrast, the Angle Orthodontist, with 10 articles and 1,367 citations, not only approaches AJO-DO in terms of total citations but also demonstrates a higher annual citation rate of 150.36. This indicates that its publications have retained their relevance and continue to make a dynamic contribution to the field. These findings suggest that in recent years, the Angle Orthodontist has hosted more sustainable and current publications related to clear aligner therapy. Furthermore, the consistent ranking of these two journals at the top in previous bibliometric studies (Gutiérrez-Salcedo et al, 2018) underscores their longstanding leadership not only in various areas of orthodontics but also, as evidenced by the results of the present study, in the field of clear aligner therapy (Fernandes et al, 2022). Although Progress in Orthodontics has less than half the total number of citations compared to AJO-DO, its annual citation rate does not fall significantly behind. This suggests that Progress in Orthodontics has rapidly published studies addressing the evolving technology and increasing clinical adoption of clear aligner therapy. Country-wise, although Italy has received fewer total citations (1,426) despite producing a higher number of publications (14), it ranks first in terms of generating up-to-date and high-quality research, with an impressive annual citation rate of 255.95. In contrast, the United States, despite accumulating more total citations (1,597) with fewer publications (12), exhibits a lower average annual citation rate of 220.8. This clearly indicates that Italy's contributions are not only more consistent in terms of annual scientific impact but also play a pivotal role in shaping the contemporary literature on clear aligner therapy. Consequently, Italy emerges as a leading country not only in terms of publication quantity but also in quality, positioning itself as a central hub for scientific advancement and academic focus in the field of clear aligners. Institutional rankings generally exhibit a parallel trend between total citation counts and annual citation rates. Selvaraj (2024) emphasized that these institutions not only produce highly cited research but also actively participate in extensive international collaborations. It is particularly noteworthy that the University of Milan, despite having nearly half the total number of citations compared to the University of Turin, demonstrates a comparable annual citation rate. This indicates that the University of Milan has rapidly aligned itself with the most current literature on clear aligner therapy in recent years and has shown significant momentum in its academic productivity within this field.

In terms of authorship, a parallel alignment is observed between annual citation rates and total citation counts. Rossini et al.'s 2015 systematic review, with an annual citation rate of 44.8, ranks as the most influential study in this field. It provides a comprehensive evaluation of the effectiveness of clear aligners in orthodontic tooth movement, making it a key reference point in the literature. Bichu Y.M. et al.'s 2023 study, which compares various aligner materials, ranks second with an annual citation rate of 39.5. These results suggest that systematic reviews, in particular, receive substantial attention and are frequently cited in the field of clear aligner research.

It is observed that the studies ranked highest based on annual citation rates primarily focus on tooth movement in clear aligner therapy, while those ranked lower on the list tend to address topics such as the finite element method, comparisons of different clear aligner materials, disadvantages of clear aligner therapy, and oral hygiene during the treatment process. This suggests that although the methodologies employed may vary, clinical studies consistently attract sustained interest in the field. It was observed that the study published by Bichu Y.M. et al. in 2023 ranked 29th based on total citation count, with 79 citations, in the list we created according to annual citation rate; however, it rose to 2nd place with an average of 39.5 citations per year when ranked by annual citation average. If the evaluation had been based solely on total citation count, this important study, which receives a high number of citations on an annual basis, might have been overlooked. Similarly, although the 2015 study by Azaripour A. et al. (2015) ranked 15th in terms of total citations with 129 citations, it dropped to 48th place in the ranking based on annual citation rate, due to an annual average of 12.9 citations. This situation reveals that rankings based on annual citation rates more accurately reflect the current impact of a study. In addition to these findings, although a large number of articles were evaluated in our study using the Scopus database, one of the potential limitations is the possibility that certain relevant publications indexed in other databases—such as Web of Science (WoS), Dimensions, PubMed, Google Scholar, and the Cochrane Library—may have been omitted.

CONCLUSION

In conclusion, while rankings based on total citation counts reflect the scientific impact of studies in the past, evaluations based on annual citation rates provide a clearer indication of current research trends and studies with the potential to shape the future direction of the field.

Acknowledgement

The authors would like to extend their sincere thanks to anyone who contributed to this study.

Conflict of interest

Authors declare that they have no conflict of interest.

Author Contributions

Plan, design: AY**; Material, methods and data collection:** YSG, RE, AAAI**; Data analysis and comments:** YSG, AAAI**; Writing and corrections:** AY, RE**.**

Fundings

This research received no funds.

Ethical Approval

Since no human or animal materials were used in the study, ethical approval was not required.

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ORİJİNAL MAKALE / ORIGINAL ARTICLE

Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1664877

Evaluation of Psychiatric Complaints and Diagnoses Associated with Skin Diseases: A Cross-Sectional Study

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Geliş Tarihi / Received: *25.03.2025,* ***Kabul Tarihi / Accepted:*** *25.06.2025*

ABSTRACT

Objective: It's known that skin diseases can affect not only physical health but also cause social and psychological problems. This study aimed to determine psychiatric follow-up rates and the frequency of psychiatric complaints in individuals with dermatologic diseases. **Materials and Methods:** The study included 791 patients who visited a dermatology outpatient clinic between July 2022 and January 2023. Participants completed a sociodemographic data form and a screening list of common psychiatric complaints, both prepared by the researchers. **Results:** A total of 791 patients were included in the study (496 females, 63.7%; 295 males, 37.3%). The most common dermatologic diagnoses were acneiform (27.9%), inflammatory (19.2%), and infectious (17.2%) dermatoses. A psychiatric follow-up history was reported by 11.8% (n=93) of the patients, and 14.2% (n=112) reported psychiatric medication use. The most frequently reported psychiatric complaint was depressive mood (50%), followed by anxiety symptoms and obsessive-compulsive complaints (30%). **Conclusion:** Various studies have shown that psychiatric problems may play a role in the onset or exacerbation of many skin diseases. The finding that half of the dermatology patients reported a depressive mood suggests that psychiatric evaluation may positively affect treatment success and improve patients' quality of life.

Keywords: Dermatologic Diseases, Psychiatric Complaints, Psychiatric Comorbidity.

Cilt Hastalıklarıyla İlişkili Psikiyatrik Şikâyet ve Tanıların Değerlendirilmesi: Kesitsel Bir Çalışma

ÖZ

Amaç: Deri hastalıklarının fiziksel sağlık üzerindeki etkilerinin yanı sıra sosyal ve psikolojik sorunlara da yol açabileceği bilinmektedir. Bu çalışmada, dermatolojik hastalığı olan bireylerde psikiyatrik takip oranlarını ve psikiyatrik şikayetlerin sıklığını belirlemek amaçlanmıştır. **Gereç ve Yöntem:** Çalışma, Temmuz 2022 ile Ocak 2023 tarihleri arasında bir dermatoloji polikliniğine başvuran 791 hastayı içermektedir. Katılımcılara, araştırmacılar tarafından hazırlanan sosyodemografik bilgi formu ve yaygın psikiyatrik şikayet kategorilerinin bulunduğu bir tarama listesi uygulanmıştır. **Bulgular:** Toplamda 791 hasta çalışmaya dahil edilmiştir (496 kadın, %63,7; 295 erkek, %37,3). En yaygın dermatolojik tanılar akneiform (%27,9), enflamatuar (%19,2) ve enfeksiyöz (%17,2) dermatozlar olmuştur. Psikiyatrik takip öyküsü bulunan hasta oranı %11,8 (n=93) ve psikiyatrik ilaç kullanım oranı %14,2 (n=112) olarak bulunmuştur. En sık bildirilen psikiyatrik şikayet depresif ruh hali (%50) olup, bunu kaygı belirtileri ve obsesif-kompulsif şikayetler (%30) takip etmiştir. **Sonuç:** Çeşitli çalışmalar, psikiyatrik problemlerin birçok deri hastalığının başlangıcında veya alevlenmesinde rol oynayabileceğini göstermiştir. Dermatoloji hastalarının yarısında depresif ruh hali görülmesi, psikiyatrik değerlendirmenin tedavi başarısını ve hastaların yaşam kalitesini olumlu yönde etkileyebileceğini göstermektedir.

Anahtar Kelimeler: Dermatolojik Hastalıklar, Psikiyatrik Şikayetler, Psikiyatrik Komorbidite.

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Bu makaleye atıf yapmak için / Cite this article: Can, I., Sahin Can, M., & Altunöz, T. (2025). Evaluation of psychiatric complaints and diagnoses associated with skin diseases: A cross-sectional study. *BAUN Health Sci J, 14*(2), 450-457. https://doi.org/10.53424/balikesirsbd.1664877

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

The skin is an organ that largely determines external appearance and plays an important role in social and interactive relations. Therefore, in addition to affecting the physical health of patients, dermatologic diseases can also lead to social and psychological problems and impact self-perception and relationships with the environment (Bilgiç & Bilgiç, 2012). On the other hand, psychiatric factors are thought to influence the onset and exacerbation of many dermatologic diseases. The relationship between the skin and the central nervous system (CNS) dates back to the embryologic development of human beings. Both the CNS and the epidermis originate from the ectoderm. There is strong communication between the skin and CNS, mediated through afferent and efferent pathways. The same hormones, neurotransmitters, and neuropeptides function in the skin and CNS, and studies suggest that stress may cause and exacerbate skin diseases by affecting hormone and neurotransmitter levels (Salzer & Schallreuter, 1995; Millington & Palmer, 2023; Peters, 2016).

The term psychodermatologic diseases has been used historically and includes conditions that are primarily psychiatric but present with skin symptoms, such as delusional parasitosis, artificial dermatitis, trichotillomania, onychotillomania, body dysmorphic disorder, neurotic excoriations, and psychogenic pruritus. Dermatologic diseases that may lead to psychiatric disorders include alopecia areata, vitiligo, chronic eczema, and rhinophyma. Additionally, psoriasis, acne, hyperhidrosis, atopic dermatitis, urticaria, herpes simplex virus infection, seborrheic dermatitis, aphthae, and rosacea are among stress-induced or exacerbated skin diseases (Koo & Lebwohl, 2001). Furthermore, some dermatological treatments, such as corticosteroids, can induce psychiatric symptoms, while psychiatric medications, such as lithium and lamotrigine, can affect the skin (Picardi et al., 2000).

When evaluating skin and psychiatric diseases together, age, gender, and personality traits of patients play important roles. Studies on acne in young people have emphasized that acne, which develops during a period when social and emotional relationships gain importance, significantly impacts interpersonal relationships, self-perception, and daily performance (Khan et al., 2001). Women appear to be more severely affected than men. For instance, women with androgenetic alopecia exhibit twice as many psychosocial symptoms, including severe depression and loss of self-confidence, compared to their peers (Cash et al., 1993). Similarly, a 2020 meta-analysis on vitiligo cases indicated that female patients have a higher incidence of anxiety disorders than male patients (Kussainova et al., 2020). Regarding personality traits, individuals with borderline personality disorder frequently experience fluctuating moods, intense anxiety, and a higher incidence of self-mutilation behaviours, artificial dermatoses, and acne excoriation (Harth et al., 2004).

The literature frequently demonstrates the relationship between various skin diseases and stigmatization, depression, and anxiety levels, as well as the negative impact of psychiatric conditions on treatment and quality of life (Hughes et al., 2022; Pärna et al., 2015; Picardi et al., 2003). Contributing to the knowledge of this comorbidity's frequency is crucial to increasing dermatologists' awareness and supporting the implementation of appropriate interventions for affected patients. Therefore, our study aims to determine both the frequency and types of psychiatric symptoms in individuals presenting to dermatology clinics and the psychiatric follow-up rates of these individuals.

MATERIALS AND METHODS

The study population included 791 patients aged 15-85 years who applied to the dermatology outpatient clinic of Balıkesir Atatürk City Hospital between July 2022 and January 2023. Patients were given a sociodemographic and clinical information form that required from them to indicate their sociodemographic characteristics such as gender, age, education level, and marital status.

These survey forms were prepared by the researchers by categorizing common psychiatric complaints in the society (depressive complaints, anxiety complaints, symptoms of obsessive-compulsive disorder, psychotic symptoms, sleep, appetite and somatic complaints, memory impairment and attention problems, and other psychiatric complaints).

The design of the research study

This was a cross-sectional research study. Literate patients aged between 15-85 years without mental retardation who received the diagnosis of any dermatologic disease were included in the study.

Sociodemographic-clinical information form

This form prepared by the researchers interrogated gender, age, education level, marital status and psychiatric complaints (if any) of the participants; if so, whether they have referred to a psychiatric clinic for these complaints and used any psychiatric medication. This form was developed by the authors based on a comprehensive review of relevant literature and clinical experience. In order to make the psychiatric complaints interrogated in this form easy for the patients to understand, the replies given were categorized under seven subheadings as follows:

Depressive complaints (depressed mood, decreased interest and desire, lack of pleasure, suicidal thoughts, unhappiness); anxiety symptoms (constant anxiety and uneasiness, panic attacks, restlessness, inability to relax, concerns about the future; psychotic symptoms (delusions and hallucinations); attention problems and memory impairment; obsessive-compulsive symptoms (presence of obsessions/compulsions); problems in vegetative function related to sleep, appetite, sexuality)

and other uncategorized complaints defined by the individual.

Statistical analysis

The data were analysed using SPSS (Statistical Package for Social Sciences for Windows v.26.0, SPSS Inc. Chicago, IL). Descriptive statistics were presented as mean (±) standard deviation, frequency distribution and percentages.

Ethical approval

Approval for this study was obtained from Balıkesir University Non-Interventional Clinical Research Ethics Committee with the decision number 2022/75 dated 28/06/2022. The purpose of the study was explained to the participants in detail and patients who agreed to participate in the study and signed the informed consent forms were enrolled in the study.

RESULTS

Demographic characteristics and diagnoses of patients

Sociodemographic data of study population (mean age: 34.3±14.3 years) consisting of 295 (37.3%) male, and 496 (62.7%) patients were evaluated. The patients were married (n:389; 49.2%), single/divorced/widowed (n: 402:50.8%), educated for ≤ 12 years (n:227; 28.7%), and university graduates (n: 564;71.3%)

Diagnostic distribution of skin diseases of the study population

The patients in the study group received the diagnosis of inflammatory dermatoses (n:152; 19.2%) (psoriasis, pityriasis rosea, seborrheic dermatitis, recurrent oral aphthae, actinic lichen planus, erythema nodosum, and hidradenitis suppurativa), eczematous and allergic dermatoses (n:78; 9.9%) (atopic dermatitis, allergic contact dermatitis, chronic urticaria, artifact dermatitis, dermatitis, urticaria, angioedema, dyshidrosis and drug sensitivity syndrome: DRESS), acneiform dermatoses (n:221; 27. 9%) (acne vulgaris, rosacea), diseases of hair, nail and skin appendages (n:88; 11.1%) (alopesia areata, telogen effluvium, nail disorders, hyperhidrosis, androgenic alopecia, eccrine hydradenitis, epidermal cyst, miliaria, mucocele, epidermal thickening, trichotillomania), infectious dermatoses (n:136;17.2%) (bacterial, viral, parasitic and fungal diseases), pigmentation disorders (n:40; 5.1%) (vitiligo, nevi, melanin hyperpigmentation and melasma), neoplastic conditions (n:7 ;0.9%) (basal cell carcinoma, squamous cell carcinoma, myelofibrosis) , bullous diseases (n:5 ;0. 6%) (bullous pemphigoid, pemphigus), acute transient conditions (n:64; 8.1%), (erythema multiforme, pruritus, insect bites, drug eruptions) and chronic diseases (dermatitis herpetiformis, pernio, keloid, bier spot callus, livedo reticularis, neurotic excoriation, haemangiomas, amyloidosis) (Table 1).

Patients with dermatologic diseases had a history of psychiatric follow-up (93/791; 11.8%), and psychiatric drug use (112/ 791; 14.2%) (Table 2). The distribution of the main psychiatric complaints and psychiatric disease categories of the study participants is shown in Table 3 and Table 4.

Table 1. Diagnostic distribution of skin diseases.

Diagnostic Categories	n	%
Acneiform Dermatoses	221	27.9
Inflammatory Dermatoses	152	19.2
Infectious Dermatoses	136	17.2
Diseases of Hair, Nail, and Skin Appendages	88	11.1
Eczematous and Allergic Dermatoses	78	9.9
Acute transient /Chronic Conditions	64	8.1
Pigmentation Disorders	40	5.1
Neoplastic Conditions	7	0.9
Bullous Diseases	5	0.6

Table 2. Diagnostic distribution of patients with a history of psychiatric follow-up, and medication use.

		Psychiatric follow-up n (%)	Psychiatric drug use n (%)
Inflammatory Dermatoses	Yes	21 (13.8)	18 (11.8)
	No	131(86.2)	134 (88.2)
Eczematous and Allergic Dermatoses	Yes	17 (21.8)	19 (24.45)
	No	61(78.2)	59 (75.6)
Acneiform Dermatoses	Yes	13(5.9)	15 (6.8)
	No	208 (94.1)	206 (93.2)
Diseases of Hair, Nail, and Skin Appendages	Yes	9 (10.2)	7 (8)
	No	79(89.8)	81 (92)
Infectious Dermatoses	Yes	11(8.1)	11 (8.1)
	No	125 (91.9)	125 (91.9)
Pigmentation Disorders	Yes	1(2.5)	5 (12.5)
	No	39 (97.8)	35 (87.5)
Neoplastic Conditions	Yes	2 (28.6)	2 (28.6)
	No	5 (71.4)	5 (71.4)
Bullous Diseases	Yes	3 (60)	3 (60)
	No	2 (40)	2 (40)
Acute transient /Chronic Conditions	Yes	16 (25)	32 (50)
	No	48 (75)	32 (50)

Table 3. Distribution of basic psychiatric complaints of the study participants.

Psychiatric complaints related to	n	%
Depression	397	50.2
Anxiety	242	30.6
Obsessive compulsive disorder	237	30.0
Attention deficit/Forgetfulness	207	26.2
Vegetative disorder	138	17.4
Psychotic disorders	18	2.3

Table 4: Distribution of basic psychiatric disease categories.

Diagnostic Categories	Psychiatric disease categories					
	Depression n (%)	Anxiety n (%)	OCD n (%)	Psychosis n (%)	Attention deficit n (%)	Vegetative disorder n (%)
Inflammatory Dermatoses	82(53.1)	49(32.2)	53(34.9)	5(3.3)	39(25.7)	24(15.8)
Eczematous and Allergic Dermatoses	39 (50)	25(32.1)	25(32.1)	2(2.6)	18(23.1)	14(17.9)
Acneiform Dermatoses	116(52.5)	60(27.1)	72(32.6)	3(1.4)	61(27.6)	38(17.2)
Hair, Nail, and Appendage Diseases	47(53.4)	28(31.8)	24(27.3)	3(3.4)	32(36.4)	18(20.5)
Infectious Dermatoses	63(46.3)	41(30.1)	40(29.4)	2(1.5)	35(25.7)	26(19.1)
Pigmentation Disorders	20(50)	12(30.0)	12(30)	1(2.5)	10(25)	4(10)
Neoplastic Conditions	0	2(28.6)	0	0	0	1(14.3)
Bullous Diseases	2(40)	1(20)	0	0	0(20)	3(60)
Acute-Transient/Chronic Conditions	28(43.3)	24(37.5)	11(17.2)	1(3.1)	11(17.2)	10(15.6)

OCD: Obsessive-compulsive disorder

DISCUSSION

In the study, in which we examined the frequency of psychiatric complaints and patient follow-up rates, we determined that 12% of patients had been followed up for psychiatric disorders, and 14% used a psychiatric drug. In addition, some patients who were not diagnosed or followed up for any psychiatric illness still reported symptoms of depression (50%), anxiety (30%), and obsessive-compulsive disorder (30%).

Psychodermatology uses a multidisciplinary approach that investigates the relationship between the skin and the mind from a common perspective. As it is a specialized field, it can be difficult to make an accurate diagnosis and provide effective treatment for these patients. Studies have shown that roughly one-fifth of psychiatrists and dermatologists have knowledge about this discipline and awareness in diagnosing and treating these patients (Jafferany et al., 2010a; Jafferany et al., 2010b). Our study highlights the prevalence of psychiatric symptoms in patients with dermatologic diagnoses and underscores the potential value of incorporating psychiatric evaluation into dermatology practice.

Previous research studies demonstrated that more than half of the patients with skin diseases (51%) need psychotherapeutic support, 28% are willing to undergo psychotherapy, and 38% have received psychiatric support (Fritzsche et al., 2001). A study involving 2,579 individuals with skin disease indicated that a psychiatric diagnosis accompanied the dermatologic disease in about a quarter of the patients (25.2%). In their study, Picardi et al. (2000) found a higher prevalence of psychiatric disorders in women and widowed individuals. In addition, health-related quality of life was also found to be a strong predictor of psychiatric morbidity. Hughes et al. (1983) reported that 30% of dermatology outpatients and 60% of inpatients scored above the threshold on the General Health Questionnaire-30 (GHQ-30), a scale developed to screen for psychiatric symptoms. These findings suggest that dermatology outpatients have a higher prevalence of psychiatric disorders compared to the general population, and dermatology inpatients have a higher prevalence compared to inpatients of general medicine. In a study conducted by Aktan et al. (1998) with dermatology patients in Turkey, the prevalence of psychiatric morbidity was 41% according to the General Health Questionnaire-12 (GHQ-12) and 33.4% according to the SCID-I guide (Structured Clinical Interview).

Wessely and Lewis (1989) examined 160 adult patients who applied to a dermatology clinic and evaluated their psychiatric comorbidities using both

questionnaire forms and one-to-one interviews. The prevalence rates were determined as 42.7% based on GHQ-12 and 40.2% according to the Clinical Interview Scale (CIS). It was thought that 75% of psychiatric comorbidities were directly, while 20% were coincidentally, associated with a skin disease. Attah Johnson and Mostaghimi (1995) examined 132 consecutive patients at a dermatology clinic in Papua New Guinea. Patients were screened using the Harding Self-Assessment Questionnaire, and those scoring above the threshold were evaluated by a psychiatrist. Higher rates of psychiatric comorbidities were reported in female (71.6%) and male (69.2%) patients with skin diseases, most commonly anxiety disorder or depression.

In our study, when all diseases of our study population were evaluated, approximately 12% of the patients were followed up with a psychiatric diagnosis. More than half of our patients with skin diseases had depressive mood, and one-third had anxiety and obsessive-compulsive complaints. The lower prevalence of psychiatric comorbidities in our study compared to the literature may reflect limited psychiatric referral among patients with such complaints. These findings indicate a potential benefit of increasing awareness and screening for psychiatric symptoms among dermatology patients.

In our study, the most frequently observed skin diseases among patients followed up with a psychiatric diagnosis were bullous diseases (60%), neoplastic conditions (28.6%), acute-transient/chronic conditions (25%), and eczematous/allergic dermatoses (21.8%), in order of decreasing frequency. However, the small number of patients with bullous and neoplastic diseases (n=12) restricts generalization of our results to the entire patient population. The finding that depressive mood was present in approximately half of the patients across all disease categories (except neoplastic conditions) suggests a potential benefit of psychiatric evaluation in improving patient care.

In a meta-analysis of prevalence rates of depression and/or depressive symptoms in general outpatient clinics, the highest prevalence estimates were reported in otolaryngology (53.0%) followed by dermatology clinics (39.0%) (Wang et al., 2017). Kökçam and Dilek (2010) examined psychiatric consultations requested for dermatology inpatients and found that 91.7% of patients had a psychiatric pathology, most commonly depression (48.1%) and generalized anxiety disorder (31.4%).

Systemic inflammation is prominent in skin diseases, especially in association with inflammatory dermatoses and depression. Increased levels of proinflammatory cytokines such as TNF-α, IL-6, and IL-17 have been reported in both psoriasis and depression. Studies with TNF-α antagonists (adalimumab, etanercept, infliximab) have shown symptomatic improvement in both psoriasis and depression (Kannan et al., 2013).

A meta-analysis of 42 studies found a significant association between acne vulgaris and depression and anxiety. Subgroup analyses showed that age, work environment, and geographical region moderated this association. The authors supported aggressive treatment of acne and psychiatric screening due to the increased risk of depression and anxiety (Samuels et al., 2020). Meta-analyses of 28 studies on depression and 12 studies on anxiety reported prevalence rates of depression (21%) and anxiety (12%) among patients with hidradenitis suppurativa (Jalenques et al., 2020). Although depression and anxiety are frequently reported in skin diseases, relatively few studies have explored obsessive-compulsive disorders in dermatologic contexts. An increased risk of developing autoimmune skin diseases has been reported in patients with obsessive-compulsive disorder compared to healthy controls (Chou et al., 2022). Individuals with atopic dermatitis were also found to be more likely to be diagnosed with OCD compared to a matched control group without AD, and this association remained significant even after adjusting for age, gender, race/ethnicity, income, smoking, and depression (Chen et al., 2023). Moreover, patients with OCD-related conditions such as trichotillomania, body dysmorphic disorder, and skin picking disorder frequently consult dermatologists, highlighting the potential importance of screening for these psychiatric comorbidities in dermatology practice.

When the relationship between psychiatric complaints and skin diseases is evaluated, certain clinical features stand out. High psychiatric comorbidity rates have been reported in patients with acne, pruritus, urticaria, alopecia, herpesvirus infections, and in individuals without objective skin symptoms (Picardi et al., 2000). In a 2015 study, skin disease restricting physical activity was identified as a risk factor for psychiatric disorders (Yildiz Miniksar, 2015). Chronicity of skin diseases also imposes a psychiatric burden on patients. For instance, chronic spontaneous urticaria has been associated with anxiety and depression at rates of 10–31% and 7–29%, respectively (Kolkhir et al., 2024). Additionally, psychiatric comorbidities observed in patients with acne, eczema, psoriasis, or alopecia have been associated with the use of high-potency topical steroids (Hughes et al., 1983).

Study Limitations and Strengths

There are some limitations to our study. The psychiatric symptom screening tool was developed by the authors specifically for this research, based on clinical expertise and relevant literature. Although its content was reviewed by two experienced psychiatrists to enhance clinical relevance, no formal psychometric validation was conducted, nor was the tool piloted in a separate sample prior to implementation. In addition, psychiatric diagnoses were not confirmed through structured clinical interviews or standardized diagnostic scales, and the

data relied on patients' self-reports, which may have led to potential under- or over-reporting of psychiatric symptoms. Furthermore, the cross-sectional design of the study precludes any conclusions about causal relationships between dermatologic and psychiatric conditions. These factors may limit the reliability and generalizability of the findings. Future research using validated instruments and longitudinal designs is needed to further explore these associations and assess changes in psychiatric symptoms over time.

CONCLUSION

In summary, our study supports the fact that psychiatric symptoms are common in individuals with skin diseases and that referring these patients to psychiatric evaluation can positively contribute to the treatment process. Dermatologists may consider incorporating brief, validated screening tools into routine practice to help identify individuals at risk for psychiatric symptoms. Where such findings or clinical impressions suggest possible comorbidity, referral to mental health services may support more holistic and effective patient management. Further studies supported by more objective diagnostic methods will provide a better understanding of psychodermatological diseases.

Acknowledgement

The authors would like to extend their sincere thanks to anyone who contributed to this study.

Conflict of Interest

The authors declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Author Contributions

Plan, design: IC; **Material, methods and data collection:** IC, MC, TA; **Data analysis and comments:** IC, MC; **Writing and corrections:** IC, MC, TA.

Funding

None

Ethical Approval

Institution: Balikesir University Ethics Committee
Date: 28.06.2022.
Approval no: 2022/75

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ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1658622

Collaboration and Psychological Ownership Among Nurses: The Role of Coworker Support

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Geliş Tarihi / Received: *15.03.2025,* ***Kabul Tarihi / Accepted:*** *27.06.2025*

ABSTRACT

Objective: The aim of this study was to examine the effect of collaboration among nurses on psychological ownership and to investigate the mediating roles of instrumental and emotional support from coworkers in this effect. **Materials and Methods:** The study employed a cross-sectional research design involving nurses working at a university hospital. Data were collected between October and December 2024, and 331 nurses were included in the study. Data were gathered using three different scales, in addition to statements measuring demographic factors. SPSS 26 and Amos programs were used for data analysis. Descriptive statistical methods, correlation analysis, and regression analysis using Hayes' Process Macro Model 4 were performed. **Results:** Of the study group, 282 (85.2%) were female, 203 (61.3%) were married, and 261 (78.9%) had undergraduate or graduate education. According to the findings of the study, collaboration (β=0.29) and emotional support from coworkers (β=0.51) had a significant positive effect on psychological ownership. In contrast, instrumental support from coworkers showed a weak and negative effect (β=-0.16). The mediating roles of instrumental and emotional support in the effect of collaboration on psychological ownership were found to be low, and positive (β=0.16). When the mediating effects were considered, the total effect of collaboration on psychological ownership increased significantly (β=0.45). **Conclusion:** The results indicate that collaboration enhances psychological ownership among nurses in the sample. Furthermore, as a mediating variable, emotional support from coworkers plays a significantly more effective role compared to instrumental support.

Keywords: Collaboration, Coworker support, Nurse, Psychological ownership.

Hemşirelerde İş Birliği ve Psikolojik Sahiplenme: Çalışma Arkadaşı Desteğinin Rolü

ÖZ

Amaç: Bu çalışmanın amacı, hemşireler arasındaki iş birliğinin psikolojik sahiplenme üzerindeki etkisini incelemek ve bu etkide çalışma arkadaşlarının araçsal ve duygusal desteğinin aracı rollerini araştırmaktır. **Gereç ve Yöntem:** Çalışma, bir üniversite hastanesinde görev yapan hemşireler üzerinde yürütülen kesitsel bir araştırmadır. Veriler, Ekim-Aralık 2024 tarihler arasında toplanmış olup çalışmaya 331 hemşire dahil edilmiştir. Veriler, demografik faktörleri ölçmeye yönelik ifadelerin yan sıra üç farklı ölçek kullanılarak toplanmıştır. Verilerin analizinde SPSS 26 ve Amos programları kullanılmıştır. Tanımlayıcı istatistiksel yöntemler, korelasyon analizi ve Hayes'in Process Macro Model 4 regresyon analizi kullanılarak analiz gerçekleştirilmiştir. **Bulgular:** Araştırma grubunun 282'si (%85.2) kadın, 203'ü (%61.3) evli ve 261'i (%78.9) lisans veya lisansüstü eğitime sahipti. Çalışmanın bulgularına göre, iş birliği (β=0.29) ve çalışma arkadaşlarının duygusal desteği (β=0.51) psikolojik sahiplenme üzerinde anlamlı bir pozitif etkiye sahiptir. Buna karşılık, çalışma arkadaşlarının araçsal desteği zayıf ve negatif etki göstermiştir (β=-0.16). İş birliğinin psikolojik sahiplenme üzerindeki etkisinde araçsal ve duygusal desteğin aracı rolleri düşük düzeyde ve pozitif yönlüdür (β=0.16). Aracı etkiler dikkate alındığında, iş birliğinin psikolojik sahiplenme üzerindeki toplam etkisi önemli ölçüde artmıştır (β=0.45). **Sonuç:** Sonuçlar, örneklemdeki hemşireler arasında iş birliğinin psikolojik sahiplenmeyi artırdığını göstermektedir. Ayrıca, bir aracı değişken olarak çalışma arkadaşlarının duygusal desteği araçsal desteğe kıyasla çok daha etkili bir rol oynamaktadır.

Anahtar Kelimeler: İş birliği, Çalışma arkadaşı desteği, Hemşire, Psikolojik sahiplenme.

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Bu makaleye atıf yapmak için / Cite this article: Gozubuyuk, O. (2025). Collaboration and psychological ownership among nurses: the role of coworker support. *BAUN Health Sci J, 14*(2), 458-465. https://doi.org/10.53424/balikesirsbd.1658622

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

Due to their mission of protecting and improving human health, healthcare professionals are expected to demonstrate higher levels of commitment, dedication, and devotion to their work compared to other professional groups. This commitment is closely tied to the concept of psychological ownership, which refers to an individual's mental and emotional attachment to an object or organization, even in the absence of legal ownership (Shukla & Singh, 2015).

Numerous combinations of factors are involved in the formation of psychological ownership, with the most important being job structure, personal factors, solidarity-oriented social interaction, and the role of leadership. In organizations where psychological ownership is prevalent, it enhances employee motivation, fosters creativity, and increases performance, organizational citizenship, commitment, and organizational identification (Zhang et al., 2021). In high-stress and high-workload environments like the healthcare sector, the instrumental and emotional support employees provide to one another can strengthen psychological ownership and, indirectly, improve the health outcomes of third parties (Chênevert et al., 2019). Coworker support, defined as the mutual assistance provided by employees at the same hierarchical level performing similar tasks, plays a critical role in enhancing psychological well-being, self-control, and personal success (Charoensukmongkol et al., 2016). Collaboration, on the other hand, refers to the collective effort and solidarity among individuals, departments, and professions to achieve shared goals (Vatn & Dahl, 2022). Thus, both collaboration and coworker support are critical factors that reinforce psychological ownership. The support provided by management and colleagues-whether technical, conceptual, or emotional-enhances employees' interpersonal relationships, psychological well-being, and sense of being valued, all of which contribute to improved performance (Tiryaki, 2018).

The healthcare sector has a dynamic and complex structure that requires the coordination of several professionals. The centrality of human life in this sector leads to high levels of stress for both healthcare professionals and patients. Nurses, in particular, play a critical role in improving the quality of patient care and coping with intense and stressful working conditions. Therefore, supporting nurses professionally and psychologically is of great importance for the sustainability of individual and organizational performance.

In the literature, there are many studies on the effect of collaboration among nurses on outputs such as clinical performance, patient care quality, job satisfaction, and organizational productivity (Aslan & Ulupınar, 2020; Uslu & Karaduman, 2023). However, research on the relationship between collaboration and coworker support and psychological ownership is limited. The current study aims to fill this literature gap and provides a new perspective to understand the impact of psychological factors on the quality of nursing services.

Against this background, this study aims to investigate the role of coworker support in the relationship between collaboration and psychological ownership among nurses. While managerial support has been extensively examined in literature, this study emphasizes the importance of collaboration and coworker support in fostering psychological ownership. By doing so, it may provide valuable insights for organizations and managers aiming to foster a harmonious work environment and promote sustained mutual support among employees.

MATERIALS AND METHODS

Population and samples of the study

The study was conducted among nurses working in a university hospital between October 2024 and December 2024. During the study period, the total number of nurses employed at the institution was 708. Data was collected using an online survey method and convenience sampling technique. At the beginning of the survey, participants were provided with a detailed information text explaining the purpose, significance, and voluntary nature of the study, and their informed consent was obtained. Data from participants who voluntarily participated were analyzed, and 13 questionnaires with continuous and outlier values were excluded from the dataset.

The sample size for this study was determined using power analysis (Hair et al., 2018; Uttley, 2019). Power analysis enables the calculation of the minimum required sample size by considering the part of the model with the most predictor variables. For this calculation, key parameters such as power (1-β error probability), effect size, and significance level must be determined (Hair et al., 2018).

The adequacy of the sample size was evaluated using the G*Power (3.1.9.7) program. The analysis employed the "Linear multiple regression: fixed model, R^2 deviation from zero" option, consistent with the study's statistical method. The "A-priori" estimation method was used to determine the sample size before data collection. As recommended by Uttley (2019, p. 158), a priori power analysis was conducted to detect a real effect. The analysis was performed with an effect size of $f^2=0.15$ (medium effect), a significance level (α) of 0.01, and a power (1-β) of 0.99 (Hair et al., 2018).

The analysis revealed that the minimum sample size required was N=219, based on an effect size of 0.15, a 95% confidence level (α=0.01), and 99% power. To ensure a sample size above this minimum threshold, data from 331 participants were included in the analysis.

Data collection tools

The study utilized two data collection tools: (1) an introductory information form consisting of eight questions to measure participants' socio-demographic characteristics, and (2) a questionnaire form comprising 35 statements and three different scales (Collaboration Scale, Psychological Ownership Scale, and Coworker Support Scale).

Introductory Information Form: This form included questions about participants' demographic and

professional characteristics, such as gender, age, marital status, occupation, total years of professional experience, total years of employment at the current organization, and educational background.

Collaboration Scale (CS): Developed by Xie, Yu, Chen, and Chen (2006) and adapted into Turkish by Yerlikaya and Doğruyol (2020), this Likert-type scale consists of one dimension and 11 statements (Appendix 2). Each item is scored on a 5-point scale (1=Strongly Disagree; 5=Strongly Agree). One statement ("I prefer to work alone rather than in a group") was reverse-coded. The Cronbach's alpha reliability coefficient for the scale was 0.85.

Psychological Ownership Scale (POS): Developed by Shukla and Singh (2015) and adapted into Turkish by Aslan and Ateşoğlu (2020), this Likert-type scale consists of two dimensions (emotional ownership and work-based ownership) and 10 statements. Each item is scored on a 7-point scale (1=Strongly Disagree; 7=Strongly Agree). No items were reverse-coded. The Cronbach's alpha reliability coefficients were 0.91 for the Emotional Ownership dimension and 0.85 for the Work-Based Ownership dimension.

Coworker Support Scale (CSS): Developed by Tews, Michel, and Ellingson (2013) and adapted into Turkish by Küçük (2021), this 5-point Likert-type scale consists of two dimensions (instrumental support and emotional support) and 14 items. Each item is scored on a 5-point scale (1=Strongly Disagree; 5=Strongly Agree). No items were reverse-coded. The Cronbach's alpha reliability coefficients were 0.94 for the overall scale, 0.92 for the Instrumental Support dimension, and 0.89 for the Emotional Support dimension.

Statistical analysis

Data analysis was conducted using the SPSS 26 and SPSS Amos programs. Model 4 regression analysis in Hayes Process Macro plug-in and parallel multiple mediation effect analysis were performed. The data were first examined for normal distribution, followed by confirmatory factor analysis (CFA). Descriptive statistical analyses, correlation analysis, and regression analysis were then conducted.

Ethical approval

Ethical approval for the study was obtained from the Bandırma Onyedi Eylül University Health Sciences Non-Interventional Research Ethics Committee (Decision No. 2023-10, Date: 14.12.2023). Permission to use the scales was obtained from the respective authors. Participants were provided with detailed information about the study, and their informed consent was obtained.

RESULTS

Validity and reliability of measurement tools

Table 1 presents the reliability analysis findings for the scales used in the study. The Cronbach's alpha values were 0.81 for the Collaboration Scale, 0.92 for the Psychological Ownership Scale, and 0.96 for the Coworker Support Scale. Although there are varying opinions on evaluating skewness and kurtosis values, values within the range of ±1.5 generally indicate that the assumption of normal distribution is met (Tabachnik & Fidell, 2013). The skewness and kurtosis values for the scales were as follows: Collaboration Scale (0.16 and -0.53), Psychological Ownership Scale (-0.35 and 0.02), and Coworker Support Scale (-0.25 and -0.11). These results confirm that the scales meet the criteria for normal distribution.

Table 1. Reliability analysis findings for measurement tools.

Measurement Tools	Cronbach's Alpha	Skewness	Kurtosis
Collaboration Scale	0.81	0.16	-0.53
Psychological Ownership Scale	0.92	-0.35	0.02
Coworker Support Scale	0.96	-0.25	-0.11

Confirmatory factor analysis (CFA) was conducted to assess the validity of the measurement tools. As shown in Table 2, the measurement tools met the fit criteria (Evci & Aylar, 2017; Karagöz & Bardakçı, 2020). Together with the reliability results, these findings support the structural validity of the scales and confirm their reliability.

Table 2. Confirmatory factor analysis findings.

	Fit Indices		Item Fit Indices		
	Acceptable Fit	Excellent Fit	CS	POS	CCS
Chi-square (CMIN)			118.948	81.116	205.351
DF			40	31	72
CMIN/DF	$X^2/DF \leq 5$	$X^2/DF \leq 3$	2.974	2.617	2.852
GFI	$0.85 \leq GFI < 0.90$	$0.90 \leq GFI$	0.937	0.955	0.920
NFI	$0.90 \leq NFI < 0.95$	$0.95 \leq NFI$	0.928	0.961	0.956
RFI	$0.90 \leq RFI < 0.95$	$0.95 \leq RFI$	0.901	0.944	0.945
IFI	$0.90 \leq IFI < 0.95$	$0.95 \leq IFI$	0.951	0.976	0.971
TLI (NNFI)	$0.90 \leq NNFI < 0.95$	$0.95 \leq NNFI$	0.932	0.964	0.963
CFI	$0.90 \leq CFI < 0.95$	$0.95 \leq CFI$	0.951	0.975	0.971
RMSEA	$0.05 < RMSEA < 0.08$	$0.05 \geq RMSEA$	0.077	0.070	0.075
SRMR	$0.00 \leq SRMR \leq 0.05$	$0.05 \leq SRMR \leq 0.10$	0.049	0.036	0.038

The demographic and professional characteristics of the 331 participants were analyzed (Table 3). Of the participants, 282 (85.2%) were female, and 49 (14.8%) were male. In terms of marital status, 203 (61.3%) were married, while 128 (38.7%) were single. Regarding age distribution, the majority of participants (61%, n=202) were between 25 and 34 years old, followed by 86 (26%) aged 35–44, and 23 (6.9%) aged 45 and above. In terms of educational background, 223 participants (67.4%) held a bachelor's degree, 38 (11.5%) had a postgraduate degree, 39 (11.8%) had an associate's degree, and 31 (9.4%) had a high school diploma.

Table 3. Findings on sociodemographic factors (n=331).

		n	%			n	%
Gender	Female	282	85.2	**Work Unit**	Internal Units	119	36
	Male	49	14.8		Surgical Units	78	23.6
Marital Status	Married	203	61.3		Operating Rooms and Intensive Care Units	65	19.6
	Single	128	38.7				
Age	≤24	20	6		Emergency Department	44	13.3
	25-34	202	61				
	35-44	86	26		Administrative Units	11	3.3
	45≤	23	6.9		Other Units	14	4.2
Educational Status	High School	31	9.4	**Professional Experience (Years)**	≤9	192	58
	Associate Degree	39	11.8		10-19	105	31.7
	Bachelor's Degree	223	67.4		20-29	32	9.7
	Graduate Education	38	11.5		30-39	2	0.6

The occupational distribution of the participants was as follows: 119 (36%) worked in internal units, 78 (23.6%) in surgical units, 65 (19.6%) in operating rooms and intensive care units, 44 (13.3%) in the emergency department, 11 (3.3%) in administrative units, and 14 (4.2%) in other units (e.g., blood collection, dialysis, medical centers, chemotherapy, and medico-social units). Regarding professional experience, 192 participants (58%) had 9 years or less of experience, 105 (31.7%) had 10–19 years, 32 (9.7%) had 20–29 years, and 2 (0.6%) had 30–39 years of experience.

Table 4 presents the descriptive statistics and correlation analysis results for the variables examined in the study. The mean score for the collaboration variable was 4.03±0.45, while the mean score for psychological ownership was 3.19±0.66. For coworker support, the mean scores were 3.88±0.73 for instrumental support and 3.63±0.67 for emotional support. The correlation analysis revealed several significant relationships among the variables. Collaboration and psychological ownership exhibited a moderately positive and statistically significant correlation (r=0.45, p=0.00). Similarly, collaboration showed a moderately positive and significant relationship with instrumental support from coworkers (r=0.42, p=0.00). Additionally, a significant and moderately positive correlation was found between emotional support from coworkers and collaboration (r=0.44, p=0.00). The relationship between psychological ownership and instrumental support from coworkers was less pronounced but still positive and significant (r=0.34, p=0.00). In contrast, psychological ownership demonstrated a stronger positive correlation with emotional support from coworkers (r=0.51, p=0.00). Finally, a highly positive and significant correlation was observed between instrumental support and emotional support from coworkers (r=0.75, p=0.00).

Table 4. Correlation analysis findings.

Variables	Mean	SD	(1)	(2)	(3)	(4)
Collaboration (1)	4.03	0.45	1			
Psychological Ownership (2)	3.19	0.66	0.45**	1		
Coworker Instrumental Support (3)	3.88	0.73	0.42**	0.34**	1	
Coworker Emotional Support (4)	3.63	0.67	0.44**	0.51**	0.75**	1

**** p=0,00**

The mediating role of both instrumental and emotional coworker support in the relationship between collaboration and psychological ownership was tested using the Process Macro Model 4, which treats both types of support as parallel mediating variables (Table 5, Figure 1). The findings on model fit indicated that the variance explained for psychological ownership was 33.4%, while the variance explained for instrumental support and emotional support was 17.7% and 19.4%, respectively. All models were statistically significant.

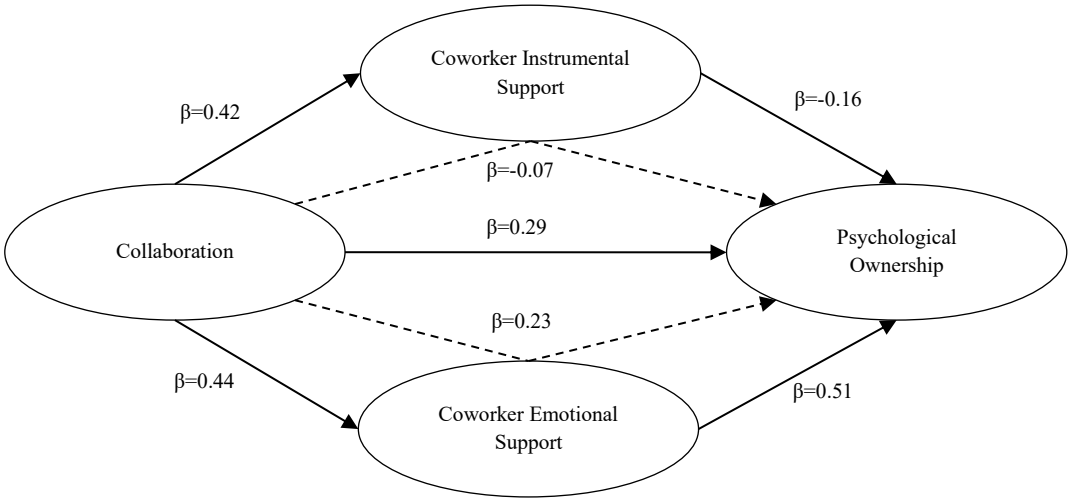
The analysis revealed that collaboration had a positive, moderate, and statistically significant effect on instrumental support from coworkers (β=0.42, p=0.00). However, the effect of instrumental support on psychological ownership was negative, weak, and significant (β=-0.16, p=0.02). Similarly, collaboration had a positive and moderate effect on emotional support from coworkers (β=0.44, p=0.00). In contrast to instrumental support, emotional support demonstrated a

strong and positive effect on psychological ownership (β=0.51, p=0.00).

The direct effect of collaboration on psychological ownership was found to be positive and significant (β=0.29, p<0.01). When examining the indirect effects, collaboration had a positive and significant effect on psychological ownership through emotional support (β=0.22, p<0.01). In contrast, the effect of collaboration on psychological ownership through instrumental support was negative, weak, and significant (β=-0.07, p<0.05). The total effect of collaboration on psychological ownership, considering both instrumental and emotional coworker support, was positive and close to a high level (β=0.45, p<0.01). These results indicate that collaboration exerts both direct and indirect effects on psychological ownership, with emotional support playing a particularly significant role in this process

Table 5. Regression analysis findings

	Coworker Instrumental Support				
	B	**β**	**SH**	**LLCI**	**ULCI**
Collaboration	0.65*	0.42*	0.08	0.50	0.81
Constant	1.24*	-	0.32	0.62	1.86
				R^2=0.18	P=0.00*
	Coworker Emotional Support				
	B	**β**	**SH**	**LLCI**	**ULCI**
Collaboration	0.72*	0.44*	0.08	0.56	0.88
Constant	0.74	-	0.32	0.09	1.38
				R^2=0.19	P=0.00*
	Psychological Ownership				
	B	**β**	**SH**	**LLCI**	**ULCI**
Collaboration	0.43*	0.29*	0.08	0.28	0.58
Coworker Instrumental Support	-0.15*	-0.16**	0.07	-0.28	-0.02
Coworker Emotional Support	0.46*	0.51*	0.06	0.33	0.58
Constant	0.39	-	1.41	-0.16	0.93
			R^2=0.33	P=0.02**	P=0.00*
	B	**β**	**SH**	**LLCI**	**ULCI**
Total Effect	0.66*	0.45*	0.07	0.51	0.80
Direct Effect	0.43*	0.29*	0.08	0.28	0.58
İndirect Effect	0.23*	0.16*	0.05	0.13	0.33
				R^2=0.20	P=0.00*



Direct Effect = 0.29 **Indirect Effect** = -0.07+0.23=0.16 **Total Effect** = -0.07+0.29+0.23=0.45

Figure 1. Regression analysis results.

DISCUSSION

This study examined the relationships between variables such as collaboration, psychological ownership, and instrumental and emotional support from coworkers in a sample of nurses. The findings revealed that collaboration has a positive effect on psychological ownership. Additionally, the instrumental and emotional

support provided by coworkers played a mediating role in this relationship.

Although coworker support was considered a mediator in the study, the direct effects of both instrumental and emotional support on psychological ownership were also determined (Figure 1). Accordingly, while instrumental support affects psychological ownership negatively and at a low level (β=-0.16, p=0.02), emotional support affects it positively and strongly (β=0.51, p=0.00). Ötken (2015) examined the relationship between organizational support and psychological ownership and found that both job-related support and emotional support dimensions support psychological ownership. In alignment with this study, emotional support had a greater effect than job-related support. The fact that this study was conducted in a university hospital may have caused the support of the hierarchical structure to be seen more as a task-oriented and routine necessity, which may have caused psychological ownership to remain relatively limited. On the other hand, the fact that the nursing profession requires a high level of emotional labor by nature suggests that the positive effect of emotional support on psychological ownership may be more pronounced.

Ghani et al. (2025) conducted a study on nurses and found that manager support and benevolent behavior are positively related to work-based psychological ownership. Işık and Uçar (2019) determined that job satisfaction positively affects psychological ownership in their study on textile employees. Similarly, Hameed et al. (2019) and Mehmood et al. (2021) found that organizational justice positively affects psychological ownership.

The mediating role of colleagues' instrumental and emotional support on psychological ownership is also supported by findings related to organizational support and leadership behaviors. Alok (2014) found that authentic leadership, and Kim and Beehr (2017) found that empowering leadership styles increase psychological ownership. These studies suggest that the support provided by employees to each other may have a similar mechanism of influence. Studies by Han et al. (2010) and Jing and Yan (2022) have also demonstrated that organizational support and participation in decision-making processes strengthen psychological ownership. These findings suggest that colleagues' support plays a critical role in the organizational context.

This model supports the impact of psychological ownership on positive outcomes such as innovative work behaviors (Hao et al., 2024), organizational commitment and knowledge sharing (Han et al., 2010), and constructive behaviors (Yıldız et al., 2015). Moreover, scholars have frequently emphasized in the literature that psychological ownership reduces turnover intention (Jing and Yan, 2022) and increases organizational citizenship behaviors (Wang et al., 2019). These results demonstrate that psychological ownership is an important source of motivation at both the individual and organizational levels. Kaur et al. (2013) emphasized the practical importance of the burnout-reducing effect of psychological ownership in high-stress occupations, such as nursing.

Limitations of the study

The research is limited by the sample size, the dimensions of the scales used, and the voluntary participation of the employees. The study employed online survey methodology, which carries inherent constraints, including its postponable nature and typically low response rates. Furthermore, since some participants may have completed the surveys too quickly or inattentively, the data quality and consequently the findings' reliability could be affected, potentially limiting the sample's representativeness and the generalizability of the results. Additionally, the study was conducted within a specific sector and cultural context, which may restrict the generalizability of the findings.

CONCLUSION

This study investigated the relationship between collaboration and psychological ownership, focusing on the mediating roles of coworkers' instrumental and emotional support. The results demonstrated that collaboration significantly enhanced psychological ownership. Emotional support was found to strengthen this relationship, while instrumental support had a limited and, in some cases, counterproductive effect. These findings underscore the critical role of emotional support in fostering psychological ownership in workplace settings.

The study highlighted the importance of collaboration and support mechanisms in boosting nurses' professional motivation and organizational commitment. From a practical perspective, organizations should prioritize creating environments that encourage emotional support among employees. Such practices can enhance psychological ownership, improve job satisfaction, and strengthen organizational commitment, ultimately leading to a more engaged and motivated workforce.

The study findings underscore the need for health managers to implement initiatives prioritizing emotional support to enhance psychological ownership. To strengthen collaboration, organizations should foster a work culture that values both teamwork and emotional support while establishing appropriate support mechanisms. It is recommended that researchers conduct comparative studies examining the relationship between collaboration dynamics, coworker support, and psychological ownership in various healthcare organizations and in different sectoral contexts to evaluate the findings from a broader perspective.

Acknowledgement

The author would like to extend their sincere thanks to anyone who contributed to this study.

Conflict of Interest

The author declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Author Contributions
Plan, design: GO; **Material, methods and data collection:** GO; **Data analysis and comments:** GO; **Writing and corrections:** GO.

Funding
None.

Ethical Approval
Institution: Bandırma Onyedi Eylül University Health Sciences Non-Interventional Research Ethics Committee
Date: 14.12.2023
Approval no: 2023-10

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ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1688633

Enhancing Resilience and Well-Being in Preschoolers with Mandala Art

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Geliş Tarihi / Received: *01.05.2025,* ***Kabul Tarihi / Accepted:*** *28.06.2025*

ABSTRACT
Objective: The aim of the study was to reveal the effect of mandala art practices on the social-emotional well-being and psychological resilience of three-five-year-old children. **Materials and Methods:** This study was conducted with an experimental research design with a pretest-posttest control group. The participants of the study consisted of 54 children between the ages of three and five attending a kindergarten. While mandala art activities were applied to the intervention group for eight weeks, no intervention was applied to the control group. For data collection, Descriptive Information Form for Children and the Social Emotional Well-Being and Psychological Resilience Scale for Preschool Children were used. SPSS 25.0 program was used to analyze the data and nonparametric tests were applied. **Results:** In the study, it was determined that mandala art practices provided a significant increase in the psychological resilience levels of children in the intervention group. An increase was also achieved in all sub-dimension scores ($p<0.05$). **Conclusion:** The results of the study revealed that mandala art practices are an effective method for strengthening the psychological resilience of children aged three to five years. These findings support the need for more use of art-based practices in fields such as pediatric nursing and early childhood education.
Keywords: Social-Emotional Well-Being, Psychological Resilience, Mandala, Children, Pediatric Nursing.

Mandala Sanatı ile Okul Öncesi Çocuklarda Dayanıklılık ve İyi Olma Halinin Geliştirilmesi

ÖZ
Amaç: Araştırmanın amacı, mandala sanat uygulamalarının üç-beş yaş grubundaki çocukların sosyal-duygusal iyi oluşları ve psikolojik sağlamlıkları üzerindeki etkisini ortaya koymaktır. **Yöntem:** Bu çalışma, ön test-son test kontrol gruplu deneysel bir araştırma tasarımıyla yürütülmüştür. Araştırmanın katılımcılarını bir anaokulda eğitim gören üç-beş yaş arası 54 çocuk oluşturmuştur. Deney grubuna sekiz hafta boyunca mandala sanat etkinlikleri uygulanırken, kontrol grubuna herhangi bir müdahalede bulunulmamıştır. Veri toplamada Çocuklar için Tanıtıcı Bilgi Formu ve Okul Öncesi Çocuklar İçin Sosyal Duygusal İyi Oluş ve Psikolojik Sağlamlık Ölçeği kullanılmıştır. Verilerin analizinde SPSS 25.0 programı kullanılmış ve nonparametrik testler uygulanmıştır. **Bulgular:** Araştırmada, mandala sanat uygulamalarının deney grubundaki çocukların psikolojik sağlamlık düzeylerinde anlamlı bir artış sağladığı belirlenmiştir. Tüm alt boyut puanlarında da artış sağlanmıştır. **Sonuç:** Araştırma sonuçları, mandala sanat uygulamalarının üç-beş yaş grubu çocukların psikolojik sağlamlıklarını güçlendirmede etkili bir yöntem olduğunu ortaya koymaktadır. Bu bulgular, çocuk hemşireliği ve erken çocukluk eğitimi gibi alanlarda sanat temelli uygulamaların daha fazla kullanılması gerektiğini desteklemektedir.
Anahtar Kelimeler: Sosyal-Duygusal İyi Oluş, Psikolojik Sağlamlık, Mandala, Çocuklar, Çocuk Hemşireliği.

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Bu makaleye atıf yapmak için / Cite this article: Özsavran, M., Hotan, E., Orhan, P., Karaoğlu, T. & Yılmaz, S. (2025). Enhancing resilience and well-being in preschoolers with mandala art. *BAUN Health Sci J, 14*(2), 466-476. https://doi.org/10.53424/balikesirsbd.1688633

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

Social-emotional well-being refers to the capacity of individuals to understand themselves and their environment, to cope with emotional difficulties, and to establish a healthy balance in social relationships. For children, this means feeling safe and able to fulfil their emotional needs in interactions with their families, teachers, health personnel and peers (Halle & Darling-Churchill, 2016; Thomson et al., 2021; Xu et al., 2024). This kind of development has a direct impact on children's overall health. Strengthening children's emotional well-being not only enables them to cope with stress in the moment but also supports the development of a healthy personality in the long term (Zins et al., 2004; Eaude, 2009).

Psychological resilience refers to the capacity of individuals to cope with stressful and challenging situations in their lives and the ability to emerge from these difficulties with strength (Masten, 2019). Children's psychological resilience affects their ability to cope with trauma or stressful events, and these abilities determine how they will cope with the challenges they face throughout their lives. In this context, psychological resilience in early childhood is critical not only to maintain emotional balance but also to lay the foundation for future psychological and social success (Bethell et al., 2016; Bingöl et al., 2025).

In the early period of children's lives when social-emotional well-being and psychological resilience skills begin to develop, these skills determine the quality of children's interactions with their environment. In this context, supporting these skills at an early age can positively affect children's long-term emotional and psychological development (Masten & Barnes, 2018).

Arts-based approaches offer powerful tools for emotional development and healing. Children can express their feelings that they may not be able to express in words through painting or other artistic activities (Sezince, 2018; Kuru, 2020; Moula, 2021; Moula et al., 2022; Khanna & Rawat, 2024; Fernando & Safitri, 2025). Mandala is one of them. Mandala is an artistic technique widely used especially to help children's emotional and mental recovery. Mandala consists of symmetrical patterns radiating outwards from the centre, and these symmetrical structures can help individuals find their mental and emotional balance (Aykaç, 2020; Kostyunina & Drozdikova-Zaripova, 2016).

Mandala practices can help children cope with stress, anxiety and negative emotional states. Such practices can be used as a therapeutic tool, especially for children who have had challenging or traumatic experiences. Through mandalas, children have the chance to express themselves, provide emotional relief and this process can accelerate their emotional healing process. In addition, mandalas also allow children to focus their attention and find inner peace, which can help increase their psychological resilience (Aykaç, 2020; Ergür et al., 2021).

The use of techniques such as mandala in art-based therapies not only helps children feel better and achieve emotional balance, but also allows them to develop their emotional intelligence. When children's psychological and emotional development is supported by creative activities, their ability to express themselves and empathise with others is strengthened (Markman, 2020; Wong et al., 2024).

Pediatric nursing, as a field with the task of protecting and improving both physical and psychological health of children, requires nurses not only to perform medical interventions but also to support emotional healing processes (Teksöz & Ocakçı, 2014). Children struggle with emotional distress as well as physical pain during illness processes; therefore, it is important for nurses to use alternative methods such as art-based approaches to support children's emotional recovery (Ding et al., 2021; Buser et al., 2023).

Mandala practices can play an important role in strengthening psychological resilience and emotional healing processes in pediatric nursing. Through mandala activities with children, nurses can better understand the emotional states of children and help them develop skills such as relaxation and coping with stress (Stinley et al., 2015). In addition, art practices such as mandala can reduce the anxiety and fear that children experience while receiving health services and enable them to approach the treatment process more positively (Özsavran & Seval, 2020; Stinley et al., 2015).

The aim of this study is to examine the effect of mandala art practices on social-emotional well-being and psychological resilience among children aged three to five years. It aims to contribute to pediatric nursing practice by revealing how mandala practices have an impact on the emotional and psychological development of children in this age group. In addition, this study aims to emphasise the importance of art-based practices in pediatric nursing and how such practices can be effectively integrated in clinical settings.

In line with this general purpose, the hypotheses of the research are as follows:

H_0= Mandala art practices have no effect on strengthening social-emotional well-being and psychological resilience of three-five-year-old children.

H_1= Mandala art practices have an effect on strengthening the social-emotional well-being and psychological resilience of three-five-year-old children.

The unique value of the study is that it aims to contribute to the literature with the limited number of studies on emotional and psychological development, especially in early childhood, and innovative findings on how art-based therapies can be used more effectively in pediatric nursing practice. By revealing

the potential of mandala practices in strengthening children's psychological resilience, it is expected to contribute to nurses and other health professionals to adopt a broader therapeutic approach in their care processes.

MATERIALS AND METHODS

Study type

The research was carried out as an experimental study with pre-test, post-test control group.

Study time and place

The research was conducted between 11 September 2023 and 1 March 2024. The research was conducted in a university-affiliated kindergarten in a province in the Western Black Sea region of Türkiye. There is one class for each age group. Full-day education service is provided.

Participants

The population of the study consisted of children attending a university-affiliated kindergarten in a city located in the Western Black Sea region of Türkiye. There were a total of 60 children receiving education from this kindergarten. The parents of all students in the kindergarten gave consent for participation in the study. The parents of all the children gave their consent for participation in the study through both verbal and written approval.

In this research, by using G. Power-3.1.9.2 program the sample size of the study was calculated before the data collection phase with 80% theoretical power. For the research, the effect size of 0.55 was calculated based on the study belonging to the sample group "Turkish Music Supported Psychological Resilience Programme: The Effect of Preschool Children on Psychological Resilience Levels" and used as the research effect size. Accordingly, with 95% confidence level, 0.05 alpha value and 0.55 effect size, the minimum number required for a single group in the study was calculated as 23. It was found that 46 participants, 23 in the experimental group and 23 in the control group, would be sufficient.

Since it was thought that there might be participants who might drop out of the study, 30 participants were included in the experimental group and 30 participants were included in the control group. Before starting the study, 2 children from the experimental group and 1 child from the control group got sick. They left before starting the study. One week after the study started, the parents of 1 child in the experimental group and 2 children in the control group reported that their children had given up participating in the study. Therefore, this study was completed with 27 participants in the experimental group and 27 participants in the control group.

At the end of this study, the power of the study was calculated using G. Power-3.1.9.2 program. Accordingly, the difference between the groups in the social emotional well-being and psychological resilience scale for preschool children in the study was examined. Using the effect size of 2.88, 95% confidence level, 0.05 alpha value, the power of the study was found to be 99%.

The criteria for the inclusion of children in the study are as follows: Being between the ages of 3-5 years, receiving education in kindergarten, the child's parent's acceptance to participate in the study, and the child not having speech, visual and physical disabilities.

Data collection tools

The research data were collected using the Descriptive Information Form for Children and the Social Emotional Well-Being and Psychological Resilience Scale for Preschool Children.

Descriptive information form for children: It is a form that includes questions about demographic information of children such as age, gender, age of parents, educational status, etc.

Social emotional well-being and psychological resilience scale for preschool children : The validity and reliability study of the Social Emotional Well-Being and Psychological Resilience Scale, developed by Mayr and Ulich (2009), was conducted in Türkiye by Özbey (2019). The scale is filled out for each child by his/her teacher on behalf of the child. The scale is a 5-point Likert-type scale and consists of 6 subscales: Communication /Social Performance, Self-Control/Thoughtfulness, Assertiveness, Emotional Stability/Coping with Stress, Task Orientation, Enjoying Exploration. No total score is obtained from the scale. The scores obtained from each of the subscales are evaluated separately. In the Communication/Social Performance subscale of the scale; positive communication, self-expression, making friends, Self-Control/Thoughtfulness subscale; self-control, following rules, respect, courtesy, empathy, thoughtfulness, Assertiveness subscale; assertiveness, self-expression, self-confidence, problem solving, Emotional Stability/Coping with Stress subscale; In the Task Orientation subscale, there are items related to orientation towards the task, fulfilling the given task, concentrating attention, responsibility, and in the Enjoyment of Exploration subscale, there are items related to enjoyment of innovation and exploration, curiosity, optimism, self-confidence, courage and patience. The Pearson Correlation Coefficient between the English and Turkish forms of the scale was found to be between 0.96 and 0.99. The alpha reliability coefficient of the scale is between 0.72 and 0.96 in 36-48-month-old children, between 0.88 and 0.95 in 49-60-month-old children, and between 0.87 and 0.96 in 61-72-month-old children (Özbey, 2019). For this study, reliability analyses were conducted for the subdimensions as follows: Communication/Social Performance (Pre-test: 0.945, Post-test: 0.962, Retention test: 0.955), Self-Control/Thoughtfulness (Pre-test: 0.903, Post-test: 0.913, Retention test: 0.903), Assertiveness (Pre-test: 0.942, Post-test: 0.953, Retention test: 0.954), Emotional

Stability/Coping with Stress (Pre-test: 0.728, Post-test: 0.857, Retention test: 0.835), Task Orientation (Pre-test: 0.874, Post-test: 0.894, Retention test: 0.881), and Enjoyment of Exploration (Pre-test: 0.910, Post-test: 0.936, Retention test: 0.939). The reliability coefficients ranged between 0.728 and 0.962, indicating acceptable to excellent reliability.

Data collection

The mandala art education practices carried out in the kindergarten were given to the children in the experimental group (Figure 1). Questionnaire and scale forms were applied beforehand (Table 1). The scales and questionnaire were filled in by the teachers of the children in the kindergarten. Then, mandala art application training modules were applied (Table 2). Finally, questionnaire and scale forms were applied. One month later, the questionnaire and scale forms were applied again for the retention test.

Data analysis

The data obtained in the study were analysed using SPSS (Statistical Package for Social Sciences) for Windows 25.0 software. Descriptive statistics were used for the information collected from the experimental and control groups. The differences in the descriptive characteristics of the experimental and control groups were determined by Chi-square analysis.

Whether the data used showed normal distribution was tested with Shapiro-Wilk test for groups ($n<50$) and Kolmogorov-Smirnov test for the whole variable ($n>50$). Accordingly, it was seen that the scales did not show normal distribution and nonparametric tests were used.

Mann Whitney U test was used to test whether the scores obtained from two unrelated samples of quantitative variables differed significantly from each other. To test whether more than two dependent groups of quantitative variables differed from each other, Friedman test for repeated measures and Bonferroni multiple comparison test to see from which group the difference originated were applied. Correlation analysis was performed to test the relationship between variables. In the study, p values below 0.05 were considered significant.

Ethical approval

Before starting the study, written permission was obtained from a University Human Research Ethics Committee (Date: 28.03.2023/Number: 099) and the institution where the project would be conducted. Then, an instruction was prepared that the data to be collected before and after the training would be used for scientific purposes within the scope of the research and that the identity information would be kept confidential, and informed consent was obtained from the parents of the children.

Table 1. Study implementation plan.

Stage 1	Creating and finalising training modules and contents	Obtaining expert opinions for the content of the training modules and finalising them (expert opinions were obtained from Child Development Specialist, Art Therapist, Pediatric Nurse, Preschool Education Teacher), training of the researchers on the training content and then the researchers being ready to provide training,
Stage 2	Introduction of the project and invitation to participate in the project	Explanation of the educational aims and objectives, explanation of the educational programme, determination of the expectations of the students and their parents,
Stage 3	Pre-training Measurement	Determination of sociodemographic characteristics and social emotional well-being and psychological resilience levels of all experimental and control group students before the training,
Stage 4	Implementation of training modules	Mandala painting and drawing or different mandala application activities were planned. Trainings were given in one session per week and the training programme ended after eight weeks. At the end of the training, the mandalas made by the children were hung in their classrooms to ensure permanence.
Stage 5	Post-Training Measurement	Determination of social emotional well-being and psychological resilience level of all students after the training,
Stage 6	Retention test	Determination of social emotional well-being and psychological resilience level of all students one month after the training,
Stage 7	Analysing the data	Analysing the data and revealing the findings,

Table 2. Education module.

	Mandala Activity and Description
Week 1	Mandala- Colouring-Game (Children are asked to paint the structured mandala visual in the colours they want).
Week 2	Mandala- Cut and Paste (The pieces of the structured mandala visual are coloured by the children and the children are asked to place them on A4 paper to form a regular visual).
Week 3	Mandala- Show Make (The shapes to be drawn are shown in a way to create a mandala visual and the children are asked to draw them. In this way, the visual is completed).
Week 4	Mandala- Expression of Emotions-Game (Images such as smiley faces, etc., which are expressions of emotions, are placed on the table before drawing. Children are asked to draw and colour the image they want into mandala rings).
Week 5	Mandala - An Icon from Nature (It is possible to see mandala rings or mandala visuals in nature. These are daisies, tree trunks, etc. Children are asked to draw/paint any image that reminds them of the mandala they see in nature).
Week 6	Mandala - The Game (There is an A4 paper in front of each child and the children stand up. The child chooses the one he/she wants from the cut and paste templates they have prepared before and pastes it. In the next stage, they slide to the side and paste the desired shape in front of them on the paper of another friend. This sequence continues until the mandala is completed and there are no more images to paste. Music can be added if desired).
Week 7	Mandala- Dot Connecting (The mandala shapes previously created in the form of dots are created by the children by connecting / drawing / passing over the dots by following the dots).
Week 8	Mandala- Music-Game (It is an activity to be done in the form of transferring what the children feel at that moment in the form of a mandala on paper accompanied by music).

RESULTS

The distribution of the groups participating in the study according to the characteristics is given in Table 3. It was found that 45.5% of the participants in the experimental group were 5 years old, 51.9% were male, 81.5% had siblings, 96.3% of the mother's education was university, 85.2% of the father's education was university, 37.0% of the daily time spent with the mother and father was 2 hours, the average age of the mother was 36.52, and the average age of the father was 38.15.

In the control group, 51.9% of the participants were 3 years old, 51.9% were girls, 74.1% had siblings, 96.3% had a university education, 81.5% had a university education, 44.4% spent 2 hours a day with their mother and father, the average age of the mother was 31.48, and the average age of the father was 33.70.

Table 3. Distribution of the groups according to descriptive characteristics.

Variables		**Experimental group (n=27)**		**Control group (n=27)**			
		n	**%**	**n**	**%**	**X^2**	**p**
Age	3,00	6	22.2	14	51.9	5.116	0.088
	4,00	9	33.3	6	22.2		
	5,00	12	44.5	7	25.9		
Gender	Girl	13	48.1	14	51.9	0.074	1.000
	Boy	14	51.9	13	48.1		
Sibling presence	Yes	22	81.5	20	74.1	0.429	0.745
	No	5	18.5	7	25.9		
Mother's education level	High School	1	3.7	1	3.7	0.000	1.000
	University	26	96.3	26	96.3		
Fatther's education level	High School	4	14.8	5	18.5	0.133	1.000
	University	23	85.2	22	81.5		
Daily time spent by the mother and father with the child	1,00	5	18.5	5	18.5	0.588	0.956
	2,00	10	37.0	12	44.4		
	3,00	9	33.3	8	29.6		
	4,00	3	11.1	2	7.4		
		$\bar{X}$ ± SD	**Median (min-max)**	**$\bar{X}$ ± SD**	**Median (min-max)**	**Z**	**p**
Age of mother		36.52±2.44	36 (32-46)	31.48±1.50	32 (29-35)	-6.154	**0.000***
Age of father		38.15±2.88	38 (34-48)	33.70±1.68	34 (31-37)	-5.657	**0.000***

*p<0.05; X^2: Chi-square test; Z:Mann-Whitney

Table 4. Distribution of the groups according to the characteristics related to their artistic activities.

Variables		Experimental group (n=27)		Control group (n=27)			
		n	%	n	%	X^2	p
Interested in art activities	Yes	21	77.8	22	81.5	0.114	1.000
	No	6	22.2	5	18.5		
Applying art activity methods with the child	Yes	24	88.9	20	74.1	1.964	0.293
	No	3	11.1	7	25.9		
Painting	Yes	22	81.5	24	88.9	0.587	0.704
	No	5	18.5	3	11.1		
Dance and movement	Yes	17	63.0	6	22.2	9.164	0.005*
	No	10	37.0	21	77.8		
Music	Yes	18	66.7	12	44.4	2.700	0.170
	No	9	33.3	15	55.6		
Drawing and colouring	Yes	11	40.7	6	22.2	2.146	0.241
	No	16	59.3	21	77.8		
Play game	Yes	18	66.7	13	48.1	1.893	0.271
	No	9	33.3	14	51.9		
Cinema	Yes	4	14.8	2	7.4	0.750	0.669
	No	23	85.2	25	92.6		
Film	Yes	2	7.4	0	0.0	2.077	0.491
	No	25	92.6	27	100.0		
Theatre	Yes	7	25.9	2	7.4	3.333	0.142
	No	20	74.1	25	92.6		
Rhythm practice	Yes	6	22.2	6	22.2	0.000	1.000
	No	21	77.8	21	77.8		
Colouring studies	Yes	13	48.1	8	29.6	1.948	0.264
	No	14	51.9	19	70.4		
Handicraft knitting	Yes	1	3.7	0	0.0	1.019	1.000
	No	26	96.3	27	100.0		
Various other hobbies	Yes	2	7.4	0	0.0	2.077	0.491
	No	25	92.6	27	100.0		
Relaxation through art	Yes	22	81.5	22	81.5	0.000	1.000
	No	5	18.5	5	18.5		

*p<0,05; X^2: Chi-square test

Table 4 presents the distribution of the experimental and control groups in terms of their engagement with artistic activities. In both groups, a high percentage of participants reported interest in art and used art activities with children (experimental: 77.8% and 88.9%; control: 81.5% and 74.1%, respectively). Painting was the most common activity in both groups. The experimental group showed higher engagement in dance/movement (63.0% vs. 22.2%), music (66.7% vs. 44.4%), and mandala activities (11.1% vs. 0%). The control group, on the other hand, reported more frequent participation in play activities (48.1% vs. 7%). While theatre, rhythm, and coloring activities were present in both groups to varying degrees, handicraft and other hobbies were scarcely practiced. Notably, 81.5% of participants in both groups reported using art as a way to relax.

The distribution of the social emotional well-being and psychological resilience scale scores of the participants according to the groups and measurements is detailed in Table 5.

It was determined that the pre-test, post-test and retention test communication/social performance dimension scores of the participants in the experimental and control groups showed a statistically significant difference according to the groups ($p<0.05$). Accordingly, it was seen that the experimental group's pre-test, post-test and retention test communication / social performance score was greater than the control group. It was determined that there was a statistically significant difference between the measurements of the experimental group's communicating/social performance dimension ($p<0.05$). Accordingly, the experimental group retention test communication / social performance score is greater than the other measurements. According to multiple comparison, the experimental retention test and post-test communication/ social performance score is greater than the pre-test. It was determined that the post-test and retention test self-control/thoughtfulness dimension score of the participants in the experimental and control groups showed a statistically significant difference according to the groups ($p<0.05$). Accordingly, it was seen that the experimental group's post-test and retention test self-control/thoughtfulness score was higher than the control group. It was determined that there was a statistically significant difference between the experimental group self-control/thoughtfulness dimension measurements ($p<0.05$). Accordingly, the experimental group post-test self-control/thoughtfulness score is greater than the other measurements. According to multiple comparison, the experiment retention test and post-test self-control/thoughtfulness score is greater than the pre-

test. It was determined that the post-test and retention test assertiveness dimension scores of the participants in the experimental and control groups showed a statistically significant difference according to the groups ($p<0.05$). Accordingly, it was seen that the experimental group post-test and retention test assertiveness score was greater than the control group. It was determined that there was a statistically significant difference between the experimental and control group assertiveness dimension measurements ($p<0,05$). Accordingly, the post-test assertiveness score of the experimental group is greater than the other measurements. Control group pre-test assertiveness score is greater than other measurements. According to multiple comparison, the experimental retention test and post-test assertiveness score is greater than the pretest. Control pre-test assertiveness score is greater than the retention test. It was determined that the pre-test, post-test and retention test emotional stability / coping with stress dimension scores of the participants in the experimental and control groups showed a statistically significant difference according to the groups ($p<0.05$). According to this, it was seen that the experimental group pre-test, post-test and retention test emotional stability / coping with stress score was greater than the control group. It was determined that there was a statistically significant difference between the experimental group emotional stability/coping with stress dimension measurements ($p<0,05$). According to this, the post-test emotional stability/coping with stress score of the experimental group is greater than the other measurements. According to multiple comparisons, the post-test and retention test emotional stability/coping with stress scores are higher than the pre-test scores.

It was determined that the pre-test, post-test and retention test task orientation dimension scores of the participants in the experimental and control groups showed a statistically significant difference according to the groups ($p<0.05$). Accordingly, it was seen that the experimental group pre-test, post-test and retention test task orientation score was greater than the control group. It was determined that there was a statistically significant difference between the experimental group task orientation dimension measurements ($p<0,05$). Accordingly, the experimental group post-test task orientation score is greater than the other measurements. According to the multiple comparison, the experimental retention test and post-test task orientation score is greater than the pretest. It was determined that the participants in the experimental and control groups showed a statistically significant difference in the pre-test, post-test and retention test enjoyment of discovery dimension score according to the groups ($p<0.05$). Accordingly, it was seen that the pre-test, post-test and retention test enjoyment of discovery score of the experimental group was greater than the control group. It was determined that there was a statistically significant difference between the experimental group's enjoyment of discovery dimension measurements ($p<0.05$). According to this, the experimental group post-test enjoyment of discovery score is greater than the other measurements. According to the multiple comparison, the experimental retention test and post-test enjoyment of discovery score is greater than the pre-test.

The effect of the groups on communication/social performance was found to be medium in the pre-test (0.70), large in the post-test (1.89), and large in the retention test (2.05). The effect of the groups on self-control/thoughtfulness was found to have a large effect on the post-test (1,47) and a large effect on the retention test (1,70). The effect of the groups on assertiveness was found to have a large effect on the post-test (1,07) and a large effect on the retention test (1,10). The effect of the groups on emotional stability/coping with stress was found to have a large effect on pre-test (0,84), a large effect on post-test (1,79), and a large effect on retention test (1,77). The effect of groups on task orientation was found to have a large pre-test (1.33), a large post-test (2.88), and a large retention test (2.61) effect. The effect of the groups on enjoyment of exploring was found to have a large effect on pre-test (0.98), a large effect on post-test (2.13), and a large effect on retention test (2.04).

DISCUSSION

This study aimed to examine the effects of mandala art activities on strengthening the social-emotional well-being and psychological resilience of three-five-year-old children. The findings show that art-based practices play an important role in children's social-emotional development and are effective in increasing their psychological resilience.

One of the remarkable findings of this study was that mandala art activities increased children's communication and social performance levels. When the pre-test, post-test and retention test scores of the children in the experimental group were analysed, a significant improvement was observed compared to the control group. It is also emphasised by previous studies that art activities help children express their emotions and increase their social interactions (Masten & Barnes, 2018; Oades-Sese et al., 2014). It is seen that mandala art offers children the opportunity to express themselves, contributes to their easier communication in social environments, and thus supports their psychological resilience.

The findings obtained in the dimension of self-control and thoughtfulness are also noteworthy. The significant development of the children in the experimental group in the post-test and retention test shows that mandala art activities support self-regulation skills in children. Jung (2016) stated that mandala art enables individuals to get in touch with unconscious emotions and contributes to the self-regulation process (Jung, 2016).

Table 5. Distribution of participants according to groups and measurements of social emotional well-being and psychological resilience scale.

Variables		Experimental group (n=27)		Control group (n=27)		Test value** and p value	Effect size d
		$\bar{x}$ ± SD	Median (min-max)	$\bar{x}$ ± SD	Median (min-max)		
Communicating/ social performance	Pre-test (1)	22.67±3.46	24 (12-29)	19.37±5.7	21 (9-27)	Z=-2.587 p=0.010*	0.70
	Post-test (2)	27.89±2.68	29 (21-30)	19.48±5.69	21 (8-27)	Z=-5.521 p=0.000*	1.89
	Retention test (3)	27.78±2.79	29 (21-30)	19.37±5.1	20 (10-28)	Z=-5.539 p=0.000*	2.05
	Test Values***	X^2=37.913		X^2=0.519			
	p	0.000*		0.772			
	Bonferroni	1<2,3		-			
Self-control/thoughtfulness	Pre-test (1)	24.07±3.5	24 (16-30)	23±4.43	22 (14-29)	Z=-1.017 p=0.309	
	Post-test (2)	28.11±2.29	29 (20-30)	22.78±3.75	22 (15-28)	Z=-5.134 p=0.000*	1.47
	Retention test (3)	27.93±2.38	29 (20-30)	22.81±3.53	22 (15-28)	Z=-5.036 p=0.000*	1.70
	Test Values***	X^2=45.532		X^2=1.231			
	p	0.000*		0,540			
	Bonferroni	1<2,3		-			
Assertiveness	Pre-test (1)	23.85±3.06	24 (18-30)	23.37±6,66	25 (9-30)	Z=-1.134 p=0.257	
	Post-test (2)	28.26±1.93	29 (23-30)	23.04±6,6	24 (9-30)	Z=-3.878 p=0.000*	1.07
	Retention test (3)	28.15±2.03	29 (23-30)	22.81±6,59	24 (9-29)	Z=-3.999 p=0.000*	1.10
	Test Values***	X^2=44.617		X^2=8.400			
	p	0.000*		0.015*			
	Bonferroni	1<2,3		3<1			
Emotional stability/coping with stress	Pre-test (1)	21.52±2.06	22 (17-24)	19.11±3.5	20 (10-24)	Z=-2.830 p=0.005*	0.84
	Post-test (2)	24.93±2.37	25 (18-29)	19.3±3.75	20 (10-24)	Z=-5.253 p=0.000*	1.79
	Retention test (3)	24.7±2.33	25 (18-28)	19.11±3.8	20 (10-24)	Z=-5.280 p=0.000*	1.77
	Test Values***	X^2=45.023		X^2=0.036			
	p	0.000*		0.982			
	Bonferroni	1<2,3		-			
Task orientation	Pre-test (1)	22.19±2.77	23 (14-27)	17.19±4.53	17 (6-24)	Z=-4.427 p=0.000*	1.33
	Post-test (2)	26.15±2.14	27 (22-29)	16.96±3.97	17 (8-21)	Z=-6.331 p=0.000*	2.88
	Retention test (3)	25.67±2.42	26 (22-29)	16.96±4.06	17 (8-22)	Z=-6.257 p=0.000*	2.61
	Test Values***	X^2=36.286		X^2=2.000			
	p	0.000*		0.368			
	Bonferroni	1<2,3		-			
Enjoyment of discovery	Pre-test (1)	23.89±1.48	24 (21-28)	20.48±4.69	22 (11-27)	Z=-3.192 p=0.001*	0.98
	Post-test (2)	27.63±2	28 (22-30)	20.26±4.46	21 (12-27)	Z=-5.785 p=0.000*	2.13
	Retention test (3)	27.59±2.08	28 (22-30)	20.3±4.61	21 (12-28)	Z=-5.527 p=0.000*	2.04
	Test Values***	X^2=42.691		X^2=2.107			
	p	0.000*		0.349			
	Bonferroni	1<2,3		-			

*p<0.05; **Z:Mann-Whitney; *** X^2 :Friedman

Figure 1. Mandalas made by children

Mandala studies can reduce children's stress and anxiety levels and encourage them to act by thinking instead of reacting instantly. The development of self-control skills, especially in early childhood, is seen as one of the foundations of academic and social success in later ages (Masten, 2019).

The results obtained in the assertiveness dimension show that mandala art activities increase children's self-expression skills and assertiveness. In the study, it was determined that the assertiveness scores of the children in the experimental group increased significantly. Art-based activities offer an environment where children have the opportunity to express themselves, develop their creativity and gain self-confidence. Studies have also indicated that art therapy and creative art activities increase children's self-confidence and strengthen their social courage (Kostyunina & Drozdikova-Zaripova, 2016). Mandala art activities are thought to encourage children to be more active in social environments and reinforce their self-confidence.

When evaluated in terms of emotional stability and coping with stress, it is seen that mandala art activities reduce children's stress levels and increase their emotional stability. In the study, it was determined that the experimental group showed a significant improvement in this dimension. In the literature, there are findings that art activities provide individuals to relax mentally by creating meditation-like effects (Ergür et al., 2021). The repetitive, rhythmic and focused structure of mandala works can support children's coping skills with stress and increase their emotional resilience. In this context, it is thought that participation in art activities at an early age may contribute to children to be more resilient against stress factors that they may encounter in later ages.

The findings in the task orientation dimension show that art activities are effective in increasing children's attention span and task orientation. In the study, it was found that the task orientation scores of the children in the experimental group increased significantly compared to the control group. Previous research shows that art activities improve children's attention skills and prolong their focusing time (Cömert & Özbey, 2021). Mandala art activities can improve children's task awareness and responsibility taking skills by enabling them to focus on a task for a long time.

The findings obtained in the dimension of enjoyment of discovery show that art activities increase children's sense of curiosity and desire to explore. It was observed that the enjoyment of discovery scores of the children in the experimental group increased significantly. Art activities support children to be open to trying new things and develop their creative thinking skills (Masten, Gewirtz & Sapienza, 2024). It is thought that art-based practices such as mandala activities encourage children to be open to new experiences and increase their interest in learning.

This research also has important implications for nursing care. Child health nursing is not only limited to physical health but also aims to support the psychosocial development of children (Teksöz & Ocakçı, 2014). Art-based interventions increase children's ability to cope with stress, strengthen their emotional well-being and support their psychological resilience. In this context, it is recommended that creative art therapies such as mandala art activities should be integrated into psychosocial support programmes for children in hospitals and health centres. The use of art-based activities for children receiving long-term treatment in the hospital can

contribute positively to their treatment processes by increasing their emotional well-being (Özsavran & Seval, 2020). In addition, training nurses in art therapy and including these practices in child care processes can offer a more holistic approach in the field of health.

The study has some limitations. The study was conducted in a kindergarten in a specific region and the findings obtained cannot be generalised to a wider population. In addition, the possibility of subjective bias should be taken into consideration since the scales are based on teacher evaluations. In future studies, it is recommended to conduct similar research with larger samples and different age groups. In addition, a comparative study of different arts-based interventions (e.g., music and dance therapy) with mandala may reveal the effects of arts activities on psychological resilience in a more comprehensive manner.

CONCLUSION

In conclusion, this study reveals that mandala art activities are an effective method to strengthen preschool children's social-emotional well-being and psychological resilience. Mandala art activities supported children's social-emotional development and contributed to the development of skills such as coping with stress, self-control, communication, discovery and task orientation. It also emphasises the importance of art-based practices in the field of child health nursing. Therefore, it is recommended to integrate arts-based practices into education and health programmes in early childhood. Strengthening children's psychological resilience at an early age can help them better cope with the challenges they will face in the future.

Acknowledgement

We would like to thank the participants who contributed to our study.

Conflict of Interest

The authors declare no conflict of interest.

Author Contributions

Plan, design: MÖ, EH; Material, methods and data collection: MÖ, EH, PO, TK, SY; Data analysis and comments: MÖ, EH; Writing and corrections: MÖ, EH.

Funding

This research was supported by TÜBİTAK 2209-A University Students Research Projects Support Programme with a budget of 6000 TL.

Ethical Approval

Institution: Zonguldak Bulent Ecevit University Human Research Ethics Committee
Date: 28.03.2023
Approval no: 099

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ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1610574

Examination of Childhood Traumas and Self-Compassion Levels of Patients Diagnosed with Depressive Disorder

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Geliş Tarihi / Received: *31.12.2024,* ***Kabul Tarihi / Accepted:*** *29.06.2025*

ABSTRACT
Objective: This study was conducted to examine the relationship between childhood traumas, depression and self-compassion in patients diagnosed with depression. **Materials and Methods:** This descriptive and correlational research was conducted in two state hospitals. The sample consisted of 150 participants diagnosed with depression who agreed to participate in the study. The data were analyzed using the descriptive statistics, independent student's t-test, one-way ANOVA, Mann-Whitney U test, Kruskal-Walli's test, Post Hoc tests. **Results:** The participants had a mean score of 48.2±16.9 on the Childhood Trauma Questionnaire (CTQ), 2.84±0.3 on the Self-Compassion Scale (SCS). The CTQ scale score had a weak positive correlation with self-judgment and isolation subscale scores (r=0.166; r=0.169, respectively), a moderate positive correlation with sexual abuse subscale score and Beck Depression Inventory (BDI) score (r=0.422; r=0.397, respectively) and a strong positive correlation with emotional abuse, physical abuse, physical neglect and emotional neglect subscale scores (r=0.881; r=0.818; r=0.807; r=0.797, respectively). The BDI score had a moderate negative correlation with self-kindness, common humanity and mindfulness subscale scores (r=-0.427; r=-0.354; r=-0.389, respectively) **Conclusion:** The depression levels of participants diagnosed with depression increase as their childhood traumatic experiences increase.
Keywords: Depression, Childhood traumas, Self-compassion, Abuse, Neglect.

Depresif Bozukluk Tanılı Hastaların Çocukluk Çağı Travmaları ve Öz Şefkat Düzeylerinin İncelenmesi

ÖZ
Amaç: Bu çalışma, depresyon tanısı alan hastalarda çocukluk çağı travmaları, depresyon ve öz-şefkat arasındaki ilişkiyi incelemek amacıyla yapılmıştır. **Gereç ve Yöntem:** Tanımlayıcı ve ilişki arayıcı tipteki bu araştırma iki devlet hastanesinde yürütülmüştür Örneklem, araştırmaya katılmayı kabul eden, depresyon tanısı almış 150 katılımcıdan oluşmuştur. Veriler tanımlayıcı istatistikler, independent student's t-test, one-way ANOVA, Mann-Whitney U test, Kruskal-Walli's test, Post Hoc testleri kullanılarak analiz edilmiştir. **Bulgular:** Katılımcıların Çocukluk Çağı Travma Ölçeği'nden (ÇÇTÖ) 48,2±16,9, Öz Şefkat Ölçeği'nden (ÖŞÖ) ise 2,84±0,3 puan aldıkları görüldü. ÇÇTÖ ölçek puanı ile kendini yargılama ve izolasyon alt ölçek puanları arasında zayıf pozitif korelasyon (sırasıyla r=0,166; r=0,169), cinsel istismar alt ölçek puanı ve Beck Depresyon Ölçeği (BDÖ) puanı ile orta pozitif korelasyon (r=0,422; r=0,397, sırasıyla) ve duygusal istismar, fiziksel istismar, fiziksel ihmal ve duygusal ihmal alt ölçek puanları ile pozitif yönde güçlü bir korelasyon (r=0,881; r=0,818; r=0,807; r=0,797, sırasıyla). BDÖ puanı ile kendine nezaket, ortak insanlık ve farkındalık alt ölçek puanları arasında orta düzeyde negatif korelasyon bulundu (sırasıyla r=-0,427; r=-0,354; r=-0,389) **Sonuç:** Depresyon tanısı alan katılımcıların çocukluk çağı travmatik deneyimleri arttıkça depresyon düzeyleri de artmaktadır.
Anahtar Kelimeler: Depresyon, Çocukluk çağı travmaları, Öz şefkat, İstismar, İhmal.

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Bu makaleye atıf yapmak için / Cite this article: Firat, P.; Polat Olca, S. (2025). Examination of childhood traumas and self compassion levels of patients diagnosed with depressive disorder. *BAUN Health Sci J, 14*(2), 477-487. https://doi.org/10.53424/balikesirsbd.1610574

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

Childhood traumas (CTs) are negative experiences encountered by individuals before the age of 18. These traumas can manifest as abuse (emotional, physical, and sexual) or neglect (emotional and physical). They can also be associated with experiences such as parental death, parental separation, domestic abuse, witnessing domestic violence, natural disasters, accidents, or wars (Mechmet & Gürsoy, 2023).

According to the WHO (World Health Organization) Europe 2018 report, the statistics of children under the age of 15 who are exposed to abuse in Europe in one year is thought to result in more than 700 preventable losses of life. This is not exclusively a European problem, with over one billion children reported to have been abused worldwide in 2017 (Sethi et al., 2018). In a study conducted in 23 states in the U.S. of the 214 157 participants included in the sample (51.51% female), 61.55% reported at least 1 and 24.64% reported 3 or more childhood traumas. Among the individual childhood traumas types, emotional abuse was the most commonly reported (Merrick et al., 2018).

Converging evidence from neurobiology, psychiatry, and epidemiology has shown that the experience of childhood trauma such as physical and sexual abuse, emotional neglect, social fragmentation, and poverty leads to an increased risk of psychopathology (Allen, et al., 2023). It is stated that exposure to childhood traumas causes serious mental problems such as depression, psychotic experiences and psychosis (McKay et al., 2021). Childhood traumas, which are considered a serious risk factor in the emergence of depression, increase the likelihood of early onset, relapse and persistence of the disease (Nelson et al., 2017; Tao et al., 2021). De Bellis et al. (2019) suggest that individuals exposed to traumatic experiences in childhood suffer from depression at an earlier age compared to those who are not exposed to traumatic experiences in childhood.

The presence of childhood traumas may cause a decrease in the individual's self-esteem and a judgmental attitude towards the self, thus preventing the development of self-compassion (Joss et al., 2019; Reffi et al.,2019). Furthermore, childhood traumas were found to decrease self-compassion levels (İme & Taş, 2018). Self-compassion is defined as an individual's willingness to approach his or her suffering with compassion (Chahar Mahali et al, 2020). Self-compassion refers to the individual's ability to accept negative experiences as a natural part of human life, to have an understanding and patient attitude towards one's own feelings of inadequacy, and to sincerely deal with feelings of pain and distress (Neff & McGehee, 2010). Self-compassion refers to how we relate to ourselves in instances of perceived failure, inadequacy, or personal suffering. It has three elements: self-kindness, common humanity and mindfulness (Neff, 2023). This concept, developed by Neff, entails not seeing negative emotions and experiences as individual, accepting them as common to all humanity, understanding that every human being is worthy of love and compassion, and being able to look at one's own experiences from a broader perspective (Neff, 2003). Individuals with high levels of self-compassion recognize their strengths and weaknesses and choose to accept themselves with compassion rather than judging themselves. A systematic review on the subject suggests that childhood traumas negatively affect self-compassion (Zhang et al., 2021). Self-compassion is negatively associated with depressive disorders, maladaptive perfectionism, and judgmental attitudes towards the self, while it is positively associated with mental well-being, enjoyment of life and self-esteem (İme & Taş, 2018).

This study was conducted to examine the relationship between childhood traumas, depression and self-compassion in patients diagnosed with depression.

MATERIALS AND METHODS

Study type

This study involved a descriptive and correlational research design to examine the relationship between childhood traumas, depression and self-compassion in patients diagnosed with depression.

Study group

The study population consisted of individuals diagnosed with depression who were receiving outpatient treatment in outpatient services in two state hospitals in Gaziantep. Referencing Arslan (2021) and investigating 'the Relationship Between Childhood Traumas and Self-compassion of Patients Diagnosed with Depression,' a sample size of 114 participants was calculated. This calculation utilized an alpha significance level of 0.05 and 80% GPower, based on an assumed moderate effect size (effect size = 0.235). The sample consisted of 150 participants diagnosed with depression who agreed to participate in the study. Inclusion criteria were (1) being able to read and write, (2) receiving outpatient treatment with a diagnosis of depression, (3) being willing to participate in the study, (4) being in the 18-65 age group and (5) not being diagnosed with an additional mental illness other than depression. Exclusion criteria were (1) not agreeing to participate in the study, (2) having a physical or cognitive disability that would prevent continuing the interview and completing the questionnaires and (3) having an existing diagnosis of an additional mental illness other than depression.

Data collection

Data were collected via face-to-face interviews conducted by the researcher between September 1, 2021, and April 1, 2022. Data were collected with data collection tools. Each interview, conducted in a private room within the psychiatry outpatient clinic, lasted approximately 30 minutes.

Procedures

The personal information form, Beck Depression Inventory (BDI), Self-Compassion Scale (SCS) and Childhood Trauma Questionnaire (CTQ) were used to collect data. The BDI is a scale developed by Beck et al. (1961). It was adapted for use in Turkish by Hisli (1989). Also, Dikmen (2020) examined its reliability and validity and found Cronbach's alpha coefficient as 0.78. The purpose of the scale is to objectively measure the severity

of depression. The highest score that can be obtained from the scale is 63. A high total score indicates the severity of depression (Dikmen, 2020). In the present study, Cronbach's alpha coefficient was found to be 0.90. The SCS developed by Neff (2003), the scale was adapted for use in Turkish by Akın et al. (2007). Confirmatory factor analysis for the Self-Compassion Scale confirmed the existence of six subscales that make up the self-compassion construct: self-kindness versus self-judgment, common humanity versus isolation, and mindfulness versus over-identification. The test-retest reliability coefficients were 88, 88, 80, 85, 85, 85 and 88, respectively. The high scores of the individual in each subscale means that he or she possesses the features of the relevant subscale. The scale also provides a total self-compassion score. For the interpretation of the total self-compassion score, scores between 1-2.5 indicate low self-compassion, scores between 2.5-3.5 indicate moderate self-compassion and scores between 3.5-5 indicate high self-compassion (Akın et al., 2007). In this study, Cronbach's alpha coefficient was found to be 0.91. The CTQ developed by Bernstein et al. (1994), the scale was adapted for use in Turkish by Şar et al. (2012). The scale gives five sub-scores including childhood physical abuse, emotional abuse, sexual abuse, emotional neglect, physical neglect, and a total score consisting of the combination of these scores. The average subscale scores that can be obtained from the scale are between 5 and 25. The total score is between 25-125 points. Higher scores obtained from the test indicate more severe levels of trauma (Şar et al., 2012). In this study, Cronbach's alpha coefficient was found to be 0.92.

Statistical analysis

SPSS (Statistical Package for the Social Sciences) version 23.0 was used for statistical analysis of the data. Categorical measurements were summarized as number and percentage, and continuous measurements were summarized as mean and standard deviation. The Kolmogorov-Smirnov test was utilized to determine whether the parameters in the study were normally distributed. For the parameters with normal distribution, independent Student's t-test was used in two-group analyses and one-way ANOVA test was used in more than two-group analyses. For the non-normally distributed parameters, the Mann-Whitney U test was used in two-group analyses and the Kruskal-Walli's test was used in more than two-group analyses. Tukey's test and Tamhane's T2 tests, which are Post Hoc tests, were used to determine the source of the difference between the groups when there were more than two groups among the variables. A correlation analysis was conducted to analyze the relationship between the variables. A reliability analysis was conducted to test the reliability of the questionnaire.

Ethical approval

Prior to the study initiation, Ethics Committee permission to conduct the study was obtained from SANKO University Non-Interventional Research Ethics Committee (Date 22.03.2021/No.2021/03) and institutional permission. Participants diagnosed with depression to be included in the study were informed about the purpose and subject of the study, and verbal and written consent was obtained from those who were willing to participate in the study. The research was conducted in accordance with the Declaration of Helsinki.

RESULTS

It was found that 66.0% of the participants were female, 36.7% were in the age group of 26-35 years, 42.7% received secondary school education or less, 65.3% were married, 56.0% were unemployed and 47.3% earned less income than expenses.

The mean scores of the participants on the CTQ, BDI and SCS are presented in Table 1. The participants had a mean score of 48.2±16.9 on the CTQ, 32.3±11.5 on the BDI, and 2.84±0.3 on the SCS (Table 1).

The childhood trauma experience rates of the participants are shown in Table 2. The childhood trauma rates experienced by the participants were CTQ 71.3 %.

The relationship between childhood traumas and depression levels based on the demographic features of the participants is shown in Table 3. The relationship between depression and other demographic characteristics of the participants is given in the table (Table 3).

The relationship between the self-compassion levels of the participants with respect to their demographic features is shown in Table 4. It was found that the self-kindness, common humanity and mindfulness subscale scores of the male participants were higher than those of the female participants ($p=0.002$; $p=0.043$; $p=0.001$, respectively). It was determined that the female participants had higher over-identification subscale scores than the male participants ($p<0.001$). There was a statistically significant difference between the self-kindness and mindfulness subscale scores and the age variables of the participants ($p=0.007$; $p=0.015$, respectively). The relationship between self-compassion and other demographic characteristics of the participants is given in the table (Table 4).

The correlation between CTQ, BDI and SCS total mean scores and subscale mean scores are shown in Table 5.

Table 1. Distrubution of the mean CTQ, BDI and SCS scores.

Scales	x̄± SD	Min–Max values	Median
Total CTQ	48.2 ±16.9	25-99	43
Emotional abuse	10.1±5.3	5-25	8
Physical abuse	7.7±4.2	5-25	5
Physical neglect	9.1±4.0	5-20	8
Emotional neglect	14.2±5.5	5-25	14.5
Sexual abuse	6.7±3.2	5-20	5
BDI	32.3±11.5	8-56	33
Total SCS	2.8± 0.3	0.05-3.45	2.85
Self-kindness	2.05±0.7	1-3.6	2
Self-judgment	3.34±0.9	1-2-5	3.4
Common humanity	2.24±0.8	1-4.75	2.12
İsolation	3.56±0.8	1.25-5	3.75
Mindfulness	2.07±0.8	1-4	2
Over-identification	3.78±0.8	1.75-5	3.75

Table 2. Childhood trauma rates of patients diagnosed with depression (n=150).

	No childhood trauma		With childhood trauma	
Scales	**n**	**%**	**n**	**%**
CTQ	43	28.7	107	71.3
Emotional abuse	62	41.3	88	58.7
Physical abuse	78	52.0	72	48.0
Physical neglect	70	46.7	80	53.3
Emotional neglect	57	38.0	93	62.0
Sexual abuse	104	69.3	46	30.7

The CTQ scale score had a weak positive correlation with self-judgment and isolation subscale scores (r=0.166; r=0.169, respectively), a moderate positive correlation with sexual abuse subscale score and BDI score (r=0.422; r=0.397, respectively) and a strong positive correlation with emotional abuse, physical abuse, physical neglect and emotional neglect subscale scores (r=0.881; r=0.818; r=0.807; r=0.797, respectively). No significant relationship was found between the CTQ and other scale scores (p>0.05). The BDI score had a moderate negative correlation with self-kindness, common humanity and mindfulness subscale scores (r=-0.427; r=-0.354; r=-0.389, respectively) and a weak positive correlation with physical abuse, physical neglect and sexual abuse subscale scores (r=0.269; r=0.261; r=0.247, respectively). There was a moderate positive correlation between the CTQ total scale score and emotional abuse, emotional neglect, self-judgment, isolation and over-identification subscale scores (r=0.397; r=0.367; r=0.337; r=0.458; r=0.406; r=0.453, respectively) (Table 5).

Table 3 The distrubution of the mean of CTQ and BDI scores according to the demographic characteristics of the participants.

Demographic characteristics		CTQ M±SD	Analysis Results	Emotional abuse M±SD	Analysis Results	Physical abuse M±SD	Analysis Results	Physical neglect M±SD	Analysis Results	Emotional neglect M±SD	Analysis Results	Sexual abuse M±SD	Analysis Results	BDI M±SD	Analysis Results
Sex	Male	55.8±18.0	t=-4.142	11.8±5.8	t=-2.879	9.54±5.0	U=-4.218	11.2±4.2	t=-4.880	15.6±4.9	t=-2.332	7.3±3.9	U=-0.406	29.6±11.8	t=2.130
	Female	44.4±14.9	p=0.001	9.24±4.9	p=0.005	6.78±3.4	p=<0.001	8.1±3.5	p=0.001	13.5±5.6	p=0.021	6.4±2.8	p=0.685	33.7±11.1	p=0.035
Age	18-25[a]	50.2±18.6	F=5.654	11.3±5.7	F=7.853	7.7±5.2	KW=11.058	9.0±4.4	F=4.827	15.0±5.9	F=2.906	6.7±2.4	KW=1.615	31.9±10.9	F=5.901
	26-35[b]	47.3±14.2	p=0.001	9.7±4.5	p=0.001	7.9±3.4		8.7±3.4	p=0.003	13.9±4.8	p=0.037	6.9±3.7	p=0.656	29.3±11.7	p=0.001
	36-45[c]	42.1±14.1	d >b; p=0.022	7.8±3.9	a>c; p=0.018	6.4±3.2	p=0.011	8.3±3.6	d>b; p=0.006	12.8±5.7	d>c; p=0.029	6.3±2.8		31.9±10.9	d>a; p=0.028
	>46[d]	58.8±19.5	d >c; p<0.001	13.7±6.6	d>b; p=0.008 d>c; p<0.001	9.7±5.3	d>c; p=0.012 d>a; p=0.046	11.8±4.5	d>c; p=0.003	16.6±5.3		6.8±3.5		40.5±8.9	d>b; p<0.001 d>c; p=0.014
Marital Status	Married	46.5±16.1	t=-1.782	9.6±5.2	t=-1.743	7.3±3.7	U=-1.533	9.1±3.7	t=-0.315	13.8±5.4	t=-1.341	6.4±2.9	U=-1.410	32.6±11.4	t=0.452
	Single	51.6±18.0	p=0.077	11.2±5.5	p=0.083	8.5±4.9	p=0.125	9.3±4.5	p=0.753	15.0±5.5	p=0.182	7.3±3.7	p=0.158	31.7±11.6	p=0.652
Education level	Secondary[a]	47.9±17.1	F=0.320	10.1±5.7	F=0.326	7.8±4.3	KW=0.082	9.8±4.2	F=3.054	14.1±5.6	F=0.147	5.8±2.1	KW=5.938	35.0±11.7	F=6.564
	High[b]	49.9±16.8	p=0.727	10.6±5.4	p=0.722	7.8±4.3	p=0.960	9.4±4.1	p=0.935	14.6±5.7	p=0.050	7.1±3.3	p=0.051	33.2±10.0	p=0.002
	Bachelor[c]	47.0±16.9		9.7±4.7		7.5±4.0		7.9±3.4		14.0±5.1		7.5±4.1		27.2±11.1	a>c; p=0.001 b>c; p=0.035
Working Status	Working	50.9±17.1	t=1.773	10.5±5.1	t=0.712	8.5±4.5	U=-2.568	9.8±3.9	t=1.794	14.8±5.1	t=1.070	7.2±3.8	U=-0.459	29.5±11.7	t=-2.721
	Not working	46.1±16.5	p=0.078	9.8±5.5	p=0.478	7.2±3.9	p=0.010	8.6±3.9	p=0.075	13.8±5.7	p=0.287	6.3±2.6	p=0.646	34.5±10.9	p=0.007
Income Levels	Income less than expenses	50.8±17.5	t=1.740	10.5±5.7	t=0.874	8.1±6.3	U=-1.376	10.1±4.3	t=2.870	14.6±5.5	t=0.880	7.1±3.5	U=-1.056	34.8±11.4	t=2.569
	Income equals expense	45.9±16.1	p=0.084	9.8±4.9	p=0.384	7.4±4.1	p=0.169	8.3±3.6	p=0.005	13.8±5.4	p=0.381	6.4±2.8	p=0.291	30.1±11.1	p=0.011

M: Mean; S.D.: Standart Deviation; F: One Way Analysis of Variance (ANOVA); KW: Kruskal-Wallis test U: Mann-Whitney U test t: independent sample t-test; a, b, c, d: Tukey test

Table 4. The distrubution of the mean of SCS scores according to the demographic characteristics of the participants.

Demographic characteristics		SCS M±SD	Analysis Results	Self-kindness M±SD	Analysis Results	Self-judgment M±SD	Analysis Results	Common humanity M±SD	Analysis Results	İsolation M±SD	Analysis Results	Mindfulness M±SD	Analysis Results	Over-identification M±SD	Analysis Results
Sex	Male	2.84±0.3	t=2.130	2.30±0.8	t=-3.122	3.17±0.8	t=1.791	2.42±0.8	t=-2.044	3.40±0.8	t=1.684	2.38±0.9	t=-3.543	3.39±0.8	t=4.247
	Female	2.84±0.3	p=0.945	1.92±0.7	p=0.002	3.43±0.9	p=0.075	2.15±0.8	p=0.043	3.64±0.9	p=0.094	1.91±0.7	p=0.001	3.97±0.8	p<0.001
Age	18-25[a]	2.84±0.4	F=0.807	2.10±0.7	F=4.204	3.26±1.0	F=1.425	2.23±0.9	F=1.208	3.52±0.9	F=0.341	2.18±0.9	F=3.623	3.75±0.9	F=1.322
	26-35[b]	2.85±0.3	p=0.492	2.22±0.7	p=0.007	3.20±0.8	p=0.238	2.31±0.7	p=0.309	3.49±0.8	p=0.796	2.25±0.8	p=0.015	3.65±0.8	p=0.269
	36-45[c]	2.87±0.3		2.05±0.7	b>d; p=0.003	3.46±0.9		2.32±0.8		3.60±0.9		1.99±0.7	b >d; p=0.011	3.80±0.9	
	>46[d]	2.76±0.3		1.61±0.6		3.57±0.8		1.97±0.7		3.68±0.7		1.66±0.7		4.06±0.7	
Marital Status	Married	2.83±0.3	t =-0.321	1.98±0.7	t=1.690	3.38±0.8	t=0.801	2.23±0.8	t=-0.202	3.61±0.8	t=0.970	1.95±0.7	t=-2.503	3.85±0.8	t=1.486
	Single	2.85±0.3	p=0.749	2.19±0.8	p=0.093	3.26±0.9	p=0.424	2.26±0.8	p=0.840	3.47±0.9	p=0.334	2.29±0.8	p=0.013	3.63±0.9	p=0.139
Education level	Secondary[a]	2.89±0.2	F= 2.151	1.84±0.7	F=5.331	3.63±0.8	F=6.853	2.13±0.8	F=1.641	3.76±0.7	F=4.283	1.85±0.8	F=4.683	4.13±0.7	F=11.399
	High[b]	2.83±0.3	p=0.120	2.25±0.7	p=0.006	3.17±0.9	p=0.001	2.24±0.9	p=0.197	3.53±0.9	p=0.016	2.25±0.8	p=0.011	3.55±0.9	p<0.001
	Bachelor[c]	2.77±0.3		2.18±0.6	b >a; p=0.010 c >a; p=0.042	3.08±0.9	a >b; p=0.015 a >c; p=0.003	2.41±0.7		3.28±0.8	a >c; p=0.011	2.25±0.8	b >a; p=0.023 c >a; p=0.042	3.47±0.9	a >b; p=0.001 a >c; p<0.001
Working status	Working	2.81±0.3	t= -1.090	2.21±0.7	t=2.425	3.20±0.8	t=-1.786	2.39±0.8	t=2.068	3.33±0.8	t=-3.026	2.25±0.8	t=2.550	3.48±0.8	t=-3.907
	Not working	2.86±0.3	p=0.277	1.93±0.7	p=0.016	3.45±0.9	p=0.076	2.13±0.8	p=0.040	3.74±0.8	p=0.003	1.93±0.7	p=0.012	4.00±0.8	p<0.001
Income levels	Income less than expenses	2.84±0.3	t= -0.138	2.01±0.8	t=-0.581	3.36±0.9	t=0.300	2.18±0.8	t=-0.892	3.54±0.8	t=-0.288	2.06±0.9	t=-0.118	3.86±0.8	t=1.134
	Income equals expense	2.84±0.3	p=0.891	2.08±0.7	p=0.562	3.32±0.9	p=0.764	2.30±0.8	p=0.374	3.58±0.9	p=0.774	2.08±0.7	p=0.906	3.7±0.9	p=0.259

M: Mean; SD: Standart Deviation; F: One Way Analysis of Variance (ANOVA); t: independent sample t-test; a, b, c,d:Tukey test

Table 5. Correlation distribution of CTQ, BDI and SCS.

Variables		1.CTQ	Emotional abuse	Physical abuse	Physical neglect	Emotional neglect	Sexual abuse	2.BDI	3.SCS	Self-kindness	Self-judgment	Common humanity	İsolation	Mindfulness	Over-identification
1.CTQ	**r**		0.881	0.818	0.807	0.797	0.422	0.397	-0.042	-0.145	0.166*	-0.149	0.169	-0.063	0.090
	p		**<0.001***	**<0.001***	**<0.001***	**<0.001***	**<0.001***	**<0.001***	0.608	0.076	**0.043***	0.070	**0.039***	0.441	0.274
2.BDI	**r**	0.397	0.367	0.269	0.261	0.337	0.247		0.133	-0.427	0.458	-0.354	0.406	-0.389	0.453
	p	**<0.001***	**<0.001***	**<0.001***	**<0.001***	**<0.001***	**<0.001***		0.104	**<0.001***	**<0.001***	**<0.001***	**<0.001***	**<0.001***	**<0.001***

CTQ:Childhood Trauma Questionnaire; BDI:Beck Depression Inventory SCS:Self-Compassion Scale r: Pearson korelasyon test *p<0.001 was taken as the level of signifcance, signifcance is shown in bold

DISCUSSION

In this study, which was conducted to examine the relationship between childhood traumas, depression and self-compassion of participants diagnosed with depression, it was determined that the depression level of the participants was high and their childhood traumas were moderate. At the same time, approximately three-quarters of the participants had a history of childhood trauma. A previous meta-analysis study showed that about half of patients with depression had experienced traumatic experiences in childhood and one in five had been exposed to multiple traumas (Nelson et al., 2017).

Participants reported that they experienced emotional neglect the most and sexual abuse the least among their childhood trauma experiences. In a meta-analysis on the prevalence of childhood trauma among adult major depression and bipolar disorder patients; It has been stated that the rates of emotional abuse, emotional neglect and physical neglect are high, while the rates of physical and sexual abuse are lower (Zhang et al., 2020).

In this study, it was observed that the self-compassion of the participants was at a moderate level. The participants' levels of self-kindness, common humanity and awareness are low, self-judgment is at a medium level, and isolation and over-identification are at a high level. In this study, factors related to childhood traumas were revealed. Male participants' levels of emotional neglect, emotional abuse, physical neglect and physical abuse are higher than female participants. The level of sexual abuse is similar in both genders. In the meta-analysis of the study in which 22,224 people from different countries participated, it was stated that the overall prevalence of childhood sexual abuse (CSA) was 24%. (Pan et al., 2021). In a cohort study conducted in 34 states in the USA, childhood trauma was reported to be significantly higher in women than in men (Giano et al., 2020). In this study, it was observed that participants aged 46 and over who were diagnosed with depression experienced more childhood trauma than other age groups. In a study conducted in the U.S., it was determined that individuals between the ages of 25-34 were significantly more likely to experience childhood trauma than other age groups (Merrick et al., 2018).

In this study, the most important factors associated with BDI are female gender, older age, not being employed, low education level and low-income level were revealed. Depression is twice as common in women than in men, and the incidence of major depressive disorder in adult women is significantly higher than in men. (Kuehner, 2017; National Institute of Mental Health, 2021). Additionally, it is suggested in the literature that low-income level is an important risk factor for depression (Kempfer et al., 2017; Oh et al., 2018).

In this study, it was determined that the most important factors associated with self-compassion were gender, age, education level and working status. It was determined that male participants' levels of self-kindness, common humanity and awareness were higher than female participants. It was determined that the overidentification level of female participants was higher than male participants. Overidentification is being excessively caught up in negative thoughts and judgments about oneself (Neff, 2003). Neff (2003) argues that women have a higher tendency to blame and judge themselves, that they are more prone to isolation in negative situations. A meta-analysis study has revealed that men exhibit significantly higher levels of self-compassion compared to women (Yarnell et al., 2015).

Self-compassion and awareness levels of participants over the age of 46 are lower than other age groups. This group is also important in that it is the group that experienced the most childhood trauma in our study. The awareness level of single participants is higher than married participants. Participants with low education levels have low levels of self-kindness and awareness, and high levels of self-judgment, isolation and over-identification. Self-compassion, common humanity and awareness levels of working participants are higher than those who are not working, and their levels of isolation and over-identification are lower than those who are not working. According to these results, it can be said that the self-compassion levels of older, less educated and unemployed individuals in our study are generally lower.

In this study, there is a positive, moderately significant relationship between depression and childhood traumas of the participants diagnosed with depression. Depression is one of the disorders that constitute a serious risk factor for older ages due to traumas encountered in childhood. Childhood traumas are believed to increase the susceptibility to depression by making the individual hypersensitive to stress (Zheng et al., 2020). Ay & Kılınçel (2021) found that more than half of patients diagnosed with depression had a history of childhood trauma and that traumatic experiences in childhood were associated with depression. Considering the traumatizing effect of the trauma experienced in childhood due to the fact that coping skills are not yet sufficiently developed, this trauma may pave the way for many mental disorders that may develop in the later years of life. There are various studies in the literature in which traumatic experiences in childhood are found to be associated with psychiatric disorders at older ages (Burke, 2024; Downey & Crummy, 2022). We could therefore suggest that the results from our study are supported by previous research indicating a relationship between depression and childhood traumas.

In the current study, it was observed that there was a negative relationship between the depression level of the participants and self-kindness, common humanity, and awareness, and a positive relationship with self-judgment, isolation, and over-identification. In the light of the findings, it can be concluded that the positive sub-dimensions of self-compassion (kindness towards oneself, common humanity and awareness) reduce the occurrence of depression, while the negative sub-dimensions (such as self-judgment, isolation and awareness) increase the occurrence of depression. Wei et al. (2021) reported a negative relationship between self-compassion and depression.

In this study, it was concluded that the participants' childhood trauma levels increased their self-judgment and isolation levels. Individuals with a history of childhood trauma have been shown to be more sensitive to self-blame than those without (Zhang et al., 2023; Coates and Messman-Moore, 2014). Traumatic experiences in childhood are a significant stressor that weakens the development of self-compassion. (Reffi et al., 2019; Wu et al., 2022). In a study with adults, Wu et al. (2022) noted that more than half of participants experienced more than one type of trauma in childhood and that early life stressors were associated with low self-compassion in adulthood. According to the results of meta-analysis studies, childhood traumas appear to be negatively related to self-compassion (Zhang et al., 2023; Hamrick and Owens, 2019; Joss et al., 2019).

Study Limitations and Strengths

The most important limitation of this study is that the research was conducted in only two different institutions in the same city.

The main strength of this study is that, using previously validated survey instruments to measure study outcomes in patients diagnosed with depression, it revealed a significant relationship between depression, self-compassion, and childhood trauma.

CONCLUSION

Based on the results of this study, we could suggest that depression levels of participants diagnosed with depression increased as their childhood traumatic experiences increased. It appears that childhood traumas are common in society. It is important to diagnose children in the risk group early and implement the necessary legal procedures. Nurses, especially those working in the field of child and adolescent mental health, have the opportunity to intervene early in individuals exposed to childhood trauma. In order to protect children from depression in their adult lives, it is important to include psychosocial interventions that increase self-compassion levels in the therapy program, especially considering the effect of self-compassion on reducing depression. It is recommended to focus on individuals who are at higher risk of developing depression. Individuals at increased risk of depression may benefit significantly from therapeutic approaches that emphasize self-compassion. Additionally, it would be appropriate to make arrangements in the nursing curriculum that emphasize the negative effects of childhood traumas, especially emotional neglect and abuse. Additionally, it may be recommended that self-compassion training be disseminated in undergraduate programs. For future research, conducting descriptive studies with a larger sample and planning studies with a qualitative research model would contribute to the literature both in understanding the issue and in providing solutions.

Acknowledgement

We thank all patients who participated in the study.

Conflict of Interest

The authors have no conflict of interest.

Author Contributions

Plan, design: PF, SPO; **Material, methods and data collection:** PF, SPO; **Data analysis and comments:** PF, SPO; **Writing and corrections:** PF, SPO.

Funding

No funding or support in this study not used.

Ethical Approval

Institution: SANKO University Non-Interventional Research Ethics Committee
Date: 22.03.2021
Approval no: 2021/03

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ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1505290

Determination of Maternal Attachment, Breastfeeding Self-Efficacy, and Insufficient Milk Perception of Mothers in COVID-19 Pandemic*

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* This article was presented as an oral presentation at the 3rd International 4th National Postpartum Congress on 16-18 September 2021.

Geliş Tarihi / Received: *26.06.2024,* ***Kabul Tarihi / Accepted:*** *3.07.2025*

ABSTRACT

Objective: This study aimed to determine the maternal attachment, breastfeeding self-efficacy, and perceived insufficient milk supply of mothers of babies placed in a neonatal intensive care unit in the face of restrictions of the COVID-19 pandemic. **Materials and Methods:** This was a descriptive and cross-sectional study. The study was conducted at the neonatal intensive care unit of a public hospital in eastern Turkey. The sample consisted of 292 mothers of term babies treated in the neonatal intensive care unit. Data were collected using a sociodemographic characteristics questionnaire, the Maternal Attachment Inventory, the Breastfeeding Self-Efficacy Scale, and the Perception of Insufficient Milk Questionnaire. **Results:** Participants had a mean maternal attachment, breastfeeding self-efficacy, and the perception of insufficient milk score of 61.80±14.60, 43.88±11.52, and 24.53±13.61, respectively. While the breastfeeding self-efficacy score was a significant explanatory variable that increased the maternal attachment score, the perception of insufficient milk score was a significant explanatory variable that decreased it ($p<0.05$). Participants with a positive COVID-19 test while their baby is in intensive care have a lower maternal attachment score. Participants who were separated from their babies during the pandemic and thought that they could not breastfeed sufficiently had a lower mean perception of insufficient milk score ($p<0.05$). **Conclusion:** Pandemic restrictions have a negative effect on maternal attachment. Breastfeeding self-efficacy and perception of insufficient milk are effective variables that explain maternal attachment.

Keywords: Attachment, Breastfeeding, COVID-19, Neonatal Intensive Care.

COVID-19 Pandemisinde Annelerin Maternal Bağlanma, Emzirme Öz Yeterlilik ve Yetersiz Süt Algısının Belirlenmesi

ÖZ

Amaç: Bu çalışma, COVID-19 salgınının kısıtlamaları karşısında yenidoğan yoğun bakım ünitesine (YYBÜ) yerleştirilen bebeklerin annelerinin anneye bağlanma, emzirme öz yeterliliği ve algılanan yetersiz süt tedarikini belirlemeyi amaçladı. **Gereç ve Yöntem:** Bu çalışma tanımlayıcı ve kesitsel tiptedir. Çalışma Türkiye'nin doğusundaki bir devlet hastanesinin YYBÜ'sünde gerçekleştirildi. Örneklem YYBÜ'de tedavi gören, zamanında doğmuş bebeği olan 292 anneden oluşuyordu. Veriler sosyodemografik özellikler anketi, Maternal Bağlanma Ölçeği, Emzirme Öz Yeterlilik Ölçeği ve Yetersiz Süt Algısı anketi kullanılarak toplandı. **Bulgular:** Katılımcıların ortalama maternal bağlanma, emzirme öz yeterliliği ve yetersiz süt algısı skorları sırasıyla 61.80±14.60, 43.88±11.52 ve 24.53±13.61 idi. Emzirme öz yeterliliği maternal bağlanmayı artıran anlamlı bir açıklayıcı değişken iken, yetersiz süt algısını düşüren anlamlı bir açıklayıcı değişkendi ($p<0,05$). Bebeği yoğun bakımdayken COVID-19 testi pozitif çıkan katılımcıların maternal bağlanmalarının daha düşük olduğu bulundu. Pandemi sürecinde bebeklerinden ayrılan ve yeterince emziremediklerini düşünen katılımcıların yetersiz süt algısı puan ortalaması daha düşüktü ($p<0,05$). **Sonuç:** Pandemi kısıtlamalarının anneye bağlanma üzerinde olumsuz etkisi vardır. Emzirme öz-yeterliği ve yetersiz süt algısı maternal bağlanmayı açıklayan etkili değişkenlerdir.

Anahtar Kelimeler: Bağlanma, COVID-19, Emzirme, Yenidoğan Yoğun Bakım.

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Bu makaleye atıf yapmak için / Cite this article: Kucukoglu, S., Altay, G., Yılmaz, H.C., & Arikan, D. (2025). Determination of maternal attachment, breastfeeding self-efficacy, and insufficient milk perception of mothers in COVID-19 pandemic. *BAUN Health Sci J, 14*(2), 488-495. https://doi.org/10.53424/balikesirsbd.1505290

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

In March 2020, the World Health Organization (WHO) declared the outbreak of coronavirus disease (COVID-19) as a global pandemic (WHO, 2020). Subsequently, the first confirmed case of COVID-19 in Türkiye was reported on March 11, 2020 (WHO, 2020; Republic of Türkiye Ministry of Health, 2020). The novel coronavirus, responsible for COVID-19, demonstrated the capacity to infect individuals across all age groups, including neonates and children (Dong et al., 2020).

The neonatal period is a critical period that shapes human development in the short and long term (Cetisli et al., 2018). Within this period, breastfeeding and secure maternal attachment are essential for infant development (Altay & Arıkan, 2021). Breastfeeding serves not only as the primary means of nutrition but also for establishing maternal attachment (Gibbs et al., 2018). Importantly, available evidence indicated that breastfeeding remains safe and should be encouraged during the COVID-19 pandemic (Liu et al., 2022).

Breastfeeding self-efficacy, defined as the mother's belief in her ability to successfully breastfeed, plays a pivotal role in the initiation and continuation of breastfeeding (Cetisli et al., 2018). Additionally, the perception of insufficient milk supply constitutes a critical determinant of breastfeeding outcomes. Although true lactation insufficiency is rare, and many mothers experiencing breastfeeding difficulties report a perception of inadequate milk supply (Kent et al., 2021; Sandhi et al., 2020). Moreover, breastfeeding self-efficacy and perceived insufficient milk affect each other (De Roza et al., 2019).

The literature has determined that mothers can be supported in gaining the confidence they need regarding their experiences with their babies in the neonatal intensive care units (NICU) by determining their breastfeeding self-efficacy and attachment levels in the postpartum period (Gumussoy et al., 2020; Gunes et al., 2021).

The COVID-19 pandemic has posed significant challenges to maternal and neonatal care, particularly through the implementation of restrictive policies in NICU, such as limitations on parental visits. Such measures, while aiming to reduce infection risk, have inadvertently disrupted early maternal-infant contact, thereby potentially influencing maternal attachment and breastfeeding behaviors (Altay & Arıkan, 2021). Given the negative impact of the pandemic on the mother-infant dyad, there is a need to strengthen maternal attachment and improve mothers' breastfeeding self-efficacy and their perception of milk supply. In literature, studies on the relationship between maternal attachment and breastfeeding self-efficacy (Gumussoy et al., 2020; Peñacoba & Catala, 2019) and breastfeeding self-efficacy and perceived insufficient milk (Sandhi et al., 2020) were found. However, the lack of research investigating how policies imposed during the COVID-19 pandemic affect maternal attachment, breastfeeding self-efficacy and perceptions of insufficient milk in mothers of NICU infants limits understanding of the potential adverse effects on maternal and neonatal health and hinders the development of effective support interventions.

The aim of this study was to examine several questions:

- What are the levels of maternal attachment, breastfeeding self-efficacy and perception of insufficient milk in mothers whose infants were admitted to the NICU during the period of restrictions due to the pandemic?
- Do the sociodemographic characteristics of mothers affect maternal attachment, breastfeeding self-efficacy and perception of insufficient milk?
- Do the attitudes and behaviors of mothers in the NICU during COVID-19 affect maternal attachment, breastfeeding self-efficacy and perception of insufficient milk?

MATERIALS AND METHODS

Study design and setting

This study is descriptive and cross-sectional type. The study was conducted between March-October 2021 at the NICU of a hospital in eastern Türkiye. The study sample consists of 292 mothers of babies born between 37 and 40 weeks and who were placed in the NICU due to hyperbilirubinemia, meconium aspiration or hypoglycemia. Random sampling was performed. All participants met the inclusion criteria and agreed to participate in the study. There was no similar study conducted during the pandemic. Therefore, a post hoc power analysis was performed on the total data collected between March and October 2021. The results showed that a sample of 292 mothers would be large enough to detect significant differences (effect size=0.283, margin of error=0.05, and power=0.99).

Inclusion criteria of the study

The inclusion criteria were (1) mother and baby not having a problem that prevents breastfeeding (congenital anomaly, neurological disorders, cleft palate or cleft lip, etc. for the baby, and drug use, psychological disorders, mastitis, weaning, etc. for the mother), (2) being 18 years of age or over, (3) gestational age between 38-40 weeks, (4) mother having no vision and hearing problems and (5) mothers who volunteered to participate in the study. Mothers who did not take a PCR (Polymerase Chain Reaction) test or who tested positive for COVID-19 were not included in the study.

Measurements

Sociodemographic Characteristics Questionnaire

The sociodemographic characteristics questionnaire was based on a literature review conducted by the researchers (Gumussoy et al., 2020; Gunes et al., 2021, Kent et al, 2021).

Maternal Attachment Inventory (MAI)

The scale was developed by Mary E. Muller (1994). The scale was adapted into Turkish by Kavlak and Şirin (2009). The scale, consisting of 26 items, is a four-point Likert

type. As the score obtained from the scale increases, maternal attachment increases. The original scale has a Cronbach's α of 0.85 (Muller, 1994). The internal validity of the Turkish version of the scale is 0.82 (Kavlak & Şirin, 2009), which was 0.97 in the present study.

Breastfeeding Self-Efficacy Scale-Short Form (BSES-SF)

Dennis (2003) developed a short form of the BSES-SF and recommended that researchers employ it because it is easier to use and more accurate than the BSES. The BSES-SF was adapted to Turkish by Aluş Tokat and Okumuş (2010). The scale consisting of 14 items is a five-point Likert type. As the score obtained from the scale increases, mothers' breastfeeding self-efficacy also increases. The Turkish version has a Cronbach's alpha of 0.86, which was 0.94 in the present study.

Perception of Insufficient Milk (PIM)

The scale was developed by McCarter-Spaulding and Kearney (2001). The questionnaire consists of six items. The first item is a nominal question (yes/no) in which the respondent is asked whether mother believes mother has enough milk to satisfy her baby. The remaining items are rated on a ten-point Likert-type scale ("0 = strongly disagree" to "10 = strongly agree"). The total score ranges from 0 to 50, with higher scores indicating higher perceived adequacy of milk supply. The questionnaire was adapted to Turkish by Gokceoglu and Kucukoglu (2017). The Turkish version has a Cronbach's alpha of 0.86, which was 0.94 in the present study.

Data collection

First, all mothers were requested to take PCR (Polymerase Chain Reaction) tests, a diagnostic method used to detect the presence of SARS-CoV-2 virus, before visiting the clinic. Mothers who did not take PCR tests or tested positive for COVID-19 were encouraged to send their breast milk to the clinic. However, they were not allowed to visit the clinic or participate in the breastfeeding and care of their babies. Mothers who tested negative for COVID-19 were placed in the maternal hotel of the clinic and were allowed to participate in the care of their babies or breastfeed them. Participants rested at the hotel at other times. Clinical nurses monitored the babies until discharge. Participants were asked not to leave the clinic until discharge, and if they did, they were asked to take PCR tests again. These procedures including PCR testing, accommodation arrangements at the maternal hotel, and permissions regarding infant care were determined and implemented by the hospital management as part of institutional COVID-19 protocols, independent of the research team.

Participants were interviewed at the hotel out of care, treatment, and feeding hours. The researcher complied with preventive measures (mask, social distance, hygiene, etc.) during the interviews. Participants filled out the data collection tools themselves, but the researcher was present to answer any questions. It took each participant 30 minutes to fill out the data collection tools.

Data analysis

The data were analyzed using the Statistical Package for Social Sciences (SPSS v. 22.0) at a significant level of 0.05. Number, percentage, mean, and standard deviation were used for descriptive statistics. Normality was tested using the Kolmogorov–Smirnov test and skewness and kurtosis values. An independent sample t-test was used to compare scale scores. One-way analysis of variance (ANOVA) was used to compare independent groups. Bonferroni test was used for multiple comparisons. A stepwise method and multiple regression analysis were used as multivariate analyses for detecting significant factors.

Ethical Approval

The study was approved by a Regional Ethical Review Board in Turkey (No: B.30.2.ATA.0.01.00/115, Date: 25.03.2021). Permission was obtained from the hospital. All mothers were informed about the research purpose and procedure. Informed consent was obtained from those who agreed to participate in the study. Permission was obtained from the authors of the scales.

RESULTS

Most participants were 20-35 years of age (82.9%). More than a quarter of the participants had high school degrees (38.7%). Less than half the participants had a negative income (income < expense). 67.1% of the participants had a vaginal birth, and 79.1% stated that their pregnancies were planned. Less than half the participants noted that they had received training in breastfeeding (breastfeeding training) before (39.7%). The babies were 11.42±6.72 days old. More than half of the babies were girls (52.7%).

In the study, the relationship between sociodemographic characteristics and MAI, BSES-SF and PIM scores was investigated. Education and income levels were found to be significantly related to the participants' MAI scores ($p<0.001$). The mean MAI score of participants who planned their pregnancies and had previously received education about breastfeeding was significantly higher than those who did not plan and had no education. There was also a weak correlation between postnatal age and MAI scores ($p<0.001$, Table 1).

Participants had a mean MAI, BSES-SF, and PIM score of 61.80±14.60, 43.88±11.52, and 24.53±13.61, respectively (Table 2). A multiple regression analysis was performed using the stepwise method to determine the associated of perceived insufficient milk and breastfeeding self-efficacy on maternal attachment. The results showed that perceived insufficient milk and breastfeeding self-efficacy affected maternal attachment ($F(2,291)=40.945$, $p<0.001$). The regression model accounted for 22% of the total variance of the MAI score (Adj. $R^2= 0.215$). The BSES-SF score ($\beta=.664$) was a significant explanatory variable that increased the MAI score, whereas the PIM score ($\beta=-0.298$) was a significant explanatory variable that decreased it (Table 3).

Table 1. The comparison of the mean scores of MAI, BSES-SF, and PIM according to the demographic characteristics of the mothers (n=292).

Variables		N	%	MAI		BSES-SF		PIM	
				X±SS	Test / p	X±SS	Test / p	X±SS	Test / p
Age (year)	[a]19y <	23	7.9	59.30±14.88	F=0.658	41.74±16.07	F=1.054	25.35±17.71	F=2.690
	[b]20-35	242	82.9	62.24±14.52	p=0.519	43.80±10.99	p=0.350	23.83±12.90	p=0.070
	[c]36>	27	9.2	59.96±15.27		46.71±11.70		30.15±15.12	
Education (degree)	[a]Literate	19	6.5	53.95±16.78	F=5.636	39.79±11.41	F=1.742	19.26±15.12	
	[b]Primary	53	18.2	61.42±14.95	**p<0.001**	46.13±11.55	p=0.158	28.09±14.61	F=2.284
	school	113	38.7	59.54±14.71	a-c<d	43.05±11.63		23.85±12.93	p=0.079
	[c]High school	107	36.6	65.72±12.91		44.36±11.28		24.43±13.30	
	[d]Bachelor's								
Income	[a]Negative	125	42.8	57.16±15.56	F=15.044	41.04±11.12	F=7.292	21.49±13.43	F=6.250
	[b]Neutral	110	37.7	63.38±12.03	**p<0.001**	45.45±10.78	**p<0.001**	27.62±12.52	**p=0.002**
	[c]Positive	57	19.5	68.91±10.72	**a<b<c**	47.05±12.50	**a<b**	25.26±14.78	**a<b**
Planned pregnancy	Yes	231	79.1	64.18±13.01	t=5.717	44.61±11.11	t=2.131	24.32±13.45	t=0.532
	No	61	20.9	52.77±16.73	**p<0.001**	41.10±12.65	**p=0.034**	25.36±14.30	p=0.595
Delivery type	Vaginal	196	67.1	61.51±14.92	t=0.489	43.84±11.16	t=0.085	24.34±13.55	t=0.354
	C-section	96	32.9	62.40±13.99	p=0.625	43.96±12.28	p=0.933	24.94±13.82	p=0.724
Baby's sex	Girl	154	52.7	63.18±13.48	t=1.708	44.06±11.13	t=0.284	24.44±13.44	t=0.123
	Boy	138	47.3	60.26±15.66	p=0.089	43.67±11.98	p=0.776	24.64±13.86	p=0.902
Receiving training in breastfeeding	Yes	116	39.7	64.34±13.67	t=2.432	45.32±11.60	t=1.743	25.21±13.79	t=0.685
	No	176	60.3	60.13±14.99	**p=0.016**	42.93±11.40	p=0.082	24.09±13.52	p=0.494
Postnatal age		X±SS		r	p	r	p	r	p
		11.42±6.72		0.205	**p<0.001**	0.047	0.428	0.057	0.331

F:One way Anova, t: Independent groups t test, Bonferroni analysis.

Table 2. Mean scores of the MAI, BSES-SF, and PIM scores (n = 292).

Scales	Mean	±SD	Min-Max
Maternal Attachment Inventory (MAI)	61.80	14.60	19-78
Breastfeeding Self-Efficacy Scale-Short Form (BSES-SF)	43.88	11.52	14-70
Perception of Insufficient Milk (PIM)	24.53	13.61	0-50

Table 3. The effects of perceived insufficient milk and breastfeeding self-efficacy on maternal attachment (n = 292).

Scales	B[1] (95% CI)	SE	β[2]	t	p	VIF
Constant	32.718 (26.213-39.223)	3.305		9.900	**p<0.000**	
BSES-SF	0.842 (0.635-1.049)	0.105	0.664	8.000	**p<0.000**	2.555
PIM	-0.320 (-0.495-0.145)	0.089	-0.298	-3.594	**p<0.000**	2.555

Notes: F: 40.945, p < 0.001, R:0.470, R^2:0.221, Adjust R^2:0.215, Durbin- Watson: 1.292.
Dependent Variable: MAI, [1]Non-standardized Coefficient, [2]Standardized Coefficient
A multiple regression analysis was performed using the stepwise method.

A quarter of the participants tested positive for COVID-19 during their babies' hospital stay (24%). Most participants were separated from their babies after a while due to the pandemic (separation) (87%). Most of the participants believed that they breastfed their babies insufficiently due to the pandemic (perceived insufficient milk supply) (86.6%). Most participants adhered to the preventive measures at the unit; hand hygiene (84.6%) and social distancing (71.2%). COVID-19 experience affected participants' maternal attachment levels. Participants who had not tested positive for COVID-19 before had a significantly higher mean MAI score than those who had (p<0.05). Participants who adhered to hand hygiene and social distancing measures had a significantly higher mean MAI score than those who did not (p<0.05, Table 4). Separation and perceived insufficient milk supply affected participants' PIM scores. Participants who were separated from their babies after birth due to the pandemic had a significantly lower mean PIM score than those who were not. Participants who believed that they had insufficient milk supply due to the pandemic had a significantly lower mean PIM score than those who did not (p<0.05, Table 4)

Table 4. Comparison of the mean MAI, BSES-SF and PIM scores of the participants according to their attitudes and behaviors in the NICU (n=292).

	N	%	MAI		BSES-SF		PIM	
Variables			**X±SS**	**Test and p**	**X±SS**	**Test and p**	**X±SS**	**Test and p**
Having tested positive for COVID-19								
Yes	70	24.0	57.69±14.52	**t=2.732**	44.34±10.01	t=0.388	26.01±12.70	t=1.043
No	222	76.0	63.09±14.42	**p=0.007**	43.73±11.97	p=0.698	13.88±0.93	p=0.298
Separation from baby after birth due to pandemic								
Yes	254	87.0	65.00(59.00)*	U=4060.000	43.00(56.00)*	U=4398.000	22.00(51.00)*	**U=3636.500**
No	38	13.0	62.50(56.00)*	p=0.114	45.00(56.00)*	p=0.378	31.50(51.00)*	**p=0.014**
Perceived insufficient milk supply due to the pandemic								
Yes	253	86.6	65.00(56.00)*	U=4415.000	43.00(56.00)*	U=4245.500	22.00(51.00)*	**U=3467.000**
No	39	13.4	63.00(59.00)*	p=0.290	46.00(56.00)*	p=0.161	31.00(51.00)*	**p=0.003**
Preventive measure (hand hygiene)								
Yes	247	84.6	62.60±14.17	**t=2.223**	43.60±11.67	t=0.950	23.96±13.44	t=1.683
No	45	15.4	57.38±16.22	**p=0.027**	45.38±10.61	p=0.343	27.67±14.27	p=0.093
Preventive measure (social distancing)								
Yes	208	71.2	63.59±13.88	**t=3.361**	44.46±10.95	t=1.367	24.73±13.38	t=0.388
No	84	28.8	57.36±15.45	**p=0.001**	42.43±12.77	p=0.173	24.05±14.24	p=0.699

F:One way Anova, t:Independent groups t test, Bonferroni analysis. U:Mann Whitney U, *[Median (Range)]

A multiple regression analysis was performed to determine the associated of the variables on participants' MAI and PIM scores. The regression model showed that COVID-19 experience affected participants' MAI scores ($F(2,291)=7.924$, $p<0.001$). Having tested positive for COVID-19 before (β=-0.123) and having difficulty adhering to social distancing (β=-0.168) were significant variables reducing the MAI scores. The regression model explained 4.5% of the MAI score (Adj. R^2= 0.045) (Table 5).

Table 5. Multiple regression analysis of the effects of mothers' attitudes and behaviors in the NICU on MAI during the COVID-19 pandemic.

Participants' Attitudes and Behaviors at the NICU during the COVID-19 Pandemic		**B[1] (95% CI)**	**SE**	**β[2]**	**t**	**p**	**VIF**
MAI	**Constant**	58.959(55.548-62.370)	1.733		34.022	**0.000**	
	Having tested positive for COVID-19 (COVID-19 experience)	-4.205(-8.142-0.268)	2.000	-0.123	-2.102	**0.036**	1.046
	Having difficulty adhering to social distancing	5.401(1.668-9.113)	1.886	0.168	2.863	**0.005**	1.046

Notes: F: 7.924, $p < 0.001$, R:0.228, R^2:0.052, Adjust R^2:0.045, Durbin- Watson: 1.053.

DISCUSSION

This study investigated maternal attachment, breastfeeding self-efficacy, and perceived insufficient milk supply in mothers of babies placed in a NICU at the stages of the pandemic.

In this study, the maternal attachment score (61.80±14.60) of the participants was found to be below average when compared to other studies conducted during the pandemic period (Çelik ve Çopur, 2023). In a study, it was reported that mothers staying in the same rooms as their healthy babies had a MAI score of 100.47±5.05 (Oskovi-Kaplan et al., 2021). Another study investigated the effectiveness of interventions for strengthening mother-infant bonding during the pandemic and found that mothers had a mean pretest MAI score of 64.6 (Wang et al., 2021). A separate study found that mother-infant attachment decreased on the pandemic (Manuela et al., 2021). These results indicate that healthcare professionals should consider the pandemic conditions and find ways to make sure that mothers spend time with their babies.

A multiple regression analysis was performed to examine the association of breastfeeding self-efficacy and perceived insufficient milk supply on maternal attachment in the pandemic. The results showed that the regression model explained 22% of the MAI scores. The results indicated that the BSES-SF score was an explanatory variable increasing the MAI score, whereas the PIM score was an explanatory variable decreasing it. Breastfeeding plays a crucial role in mother-infant attachment (Gibbs et al., 2018; Cetisli et al., 2018). Peñacoba and Catala conducted a systematic review for associations between breastfeeding and mother-infant relationships (Peñacoba and Catala, 2019). There was evidence that

secure attachment between mother and baby was achieved mostly through breastfeeding. Another study found that there was a significant relationship between breastfeeding self-efficacy and mother-infant attachment (Gümüşsoy et al. 2020). Our results also showed that breastfeeding self-efficacy affected maternal attachment significantly. During the pandemic, healthcare professionals should not only allow mothers to spend time with their babies but also consider breastfeeding self-efficacy to ensure mother-infant attachment.

Participants had a mean PIM score of 24.53±13.61, suggesting moderate perceptions of insufficient milk supply. Perceived insufficient milk supply is a critical factor affecting breastfeeding in the first six months. Perceived insufficient milk supply is one of the main reasons given for formula supplementation and breastfeeding discontinuation (Rodrigo et al., 2019). Our results showed that the PIM score was an explanatory variable reducing the MAI score. Another study reported that mothers with high perceived breastfeeding self-efficacy were more likely to consider their breastmilk sufficient (Gokceoglu & Kucukoglu, 2017). The inability of mothers to have sufficient contact with their babies due to the pandemic may explain why our participants have perceptions of insufficient milk supply, which negatively affects mother-infant attachment.

This study investigated whether participants' sociodemographic characteristics affected their MAI, BSES-SF, and PIM scores. Participants with a negative income had lower MAI, BSES-SF, and PIM scores than those with a positive income. Another study found that mothers with a positive income had higher BSES-SF and PIM scores than those with a negative income (Gokceoglu & Kucukoglu, 2017). Our results are consistent with those of earlier studies conducted before the pandemic. Many families in Turkey have faced financial difficulties since the pandemic began. Almost half of our participants reported a negative income (42.8%). Therefore, our results show that low socioeconomic status affects mother-infant attachment and breastfeeding self-efficacy.

Participants who had tested positive for COVID-19 had a lower MAI score than those who had not. Moreover, participants who had difficulty adhering to social distancing at the NICU had a lower MAI score than those who did not. Mothers have to cope with postpartum stressors and the adverse effects of the pandemic (Dekel et al., 2019). As the pandemic unfolded, authorities published guidelines for the admission of infected mothers to health institutions, the prevention of infection, and the care of infants (Wang et al., 2021). However, not all healthcare institutions stick to those guidelines, which may have negatively affected the mother-infant relationship and attachment. Social distancing is a set of actions that involve reducing face-to-face contact to slow down or stop the spread of the coronavirus. Although social distancing has helped reduce the exponential reproducibility of the virus, it has caused social isolation and reduced community support (Reger et al., 2020). Moreover, it might have been a challenge for mothers to adhere to social distancing at the NICU during the postpartum period.

Participants who were separated from their babies due to the pandemic had a lower mean BSES-SF score than those who were not. Prolonged mother-infant separation during the pandemic has negative consequences (Tomori et al., 2020). When the pandemic started, the NICU restricted parents from taking care of their infants and allowed them on postnatal wards only during certain visiting hours. Mothers who tested positive for COVID-19 were asked to pump their breastmilk and have it delivered to the unit by their relatives. Wang et al. (2020) also reported that Chinese mothers were separated from their infants when the pandemic broke out. They found that mothers were recommended to feed their babies with formula. Research shows that breastfeeding is the best preventative measure available for healthy and at-risk babies and their mothers during the COVID-19 pandemic (Lubbe et al., 2020). Most of our participants were separated from their babies in the first two waves of the pandemic, adversely affecting their breastfeeding practices. Studies conducted in NICU during the pandemic period reported that visitor restrictions negatively affected the growth and development of the baby (Çiğdem et al., 2024). In this case, visitor restrictions may be considered to have a negative impact on breastfeeding. Our participants had low breastfeeding self-efficacy levels. Research shows that the pandemic has a negative relationship with mothers' breastfeeding practices (Wang et al., 2020; Tomori et al., 2020). Our results also show that the pandemic has a negative relationship with mothers' breastfeeding self-efficacy levels.

Strengths and Limitations

This study was conducted during the COVID-19 pandemic. Pandemic conditions have created extraordinary social, emotional, and environmental factors that may affect individuals' breastfeeding self-efficacy levels and perceptions of milk insufficiency. The Breastfeeding Self-Efficacy Scale-Short Form and Perception of Insufficient Milk scales used in the study measure basic psychological structures, and it is thought that these structures maintain their validity during the pandemic process. However, it should be taken into account that pandemic conditions may create different dynamics in measurements and limit the generalizability of the results. Therefore, the findings should be evaluated within the framework of the specific conditions of the pandemic period. There are other limitations to this study. It should be noted that the inclusion of only mothers with negative PCR results may have introduced a selection bias, potentially limiting the generalizability of the findings. One limitation of this study is the lack of a

non-pandemic comparison group, which restricts the ability to evaluate the direct psychological impact of mother-infant separation caused specifically by COVID-19. Future studies comparing similar variables before, during, and after the pandemic may offer a clearer understanding of its effects on maternal emotional well-being.

CONCLUSION

Prolonged mother-infant separation during the COVID-19 pandemic has adversely affected maternal attachment levels, which were much lower than what has been reported by earlier studies. Our results show that breastfeeding self-efficacy and perceived insufficient milk supply are significant variables that explain maternal attachment. Income affects mothers' MAI, PIM, and BSES-SF scores, while planned pregnancy is a significant variable that increases mothers' MAI scores. COVID-19 experience also reduces maternal attachment. Mothers who cannot breastfeed their babies adequately have a high perceived insufficient milk supply. These results suggest that healthcare professionals should promote the contact between mothers and their infants and consider their health and well-being when introducing preventive measures as a response to the pandemic.

Acknowledgement

The authors would like to extend their sincere thanks to anyone who contributed to this study.

Conflict of Interest

The author declares no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Author Contributions

Plan, design: SK, GA, DA; **Material, methods and data collection:** SK, GA, HCY, DA; **Data analysis and comments:** SK, GA; **Writing and corrections:** SK, GA, HCY.

Funding

The authors declare that this study has received no institutional or financial support.

Ethical Approval

Institution: Atatürk University Medicine Faculty Clinical Studies Ethical Committee
Date: 25.03.2021
Approval no: B.30.2.ATA.0.01.00/115

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ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1579782

The Relationship between Parents' Attitudes towards Children's Sexual Education and Their Sexual Communication and Affecting Factors

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Geliş Tarihi / Received: *05.11.2024,* ***Kabul Tarihi / Accepted:*** *05.07.2025*

ABSTRACT

Objective: The objective of this study was to determine the relationship between parents' attitudes towards their children's sexual education and their sexual communication and to determine the influencing factors. **Materials and Methods:** The research was conducted with 305 parents who met the inclusion criteria using a cross-sectional-correlational research design between June and December 2022. Data were collected using the "Demographic Information Form", "Attitude Towards Sexual Education Scale" and "Sexual Communication Scale for Parents". Data were analyzed using SPSS for Windows 25.0 program. Descriptive statistics, independent samples t test and ANOVA were used in the analysis of the data. Correlation and logistic regression analyzes were performed. **Results:** The mean age of the children was 10.03±5.39 and 52.1% were girls. The strongest predictors of parental characteristics associated with attitudes towards sexual education were the mother's education level and employment status ($p<0.05$). Among the predictors of sexual communication related to parental attitudes, the content and skill sub-dimensions in managing the communication process were positively correlated ($p<0.05$). At the same time, the anxiety sub-dimension showed a negative correlation ($p<0.05$). **Conclusion:** The study determined that parental sexual communication was associated with attitudes towards sexual education. These findings may guide researchers in developing parent-child sexual education programs and health professionals in providing care and services to parents and children.

Keywords: Sexual Education, Sexual Communication, Children, Parents, Attitudes.

Ebeveynlerin Çocuklarının Cinsel Eğitimine Yönelik Tutumları ile Cinsel İletişimleri Arasındaki İlişki ve Etkileyen Faktörler

ÖZ

Amaç: Ebeveynlerin çocuklarının cinsel eğitimine yönelik tutumları ile cinsel iletişimleri arasındaki ilişkiyi ve etkileyen faktörleri belirlemektir. **Gereç ve Yöntem:** Araştırma Haziran- Aralık 2022 tarihleri arasında kesitsel-korelasyonel araştırma deseni kullanılarak dahil etme kriterlerini karşılayan 305 ebeveynle yürütülmüştür. Veriler "Demografik Bilgi Formu", "Cinsel Eğitime Yönelik Tutum Ölçeği" ve "Ebeveynler İçin Cinsel İletişim Ölçeği" ile toplanmıştır. Veriler SPSS for Windows 25.0 programı kullanılarak analiz edilmiştir. Verilerin analizinde tanımlayıcı istatistikler, bağımsız örneklem t testi ve ANOVA kullanılmıştır. Korelasyon ve lojistik regresyon analizleri yapılmıştır. **Bulgular:** Çocukların yaş ortalaması 10.03±5.39 olup %52.1'i kızdır. Ebeveynler 18-55 yaş arasındadır. Ebeveyn özelliklerinin cinsel eğitime yönelik tutumlarla ilişkili en güçlü yordayıcılarının annenin eğitim düzeyi ve çalışma durumu olduğu bulundu ($p<0.05$). Ebeveyn tutumlarıyla ilişkili cinsel iletişimin yordayıcıları arasında, iletişim sürecini yönetmedeki içerik ve beceri alt boyutları pozitif ilişkiliydi ($p<0.05$). Aynı zamanda, kaygı alt boyutu negatif bir ilişki gösterdi ($p<0.05$). **Sonuç:** Çalışmada, ebeveyn cinsel iletişiminin cinsel eğitime yönelik tutumlarla ilişkili olduğu belirlendi. Bu bulgular, araştırmacılara ebeveyn-çocuk cinsel eğitim programları geliştirmede ve sağlık profesyonellerine ebeveynlere ve çocuklara bakım ve hizmet sunmada yol gösterebilir.

Anahtar Kelimeler: Cinsel Eğitim, Cinsel İletişim, Çocuklar, Ebeveynler, Tutumlar.

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Bu makaleye atıf yapmak için / Cite this article: Cirban Ekrem, E., Kurt, A., Gökçe M. C., & Uçman, S. (2025). The relationship between parents' attitudes towards children's sexual education and their sexual communication and affecting factors. *BAUN Health Sci J, 14*(2), 496-504. https://doi.org/10.53424/balikesirsbd.1579782

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

Sexuality, a significant component of the human experience, commences at birth and persists throughout life (Erenoğlu and Bayraktar 2017). Humans are inherently sexual beings, and their sexuality constitutes a substantial aspect of their personality (Astle et al. 2022). In addition to its role in personality, sexuality is a critical element of human health, well-being, and contentment (Astle et al., 2022). The biopsychosocial model posits that sexuality encompasses an individual's self-perception, body image, gender identity, style of dress, movement, speech, behavior toward others, and perceptions of others (Öz and Kısa 2023). According to the World Health Organization (2006), sexual health is defined as "a state of physical, emotional, mental, and social well-being regarding sexuality, not merely the absence of disease or dysfunction." The preservation and promotion of sexual health is contingent upon respecting and safeguarding the sexual rights of all individuals. An individual's perception and attitudes toward sexuality are intertwined with their importance given to it, and positive levels of sexuality perception and attitudes can be achieved through sexual education (Ganji et al. 2017).

Attitudes toward sexuality are not spontaneous phenomena; rather, they are shaped by individual characteristics, as well as sociocultural and environmental factors. Determining the current attitudes of individuals on health-related issues is a fundamental component of health education outcomes (Yalçın, Erkoç, and Şişman 2023). The attitudes and thoughts of individuals towards sexuality are influenced by various factors, including family, society, culture, media, religion, socio-economic status, family structures, and parental sexual education levels and attitudes (Pop and Rusu 2015). Determining these attitudes is crucial, particularly to understand the communication between parents and their children (Uzkul and Öğretir Özçelik 2024).

The foundational elements of sexual education, encompassing attitudes, beliefs, behaviors, and values, are established during early childhood, predominantly through family engagement (Uzkul and Öğretir Özçelik 2024). Parents are assumed to be the predominant role in the education of their children's sexuality, yet despite their awareness of the importance of their function in this regard, many parents find themselves lacking adequate preparation to engage in discussions about sexuality (Ganji et al. 2017). In many societies, discussions concerning sexuality are regarded as a taboo, which can hinder children's ability to seek guidance from their parents on sexual matters (Goldschmidt-Gjerløw 2019; Mohd. Tohit and Haque 2024). This can result in children facing difficulties in approaching their parents for guidance, and even when they do, they may not receive adequate responses (Ganji et al. 2017). This can potentially result in children seeking information from alternative sources, which may contain misinformation. Research indicates that children who can communicate with their parents about sexuality and acquire accurate information exhibit higher levels of safe sexual behaviors and lower levels of risky sexual behaviors (Evans et al. 2020). However, studies also indicate an insufficient understanding of how the cycle of parental and child sexual education and communication is sustained (Astle et al. 2022; Flores and Barroso 2017).

This study aims to address a significant gap in the field by examining the relationship between parents' attitudes toward their children's sexual education and their sexual communication. While numerous studies have been conducted on parents' attitudes toward sexual education, research on how these attitudes are reflected in their sexual communication with their children and which factors influence these attitudes is limited (Apaydin Cirik, Aksoy, and Bulut 2023; Aral and Deleş 2024; Çevik Güner and Aktaş 2022; Kandemir, Albayrak, and Karaaziz 2023). This study aims to address this lacuna by evaluating the impact of cultural, socio-economic, and individual characteristics of parents on their attitudes toward sexual education. It comprehensively addresses how these factors are reflected in sexual communication processes. In this respect, the study makes an original contribution to literature by providing scientific and practical suggestions to increase the effectiveness of sexual education in the context of parent-child relationships.

Research questions:

- Is there a relationship between parents' attitudes towards sexual education and sexual communication attitudes?
- Are parents' attitudes towards sex education affected by promotional features?

MATERIALS AND METHODS

Design and participants

The present study employed cross-sectional-correlational research design, and the number of admissions to the children's ward in the institution where the research was conducted was approximately 3,800 in a single year. When the margin of error was calculated at 5% and the confidence interval was established at 95% from the known universe sample, it was sufficient for 289 parents to participate in the research. The purposive sampling method was employed in the research. The sample population encompassed patients admitted to a gynecology and children's diseases hospital for various reasons, including examination, hospitalization, companionship, and so on, during the specified period of June to December 2022. Parents who came for specific purposes and met the inclusion criteria were included in the study. The inclusion criteria encompassed having a child aged 0-18, seeking medical attention at a Children's

Hospital in the northwest of Turkey between June and December 2022 for reasons such as illness, diagnosis, treatment, or accompaniment, completely filling out the survey, lacking any impediment to communication, and consenting to participate in the research. The exclusion criteria of the study included data collection forms that were incompletely filled out and participants wanting to withdraw from the study. During the data collection process, no participants met the research exclusion criteria. The study was completed with 305 parents.

Research variables

Dependent variable: Attitude towards sexual education

Independent variable: Attitude towards sexual communication and descriptive characteristics of parents

Data collection tools

Demographic Information Form: This form, a document developed by researchers in accordance with extant literature, is comprised of 18 inquiries addressing various demographic variables. These include, but are not limited to, the child's gender, age, mother's age, father's age, parental employment status, parental education level, number of children in the family, family type, and parents' thoughts and behaviors regarding sexuality.

Scale of Attitudes Towards Sex Education (SATSE): The scale developed by Artan, Ceylan, and Kurnaz Adıbatmaz (2020) was designed to assess parents' attitudes toward sex education. The scale consists of four sub-dimensions and 39 items. The scale encompasses items concerning professional support and respect for differences (items 1-8), parental role (items 9-16), belief in necessity (items 17-28), and avoidance (items 29-39). Respondents utilize a four-point Likert scale ranging from "Strongly Disagree-1" to "Strongly Agree-4." The total score is determined by adding the scores from each scale item, with a minimum of 39 points and a maximum of 156 points. Higher total scores indicate a more positive attitude toward sex education. The internal consistency coefficient for the overall scale was calculated to be 0.90 (Artan, Ceylan and Kurnaz Adıbatmaz 2020), and among the current sample, it was 0.93.

Sexual Communication Scale for Parents (SCSP): The scale developed by Artan, Ceylan, and Kurnaz Adıbatmaz (2020) comprises five sub-dimensions and 23 items. The sub-dimensions include content (items 1-7), body language (items 8-12), process management (items 13-19), and anxiety (items 20-23). Respondents utilize a four-point Likert scale ranging from "Not Suitable for Me at All-1" to "Completely Suitable for Me-4." It is noteworthy that the anxiety sub-dimension items are reverse-scored. High scores on all sub-dimensions signify that parents' sexual communication style is deemed appropriate. The scale demonstrated a reliability score of 0.80 (Artan, Ceylan, and Adıbatmaz 2020), 2020), and among the current sample, it exhibited a reliability score of 0.90.

Data collection

The data for the study were collected from parents who met the inclusion criteria and sought appointments, examinations, or check-ups at a children's hospital in northwest Turkey between June 2022 and December 2022. Information about the research was provided to parents in face-to-face meetings, and the surveys were administered using a self-reporting technique, taking approximately 15 minutes to complete.

Data analysis

The data were analyzed using SPSS (Statistical Package for Social Sciences) for Windows 25.0 software. Descriptive statistics were used to evaluate the data, and it was determined that the kurtosis and skewness values were normally distributed (Blanca et al., 2013). To make meaningful comparisons between the groups, statistical tools such as independent sample t-test and one-way analysis of variance (ANOVA) were employed. To identify the statistical significance of the differences in mean scores, the Bonferroni test was implemented. To explore the interrelationships among the scales, a correlation analysis was conducted. To assess the impact of various independent variables and parents' attitudes on their children's sexual education, logistic regression models were utilized.

Ethical approval

The institutional ethical committee with which the researchers were affiliated provided its approval (Protocol no: 2021-SBB-0310, Date: 14.09.2021). Additionally, the institutional committee at the location where the research was conducted provided its approval. The use of the scales was permitted through email correspondence with the authors. The participants were informed about the study, and both verbal and written consent were obtained.

RESULTS

The mean age of the children was 10.03 years (±5.39), and 52.1% of them were female. The results of the study indicated that 29.22% of the children were between the ages of 10 and 14 (Table 1). The parents included in the study were predominantly female, with 64.8% of them being mothers and 35.2% being fathers. The age range of the parents was between 18 and 55 years, with the average age of mothers being 36.26±6.95.

Table 1. Relationship between parent and child characteristics and SATSE (n=305).

Parent and child characteristics			SATSE	
	X̄±SD			r, p
Child age	10.03±5.39			r=-0.142, p=0.013
Mother's age	36.26±6.95			r=-0.240, p<0.001
Father's age	38.57±7.63			r=-0.271, p<0.001
Number of Children in the Family	1.95±0.94			r=-0.213, p<0.001
	n	**%**	**X̄±SD**	**t or F, p**
Child age group				F=3.419, p=0.018
1-4 age group (1)	53	18,9		**Post hoc**
5-9 age group (2)	79	28,1		1>2 (p=0.033)
10-14 age group (3)	82	29,2		1>4 (p=0.027)
15-18 age group (4)	67	23,8		
Child gender				
Girl	159	52.1	139.13±13.85	t=-0.478, p=0.633
Boy	146	47.9	139.89±13.63	
Mother's education level				
Basic education (primary and high school)	213	69.8	138.52±14.08	t=-1.981, p<0.001
Higher education (bachelor's and postgraduate)	92	30.2	141.76±12.66	
Mother's employment status				
Employed	179	58.7	142.20±11.98	t=4.053, p<0.001
Unemployed	126	41.3	135.65±15.11	
Father's education level				
Basic education (primary and high school)	214	70.2	139.40±13.82	t=-0.644, p=0.521
Higher education (bachelor's and postgraduate)	91	29.8	140.9±14.19	
Father's employment status				
Employed	265	86.9	140.28±13.23	t=1.738, p=0.102
Unemployed	16	5.2	131.00±21.11	
Family type				
Nuclear	256	83.9	139.81±13.62	t=0.896, p=0.374
Extended	49	16.1	137.83±14.27	

Table 2. Relationship between SATSE scores according to parents' previous sexual education and communication experiences with their children (n=305).

Variables	n	%	SATSE	t or F, p
			X̄±SD	
Previous sexual education experience				
Yes	136	44.6	140.10±13.44	t=0.692, p=0.489
No	169	55.4	139.01±13.97	
Sexual education source*				
Family	50	23.9	138.63±12.56	F=1.325, p=0.133
School	39	18.7	138.12±12.32	
Course	9	4.3	139.91±12.13	
Tv/internet	47	22.5	140.97±11.07	
Healthcare professional	64	30.6	138.52±13.48	
Previous communication experience about sexuality with their children				
Yes	174	57.0	140.36±12.65	t=1.237, p=0.127
No	131	43.0	138.35±15.01	
Sexual communication topics*				
Gender and Body Differences	109	26.5	139.95±15.97	F=0.529, p=0.147
Pregnancy	25	6.1	137.57±13.96	
Reproduction	29	7.0	136.33±15.01	
Masturbation	20	4.9	137.39±11.05	
Sexual abuse	73	17.7	138.88±15.21	
Sexual Curiosity and Play	7	1.7	139.75±15.49	
Sexually transmitted diseases	14	3.4	139.40±15.61	
Personal hygiene	135	32.8	138.71±12.12	

*Multiple options selected.

A significant proportion of the mothers, 69.8%, had a basic education level, and 58.7% of them were employed. The mean age of fathers was 38.57 years (SD = 7.63 years), 70.2% had a basic education level, and 86.9% were employed. The mean number of children in the family was 1.95 (SD = 0.94), and 83.9% had a nuclear family type. A significant relationship was, with higher levels of education corresponding to higher scores (F=7.169, p=0.001). Furthermore, employed mothers exhibited higher SATSE total mean scores compared to their non-employed counterparts (142.20±11.98, 135.65±15.11; t=4.053, p<0.001). Subsequent analyses revealed no statistically significant disparities in SATSE total mean scores based on child gender, father's education level, found between the age groups of the children and SATSE (p<0.005) (Table 1). A statistically significant discrepancy was observed in the mean scores on the Attitudes Towards Sex Education (ATSE) scale, contingent on various participant characteristics (Table 1). A positive correlation was observed between maternal education level and SATSE total mean score employment status, or family type (p>0.05). However, a negative correlation was observed between the child's age and the SATSE total mean score (r=-0.142, p=0.013), as well as between the mother's age and the SATSE total mean score (r=-0.240, p<0.001). A similar correlation was found between the father's age and the SATSE total mean score (r=-0.271, p<0.001). Finally, a negative correlation was identified between the number of children in the family and the SATSE total mean score (r=-0.213, p<0.001) (Table 1).

A significant proportion of the parents, 55.4%, reported having no prior experience with sexual education. Among those with such experience, healthcare professionals (30.6%), family (23.9%), TV/internet (22.5%), and school (18.7%) served as the primary sources. Furthermore, 43.0% of parents acknowledged a lack of previous communication with their children regarding sexual topics. The thematic content of sexual communication with their children primarily encompassed personal hygiene (32.8%), gender and body differences (26.5%), and sexual abuse (17.7%) (Table 2).

A discrepancy in SATSE scores is observed, contingent on participants' prior encounters with sexual education and discourse on sexuality with their progeny, as gauged by the SCSP. A non-significant divergence in total SATSE scores is evident, contingent on parents' prior experiences with sexual education, the medium through which sexual education was imparted, prior communication experiences on sexuality with their children, and the subject matter of sexual communication (p > 0.05) (Table 2)

Table 3 elucidates the intercorrelations among variables. As illustrated, all subscales of the SCSP demonstrated a significant association with all subscales of the SATSE.

Table 4 presents the outcomes of logistic regression analyses investigating parental characteristics associated with attitudes toward sexual education. The model was affected by the mother's education level (β=-0.355, SE=0.420, OR=1.426; p=0.005), the mother's employment status (β=-0.803, SE=0.268, OR=0.448; p=0.003) and the number of children in the family (β=-0.243, SE=0.847, OR=0.548; p<0.001). Notably, variables such as child's age, mother's age, father's age did not demonstrate a significant impact on parents' attitudes toward their children's sexual education (p>0.05).

Table 3. Correlations between SCSP and SATSE total and sub-scales scores (n=305).

	1	2	3	4	5	6	7	8	9	10
SCSP										
Total (1)	1									
Content (2)	0.834**	1								
Body language (3)	0.811**	0.627**	1							
Process management (4)	0.825**	0.643**	0.534**	1						
Anxiety (5)	0.627**	0.355**	0.336**	0.310**	1					
SATSE										
Total (6)	0.649**	0.535**	0.507**	0.481**	-0.502**	1				
Avoidance (7)	0.468**	0.320**	0.372**	0.305**	0.468**	0.837**	1			
Belief in necessity (8)	0.611**	0.565**	0.442**	0.491**	-0.407**	0.827**	0.500**	1		
Professional support and respect for differences (9)	0.509**	0.511**	0.364**	0.384**	-0.340**	0.693**	0.403**	0.625**	1	
Parental role (10)	0.501**	0.398**	0.439**	0.400**	-0.312**	0.753**	0.437**	0.605**	0.401**	1

SCSP: Sexual Communication Scale for Parents, SATSE: Scale of Attitudes Towards Sex Education

Table 4. Logistic regression model identifying parental characteristic predictors for SATSE (n=305).

Effect	β	SE	p	OR	95% CI	
					LL	UL
Child's age	-0.012	0.032	0.715	1.012	0.951	1.076
Mother's age	-0.041	0.058	0.482	0.960	0.857	1.076
Father's age	-0.023	0.054	0.676	0.978	0.880	1.087
Mother's education level	-0.355	0.420	**0.005**	1.426	0.626	3.246
Mother's employment status	0.803	0.268	**0.003**	0.448	0.265	0.758
Number of children in the family	-0.243	0.847	**<0.001**	0.548	-5,206	-1,886
Categorical variable= Adequate attitude towards education -2LL=159.15; Nagelkerke R^2=0.39; X^2=8.616**; dl=8** p<0.01						

Table 5 presents the results of the logistic regression analysis for predictors of sexual communication related to parents' attitudes toward sexual education. The findings from this model suggest that two factors emerged as significant predictors of parents' attitudes toward sexual education: "content" (β=0.348, SE=0.120, OR=1.416; p=0.043) and "process management" (β=0.147, SE=0.0608, OR=1.159; p=0.014). Conversely, "anxiety" (β=−0.277, SE=0.060, OR=1.319; p=0.000) was negatively associated with parents' attitudes towards sexual education. The impact of parents' prior experience with sexual education and their communication experience with their children regarding sexuality on their children's sexual education was not significant (p>0.05).

Table 5. Logistic regression model with the best fit of sexual communication predictors for SATSE (n=305).

Effect	β	SE	p	OR	95% CI	
					LL	UL
Previous Sexual Education Experience	-0.237	0.302	0.432	0.789	0.436	1.425
Previous Communication Experience about Sexuality with Their Children	0.464	0.310	0.134	1.590	0.867	2.918
Content	0.348	0.120	**0.004**	1.416	1.118	1.792
Body Language	0.125	0.065	0.055	1.133	0.997	1.288
Process Management	0.147	0.060	**0.014**	1.159	1.030	1.304
Anxiety	-0.277	0.060	**0.000**	1.319	1.172	1.484
Categorical variable= Adequate attitude towards education -2LL=136.07; Nagelkerke R^2=0.42; X^2=5.910**; dl=8** p<0.01						

DISCUSSION

Despite the existence of studies that have examined the relationship between parents' attitudes toward their children's sexual education and their sexual communication, there is a paucity of studies that have analyzed the dynamics between these variables in depth (Apaydin Cirik et al. 2023; Aral and Deleş 2024; Çevik Güner and Aktaş 2022; Kandemir et al. 2023). While regression analysis was not identified in the extant literature, this study addresses an important gap by statistically revealing the relationship between the variables. In this respect, the study addresses the factors affecting sexual communication between parents and children from a more comprehensive perspective.

Although child age was found to be negatively correlated with CEYTO in the study, no significant relationship was found in the regression analysis. While Kuborn, Markham, and Astle (2023) suggested the provision of sexual education to children from a young age, there are studies in the literature indicating a positive correlation between parents' sexual communication with their children and the child's age (Astle et al. 2022). A significant number of parents express reservations about initiating discussions on sexual topics with children under the age of 12, citing concerns that such conversations might potentially disrupt their children's sense of innocence, cause confusion, and result in a lack of clarity regarding how to address their children's sexual curiosity (Kamutambayi et al. 2023). Research from various countries worldwide indicates that attitudes toward sexual education are influenced by parental socio-demographic, geographic, and cultural differences (Adetokunbo S et al. 2022; Apaydin Cirik et al. 2023).

A substantial proportion of the parents in the study reported a lack of prior experience in initiating dialogues with their children concerning sexual matters. This observation is consistent with the extant literature, which suggests that most parents do not engage in discourse with their children on sexual subjects (Astle et al. 2022; Evans et al. 2020). Muslim mothers expressed a lack of perceived

necessity for initiating a conversation about sexuality and indicated their willingness to engage in dialogue when their children indicated a desire to do so (Camellia, Rommes, and Jansen 2021). In a separate study, researchers found that approximately 61% of children did not discuss sexual topics with their parents (Klu et al. 2024). While parents play a pivotal role in their children's sexual health education by imparting information and education to safeguard them from various adverse experiences, the quality and scope of sexual health education provided by parents is often found to be deficient (Schaafsma 2023).The mutual inability of parents and children to communicate about sexuality may be attributed to social and cultural norms or parents' perceived inadequacy in this domain. When parents do not feel prepared to discuss sexual matters with their children, children learn this attitude within the family through social learning, and this situation is transmitted across generations (Klu et al. 2024).

The present study examined the nature of communication between parents and their children regarding sexual topics. The analysis revealed that the predominant subjects of discussion were personal hygiene (32.8%), gender and body differences (26.5%), and sexual abuse (17.7%). Consistent with these findings, extant literature suggests that parents more frequently discuss body parts, body differences, and gender topics with their children but engage in minimal communication about sensitive and important subjects such as sex, masturbation, and orgasm (Astle et al. 2022; Evans et al. 2020). The limited communication on sensitive topics by parents may be attributed to their perception of inadequacy, a lack of sufficient knowledge on how to communicate, or a lack of awareness regarding the importance of sexual education delivered through sexual communication (Schaafsma 2023).

During sexual communication, numerous factors have been identified as influential, including the parent's gender, the sensitivity of the discussed topics, the verbal and non-verbal communication styles of parents, tone of voice, and body language (Flores and Barroso 2017). The present study examined the relationship between the sub-dimensions of the Sexual Communication Scale for Parents (SCSP) and the sub-dimensions of the Scale of Attitudes Towards Sex Education (SATSE). The SCSP sub-dimensions include content, body language, process management, and anxiety, while the SATSE sub-dimensions encompass avoidance, belief in necessity, professional support, and respect for awareness. The findings of this study indicate that the content of parental sexual communication and the efficacy in managing the communication process exert a positive influence on parents' attitudes toward sexual education. Conversely, anxiety related to sexual education has a detrimental effect on parents' attitudes toward sexual education. The avoidance behavior observed in the sub-dimensions of the SATSE is predominantly characterized by a deficiency in sexual communication knowledge and skills, leading to parents' reluctance to engage in discussions about sexual topics with their children and a concomitant sense of apprehension.

Conversely, parents who can communicate with their children about sexuality exhibit a propensity to share and discuss their knowledge and experiences regarding sexuality with minimal hesitation (Apaydin Cirik et al. 2023). However, parents may also exhibit behaviors that suggest avoidance due to concerns about providing clear messages during these discussions and the potential encouragement of their children's engagement in sexual activity (Flores and Barroso 2017). Concurrent with these findings, a communication style that explicitly articulates expectations and effectively manages the process has been shown to positively influence parent-child relationships by providing clearly stated expectations related to sexuality (Kuborn et al. 2023). In a separate study, an authoritarian communication style was associated with non-acceptance of differences and the cessation of communication on sexual education in non-professional contexts (Heller & Johnson, 2010). The emphasis on the importance of parents' belief in the necessity of their children's sexual education, support for their children, respect for differences, and effective communication is underscored (Astle et al. 2022).

The social status of parents in society, as determined by factors such as education and employment status has been shown to be closely related to children's sexual education (Astle et al., 2022c; Opara et al., 2010). This study observed that mothers with a higher education and working mothers had higher average scores on the SATSE. These findings are consistent with previous research (Uğurlu and Karahan 2022). Additionally, the analysis revealed that there were no statistically significant differences in SATSE total scores based on child gender, paternal education level, paternal employment status, or family type. In societies where mothers are considered the primary caregivers, an increase in mothers' income and education level has been shown to be associated with an increase in their awareness of opportunities for their children's development (Flores and Barroso 2017). This increased awareness has been shown to be associated with higher levels of communication and education about sexuality with their children. A global perspective reveals that mothers engage more frequently in sexual communication with both daughters and sons compared to fathers, demonstrating increased comfort in discussing sexual topics (Astle et al. 2022; Schaafsma 2023). Notably, the study found that a child's gender does not influence parents' attitudes towards sexual education. Pariera's (2016)

research also found no relationship between the child's gender and sexual education. In this context, sexual education is considered not to be gender-based.

Study Limitations and Strengths

This study did not examine the tone of voice parents used during sexual communication with their children. Future research may explore this aspect. The restriction of the research to a single institution introduces limitations to the data. This limitation should be acknowledged, as it may impact on the generalizability of the research findings.

CONCLUSION

The present study examined the impact of parental sexual communication and the efficacy of communication process management on attitudes toward sexual education. The study found that positive attitudes toward sexual education were influenced by the content of parental sexual communication. Conversely, anxiety related to sexual education had a negative impact on attitudes toward sexual education. These results shed light on both researchers' design of parent-child sexual education programs and the care services provided by health professionals to families. The findings of this study indicate that the implementation of programs aimed at addressing the obstacles faced by parents in communicating with their children about sexuality is a potential solution. These programs should include preparation and empowerment for communication. Furthermore, the integration of web-based training and animations that support sexual communication and education for parents and children can enhance the understanding of the importance of the topic.

Acknowledgements

None.

Conflict of Interest

The authors declare no competing interests.

Author Contributions

Plan, design: AK, ECE; **Material, methods, and data collection:** AK, ECE, MG, SU; **Data analysis and comments:** AK; **Writing and corrections:** ECE, AK, MG, SU.

Funding

The author(s) have not received the following financial support for the research.

Ethical Approval

Institution: Bartin University Rectorate Social and Human Sciences Ethics Committee
Date: 14.09.2021
Approval no: 2021-SBB-0310

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ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1660564

Understanding Attitudes Towards Dating Violence Among Adolescents: A High School Perspective

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Geliş Tarihi / Received: *18.03.2025,* ***Kabul Tarihi / Accepted:*** *09.07.2025*

ABSTRACT
Objective: Violence is a long-standing public health issue that negatively impacts physical, psychological, and social development. Adolescents are particularly vulnerable to violence due to their inexperience and psychosocial immaturity. This study aimed to examine high school students' attitudes toward dating violence and their exposure to it. **Materials and Methods:** The sample included 118 female and 50 male students in the 10th, 11th, and 12th grades. Data were collected using a demographic form and the Dating Violence Attitude Scale and analyzed with Mann-Whitney U, Kruskal-Wallis, and Chi-Square tests in SPSS. **Results:** Findings revealed that over 50% of students did not view accountability, jealousy, or men paying the bill as violence. Additionally, 14% of students reported experiencing domestic violence, and 8% reported violence in intimate relationships, though none sought support. Gender differences were found in attitudes toward violence, with female students scoring higher on the violence attitude scale ($p<0.05$). Differences were also observed across high school types, with Science High School students showing less support for violence ($p<0.05$). However, no correlation was found between academic achievement, exposure to family violence, current experiences of violence, and attitudes toward dating violence. **Conclusion:** This study highlights gender and school-type differences in attitudes toward dating violence among high school students, emphasizing boys' permissive attitudes and science high schools' less supportive stances. Findings suggest that tailored interventions promoting healthy relationships across diverse educational environments are essential.
Keywords: Violence, Dating Violence, Adolescents, High School.

Ergenlerin Flört Şiddetine Yönelik Tutumlarının Anlaşılması: Bir Lise Perspektifi

ÖZ
Amaç: Şiddet, fiziksel, psikolojik ve sosyal gelişimi olumsuz etkileyen, uzun süredir devam eden bir halk sağlığı sorunudur. Ergenler, deneyimsizlikleri ve psiko-sosyal olgunlaşmamışlıkları nedeniyle şiddete karşı özellikle savunmasızdır. Bu çalışma, lise öğrencilerinin flört şiddetine yönelik tutumlarını ve bu şiddete maruz kalma durumlarını incelemeyi amaçlamaktadır. **Gereç ve Yöntem:** Örneklem, 10., 11. ve 12. sınıflarda okuyan 118 kız ve 50 erkek öğrenciden oluşmuştur. Veriler, demografik form ve Flört Şiddeti Tutum Ölçeği kullanılarak toplanmış ve SPSS programında Mann-Whitney U, Kruskal-Wallis ve Ki-Kare testleri ile analiz edilmiştir. **Bulgular:** Bulgular, öğrencilerin %50'den fazlasının hesap sorulmasını, kıskançlığı veya hesabı erkeğin ödemesini şiddet olarak görmediğini ortaya koymuştur. Ayrıca, öğrencilerin %14'ü aile içi şiddete, %8'i ise yakın ilişkilerinde şiddete maruz kaldığını bildirmiş, ancak hiçbiri destek aramamıştır. Şiddete yönelik tutumlarda cinsiyet farklılıkları bulunmuş, kız öğrenciler Flört Şiddeti Tutum Ölçeği'nde daha yüksek puan almıştır ($p<0.05$). Lise türleri arasında da farklılık gözlemlenmiş, Fen Lisesi öğrencilerinin şiddeti daha az desteklediği belirlenmiştir ($p<0.05$). Bununla birlikte, akademik başarı, aile içi şiddete maruz kalma, mevcut şiddet deneyimleri ile flört şiddetine yönelik tutumlar arasında herhangi bir ilişki bulunamamıştır. **Sonuç:** Bu çalışma, lise öğrencileri arasında flört şiddetine yönelik tutumlarda cinsiyet ve okul türüne bağlı farklılıkları vurgulamakta, erkek öğrencilerin şiddete karşı daha müsamahakar tutum sergilediğini ve Fen Liselerinin şiddeti daha az desteklediğini ortaya koymaktadır. Bulgular, farklı eğitim ortamlarında sağlıklı ilişkileri teşvik eden, ihtiyaca yönelik müdahalelerin gerekliliğine işaret etmektedir.
Anahtar Kelimeler: Şiddet, Flört Şiddeti, Ergenler, Lise.

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Bu makaleye atıf yapmak için / Cite this article: Kutahyalioglu, N., & Yargici, I. (2025). Understanding attitudes towards dating violence among adolescents: a high school perspective. *BAUN Health Sci J, 14*(2), 505-513. https://doi.org/10.53424/balikesirsbd.1660564

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

Violence is a long-standing public health issue, causing countless deaths and significantly impacting psychological and social development (Rutherford et al., 2007). The World Health Organization (WHO) defines violence as "the intentional use of physical force or power, threatened or actual, against oneself, another person, or a group, resulting in or likely to result in injury, death, psychological harm, maldevelopment, or deprivation" (WHO, 2002). In this context, violence encompasses not only physical harm but also emotional and psychological damage, often involving neglect and omission.

Intimate partner violence (IPV) affects one-third of women and 3–20% of men globally, yet it remains significantly underreported (Gabster et al., 2022). Dating violence, a form of IPV, involves abuse between individuals in romantic relationships and can include verbal, emotional, digital, physical, sexual, or economical violence (Turk et al., 2020; Özdere & Kürtül, 2018). Emotional abuse, often harder to recognize, inflicts psychological harm comparable to physical violence (Aslan et al., 2008; Fidan and Yeşil, 2018).

Besides, intimate partner violence is a significant global public health issue affecting individuals across all age groups. Adolescents, however, are particularly vulnerable to dating violence due to their ongoing psychosocial development, inexperience, and increased susceptibility to harmful influences (Heinze et al., 2021). Globally, 30% of women with partners report lifetime exposure to IPV, with similar rates observed among adolescents (WHO, 2013; 2015). Studies indicate that 1–66.5% of youth experience dating violence worldwide, with prevalence rates in Turkey ranging from 11–45.8% (Wincentak et al., 2017).

The high school years represent a critical period within adolescence, marked by the formation of romantic relationships and increasing independence, which can elevate the risk of experiencing or perpetrating dating violence. The rise of dating violence among high school students is alarming, mirroring trends observed in the United States, Latin America, and the Caribbean (CDC, 2024; Gabster et al., 2022). In the U.S., one in twelve high school students experiences physical or sexual dating violence (Basile et al., 2020), while in Latin America, rates reach 24.1% for boys and 21.0% for girls (Gabster et al., 2022). In Turkey, adolescent exposure to dating violence ranges between 15–50% (Türk et al., 2020; Toplu-Demirtaş & Aracı-İyiaydın, 2021; Kumcağız et al., 2022).

The consequences of dating violence are severe, including mental health issues, suicidal tendencies, and increased risk of homicide (Baiden et al., 2021; Heinze et al., 2021; Taquette & Monteiro, 2019). Victims are prone to developing eating disorders, substance abuse, post-traumatic stress disorder, depression, anxiety, and suicidal thoughts (Baiden et al., 2021; Luft et al., 2022; Avşar et al., 2017). Risk factors include witnessing parental violence, accepting gender-based stereotypes, and prior abuse or neglect (Foshee et al., 2013; Türk et al., 2020).

Notably, adolescents may fail to recognize dating violence due to inexperience or emotional attachment to their partners, making them less likely to seek help (Aslan et al., 2008). Awareness and education are crucial in addressing this issue. For example, some U.S. states provide dating violence prevention training as part of school curricula, covering healthy relationships and recognizing abuse (Arizona State Legislature, 2014).

While dating violence has been widely studied, there is a noticeable gap in literature regarding its prevalence among high school students. Therefore, the primary aim of this study is to raise awareness among adolescents, addressing the issue of dating violence early in their development. Increasing awareness among young people, whether they experience or perpetrate such violence knowingly or unknowingly, may help reduce both its occurrence and impact. This study seeks to assess high school students' experiences as both perpetrators and victims of dating violence.

MATERIALS AND METHODS

Study type

This quantitative study was prepared as a cross-sectional and descriptive design to examine the relationship between dating violence and high school students' demographic data.

Study group

The population of the study consisted of 10th, 11th, and 12th-grade students who were studying in high school in Turkey during the 2022-2023 academic year and who were in a close relationship. Ninth-grade students were not included in the study because they are in the initial phase of high school and are generally still in the process of adjusting to the new academic and social environment. At this stage, many have limited experience with romantic relationships, which may affect the relevance and accuracy of their responses regarding dating violence. G-power analysis was used to calculate a minimum required sample size based on the following parameters: anticipated effect size (Cohen's *d*): (0.5), statistical power of 0.8, probability level of 0.05. A minimum sample size of 102 volunteer high school students was determined (Soper, 2022). The study was conducted using an online survey distributed through snowball sampling and participants were recruited through peer sharing and social networks. Rather than being limited to a specific province, this approach allowed us to reach high school students from various regions.

Procedures

The demographic questionnaire consisted of two sections and was developed in line with the existing literature. The first section focused on participants' socio-demographic characteristics, while the second aimed to assess their knowledge of dating violence. To better understand students' perspectives, the second

section was guided by a questionnaire from Hacettepe University Women's Research and Application Center, comprising 28 questions related to participants' dating experiences and their history of perpetrating or being exposed to violence in these relationships.

The original *Dating Violence Attitude Scale (DVAS)* was developed by Terzioğlu et al. (2016), with its validity and reliability established. The scale consists of 23 items measured on a 5-point Likert scale, designed to assess individuals' attitudes toward dating violence. Each item is scored between 1 and 5, with higher average scores indicating less tolerance for dating violence and more supportive attitudes toward healthy relationships.

Statistical analysis

After being transferred to digital format, the data collected through the scales used in this study were prepared for analysis. Statistical analyses were conducted using the Statistical Package for the Social Sciences (SPSS) (IBM, Version 25). Following data cleaning, missing data and outliers were examined, and descriptive statistics were applied to summarize the sample characteristics. Descriptive findings were presented through minimum/maximum values, mean, standard deviation, median, and quartiles. The data were assessed for normality, linearity, and homogeneity assumptions. A 5% margin of error and a 95% confidence interval were adopted, with the significance level set at $p = 0.05$. To explore the relationships between independent variables and dating violence, nonparametric tests Mann Whitney U, Kruskal-Wallis and Chi Square were performed.

Ethical approval

Ethical approval for this study was obtained from the Kastamonu University Clinical Research Ethics Committee (Approval No: 2023-KAEK-20). Data were collected online through a survey platform, which took approximately 15 minutes to complete and could only be accessed once per IP address. Participation was voluntary, and students' information remained confidential throughout the data collection process, with informed consent obtained beforehand. As an incentive, participants had the opportunity to enter a raffle for a 200 TL bookstore gift card upon completing the survey.

RESULTS

The socio-demographic characteristics of the 168 high school students and their families are presented in Tables 1 and 2. In line with the data in Table 1, we can say that the majority of the sample consisted of girls (n=118, 70.2%), and mainly participants were studying at Anatolian High School (n=126, 75%) and 11th grade (n=67, 39.9%). While the average age of the students was 17, more than half (54.1%) evaluated their academic achievement as high (79-100).

Table 1. Distribution of socio-demographic characteristics of students (n=168).

Variables	**Median (IQR)**	
Age	17 (17)	
	n	**%**
High School		
Science School	23	13.7
Anatolian School	126	75
Religious School	19	11.3
Grade		
10th grade	40	23.8
11th grade	67	39.9
12th grade	61	36.3
Gender		
Female	118	70.2
Male	50	29.8
Academic Achievement (GPA)		
Low (range 30-53)	5	3
Medium (range 53-79)	72	42.9
High (range 79-100)	91	54.1

When we look at the socio-demographic characteristics of the participants' families in Table 2, we see that most of them live in nuclear families (n=150, 89.3%), in the city (n=132, 78.6%), parents are alive and live together (n=157, 93.5%). In addition, the educational level of most of the students' mothers was in primary school (n=85, 50.6%), and the job situation is described as that of a housewife (n=117, 69.6%). The educational level of their fathers was at primary school (n=81, 48.2%), and their job

situation is described as a officer (n=103, 61,3%). The total monthly income of 45.2% (n=76) was 15,000, which means the lower middle class.

Table 3 shows the gender distribution of the participant students and their smoking/alcohol consumption and exposure to violence. Accordingly, 17% of girls smoke cigarettes, and 7% consume alcohol, while 24% of boys smoke cigarettes and 16% consume alcohol. In addition, 14% of the girls stated that they were exposed to domestic violence, while this rate was 16% for boys. None of the participants indicated that they use drugs.

Table 2. Distribution of socio-demographic characteristics of the families of students (n=168).

Variables	n	%
Family Type		
Nuclear family	150	89.3
Extended family	18	10.7
Parental Status		
At least one of the parents is not alive	1	0.6
Parents are alive and divorced	10	6
Parents are alive and together	157	93.5
Place of Residence		
Village	12	7.1
District	24	14.3
City	132	78.6
Monthly Family Income		
Under 8000 TL	27	16.1
8000 TL-15000 TL	65	38.7
15000TL and above	76	45.2
Mother's Education Level		
No literacy	3	1.8
Primary education	85	50.6
High School	56	33.3
University	22	13.1
Master's Degree/PhD	2	1.2
Father's Education Level		
No literacy	1	0.6
Primary education	81	48.2
High School	50	29.8
University	32	19
Master's Degree/PhD	4	2.4
Mother's Employment Status		
Housewife	117	69.6
Officer	43	25.6
Worker	3	1.8
Retired	5	3
Father's Employment Status		
Unemployed	6	3.6
Officer	103	61.3
Worker	38	22.6
Retired	21	12.5

Table 4 demonstrates the distribution of some of the students' views on dating relationship status and violence. More than half of girls and boys stated that they have an active dating relationship. While 82% of the girls reported that this relationship lasted less than one year, and 9% of them reported being subjected to violence by their partner in this relationship; 88% of the boys have been in a relationship for 1-3 years, and

4% of them think that they have been subjected to violence by their partner in this relationship. For more than 50% of girls, all of the data except jealousy and having the man pay the bill were considered as violence. On the other hand, for more than 50% of boys, only extreme indifference and sexual coercion were considered as violence. However, most male and female students (more than 50%) considered all the data except jealousy and expecting too much attention as behaviors that could harm the dating relationship.

Table 3. Gender distribution of students' exposure to violence, smoking and alcohol use.

Variables	Female (n=118)		Male (n=50)	
	n	%	n	%
Smoking				
Yes	20	17	12	24
No	98	83	38	76
Alcohol use				
Yes	8	7	8	16
No	110	93	42	84
Drug use				
No	118	100	50	100
Domestic Violence				
Yes	16	14	8	16
No	102	86	42	84

Table 4. Distribution of students' dating relationship and their views on violence.

Variables	Female (n=118)		Male (n=50)	
	n	%	n	%
Current Dating Relationship Status				
Yes	52	44	17	34
No	66	56	33	66
Duration of Last Dating Relationship				
Less than 1 year	97	82	6	12
1-3 years	21	18	44	88
Exposure to Violence				
Yes	11	9	2	4
No	107	91	48	96
Behaviors perceived as dating violence				
Interference in social life	70	59	24	48
Accountability, questioning	68	58	16	32
Jealousy	46	39	22	44
Sexual coercion	81	69	37	74
Extreme apathy	67	57	28	56
Man pays the bill	29	25	20	40
Behaviors that can harm a dating relationship				
Insecurity	99	84	42	84
Deception	105	89	47	94
Blasphemy-insult	95	81	45	90
Disrespect	93	79	39	78
Lack of understanding	85	72	32	64
Miscommunication	84	71	28	56
Restriction	77	65	27	54
Jealousy	50	42	22	44
Expecting too much attention	39	33	20	40

The distribution of the median scores of the students on the Dating Violence Attitude Scale (DVAS) according to gender is demonstrated in Table 5. Accordingly, statistically significant differences between genders were found in the subscales of economic (p = 0.002) and sexual (p = 0.003) violence and the overall total of dating violence (p = 0.005). Scale mean scores approaching five indicate that students' attitudes toward dating violence do not support dating violence. In this context, girls do not support dating violence at a higher rate than boys in economic violence (Median = 4.20), sexual violence (Median = 4.57), and total violence (Median = 4.43). Finally, the distribution of the median scores of the students according to some socio-demographic characteristics is shown in Table 6. The total attitude towards violence shows a statistically significant difference only in terms of gender (p = 0.005; female M=4.43; male M=4.23) and school type (p = 0.014; Science high school M=4.43, Anatolian high school M=4.32; Religious high school M=3.75). In this case, it can be said that the current attitudes of science high school students and female students do not support violence. There was no significant relationship between academic achievement, being exposed to violence in the family, and thinking that they are currently exposed to violence and students' attitudes towards dating violence.

Table 5. Distribution of students' Dating Violence Attitude Scale scores by gender.

	Female		Male			
	Median	**Min-Max**	**Median**	**Min-Max**	**z**	***p***
General Violence	4.80	3-5	4.60	2-5	-0.93	0.35
Physical Violence	4.40	2-5	4.20	1-5	-1.68	0.92
Emotional Violence	4.33	2-5	4.17	1-5	-0.47	0.64
Economic Violence	4.20	2-5	3.80	2-5	-3.07	0.002*
Sexual Violence	4.57	2-5	4.29	3-5	-3.03	0.003*
Total Violence	4.43	2-5	4.23	2-5	-2.78	0.005*

*p<0.05, Mann Whitney U test

Table 6. Distribution of students' DVAS scores by some socio-demographic characteristics.

Variables	**Median**	**Min-Max**	**z/χ2**	***p***
Gender				
Female	4.43	2-5	-2.78	0.005*
Male	4.23	2-5		
High School				
Science School	4.43	4-5	4.35	0.014*
Anatolian School	4.32	2-5		
Religious School	3.75	3-5		
Exposure of Dating Violence				
Yes	4.69	4-5	-1.69	0.09
No	4.36	2-5		
Domestic Violence				
Yes	4.39	2-5	-0.52	0.60
No	4.36	2-5		
Academic Achievement (GPA)				
Low (range 30-53)	4.11	2-4	3.71	0.15
Medium (range 53-79)	4.36	2-5		
High (range 79-100)	4.38	4-5		

*p<0.05, Mann Whitney U test, Chi Square test

DISCUSSION

In the current study, we sought to explore high school students' knowledge and exposure to dating violence. A total of 168 students participated in the study, providing valuable data on their experiences and attitudes toward dating violence. The findings can be interpreted through two main conceptual lenses; (1) gender socialization theory and (2) the ecological systems model, which offer insight into how individual, interpersonal, and contextual factors shape adolescents' views on dating violence. Consistent with gender socialization theory, which suggests that societal norms and expectations shape behaviors and attitudes differently for males and females (Carter, 2014), the current study's results revealed that male students held more permissive attitudes toward dating violence. This aligns with previous studies conducted in Turkey (Set, 2020;

Selçuk et al., 2018; Terzioğlu et al., 2016) and globally (Collibee et al., 2022; Spencer et al., 2021; Taquette & Monteiro, 2019), which also observed that boys tend to tolerate or normalize violence in romantic relationships more than girls. Interestingly, however, some studies (Gabster et al., 2022; Taylor et al., 2021) reported higher rates of dating violence victimization among boys, highlighting the complex interplay of gender norms, victimization, and masculinity constructs. This study findings suggesting that underlying cultural or social factors may contribute to more permissive attitudes toward dating violence among boys. These findings underscore the need to challenge harmful gender norms and promote gender-equitable relationship models during adolescence as it can significantly influence young people's understanding of healthy relationships.

The role of school environment was also examined. Although limited, existing literature suggests that academic context may influence students' attitudes toward violence. In line with social norms theory, which posits that behavior is shaped by perceptions of what is considered acceptable within a group (Berkowitz, 2004), students from science high schools in our study demonstrated less supportive attitudes toward dating violence. Similar findings were reported by Çelik and Demirli (2021) and Lesinskienė et al. (2023), who found that students in academically demanding environments tend to reject aggressive behaviors. This similarity suggests that students in academically rigorous environments may possess a heightened awareness of the implications of violence or perhaps benefit from a school culture that discourages aggressive behavior. These insights point to the value of considering school climate and peer influence when designing interventions. Further research should provide more insight into how academic environments and school culture shape students' attitudes toward dating violence.

Contrary to previous research, this study did not find statistically significant associations between students' attitudes and demographic or lifestyle variables such as academic performance, parental education, substance use, or exposure to domestic violence. Studies from Turkey and other countries (Çakır Koçak & Öztürk Can, 2019; Türk et al., 2020; Gabster et al., 2022; Luft et al., 2022; Collibee et al., 2022; Taylor et al., 2021) have consistently shown that such factors contribute to shaping adolescents' attitudes toward dating violence. From the perspective of the ecological systems theory (Bronfenbrenner, 1979), which emphasizes the interaction between individual behavior and multiple environmental systems (family, peers, school, society), these findings suggest that other unmeasured variables—perhaps within the mesosystem (e.g., peer relationships) or macrosystem (e.g., cultural values)—may be influencing attitudes in this sample. The lack of significance may also reflect the characteristics of the online, self-selected sample or other unmeasured factors may substantially impact these attitudes. These discrepancies between this study's results and those of other studies (Çakır Koçak & Öztürk Can, 2019; Türk et al., 2020; Gabster et al., 2022; Luft et al., 2022; Collibee et al., 2022; Taylor et al., 2021) highlight the importance of context-sensitive approaches when examining adolescent dating violence. Cultural, regional, and institutional differences likely influenced the findings, emphasizing the need for future research with larger, more diverse samples across different provinces and school types in Turkey.

Study Limitations and Strengths

The current study has several limitations that should be considered. First, the use of a convenience sampling method limits the generalizability of the findings. While the sample was drawn from different types of high schools, it may not accurately reflect the attitudes and experiences of adolescents from different regions or cultural settings. Additionally, the reliance on self-reported data introduces the potential for response bias, as participants may have underreported or overreported their experiences with dating violence or their attitudes toward it, leading to inaccuracies. The cross-sectional design of the study also means that it provides only a snapshot of students' attitudes and experiences at one point in time, limiting the ability to draw conclusions about causal relationships or changes in attitudes over time. The study's scope was also limited, as it focused primarily on high school students' exposure to dating violence without considering broader societal and familial factors that may influence its prevalence. Despite these limitations, the study has several strengths. It includes a diverse sample of students from different types of high schools, offering valuable insights into how academic and institutional environments may influence attitudes toward dating violence. Additionally, the study contributes to public health by addressing the prevalence and impact of dating violence among adolescents, providing a foundation for the development of targeted interventions. Finally, it adds to the growing body of literature on adolescent dating violence, especially within high school settings, offering valuable data for future research and intervention programs.

CONCLUSION

There is a notable lack of data on adolescents' dating experiences, particularly regarding common dating behaviors associated with violent or non-violent tendencies. Overall, this research contributes to the growing body of literature on adolescent dating violence by underscoring the need for targeted interventions that address gender norms and school environment in shaping attitudes. This study's findings support the need for targeted, evidence-based prevention educational programs tailored to high school students, particularly those that address

gender-based beliefs and cultivate healthy relationship models. Additionally, this study suggests that programs may need to be customized to fit various school environments' cultural and social dynamics. Incorporating theoretical frameworks into intervention design—such as gender socialization theory and ecological systems theory—may enhance the effectiveness and cultural relevance of such efforts. By addressing these factors, educators and policymakers can work toward reducing dating violence and can help foster safer, more equitable environments for all adolescents.

Despite societal criticism of adolescent dating, it remains a prevalent practice among high school students. However, this age group - still undergoing physical, emotional, and psychological development - is particularly vulnerable to dating violence, often without recognizing it or seeking support when exposed. Dating violence among high school students is a significant reality that demands attention. Ignoring or overlooking this issue only exacerbates students' struggles while leaving them without appropriate interventions. Therefore, raising awareness among students, parents, and school staff is crucial. Information on dating violence should be continuously updated in line with current literature, and proactive measures should be implemented to prevent its occurrence.

Acknowledgement

We sincerely thank TÜBİTAK for their financial support, which made this study possible. We also extend our heartfelt gratitude to the adolescents who participated in this research.

Conflict of Interest

The author declares no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Author Contributions

Plan, design: NK, IY; **Material, methods, and data collection:** NK, IY; **Data analysis and comments:** NK, IY**; Writing and corrections:** NK**.**

Funding

This research was supported by TUBITAK 2209/A, 2022, First Period.

Ethical Approval

Institution: Kastamonu University Ethics Committee
Date: 02.02.2023
Approval no: (2023-KAEK-20).

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ORİJİNAL MAKALE / ORIGINAL ARTICLE
Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1657498

Evaluation of Femur Length in Rats Using Three Different Methods and the Reliability of the Anthropometric Measurement Method

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Geliş Tarihi / Received: *13.03.2025,* ***Kabul Tarihi / Accepted:*** *11.07.2025*

ABSTRACT

Objective: The skeletal system evaluated in rodent models plays a crucial role in various experimental studies, including bone development, fracture healing, biomechanical testing, osteoporosis, drug efficacy, and safety. This study aims to assess the applicability of the anthropometric method, which is widely used in humans, for measuring femur length in rats. Additionally, the reliability of the anthropometric method was compared with dissection and radiological methods. **Materials and Methods:** A total of 66 male Wistar Albino rats (14–16 weeks old) were used. The right femur length was measured using three different methods: anthropometric measurement, digital caliper measurement after dissection, and radiological measurement via Micro-CT. The obtained data were analyzed, and the agreement between methods was evaluated using the Bland-Altman test. **Results:** The mean femur length was measured as 37.57 mm anthropometrically, 33.55 mm using a digital caliper post-dissection, and 33.84 mm using Micro-CT. The intraclass correlation coefficient (ICC) values at a %90 confidence interval were as follows: 0.987 (0.979–0.992) between the dissection and radiological groups, 0.709 (0.564–0.812) between the anthropometric and dissection groups, and 0.713 (0.569–0.814) between the anthropometric and radiological groups. The anthropometric method showed a significant agreement with both dissection and radiological methods, with a difference of approximately 4 mm. **Conclusion:** The anthropometric method has been demonstrated to be a reliable, easy-to-use, non-invasive, cost-effective, and time-saving alternative for measuring femur length in rats. Since this method allows for repeated measurements on the same animal, it can reduce the number of animals used in studies, thereby promoting more ethical and efficient research in bone studies.

Keywords: Femur Length, Rat, Anthropometry, Dissection, Micro-CT.

Sıçanlarda Femur Uzunluğunun 3 Farklı Yöntem ile Değerlendirilmesi ve Antropometrik Ölçüm Yönteminin Güvenilirliği

ÖZ

Amaç: Kemirgen modellerinde değerlendirilen iskelet sistemi; kemik gelişimi, kırık iyileşmesi, biyomekanik testler, osteoporoz, ilaç etkinliği ve güvenliği gibi birçok deneyde önemli yer tutmaktadır. Bu çalışmada, sıçanlarda en çok değerlendirilen kemiklerden olan femur'un uzunluğunu ölçmek için insanlarda yaygın olarak kullanılan antropometrik yöntemin sıçanlardaki uygulanabilirliği, bunun yanında antropometrik yöntemin güvenilirliğinin diseksiyon ve radyolojik yöntemler ile karşılaştırılması amaçlanmıştır. **Gereç ve Yöntem:** 66 adet erkek Wistar Albino sıçan kullanılmıştır ve sağ femur uzunluğu antropometrik olarak, diseksiyon sonrası dijital kumpas ile ve Mikro-BT ile radyolojik olarak ölçülmüştür. Elde edilen veriler analiz edilmiş ve Bland-Altman testi ile yöntemler arasındaki uyum değerlendirilmiştir. **Bulgular:** Femur uzunluğu; antropometrik olarak 37.57 mm, diseksiyon sonrası dijital kumpas ile 33.55 mm, mikroCT ile 33.84 mm bulunmuştur. %90 güven aralığında ICC katsayıları; diseksiyon ve radyolojik grup arasında 0.987 (0.979-0.992), antropometrik ve diseksiyon grup arasında 0.709 (0.564-0.812), antropometrik ve radyolojik grup arasında 0.713 (0.569-0.814) şeklindedir. Antropometrik yöntem, diseksiyon sonrası ve radyolojik yöntemlerle arasında 4 mm'lik farkla önemli derecede uyumlu olarak bulunmuştur. **Sonuç:** Sonuç olarak sıçanlarda femur uzunluğunu ölçmek için antropometrik yöntem, güvenilir, kolay uygulanabilir, invaziv olmayan, maliyet ve zaman tasarrufu sağlayan alternatif bir yöntem olduğu ortaya koyulmuştur. Bu yöntem, kullanılan hayvan sayısını azaltıp tek bir hayvanın tekrar tekrar değerlendirilmesine olanak sağladığından kemik çalışmalarında daha etik ve daha verimli çalışmaların yapılmasına imkân sağlayabilir.

Anahtar kelimeler: Femur Uzunluğu, Sıçan, Antropometri, Diseksiyon, Mikro-BT.

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Bu makaleye atıf yapmak için / Cite this article: Acan, A. E., Aslantekin, B., Aldemir O. S., Özcan, E., Saraçlı, S., Bulmuş, Ö., Karakılıç, A., & Turan, G. (2025). Evaluation of femur length in rats using three different methods and the reliability of the anthropometric measurement method. *BAUN Health Sci J, 14*(2), 514-522. https://doi.org/10.53424/balikesirsbd.1657498

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

Bone is a complex tissue that adapts to both environmental influences and internal physiological factors of the body. Osteoclasts facilitate the resorption of old bone, followed by the formation of new bone by osteoblasts, ensuring continuous remodeling throughout life. Osteoclast and osteoblast activity occur sequentially, maintaining anatomical and structural integrity while supporting skeletal renewal (Gürgül et al., 2007, Cvetkovic et al., 2013). The skeletal system, with its composition and organization determined by the mechanical properties of bone, bone geometry, mineral density, and structure, is a mechanically optimized system that adapts to functional demands. Hydroxyapatite, which provides most of the strength and stiffness of the skeleton, also allows for the use of radiological techniques to assess bone mass and structure (Bagi et al., 2011).

Rodent models play a significant role in preclinical studies investigating fracture healing, biomechanical testing, and osteoporosis. These models provide valuable predictive insights into drug efficacy and safety in humans and enable the examination of the physiological process of bone healing. Due to their surgical feasibility and standardization, experiments on rat bones are of great importance (Prodinger et al., 2018, Cao et al., 2022, Prodinger, Bürklein, et al., 2018). Both the femur and tibia are suitable bones for experimental studies in rats. The femur, with its thick muscular structure, prevents the formation of non-standard fractures and allows for the use of appropriate implants. Additionally, it is frequently preferred because it enables comparisons across different studies (Prodinger et al., 2018, Prodinger, Bürklein, et al., 2018).

The femur has been extensively evaluated in various rat studies focusing on age- and sex-specific bone characteristics, bone histomorphometry, resistance testing, biomechanical testing (Cvetkovic et al., 2013, Prodinger et al., 2018, Castillo et al., 2022, Silveira et al., 2020), hip implants (Paish et al., 2020), diabetes and vitamin K2 (Mahmoud et al., 2023), trabecular and cortical bone microarchitecture (Williams et al., 2019), bone mineral density (Silveira et al., 2020), osteoporosis (Pandit et al., 2020, Sato et al., 2018), different drug effects (Matuszewska et al., 2021), and the impact of swimming on bone (Freitas et al., 2025). Morphometric measurement methods have included digital calipers or radiological techniques such as dual-energy X-ray absorptiometry, bidirectional radiographic imaging, and micro-computed tomography (Micro-CT). These methods generally require the sacrifice of the animal, followed by careful dissection of the femur and removal of surrounding muscle tissue. In experiments requiring periodic observation, such as the evaluation of skeletal growth at 6, 9, and 12 weeks, a large number of rats may be needed (Sato et al., 2018, Y. Sato et al., 2024).

Anthropometry refers to the systematic direct measurement of physical characteristics such as body weight and height in humans. It is a simple, portable, non-invasive, and cost-effective measurement method widely used in clinical practice due to its numerous benefits. A review of the literature reveals no studies in which the femur of rats has been assessed anthropometrically (Rumbo-Rodríguez et al., 2021, Padilla et al., 2021). Implementing anthropometric measurements in rats could offer several advantages, including reducing the number of animals required and enabling continuous assessment of a single animal in longitudinal studies, such as fracture healing or bone growth.

Several studies have evaluated the morphometry of long bones in rats, with digital calipers and Micro-CT being the primary measurement techniques. However, no studies have been identified that utilize anthropometric measurements. In this study, femur length was assessed using anthropometric methods, digital calipers, and Micro-CT, and the results were compared to evaluate the accuracy and reliability of anthropometric measurements in rats. Additionally, based on the human anthropometric assessment method, reference points for femur length measurement in rats were established.

MATERIALS AND METHODS

Study type

It involved 66 male Wistar albino rats (14–16 weeks old) housed at our university's animal research center. All procedures involving animals were conducted in accordance with the National Institutes of Health (NIH) Guide for the Care and Use of Laboratory Animals and adhered to international guidelines on animal research ethics. Using G*Power software (effect size: 0.40, confidence level: 0.90, power: 0.80), the minimum number of rats required was calculated as 65. The study was conducted with 70 rats.

Surgical procedure and experimental design

This study was conducted using 70 male Wistar Albino rats (14–16 weeks old) at the Balıkesir University Experimental Animals Production, Care, and Research Center. Under anesthesia (80 mg/kg ketamine and 8 mg/kg xylazine, intraperitoneally), the right knee joint was shaved and covered with a sterile drape. An arthrotomy was then performed using a medial parapatellar approach to the right knee. A closed fracture was created at the midshaft of the femur using the three-point bending technique. After the fracture was induced, the same individual confirmed via palpation whether the fracture was at the diaphyseal level and whether there was any comminution, ensuring the creation of a standardized fracture pattern. The fracture was then fixated with a 1.0 mm Kirschner wire, which was retrogradely advanced from the intercondylar area of the femur to the trochanteric region and anchored at the greater trochanter. The correct positioning of the wire was confirmed by tactile feedback, ensuring precise delivery of the fixation. At

the knee region, the wire was trimmed at the condyle to prevent restriction of joint movement. Finally, the patella was repositioned, and the medial parapatellar incision was sutured. Following the surgery, rats were allowed unrestricted movement, and no immobilization of their lower limbs was applied. The animals were housed in standard laboratory cages (4 rats per cage) under controlled conditions, including a temperature of 22±2°C, relative humidity of 50–60%, and a 12-hour light/dark cycle. They had free access to standard pellet feed and water throughout the study.

Sacrification was performed at either the 2nd or 4th week via cervical dislocation under high-dose anesthesia, ensuring minimal pain and distress. prior to cervical dislocation, while the animals were still under anesthesia, body length, body weight, and anthropometric femur length measurements were planned to be recorded. Following sacrification, the entire femur, including the fracture site with callus tissue, was carefully dissected from the hip and knee joint. Subsequently, femur length was first measured using a digital caliper, followed by an additional measurement using Micro-CT imaging. All surgical procedures were performed by the same author. Additionally, anthropometric length measurement, post-excision femur length measurement, and femur length measurement using Micro-CT were planned to be conducted by different authors, who were blinded to each other's data.

Femoral length measurement

Measurements were made in three different ways:

1-Anthropometric femur length measurement (Anthropometric group): In humans, femur length is anthropometrically measured as the distance between the trochanter major and the condylus lateralis (Shantanu et al., 2023). Similarly, in rats, the same anatomical reference points were used to measure the right femur length with a digital caliper (Mitutoyo Corporation, CD-15D, Japan) with a precision of 0.001 mm.

2- Femur length measurement using a digital caliper (Dissection group): The right femur was carefully dissected from the hip and knee joints. Femur length was measured using a digital caliper with a precision of 0.001 mm (Mitutoyo Corporation, CD-15D, Japan). The measurement was taken parallel to the corpus femoris, from the trochanter major to the distal surface of the condylus lateralis (Williams et al., 2019, Freitas et al., 2025, Lezón et al., 2008, Foster, 2019, Jäger et al., 2005).

3-Femur length measurement using micro-ct Imaging (Radiological group): Following sacrification, the carefully extracted right femurs were preserved in a 10% formaldehyde solution until they were transported for Micro-CT analysis. Micro-CT scans were performed by positioning the femurs in a plastic holder and scanning them at a dose of 50 kVp and 45 mA, with a step angle of 0.75 degrees and an exposure time of 40 ms per projection, using a U-CT (MILabs MicroCT-OI) scanner. The scanned sections were reconstructed with voxel sizes of 60 micrometers. The images were then transferred in DICOM format to the RadiAnt software, where the distance measurement tool was selected. To measure femur length, the trochanter major and condylus lateralis were marked, and the distance between these two points was measured in millimeters (mm) (Wong et al., 2022, Hernández-Becerra et al., 2020) (Figure 1).

Figure 1. Radiological measurement of femur length.

Body length measurement

Body length measurements were taken while the animals were under anesthesia, immediately before cervical dislocation. During the measurement, the rats were placed in a fully stretched supine position (Soon et al., 2006).

- Nose-to-tail length: The distance from the tip of the nose to the tip of the tail was measured (Kim et al., 2012).

- Nose-to-anus length: The distance from the tip of the nose to the anus was measured using a non-stretchable measuring tape (Novelli et al., 2007).

Body weight and lee index measurement

The body weight of the rats was measured using a precision scale with 1-gram sensitivity immediately before sacrification (Pazvant & Kahvecioğlu, 2009). Subsequently, the Lee index, which is recognized as an obesity index in rats, was calculated. A Lee index value above 300 was considered indicative of obesity. The index was determined using the following formula (Lee, 1929):

- Lee index= [body weight1/3 (g)/naso-anal length (cm)] × 1000 (Lee, 1929).

Statistical analysis

The mean and standard deviations of the data obtained from the study were calculated using one-way analysis of variance (ANOVA). Since femur length was assessed using three different methods—anthropometric, post-dissection, and radiological measurements—these were categorized into three groups, and ANOVA was used to analyze differences

between groups, followed by a post-hoc LSD correction. The Intraclass Correlation Coefficient (ICC), which evaluates the consistency and agreement of quantitative measurements, was calculated among the groups (Y. Sato et al., 2024). The agreement among the three groups was further assessed using the Bland-Altman test. Statistical analyses were performed using IBM SPSS version 30 and MedCalc® version 20.111 (MedCalc Software Ltd, Ostend, Belgium). Related with the results of the power analysis, The *p*-value < 0.10 was considered statistically significant.

Ethical approval

This study was approved by the local animal ethics committee on 28.03.2024 (approval number3-6/2024).

RESULTS

On the day the experimental fractures were induced, three rats were excluded due to comminution.

Additionally, one rat died the following day, bringing the total number of exclusions to four. As a result, the study was conducted with 66 rats.

The average femur length measurement values were found to be 37.57 mm for Anthropometric Femur Length Measurement (anthropometric group), 33.55 mm for Femur Length Measurement Using a Digital Caliper following dissection (dissection group), and 33.84 mm for Femur Length Measurement Using Micro-CT Imaging (radiological group) (Table 1).

Table 1. Descriptive statistical values of variables.

	Mean	Standard Deviation	Minimum	Maximum
Body weight (g)	281.12	37.14	200	367
Nose-to-anus length (cm)	22.03	0.94	18.8	23.5
Nose-to-tail length (cm)	40.99	1.62	36.1	43.1
Lee index ($g^{1/3}$/cm)	2.96	0.08	2.62	3.17
Anthropometric femur length (mm)	37.57	1.17	34.0	41.6
Dissection Group (mm)	33.55	1.27	30.5	36.6
Radiologic Group (mm)	33.84	1.28	30.3	36.4

Table 2 indicates that there is a statistically significant difference between the anthropometric group and both the dissection group and the radiological group ($p<0.10$), whereas no significant difference was obtained between the dissection group and the radiological group ($p>0.10$).

Table 2. Mean differences between groups.

Groups		Mean difference	p
Anthropometric group	Dissection group	4.022	0.000
	Radiological group	4.153	0.000
Dissection group	Anthropometric group	-4.022	0.000
	Radiological group	0.130	0.549
Radiological group	Anthropometric group	-4.153	0.000
	Dissection group	-0.130	0.549

The reliability of repeated measurements was evaluated using intraobserver correlation coefficient (ICC) values. The analysis revealed that the correlation between the dissection group and the radiological group was within the range of 0.81 to 1.00, indicating near-perfect reliability. In contrast, the correlation between the anthropometric group and the other two groups ranged from 0.61 to 0.80, suggesting a significant level of reliability. Furthermore, the p-value for all comparisons was calculated as 0.0001, indicating that the tested relationships were not due to random chance but were statistically highly significant. Specifically, the ICC value for the dissection and radiological groups was 0.987 (90% CI: 0.979–0.992, p=0.0001), while the correlation between the anthropometric and dissection groups was 0.709 (90% CI: 0.564–0.812, p=0.0001). Similarly, the ICC value between the anthropometric and radiological groups was 0.713 (90% CI: 0.569–0.814, p=0.0001). As can be seen from Table 3, these results indicate that while all groups demonstrate a strong correlation, the highest level of agreement was observed between the dissection and radiological groups, whereas the anthropometric group exhibited a relatively lower but still significant correlation with the other two groups.

Table 3. Intraclass Correlation Coefficient (ICC) analysis for repeated measurement reliability.

	ICC (90% Confidence interval)	p
Dissection Gr. / Radiological Gr.	0.987 (0.979-0.992)	0.0001
Anthropometric Gr. / Dissection Gr.	0.709 (0.564-0.812)	0.0001
Anthropometric Gr. / Radiological Gr.	0.713 (0.569-0.814)	0.0001

The agreement between the measurement methods, as shown in Figure 2, indicates that the blue line represents the mean difference between the two methods, while the upper and lower lines represent the confidence interval. The data points are randomly distributed around the mean line, and except for a few outliers, they fall within the confidence interval, suggesting a good agreement between the methods. The mean difference between the dissection group and the radiological group is close to zero, whereas the mean differences between the anthropometric and dissection groups and the anthropometric and radiological groups are 4.0 mm and 4.2 mm, respectively. Therefore, it can be concluded that the anthropometric method exhibits a systematic bias, consistently yielding higher values compared to both the dissection group and the radiological group.

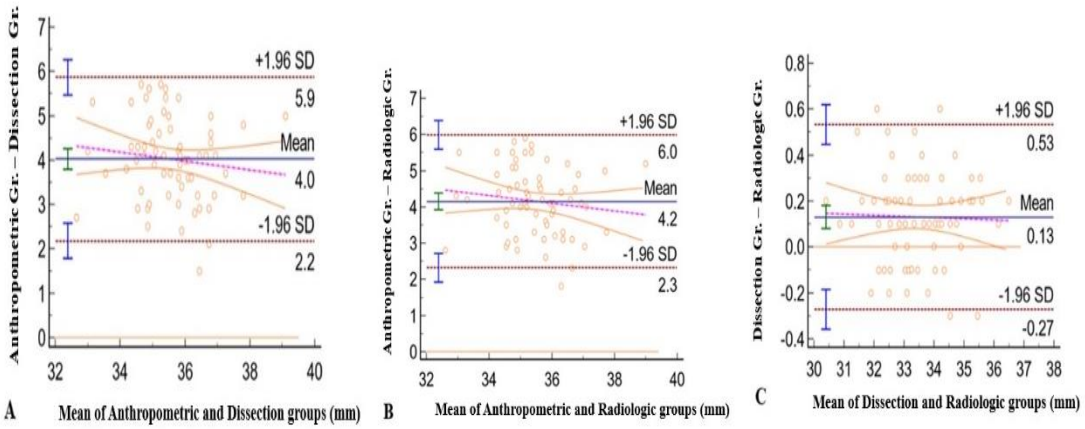

Figure 2. The agreement between the measurement methods

DISCUSSION

This study demonstrated that the anthropometric measurement method, widely used in humans, can also be applied to rats, allowing repeated femur evaluations during or at the end of an experiment without the need for animal sacrifice. Compared to dissection-based digital caliper measurements and radiological Micro-CT imaging, the anthropometric method consistently showed a higher femur length measurement, with a mean difference of approximately 4 mm. Despite this difference, the strong agreement observed between the three methods suggests that the anthropometric method is a reliable alternative that is non-invasive, easy to apply, and cost-effective. This makes it a promising approach for future experimental studies, particularly those requiring longitudinal skeletal assessments.

A review of the literature revealed limited studies directly comparing radiographic measurements and digital caliper measurements. Järvinen et al. (1998) examined the accuracy of femur length measurements obtained via dual-energy X-ray absorptiometry (DXA) in comparison to digital caliper measurements, reporting a measurement error of less than 1%, thereby confirming the accuracy of DXA-based femur length assessments (Järvinen et al., 1998). Similarly, in the present study, femur length measurements obtained using a digital caliper after dissection were found to be interchangeable with those obtained via Micro-CT imaging, supporting previous findings.

Rodent models play a crucial role in preclinical research, particularly in studies investigating fracture healing, metabolic bone diseases, and drug effects on bone morphology. Appendicular bones, such as the femur, tibia, and humerus, are frequently used due to their accessibility, well-characterized structure, and cost-effectiveness (Cao et al., 2022, Castillo et al., 2022). Numerous studies have employed these bones to evaluate morphological, histological, and biomechanical changes (Williams et al., 2019, Freitas et al., 2025, Lezón et al., 2008, Foster, 2019, Jäger et al., 2005, Wong et al., 2022, Hernández-Becerra et al., 2020, Ponyrko et al., 2021).

The femur is one of the most commonly studied bones in rat models due to its thick muscular structure, resistance to non-standard fractures, and suitability for various biomechanical tests. For instance, Mahmoud et al. (2023) investigated the impact of vitamin K2 supplementation on diabetic and non-diabetic rats, analyzing femur length after sacrificing the animals (Mahmoud et al., 2023). Similarly, Ponyrko et al. (2021) conducted a longitudinal study on hyperglycemic rats, in which femurs were sacrificed and analyzed at different time points (days 2, 30, 60, 90, 120, 150, and 180) for morphometric and histological evaluation (Ponyrko et al., 2021).

In studies examining the effects of antiepileptic drugs on bone metabolism, findings remain limited and inconclusive. Nowińska et al. (2012) explored the impact of vigabatrin, an antiepileptic drug, on skeletal development in 4-week-old rats. However, as all animals were sacrificed at the same time, the study did not allow for a week-by-week assessment of femur growth (Nowińska et al., 2012). The inability to conduct repeated in vivo evaluations is a major limitation in such research, further supporting the need for alternative non-invasive methods like anthropometric assessments.

Bone growth is a complex process influenced by hormonal regulation, genetic predisposition, and nutritional status. Consequently, bones are often used as biomarkers to assess endocrine function, metabolic status, and dietary effects. Kim et al. (2020) studied the impact of a botanical extract (H. japonicus) on bone growth by sacrificing all animals after 4 weeks and performing morphometric analyses of the femur and tibia using Micro-CT (Kim et al., 2020). Although the study provided valuable insights, it was limited to a short-term (4-week) analysis, preventing the evaluation of long-term skeletal effects.

Similarly, Maditz et al. (2015) investigated the impact of diet on bone growth in polycystic kidney disease (PKD) rats. Femur and tibia lengths were measured only at the end of the experiment (12 weeks post-intervention) using a digital caliper following dissection (Maditz et al., 2015). This end-point-only approach failed to assess gradual changes in bone growth, highlighting the need for alternative methods that allow repeated, non-invasive measurements over time.

In human research, long-term studies on longitudinal skeletal growth from infancy to adolescence are often limited by the extended duration required and financial constraints. As an alternative, animal models provide a valuable opportunity to study bone growth over shorter periods. Soon et al. (2006) utilized PIXImus (dual-energy X-ray absorptiometry) to evaluate skeletal development in rats aged 4–17 weeks. While the method demonstrated reliable results, it presented limitations such as manual adjustments, difficulty differentiating bone from soft tissue, and region-of-interest (ROI) selection issues (Soon et al., 2006). Given these limitations, anthropometric assessments may offer a simpler, cost-effective, and reproducible alternative for monitoring longitudinal skeletal development.

Studies examining the impact of physical activity on bone quality further highlight the limitations of endpoint-based evaluations. Freitas et al. (2025) conducted an 8-month study on the effects of swimming on bone structure in rats but only measured bone parameters at the end of the experiment using Micro-CT, making it impossible to assess progressive skeletal changes (Freitas et al., 2025). Similarly, Sato et al. (2018) evaluated juvenile osteoporosis treatments, measuring femur length at 6, 9, and 12 weeks via Micro-CT under anesthesia, but still required sacrificing animals for assessment (Sato et al., 2018). Dancause et al. (2012) investigated stress-related effects on offspring development, where femur length was measured only at postnatal day 80 following animal sacrifice (Dancause et al., 2012). Ekong et al. (2012) analyzed the impact of C. chalk exposure on bone morphometry and mineralization, but since femur dissection was performed at day 29, long-term skeletal effects remained unexamined (Ekong et al., 2012). These findings emphasize the need for methodologies that allow continuous in vivo bone assessment, such as anthropometric measurements.

When evaluating femur length during an experiment, radiological methods (e.g., Micro-CT) are commonly used. However, these techniques are expensive, require specialized equipment, and involve extensive image processing. Some experiments rely on dissection-based digital caliper measurements, which increase the number of animals required and introduce variability due to individual differences, even when experimental conditions are controlled (Y. Sato et al., 2024).

In contrast, anthropometric methods provide a non-invasive, repeatable, and cost-effective alternative. Additionally, non-invasive skeletal characterization techniques have broad applications in medicine, pharmacology, veterinary science, biological research, and forensic anthropology (Bagi et al., 2011).

Study Limitations and Strengths

This study has certain limitations. Although the sample size was adequate, variations in bone growth rates and structural differences between sexes and strains were not assessed. Additionally, the use of a closed fracture model may have influenced measurement results. Lastly, due to the small size of rat bones, anthropometric measurements may have a minor margin of error. Future studies should expand on these findings with repeated trials and larger sample sizes to validate measurement accuracy.

CONCLUSION

This study presents the anthropometric method as a viable alternative to radiological and post-dissection techniques for femur length measurement. Its non-

invasive nature allows repeated assessments within the same animal, reducing the number of animals required. This enhances experimental efficiency while promoting ethical research practices, making it a valuable tool for longitudinal skeletal studies in animal models.

Acknowledgement
The authors would like to extend their sincere thanks to anyone who contributed to this study.

Conflict of Interest
The author declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Author Contributions
Plan, design: AEA**; Material, methods and data collection:** AEA, AB, ASO, ÖE**; Data analysis and comments:** SS, ÖB, KA**; Writing and corrections:** AEA, AB, ASO, ÖE, TG.

Funding
This research was supported by Balıkesir University Scientific Research Projects Unit (BAP2024/178).

Ethical Approval
Institution: Balikesir University Ethics Committee
Date: 28.03.2024
Approval no: 3-6/2024

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ORİJİNAL MAKALE / ORIGINAL ARTICLE

Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağ Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: https://doi.org/10.53424/balikesirsbd.1713611

The Effect of Physical Activity Level on Body Composition, Physical Fitness, and Quality of Life: The Case of Sedentary Female Health Workers

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Geliş Tarihi / Received: *04.06.2025,* ***Kabul Tarihi / Accepted:*** *16.07.2025*

ABSTRACT

Objective: This study aimed to examine the effects of physical activity levels on body composition, physical fitness, and health-related quality of life in sedentary female healthcare workers. **Methods**: A descriptive cross-sectional design was used. The sample consisted of 97 female healthcare workers employed at a private hospital in Istanbul. Physical activity levels were assessed using the International Physical Activity Questionnaire (IPAQ), quality of life with the WHOQOL-BREF, body composition through Bioelectrical Impedance Analysis (BIA), and physical fitness with sit-up, sit-and-reach flexibility, and handgrip strength tests. Data were analyzed using descriptive statistics, independent t-tests, and Pearson correlation analysis. **Results:** The average BMI of participants was 25.23 ± 5.25, with 39.6% classified as having low physical activity levels. Participants with a BMI below 25 scored significantly higher in the physical and environmental domains of quality of life. Although those with normal BMI performed better in fitness tests, the differences were not statistically significant. Flexibility was positively correlated with weight, fat mass, and BMI, and negatively correlated with body fat percentage. **Conclusion:** High BMI and body fat percentage negatively affect physical fitness and quality of life in sedentary female health workers. Promoting physical activity in the workplace is essential for improving individual well-being, work productivity, and public health.

Keywords: Physical Activity Level, Body Composition, Physical Fitness, Quality of Life, Sedentary Women.

Vücut Kompozisyonu, Fiziksel Uygunluk ve Yaşam Kalitesi Üzerine Fiziksel Aktivite Düzeyinin Etkisi: Sedanter Kadın Sağlık Çalışanları Örneği

ÖZ

Amaç: Bu çalışma, sedanter yaşam tarzına sahip kadın sağlık çalışanlarında fiziksel aktivite düzeylerinin vücut kompozisyonu, fiziksel uygunluk ve sağlıkla ilişkili yaşam kalitesi üzerindeki etkilerini incelemeyi amaçlamaktadır. **Yöntem:** Tanımlayıcı-kesitsel desende yürütülen çalışmada, İstanbul'daki özel bir hastanede görev yapan 97 kadın sağlık çalışanı değerlendirilmiştir. Fiziksel aktivite düzeyi Uluslararası Fiziksel Aktivite Anketi (IPAQ) ile, yaşam kalitesi WHOQOL-BREF, vücut kompozisyonu Biyoelektrik Empedans Analizi (BIA) yöntemiyle ve fiziksel uygunluk düzeyi mekik, otur-uzan esneklik ve el kavrama kuvveti testleriyle ölçülmüştür. Veriler tanımlayıcı istatistikler, t-testi ve Pearson korelasyon analizi ile değerlendirilmiştir ($p<0.05$). **Bulgular:** Katılımcıların ortalama VKİ'si 25,23 ± 5,25 olup, %39,6'sının fiziksel aktivite düzeyi düşük olarak sınıflandırılmıştır. VKİ'si 25'in altında olan bireylerde fiziksel ve çevresel yaşam kalitesi puanları anlamlı şekilde daha yüksektir. Fiziksel uygunluk testlerinde normal VKİ grubunun daha iyi performans sergilediği gözlenmiş, ancak bu farklar istatistiksel olarak anlamlı bulunmamıştır. Esneklik ile ağırlık, yağ kütlesi ve VKİ arasında pozitif; vücut yağ oranı ile negatif yönlü ilişkiler saptanmıştır. **Sonuç:** Sedanter kadın sağlık çalışanlarında yüksek VKİ ve vücut yağ oranı, fiziksel uygunluk ve yaşam kalitesini olumsuz etkilemektedir. İş ortamlarında fiziksel aktivitenin artırılması hem bireysel sağlık hem de iş verimliliği açısından önem taşımaktadır.

Anahtar Kelimeler: Fiziksel Aktivite Düzeyi, Vücut Kompozisyonu, Fiziksel Uygunluk, Yaşam Kalitesi, Sedanter Kadınlar.

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Bu makaleye atıf yapmak için / Cite this article: Demirli, A. (2025). The effect of physical activity level on body composition, physical fitness, and quality of life: the case of sedentary female health workers. *BAUN Health Sci J, 14*(2), 523-530. https://doi.org/10.53424/balikesirsbd.1713611

BAUN Health Sci J, OPEN ACCESS https://dergipark.org.tr/tr/pub/balikesirsbd
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INTRODUCTION

Physical activity is known to play a fundamental role in improving an individual's overall health, regulating body composition, and enhancing quality of life. Technological and industrial developments in the modern world have led to fundamental changes in individuals' lifestyles; in particular, with the increase in mechanization, a significant decrease in physical activity levels has been observed. The resulting sedentary lifestyle has paved the way for serious problems that threaten public health and is now recognized as one of the main risk factors for various chronic diseases, particularly obesity (World Health Organization [WHO], 2021). This situation clearly demonstrates the contribution of sedentary lifestyles to the obesity epidemic, both globally and nationally. According to 2022 data, approximately 2.5 billion adults aged 18 and over worldwide are overweight, with more than 890 million of them living with obesity. This situation shows that 43% of the adult population (43% of men and 44% of women) are obese. This rate reflects a significant increase compared to the obesity prevalence rate of 25% in 1990. The prevalence of overweight varies regionally, with the WHO reporting a rate of 31% in Southeast Asia and Africa, while in the Americas, this rate rises to 67% (WHO, 2024). When evaluating Turkey specifically, the body mass index calculated using height and weight values shows that the rate of obese individuals aged 15 and older was 21.1% in 2019 and 20.2% in 2022. When broken down by gender, 23.6% of women were obese and 30.9% were pre-obese in 2022, while 16.8% of men were obese and 40.4% were pre-obese (Türkiye İstatistik Kurumu [TÜİK], 2023). These findings reveal that obesity and overweight issues are becoming increasingly prevalent globally.

Changes in eating habits and decreased physical activity lead to changes in body composition, and with age, fat accumulation in the body increases, raising the risk of obesity and chronic diseases (Montero et al., 2000). Before the rapid development of industrialization and technology, a large part of daily life was spent doing physically demanding work. However, with the widespread adoption of mechanization, the need for physical performance has significantly decreased, and as a result, the average time individuals spend sitting daily worldwide has reached 4.5 hours, with reports indicating this duration varies between 2.5 and 7.2 hours (McLaughlin et al., 2020). This decline in daily physical activity levels has various negative effects on individual health. On the other hand, previous studies have shown that regular physical activity improves health-related quality of life and supports physical and mental well-being (Alves et al., 2016; Moghanlou & Demirli, 2024).

Quality of life has become an important concept in recent years due to its effects on an individual's mental health. The WHO 's definition of subjective quality of life is based on an individual's perception of their position in life within the framework of their cultural and value systems, in line with their personal goals, expectations, standards, and concerns. This definition does not limit quality of life to physical health alone; it also considers it as a multidimensional and comprehensive concept that encompasses an individual's psychological state, level of independence, social relationships, personal beliefs, and the various aspects of their relationship with their environment (WHOQOL Group, 1994). Quality of life measurements provide important data for tracking changes in the health status of the population over time, identifying health inequalities between different demographic groups, and planning, implementing, and evaluating the effectiveness of health-based interventions (Burdine et al., 2000). Some studies have reported that physical activity has positive effects on health-related quality of life (Kokkinos, 2012; Leow et al., 2013; Pedersen & Saltin, 2015) other studies have shown that high levels of sedentary behavior are negatively associated with health-related quality of life (Hamer & Stamatakis, 2014; Teychenne et al., 2010). While the positive effects of physical activity on health-related quality of life have been scientifically established, it is evident that this effect is not limited to psychosocial dimensions but also plays a decisive role in physical health indicators such as body weight, fat percentage, muscle mass, and metabolic health. Therefore, examining the effects of physical activity on individuals' body composition enables a more comprehensive assessment of overall health status and quality of life. Today, individuals' ability to adapt effectively to environmental conditions is closely related to their optimal level of physical fitness and healthy body composition. Imbalances in physical fitness and body composition can negatively affect not only physiological functions but also an individual's psychological well-being. Therefore, high levels of health-related physical fitness and basic physiological indicators can be considered an important indicator not only of individual health status but also of the general health profile and functional capacity of society (Pohjola et al., 2024). The importance of physical fitness levels as a health indicator becomes even more evident in occupational groups associated with prolonged sedentary behavior. Identifying this effect, particularly in at-risk groups such as healthcare workers with sedentary lifestyles, is of great importance for preventive and rehabilitative interventions.

This study was designed in line with two main objectives: to determine the current physical activity levels of female healthcare workers with sedentary lifestyles and to examine the effects of physical activity on body composition and health-related quality of life. Healthcare workers constitute a high-risk group in terms of health, as they are more frequently exposed to sedentary behaviors due to occupational factors such as prolonged sitting, irregular shift hours, and high workload. In this context, the study aims to contribute to the literature by focusing specifically on female healthcare workers, thus addressing a unique target

population. The research was conducted within the framework of the hypothesis: "Are the physical activity levels of female healthcare workers associated with their body composition and health-related quality of life indicators?" The findings are expected to provide a scientific basis for the development of culturally appropriate intervention strategies that will encourage lifestyle changes among female healthcare workers with low levels of physical activity.

MATERIALS AND METHODS

Research model

In this study, a descriptive cross-sectional research model was used to examine the relationship between the physical activity level, body composition, and quality of life of sedentary female healthcare workers. This model was selected because it is appropriate for analyzing the current status and associations between variables without experimental manipulation.

Study group

The sample of the study consisted of 97 sedentary female healthcare workers aged between 22 and 45 working at a private hospital in Istanbul. Participants were selected using a non-probability convenience sampling method due to accessibility and voluntary participation. The average age of the participants was calculated as 38.20±6.65 years. When the distribution according to education level was examined, it was determined that 15.5% (n=15) of the participants had a high school diploma, 51.5% (n=50) had an associate's degree, 17.5% (n=17) had a bachelor's degree, and 15.5% (n=15) had a graduate degree (master's or doctorate). The inclusion criteria for the study were female healthcare workers with a sedentary lifestyle who voluntarily agreed to participate in all stages of the study. The exclusion criteria were defined as having a history of chronic diseases such as pregnancy, diabetes, hypertension, and cardiovascular diseases, participating in a regular exercise program, and being unable to fully comply with the research process. The BMI cutoff point of 25 kg/m² used in the evaluation is based on the classification of the WHO. According to this classification, individuals with a BMI over 25 are considered overweight, while those with a BMI over 30 are classified as obese.

Data collection process

Personal information forms containing variables such as age and education level were used to determine the demographic characteristics of the participants, along with questionnaires designed to assess physical activity levels and quality of life. All data collection tools were administered individually by the participants under the guidance and supervision of the researchers. Measurements related to body composition were conducted on pre-planned dates in the relevant laboratory environment within the hospital. Physical fitness tests were administered on specified days in accordance with standard test protocols within the university's sports complex. In addition to being conducted under the guidance of the researchers, all assessments followed standard protocols outlined in the relevant test manuals, and verbal instructions along with physical demonstrations were provided to each participant before testing.

Data collection tools

Body composition, the study was conducted using the Avis 333 plus (Korea) model Bioelectrical Impedance Analysis (BIA) device in accordance with standard protocols. The body composition parameters evaluated included body weight, body fat percentage, fat mass, body fluid percentage, and body mass index (BMI). Participants' heights were measured using a Holtain (UK) brand stadiometer with ±1 mm sensitivity.

Physical fitness tests, participants' isometric hand strength was measured using a Takei A5001 Hand Grip Dynamometer (Tokyo, Japan). The dominant hand was preferred during the hand grip strength test. During the handgrip strength test, participants were tested in a standing position with their arms at their sides without touching the body. Each participant performed two trials using the dominant hand, and the best score was recorded for analysis.

The One-Minute Sit-Up Test was administered to assess the strength and endurance levels of the abdominal muscle groups. Participants lay supine with their knees in a flexed position and performed the sit-up movement, which involves trunk flexion, continuously at maximum effort for 60 seconds. The number of correct repetitions performed during the test was recorded as numerical data as a performance indicator.

Flexibility was assessed using a sit-and-reach bench (Model 01285A, Lafayette, USA) with a measurement length of 80 cm and a sensitivity of 0.1 cm. Participants were seated in a standard position with their knees straight and feet flat on the bench. With their hands joined at the starting line, they reached forward as far as possible without bending their knees and pushed the movable bar on the bench to its end point. The distance reached by the bar was measured in centimeters relative to the starting line and recorded as a flexibility score.

Physical activity levels were assessed using the International Physical Activity Questionnaire (IPAQ). This questionnaire has been translated into different languages worldwide, and its validity and reliability in Turkish have been proven (Kartal, 2022). The questionnaire covers physical activities in different areas, including work, transportation, household chores, and leisure activities, and inquires about activities performed in the past 7 days. Participants' physical activity levels were classified based on total MET (Metabolic Equivalent) values calculated from the questionnaire data. Individuals with a weekly total MET-min value below 600 were classified as having a low level of physical activity. Those with a weekly value of 600 MET-min or higher were considered to have a moderate level of physical activity, while participants who achieved a value of 3000 MET-min or higher were classified as having a high level of physical activity.

World Health Organization Quality of Life Questionnaire (WHOL-BREF), developed to assess

health-related quality of life, was created by the WHO and its validity and reliability in Turkish was studied by Eser and colleagues (Eser et al., 1999). There are two different versions of the scale: the long form (WHOQOL-100) and the short form (WHOQOL-BREF, 27). The widely used short form consists of four subscales: physical health, mental health, social relationships, and environmental health. Each subscale independently assesses the individual's quality of life in that area, and the 26-item questionnaire is answered using a 5-point Likert-type scale. Subscale scores range from 4 to 20, with higher scores indicating a higher level of quality of life. The scale has also been successfully applied in various professional groups, such as healthcare workers (Kavlu, 2008; Eser et al., 1999).

Statistical analysis

The data obtained in the study were analyzed using IBM SPSS Statistics 22.0 software. Descriptive statistics were used to summarize participants' demographic characteristics, as well as body composition, physical fitness, and quality of life variables. Independent samples t-test was conducted to determine the differences in quality of life and physical fitness test results between BMI groups. Additionally, Pearson correlation analysis was used to examine the relationships between body composition measurements and physical fitness test performance. The significance level was set at 0.05 for all statistical analyses.

Ethical approval

This study was conducted in accordance with the principles of the Declaration of Helsinki and was approved by the Istanbul Aydın University Social and Human Sciences Ethics Committee with the decision number 2025/5. The research process was carried out in compliance with the Scientific Research and Publication Ethics Directive of Higher Education Institutions.

RESULTS

Table 1 shows the body composition assessment: average height 165.17±3.00 cm, body weight 68.00±11.50 kg, body fat percentage 34.60±12.20, fat mass 24.95±7.03 kg, body fluid percentage is 37.50±5.75%, BMI is 25.23±5.25 kg/m². When the distribution according to physical activity levels was examined, 39.6% (n=39) of the participants were classified as low, 55.4% (n=51) as moderate, and 5% (n=7) as high in terms of physical activity. According to the WHO 's BMI classification, 10.3% of participants were underweight (BMI<18.5), 41.0% were of normal weight (BMI: 18.5–24.9), 30.4% were overweight (BMI: 25.0–29.9), and 18.3% were obese (BMI≥30.0).

Table 1. Anthropometric measurements of individuals participating in the study.

Measurement	Minimum	Maximum	Mean ± SD
Height (cm)	155.2	178.2	165.17 ± 3.00
Weight (kg)	45.0	91.0	68.00 ± 11.50
Body Fat Percentage (%)	10.2	59.0	34.60 ± 12.20
Fat Mass (kg)	10.9	39.0	24.95 ± 7.03
Body Water Percentage (%)	26.0	49.0	37.50 ± 5.75
BMI (kg/m²)	16.0	38.0	25.23 ± 5.25

When Table 2 is examined, individuals with a BMI below 25 have statistically significantly higher scores in the physical health and environmental health areas of quality of life compared to overweight or obese individuals ($p<0.05$). The differences observed between the groups in the mental health and social health dimensions were not found to be statistically significant ($p>0.05$).

Table 2. Comparison of quality of life dimensions according to BMI.

Quality of Life Domain	BMI < 25 (Mean ± SD)	BMI ≥ 25 (Mean ± SD)	p-value
Physical Health	15.12 ± 1.95	13.28 ± 2.26	0.001
Psychological Health	14.01 ± 2.02	13.54 ± 2.23	0.308
Social Relationships	14.62 ± 2.00	14.11 ± 2.18	0.421
Environmental Health	13.92 ± 2.03	12.61 ± 1.96	0.018

When Table 3 is examined, individuals with a BMI < 25 have higher averages in flexibility and sit-up tests, while hand grip strength is higher in the BMI ≥ 25 group. However, the differences between the groups in all physical fitness parameters were not found to be statistically significant ($p > 0.05$).

Table 3. Physical fitness test results according to BMI.

Physical Fitness Measurement	BMI < 25 (Mean ± SD)	BMI ≥ 25 (Mean ± SD)	p-value
Flexibility (cm)	11.23 ± 6.52	9.19 ± 7.37	0.105
Hand Grip Strength (kg)	24.62 ± 2.34	25.94 ± 4.85	0.262
Sit-up Test (repetitions per minute)	11.96 ± 9.92	10.84 ± 12.09	0.188

Table 4 shows that there are statistically significant relationships between flexibility and some anthropometric variables. Flexibility is positively correlated with weight (r = 0.28, p = 0.001), fat mass (r = 0.22, p = 0.001), and BMI (r = 0.19, p < 0.001); and negatively with body fat percentage (r = -0.11, p = 0.001). No significant relationship was found between handgrip strength and sit-up performance and anthropometric measurements (p > 0.05).

Table 4. Comparison of anthropometric measurements and physical fitness test performance.

Anthropometric Measurements	Flexibility r (p)	Hand Grip Strength r (p)	Sit-up r (p)
Weight (kg)	0.28 (p = 0.001)	-0.12 (p = 0.109)	0.06 (p = 0.211)
Body Fat Percentage (%)	-0.11 (p = 0.001)	0.18 (p = 0.205)	0.04 (p = 0.312)
Fat Mass (kg)	0.22 (p = 0.001)	0.27 (p = 0.301)	0.03 (p = 0.336)
BMI (kg/m²)	0.19 (p < 0.001)	-0.09 (p = 0.119)	0.29 (p = 0.294)

DISCUSSION

This study, conducted on female healthcare workers with a sedentary lifestyle, aimed to reveal their current level of physical activity and evaluate the effects of physical activity on body composition and health-related quality of life, and important findings were obtained in this regard. The average body fat percentage of the female healthcare workers participating in the study was 34.60%, body fat mass was 24.95 kg, body fluid percentage was 37.50%, and BMI, an important indicator of health status, was determined to be 25.23. According to BMI classification, 10.3% of the participants were underweight, 41% were of normal weight, 30.4% were overweight, and 18.3% were obese. When looking at physical activity levels, it was determined that the majority (55.4%) were moderately active, 39.6% were low, and only 5% were highly physically active (Table 1). These findings generally show that physical activity levels are insufficient among female healthcare workers with sedentary lifestyles and that this leads to an increase in weight. It is noteworthy that a significant portion of participants are physically active at low or moderate levels, with only a very small group engaging in high levels of activity. Additionally, the high average body fat percentage and BMI values suggest that these individuals may be at potential risk for cardiometabolic risks (Powell-Wiley et al., 2021; Shah et al., 2014). This situation serves as a warning for public health authorities. In a study examining the relationship between physical activity and quality of life among healthcare workers, the findings are consistent with the existing literature. In a study conducted by Yıldırım and colleagues (2019), the average BMI of 240 healthcare workers was reported as 25.58 ± 5.29. Of the participants, 21.7% were classified as physically inactive (n = 52), 52.9% as low-level active (n=127), and 25.4% as having sufficient physical activity (n = 61). Similarly, in another study conducted by Kadıoğlu and Fatoş (2017) with 235 female students, it was determined that 7.2% of the participants had low, 80.4% had moderate, and 12.3% had high levels of physical activity. In a study conducted on university students, it was observed that as the level of physical activity increased, the overall quality of life, particularly in sub-areas such as emotional responses and sleep quality, increased significantly (Yeşil et al., 2021).

Individuals with a BMI below 25 scored higher than overweight and obese individuals in terms of physical and environmental health dimensions of quality of life. However, no significant difference was observed between the groups in terms of mental and social health (Table 2). Our findings indicate a relationship between body composition and quality of life subdomains. In particular, individuals with a normal BMI ≤ 25 were found to have higher quality of life in the physical health domain. This finding supports the effect of body composition on quality of life. In addition to BMI-based interpretations, physical activity levels were also considered in evaluating the findings. Although only a small portion of participants were classified as highly active, it was observed that those in the moderate and high activity groups generally showed more favorable outcomes in body composition and quality of life scores. This trend supports the importance of maintaining an active lifestyle, even at moderate levels.

When examining studies consistent with our findings, one study found an inverse U-shaped relationship between BMI and health-related quality of life (HRQoL). A decrease in quality of life scores was observed at BMI levels below or above normal values (Luah et al., 2024). In another study, overweight individuals reported lower quality of life in both general health perceptions and obesity-related issues (Kolotkin & Andersen, 2017). In another study examining the relationship between body mass index and health-related quality of life in adults, it was found that adults with a body mass index higher than normal had a significant decrease in physical quality of life across all categories (Ul-Haq et al., 2013). There are also studies that support our findings but show that BMI has a limited effect on quality of life. In a study conducted by Stephenson and colleagues (2021), it was determined that an increase in obesity levels was associated with a significant decrease in HRQoL scores. However, while the difference in quality of life between normal-weight and overweight individuals was statistically significant, it was emphasized that this difference was clinically very low and negligible. This finding indicates that the significant decline in quality of life primarily occurs at obesity and morbid obesity levels.

Individuals with a BMI below 25 performed better in flexibility and sit-up tests, while individuals with a higher BMI stood out in terms of hand grip strength. However, these differences were not statistically significant (Table 3). In a study examining the relationship between BMI and physical fitness in normal-weight, overweight, and obese university students, negative correlations were found between BMI and explosive strength and muscle endurance at both the inter-individual level (based on differences between individuals) and the intra-individual level (based on changes over time). On the other hand, a positive relationship between BMI and flexibility was identified at the between-individual level, but this relationship was found to be negative at the within-individual level (Kung et al., 2020). These findings indicate that the effect of BMI on various components of physical fitness is multidimensional. Similarly, in our study, individuals with a BMI below 25 had higher averages in flexibility and sit-up tests, while hand grip strength was higher in individuals with a BMI of 25 and above; however, these differences were not found to be statistically significant. The negative effects of BMI on explosive power and muscle endurance reported in the relevant literature support the possible structural relationship between physical performance and body composition. However, conflicting results regarding the relationship between BMI and flexibility may vary depending on factors such as the measurement methods used and the demographic characteristics of the sample. In a study examining the relationship between BMI and lumbar flexibility in obese students aged 18–21, a weak but positive relationship was found between BMI and lumbar flexibility. This result indicates that as BMI increases, lumbar flexibility also increases, but this relationship is of a low magnitude (Lamtiar & Sibarani, 2022). Another study reported that underweight and normal-weight girls performed better than overweight and obese girls in physical fitness parameters such as jumping, long-distance running, and shuttle running (Kwieciński et al., 2018).

It has been stated that low physical fitness levels can lead to negative outcomes associated with obesity and excessive weight, metabolic disorders, and health risks (Lee et al., 2010). Findings related to the multi-stage shuttle run clearly demonstrate the negative effect of increasing BMI on cardiorespiratory endurance (Bovet et al., 2007). These results indicate that increased body weight in overweight and obese individuals may negatively affect their physical fitness levels. Similarly, in our study, individuals with a BMI below 25 were found to have higher average scores in the shuttle run test.

Study Limitations and Strengths

This study provides valuable insights into the relationship between physical activity levels, body composition, physical fitness, and health-related quality of life among sedentary female healthcare workers. One of the main strengths of the study is its use of validated measurement tools such as the IPAQ, WHOQOL-BREF, BIA, and standardized fitness tests, ensuring reliable and comprehensive data collection. Furthermore, the study addresses a relatively underexplored population group and emphasizes the importance of promoting active lifestyles in occupational settings, especially in healthcare environments.

However, several limitations should be acknowledged. First, the cross-sectional design limits the ability to infer causality between variables. Second, the sample was limited to female healthcare workers from a single private hospital in Istanbul, which may restrict the generalizability of the findings. Additionally, physical activity levels were self-reported using questionnaires, which may introduce recall bias or over/underestimation. Despite these limitations, the study offers a meaningful contribution to the literature and underscores the need for workplace-based interventions to improve physical activity and overall health outcomes.

CONCLUSION

This study comprehensively evaluated the effects of physical activity levels on body composition, physical fitness, and health-related quality of life in a sample of female healthcare workers with a sedentary lifestyle. The findings indicate that the majority of participants had low or moderate levels of physical activity, which was associated with increased body fat percentage, high BMI, and consequently reduced physical fitness and quality of life. Individuals with a BMI below 25 achieved higher quality of life scores, particularly in the areas of physical and environmental health, and performed better in physical fitness tests such as

flexibility and sit-ups. In contrast, individuals with a high BMI were found to have higher hand grip strength. However, these differences were not statistically significant in most parameters. The findings reveal that the relationship between body composition and quality of life is multidimensional and sensitive, particularly supporting the notion that increasing levels of obesity are associated with significant declines in quality of life.

The results of the study show that improving physical fitness levels not only enhances an individual's physiological capacity but can also have a positive impact on their overall perception of health and quality of life. In this regard, it is of great importance for individuals who influence the health of society, such as healthcare professionals, to have more opportunities for physical activity in their work environments and to participate in regular exercise programs in order to protect their own health. Additionally, it should be noted that high BMI and body fat percentage not only increase individual health risks but can also indirectly affect professional work performance. Therefore, it is necessary to implement planned, sustainable, and multi-level health policies aimed at facilitating access to physical activity, promoting healthy lifestyles, and improving individuals' quality of life across the general population.

Acknowledgement

We would like to thank all the participants who voluntarily contributed to this study.

Conflict of Interest

The author declares no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Author Contributions

Plan, design: AD; **Material, methods, and data collection:** AD; **Data analysis and comments:** AD; **Writing and corrections:** AD.

Funding

This research received no external funding.

Ethical Approval

Institution: Istanbul Aydın University Social and Human Sciences Ethics Committee
Date: 23.05.2025
Approval no: 2025/5

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