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## REVIEW



## ORIGINAL ARTICLES

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REVIEW

# Empowering Nursing Students

## Hemşirelik Öğrencilerinin Güçlendirilmesi

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**Abstract**

In nursing, empowerment can enable nurses to raise concerns about patient safety and do so in a safe and supportive environment. Furthermore, empowering patients to gain more ownership of their health can positively influence both nurses and patients. This narrative review focused on the importance of empowering nursing students. The literature has determined that nursing students should feel valued and be treated equally and should work in an environment that is open and transparent to feel empowered. Fear of retaliation may prevent nursing students from speaking out about poor care and practices. Moreover, co-developing care and support regimens with service users benefited both nursing students and patients, as well as local communities, reduced stress and burnout, and allowed patients to self-care and act in their own best interests.

**Keywords:** Health education, nurse management, nursing support, patient assistance, patient care

**Öz**

Hemşirelikte güçlendirme, hemşirelerin hasta güvenliğiyle ilgili endişelerini dile getirmelerini ve bunu güvenli ve destekleyici bir ortamda yapmalarını sağlayabilir. Ayrıca, hastaların kendi sağlıklarını daha fazla dikkate almaları için güçlendirilmeleri hem hemşireleri hem de hastaları olumlu yönde etkileyebilir. Bu anlatısal derleme, hemşirelik öğrencilerini güçlendirmenin önemine odaklanmıştır. Literatürde, hemşirelik öğrencilerinin kendilerini değerli hissetmeleri ve eşit muamele görmeleri gerektiği ve güçlendirilmiş hissetmek için açık ve şeffaf bir ortamda çalışmaları gerektiği ortaya koyulmuştur. Kısas korkusu, hemşirelik öğrencilerinin kötü bakım ve uygulamalar hakkında konuşmalarını engelleyebilir. Ayrıca, bakım ve destek rejimlerinin hizmet kullanıcılarıyla birlikte geliştirilmesi hem hemşirelik öğrencilerine hem hastalara hem de yerel topluluklara fayda sağlamış, stres ve tükenmişliği azaltmış ve hastaların kendi bakımlarını yapmalarına ve kendi çıkarları doğrultusunda hareket etmelerine olanak tanımıştır.

**Anahtar Kelimeler:** Sağlık eğitimi, hemşire yönetimi, hemşirelik desteği, hasta yardımı, hasta bakımı

## Introduction

The inception of the Ottawa Charter on Health Promotion (1) advocated that individuals and communities should be empowered to gain ownership and control over their health. Like other Western countries, the United Kingdom (UK) government has embraced the idea of more self-determination for patients within the National Health Service (NHS) and has embedded the principles of empowerment in several National Institute for Care and Health Excellence (NICE) guidelines, for example, the NICE for diabetes (2). Within the UK nursing profession, nurses, including nursing students, play a crucial role in promoting patient empowerment. This practice of involving patients in making decisions about their own healthcare can benefit both patients and the NHS in terms of reducing healthcare costs (3). This article outlines the importance of empowerment in the context of nursing students. This will draw on empowering nursing students through education to raise concerns and how they can do this in a safe environment. Moreover, this article will include the strengths-based nursing and healthcare leadership (SBNH-L) framework to enhance empowerment in healthcare settings. This will highlight the benefits of empowering patients through the lens of nursing students.

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### Information About Nursing Student Enrollment

At the beginning of the 19th century, hospital treatment for medical conditions were not common in the UK, with the majority of care being undertaken within family units (4). The personal care of an individual was often performed by servants, who commanded little respect. This began to change in the 1860s with the introduction of Florence Nightingale's and Mary Seacole's philosophical caring ideas and the opening of the Nightingale Training School at St. Thomas's Hospital in London (4). Since then, the nursing profession has gained status and professional autonomy, which requires professional registration with the Nursing and Midwifery Council (NMC) (5). According to Traynor (4), along with the changes in the nursing profession, empowerment has also increased in importance for both nursing and nursing students as a key element to promoting practitioner-nurse relationships, increasing both patient and nurse autonomy, increasing compliance, and supporting patient-centered healthcare.

### Defining Empowerment

Empowerment is difficult to define because of its complexity (6). However, authors such as Cayaban et al. (7) and Conger (8) stated that this concept is personal to each and every individual as it encompasses their energy and drive to do a good job and be successful. Given the challenges of defining empowerment, Ahn and Choi (9) noted that all organizations require the empowerment of their people to achieve their goals and mission statements. In nursing, this means enabling people's ability to work efficiently and effectively in an environment where they can practice with autonomy, have the desire to be accountable for their actions, and be trusted with the responsibility to make evidence-based decisions in clinical practice (9). In the context of nursing students, empowerment is the act of strengthening nursing students' confidence and belief in their sense of effectiveness (6) alongside their competence (10) with the ultimate effect of enabling them to feel motivated to provide optimum care for patients in the healthcare environment (11). Moreover, proponents such as Kanter (12) argued that organizational conditions must positively affect an individual's internal motivation, and if this occurs, the individual will feel empowered. The organizational conditions described by Kanter (12) include access to resources, opportunities, information and support. Without these conditions, an individual would not achieve the desired organizational outcomes. Similarities can be observed in the nursing student context. They may not feel empowered to execute their role if the organization environment is not conducive to learning; therefore, they may feel deflated and lack enthusiasm. For example, nursing students require access to information about the people they care for and the policies of their organizations for which they work. Without this access, nursing students may feel unvalued, unsupported, and ultimately disempowered.

A study conducted by Bradbury-Jones et al. (6) found that it is important for nursing students to have the necessary knowledge and confidence and to be valued as learners in clinical practice. These are crucial components for developing empowerment. Importantly, knowledge and confidence are locked into a dynamic interplay, and from a nursing student's perspective, empowerment cannot exist without knowledge and confidence; they co-exist. Lauder et al. (13) equated confidence with self-efficacy. The relationship between empowerment and self-efficacy was identified by Pearson (14), who found that if nursing students felt empowered, their levels of self-efficacy would increase, and ultimately, this could have a positive impact on patient care and students' experience and competence in the clinical environment (6).

### Empowering Students of Education

The NMC (15) standards for professional practice and behaviour stipulate that nurses should work with competence and confidence. Stayt and Merriman (16) surveyed 421 students regarding their perception of opportunities to practice clinical skills and level of supervision in their clinical placements. They concluded that a lack of empowerment through reduced opportunities to practice skills reduced work performance and students' recognition of professional responsibilities was an overall threat to patient safety and the level of patient care. Stayt and Merriman (16) suggested that timely access to resources and support within both a university and clinical learning environments encourages confidence among nursing students, which in turn promotes higher levels of competence and increases patient care and safety. Conversely, a reduction in competence among nursing students is linked to poor levels of structural empowerment (17). Structural empowerment is where organizations facilitate access to resources and support that empower the workforce to work more effectively (17). Evidence has determined that education significantly increases psychological and structural empowerment across all dimensions (18). Liao and Liu (10) completed a cross-sectional survey of 300 senior nursing students undertaking clinical practice. A 95.3% response rate indicated a significant relationship between nursing students' levels of structural empowerment and their overall competence in nursing due to having access to the right resources at the right time.

Numminen et al. (19) examined newly graduated nurses' perceptions of the ethical climate of their work environment and its association with self-assessed professional competence, turnover intentions, and job satisfaction. The study found that self-assessed competence was strongly linked to empowerment (19). This relationship was later supported by Visiers-Jiménez et al. (20), with the additional finding that competence is specifically related to expertise and professional development during nurse education. Visiers-Jiménez et al. (20) highlighted that competence in a newly graduated nurse's role development was a particularly important aspect of empowerment for nursing students. This suggests that to build confidence and competence and support empowerment throughout professional

development, encouraging an open and transparent dialog where everyone feels listened to. The implications for both managers in clinical practice and nurse educators indicate that empowerment is facilitated by treating everyone as equals and encouraging open conversations from the beginning of a nursing student's education and throughout their career (20). Additionally, Sharma and Sharma (21) found high levels of student empowerment in a Category A, National Assessment and Accreditation Council accredited premier nursing institute, suggesting that education can lead to increased levels of competency and assuredness.

### Empower Nursing Students in Clinical Placement Settings

The NMC (15) stipulates that UK nurses should undergo 50% of their pre-registration nurse education learning theory and 50% in clinical practice placement settings. These clinical learning experiences are essential to practicing nursing care; they help build fundamental nursing skills, and nursing students can apply the theory taught in universities to the practice environment. Argyris and Schön's (22) practice learning theory argues that without clinical learning experiences during formative education, nursing students will not have the opportunity to develop their tacit knowledge, confidence, and sense of empowerment for themselves and for their patients, which suggests that nurse educators and placement partners are in a strong position to encourage, nurture, recognize, and address nursing students' empowerment needs (20). Additionally, Maslow (23) claims in his motivational hierarchy of needs theory that people need to be accepted, recognized, appreciated, and included to ensure self-actualization. Similarly, Lakin et al. (24) asserted that a sense of belonging is a universal human need. Sense of belonging has been widely researched in nursing and is an emotional response to feeling included, valued, and accepted (25). When students feel accepted in a workplace, the result is a positive learning experience, confidence, and motivation to learn (26) and thus empowers nursing students' ability to socialize and form a strong professional identity (27).

Albloushi et al. (28) identified many facilitators and barriers to empowering nursing students' learning ability during clinical placements. The study used an interpretive design to conduct semi-structured interviews with 16 Saudi nursing students about their sense of belonging during their placement. The findings support those of Lakin et al. (24), Levett-Jones and Lathlean (25), and Gerrard and Billington (26) who reported that when students are included, valued, and welcomed into practice areas, their sense of motivation to learn is enhanced. In contrast, students in the study by Albloushi et al. (28) reported that when they were not well-prepared for placement by academic teams in education, a lack of participation and acceptance in placement. Additionally, language barriers affected the students' ability to understand the requirements of the placement, which led to feelings of distress, anxiety, and disempowerment (28). These results demonstrate the need for nursing students to feel like they belong in the workforce and highlight the necessity for nurse educators to ensure that nursing students are well-prepared for clinical placements in all care settings. Moreover, evidence has shown that creating a healthy working environment and adhering to standard norms may foster the empowerment of nurses and nursing students, irrespective of the setting where they work (29). Fostering this sense of empowerment might be achieved by enhancing nursing students' ability to recognize, understand, and communicate learning outcomes in all care settings. This will help enhance their ability to learn and take responsibility for their learning and may empower placement staff to understand and support their needs, with the ultimate goal of student's ability to gain a sense of belonging to the workforce team.

### The SBNH-L Framework to Enhance Empowerment in Healthcare

The SBNH-L framework to enhance the empowerment of healthcare professionals (30) was conceptualized from the original SBNH model (31) intended to guide healthcare staff in delivering compassionate and knowledgeable care. The SBNH-L (Figure 1) is a unique, values-driven framework to assist leaders and managers of healthcare teams in creating safe and equitable environments that recognize individual strengths. The framework is driven by core person- and family-centered care values of systems-thinking; uniqueness; health and healing; multiple perspectives and creating meaning; self-determination; goodness-of-fit; timing-readiness-learning; and collaborative partnerships (30).

The framework focuses on the innate quality of leaders using their attributes to empower those working in their teams to deliver safe and compassionate care to service users. Gottlieb et al. (30) summarized the SBNH-L framework as follows:

*"SBNH leaders strive to be humble, self-aware, authentic, open-minded, compassionate, courageous, credible, curious, creative, flexible, and resourceful. They have integrity, imagination, and operate from a growth mindset. They strive to be engaged, collaborative, systems-focused, solution-oriented, and evidence-informed. These SBNH leadership qualities determine how the four foundational and eight core values are enacted".*

The SBNH-L was created to guide leaders to create an environment that enhances and encourages self-awareness and gives them the confidence to value their judgments and act upon them. The framework is reflective and asks questions of leaders such as:

*1. What do I need to consider or think about when establishing a policy or directive in place?*

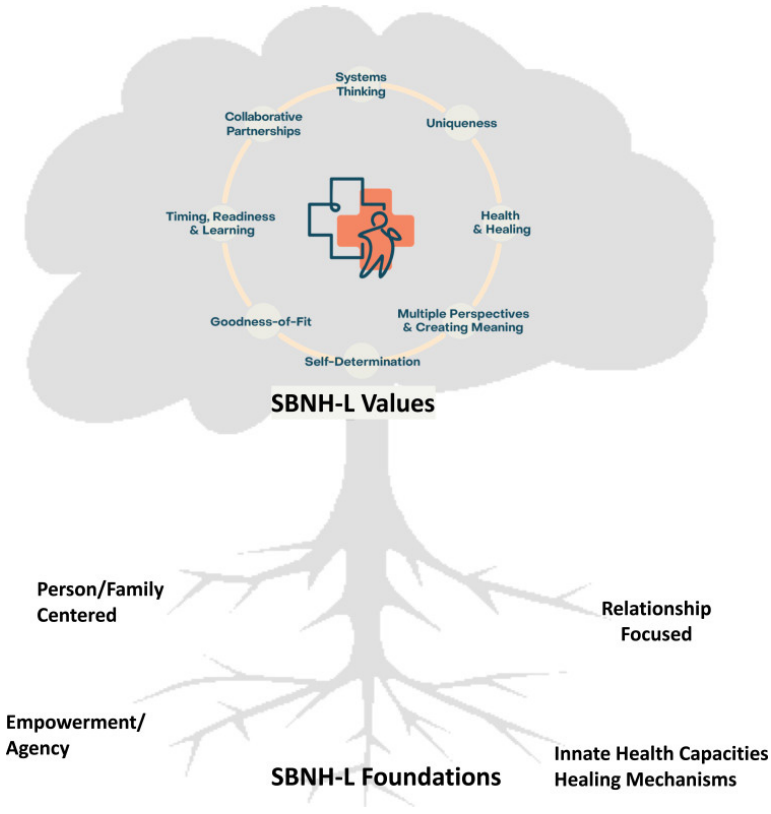


**Figure 1.**
**Strengths-based Nursing and Healthcare Leadership (SBNH-L) Values and Foundations (30)**

*2. How does my department or unit fit within a larger healthcare institution?*

*3. As a nurse manager, how does the organization foster autonomy and agency in a nurse manager? How do these policies impact my actions at the unit level?* (27). Responding to these questions empowers leaders to recognize and value collaborative partnerships with staff that invite participation in decision making and enhances their value in the workplace. Collectively, these contribute positively to nursing students' experiences.

### Support Students in Raising Concerns

In the 1990s, a call was made to nurses to develop a strong voice and the willingness to speak out when necessary (32). This was reiterated in the Francis Report of 2013 (33) which recommended a duty of candor for healthcare professionals. However, Bradbury-Jones et al. (34) found that nursing students failed to speak out even when they witnessed unprofessional behaviour. One reason for this was that nursing students were unsure of their place and felt uncertain about how to escalate issues (35). The evidence suggested that this issue was reduced as nursing students progressed through education. However, a suggested cause for fear to speak out was the fear of reprisals from colleagues, which is supported by evidence from Brown et al. (35) who explained that the clinical area and the dynamics on the ward dictated how confident nursing students felt about raising any concerns. Further evidence suggested that bullying and incivility were rampant in clinical nursing education and that instructors must address these behaviours so that nursing students feel empowered (36). Through psychological empowerment, nursing students can learn to be more assertive (37).

In the professional environment, nursing students play many important roles to play; however, one of the roles is raising concerns. The NMC has provided information regarding the processes that should be followed when raising concerns. Pre-registration nurses have a professional responsibility to put the interests of patients first and to act in the best interest if it is felt that service users are at risk (38). Regardless of the healthcare environment, concerns should be raised appropriately. Safeguarding the health and well-being of patients in care means working in their best interest and protecting them from abuse or neglect (38).

According to the Care and Support Statutory Guidance (39), there are many different types of abuse that nurses should be aware of

- Physical abuse,
- Domestic violence,
- Sexual abuse,
- Psychological abuse,

• Financial or material abuse,

• Modern slavery,

• Discriminatory abuse,

• Organizational abuse,

• Neglect and omission,

• Self-neglect.

According to the Care Quality Commission (40), it is of paramount importance for all healthcare providers to be aware of the warning signs of any type of abuse and that healthcare professionals, such as nurses, can escalate any concerns without fear of retribution or harm. Nursing students are in an excellent position to be able to see the warning signs as they may spend more time with the patients. Therefore, part of the education process must be to ensure that nursing students are confident in speaking up when necessary (41).

Nursing students may not always easily report concerns in the practice environment due to a belief of disloyalty to the team or fear of reprisals from a practice assessor or a practice supervisor. Here are some principles outlined by the NMC (38) that nursing students should follow when raising concerns:

- Inform their practice assessor/practice supervisor, tutor or link lecturer immediately if they believe a patient is at risk of harm.
- Seek immediate help from an appropriately qualified professional if someone in their care has suffered any damage for any reason.
- Seek help from their practice assessor/practice supervisor, tutor, or link lecturer if people indicate that they are unhappy with their care or treatment.

The adoption of these principles could result in concerns being investigated. It is important to note that it is the responsibility of nurses who have received these concerns to take action. Should action not be taken, a nursing student can further escalate concerns to the ward manager, who in turn should take immediate and expeditious action. It is also important for nursing students to inform their link lecturers in the education setting about the concerns they have raised in practice regarding patient care and treatment to obtain support from link lecturers.

**Empowerment Beyond Pre-registration**

Evidence from the literature suggests a significant positive relationship between nurses' perceptions of empowerment and patient satisfaction (42). This revealed that nurses with a Master's degree or higher perceived themselves to be highly empowered, which in part also took into consideration rank and experience, with more experienced nurses having higher graduate qualifications (42). Education and experience are factors that increase confidence; therefore, pre-registration nurses should aspire to continuously self-actualize throughout their career. This may lead to the empowerment of nursing students, who can deliver and provide high-quality person-centered care for all ethnicities, including diverse communities (43).

According to Sensenig (44), through successful collaboration, nursing students benefit from working with culturally diverse, underserved populations while also having a positive effect on the health of the local community. Haycock-Stuart et al. (45) also recommended the involvement of service users and carers in providing feedback to nursing students about their clinical practice. Further evidence indicates that nursing care should be developed to enable nursing students and service users to collaborate to co-create care and support regimens. However, nursing students may have to give away power to patients (46). This would allow patients to not entirely depend on them while also ensuring that nursing students prevent stress and burnout from feeling overworked (46).

Christensen and Hewitt-Taylor (47) argued that empowering patients contrasts with the traditional healthcare stance and requires patients to want to take control and take responsibility for their own health. Hewitt-Taylor (48) noted that patient empowerment can aid in addressing any power imbalances between patients and healthcare providers, where nurses and indeed nursing students can empower patients to act in their own best interests if they are being subjected to coercive or controlling practices by healthcare staff. However, patient empowerment brings with it responsibility and greater autonomy, resulting in discussions on potentially difficult issues of an individual's responsibility for their own health and how their decisions may affect others (48). Christensen and Hewitt-Taylor (47) warned that if patient empowerment is to become a reality, then the attitudes and values held by staff and patients, as well as overt behaviours, must be congruent with the principles of empowerment. It is the responsibility of nurses, including nursing students, to empower patients to take control of their care. Empowering patients will enable them to further develop their self-awareness skills and enable them to become equal partners in healthcare.

**Positive Effects on Nursing Students**

A recent study determined that empowering nursing students with competency-based clinical education has a positive impact on their attitudes, knowledge, advocacy, and care strategies when dealing with vulnerable and underserved populations (49). The results of another study demonstrated that case-based learning can lead to feelings of empowerment for nursing students, as well as develop critical thinking and stress management skills and acquire professional competencies (50). Education that challenges and empowers nursing students can also enable them to take action toward Sustainable Development Goals (51), and they are increasingly showing job satisfaction, productivity, and high standards of nursing care (21). Emrani et al. (52)

concluded that incorporating service-based learning techniques into clinical education programs is essential for empowering nursing students. Other studies have also reported that educational programs are vital for developing a positive self-image and improving empowerment among nursing students (18,53).

### Summary of Positive Empowerment Strategies for Nursing Students, Nurse Educators and Learning Environments

This discussion paper has demonstrated that nurse educators are in a good position to ensure that student nurses are well supported to develop confidence and competence and enhance empowerment. The knowledge gained from this discussion is important for nurse educators, students, and practice partners who support clinical placement to enhance the empowerment of nursing students throughout nurse education and clinical practice. Table 1 summarizes the strategies discussed throughout this work.

## Conclusion

Empowerment enables nurses, including nursing students, to possess the knowledge and confidence to increase both nurse and patient autonomy, which in turn positively affects patient care, development of critical skills, professional competencies, and confidence. Nursing students must feel valued and treated with respect, work in an environment that is open and transparent, and have access to adequate resources and support; otherwise, oppressive power structures may prevent them from speaking out about poor care and fear reprisals from senior healthcare staff. In contrast, the literature has suggested that nurse-led environments, in conjunction with service users, benefit nursing students, patients, and local communities.

***Table 1.***
***Summary of Empowerment Strategies Discussed in This Paper***

| |
|---|
| **Education** |
| Be aware of the available opportunities in education and practice environments to ensure adequate access to these opportunities through supported clinical placements. |
| Encourage student self-assessment and reflection and access to the right level of learning at the right time during pre-registration education. |
| Ensure that nursing students are listened to and have a voice as equal partners in their education. |
| Ensure that students are adequately prepared for clinical placements in all care settings to enable realistic expectations, understanding of the requirements and address anxieties. |
| Recognise, understand and communicate with students about their placement and about how the learning environment they are going to can contribute to their education. This will help to alleviate any concerns. |
| Ensure that students have awareness about how and when to raise concerns and are well-versed in the types of abuse they may encounter in clinical practice. |
| Implement and build case-based innovations into the curriculum to promote discussions about empowerment that might be difficult. Challenge students outside their comfort zone. |
| **The learning environment/placement partners** |
| Provide a welcoming and supportive environment to strengthen nursing student's confidence, competence and motivation to learn in an environment they feel they belong in. |
| Promote autonomous working where individuals can be accountable for their own clinical evidence-based decision-making. |
| Provide nursing students with access to information and resources in order to promote knowledge, feel valued and develop self-efficacy through structural empowerment |
| Develop awareness of leadership frameworks such as the SBNL-H framework to support placements and students to raise concerns. |
| **Nursing students** |
| Become familiar with nursing policy and guidelines and the NMC (2018) code to enhance your understanding of your professional responsibilities, and carry this throughout your studentship and career. |
| Familiarise yourself with the raising concerns policy and seek advice if you are unsure. |
| Advocate for patients/residents and help them to take control of their care. |
| Take responsibility for identifying your own learning goals in clinical placements and understand how each care setting contributes to your education. |

*SBNL-H=strengths-based nursing and healthcare, NMC=nursing and midwifery council*

Education plays a vital role in enabling nursing students to feel empowered. This article has contributed to the literature by collating and summarizing the history and importance of empowering nursing students, using evidence and suggestions from various studies.

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ORIGINAL ARTICLE

# The Effect of Art-based Mandala on Mental Health Among Patients Transplanting Bone Marrow: A Randomized Controlled Study

## Kemik İliği Nakli Hastalarında Sanat Temelli Mandalanın Mental Sağlığa Etkisi: Randomize Kontrollü Çalışma

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**Abstract**

**Objective:** This study aimed to investigate the effect of nurse-led art-based mandala practice on psychosocial problems in patients undergoing bone marrow transplantation.

**Method:** This parallel-group randomized controlled study with repeated measurements was conducted in a university hospital's bone marrow transplant unit. A total of 46 patients hospitalized for bone marrow transplant treatment were randomly assigned to the intervention and control groups. The intervention group was made to apply an art-based mandala under the leadership of a nurse for 7 sessions. The control group received only routine treatment. Patients in both groups completed the Beck hopelessness scale, distress thermometer, psychological well-being scale and state-trait anxiety questionnaires before, during, and after transplantation. The data were analyzed using the SPSS IBM 27.0 package data program.

**Results:** During and after bone marrow transplantation, the intervention group experienced a noteworthy reduction in stress, anxiety, and hopelessness, as well as a considerable improvement in psychological well-being compared with the control group. The difference in mean scores between the groups over time was statistically significant.

**Conclusion:** Nurse-led art-based mandala practice is an effective, safe, and well-received method for addressing the psychosocial challenges of patients undergoing bone marrow transplantation. This nursing intervention is reliable and impactful for managing psychosocial problems during the bone marrow transplantation process.

**Keywords:** Art-based mandala, bone marrow transplantation, mental health, nurse-led care

**Öz**

**Amaç:** Bu çalışmada, kemik iliği nakil hastalarında hemşire liderliğindeki sanat temelli mandala uygulamasının psikososyal sorunlar üzerine etkisinin incelenmesi amaçlanmıştır.

**Yöntem:** Çalışma, bir üniversite hastanesinin kemik iliği nakil ünitesinde tekrarlı ölçümler tasarımına sahip paralel grup randomize kontrollü bir çalışma olarak gerçekleştirildi. Kemik iliği nakil tedavisi amacıyla hastanede yatan 46 hasta müdahale ve kontrol gruplarına rastgele atandı. Müdahale grubuna 7 seans olacak şekilde hemşire liderliğinde sanat temelli mandala uygulaması yaptırıldı. Kontrol grubuna sadece rutin tedavi uygulandı. Her iki gruptaki hastalar nakil öncesi, günü ve sonrası Beck umutsuzluk ölçeği, distres termometresi, psikolojik iyi oluş ölçeği ve süreksiz-sürekli kaygı envanteri anketlerini tamamladılar. Veriler SPSS IBM 27.0 paket veri programı ile analiz edildi.

**Bulgular:** Nakil günü ve sonrası müdahale grubundaki kemik iliği nakil hastalarının kontrol grubundaki hastalara kıyasla stres, kaygı ve umutsuzluk puan ortalamalarında anlamlı bir azalma ve psikolojik iyi oluş ortalama puanlarında ise başlangıç düzeyine göre anlamlı bir artış vardı. Grupların ortalama puanlarındaki değişimde zaman içinde istatistiksel olarak anlamlı bir fark vardı.

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**Sonuç:** Hemşire liderliğindeki sanat temelli mandala uygulaması, kemik iliği nakil sürecinde hastaların psikososyal sorunlarını yönetmek için etkili, güvenli ve kabul edilebilir bir yöntemdir. Hemşire liderliğindeki sanat temelli mandala uygulamasının, kemik iliği nakil sürecinde yer alan hastaların psikososyal sorunlarının yönetilmesi için güvenilir ve etkili bir hemşirelik müdahalesi olarak kullanılabilir.

**Anahtar Kelimeler:** Sanat temelli mandala, kemik iliği nakli, mental sağlık, hemşire liderliğinde bakım

## Introduction

Bone marrow transplantation is a frequently preferred treatment method in patients with hematological malignancies and bone marrow failure (1,2). In the bone marrow transplantation process, psychosocial problems can be seen in patients due to the success rate of the treatment method, whether a suitable donor can be found for allogeneic transplants, uncertainty, social isolation, and physical problems related to the process (3). Psychosocial difficulties accompanying bone marrow transplantation are evaluated by the relevant literature in the context of quality of life and psychopathological research, and psychosocial problems such as anxiety, depression, anxiety, stress, and hopelessness are frequently addressed (4).

The American Art Therapy Association defines the purpose of visual art-based practices as helping individuals develop interpersonal skills to solve their problems and conflicts, direct behavior, reduce stress, increase self-esteem and individual awareness, and realize self-realization. The relevant literature also reports that art-based practices are an effective therapy method in protecting and improving the psychological well-being of individuals as a journey to the inner world of individuals (5,6). Mandala, which is among the art-based practices, means center or circle in Sanskrit and is a kind of meditation therapy method that relaxes the human mind, allows the individual to psychologically evaluate the conditions he is in, and improves negative mood (6). When the literature is examined, it is stated that supporting the treatment and care of individuals with mandala, which is among the art-based practices, positively affects the adaptation process, enables them to live a meaningful life, increases their insights about cancer and their life, their acceptance of the disease and their participation in treatment are better, their emotional expressions are more effective, and their spiritual and mental well-being is positively affected (7-9).

**Main Points**

- It is important to support the mental health of bone marrow transplant recipients.
- Mandala is an art-based practice that can be used to support mental health.
- It has been reported that the mandala supports mental health, reduces stress, depression, anxiety, and increases psychological well-being.
- Mandala positively contributes to the healing process of bone marrow transplant recipients by helping them express themselves and manage their emotions.
- It is recommended that bone marrow transplant nurses use the mandala, which is one of the art-based practices, in the treatment and care process.

Bone marrow transplantation involves not only physical but also emotional and psychological challenges (1,3). However, clinical practices often neglect the mental health needs of these patients. Art-based interventions, such as mandalas, can help patients express emotions, understand their illness, and actively participate in treatment, ultimately improving their well-being and quality of life (4). In the bone marrow transplantation process, no study has focused on the nurse-led art-based mandala application and addressed the psychosocial problems of patients. Therefore, this study aimed to determine the effectiveness of nurse-led art-based mandala practice for the treatment and care of psychosocial problems in bone marrow transplant recipients.

### Study Question

Is a nurse-led, art-based mandala intervention effective in reducing distress, hopelessness, and trait anxiety and improving psychological well-being in bone marrow transplant recipients?

### Research Hypothesis

$H_0$. Nurse-led, art-based mandala intervention does not affect distress, hopelessness, trait anxiety, or psychological well-being in bone marrow transplant recipients.

$H_1$. Nurse-led art-based mandala intervention reduces distress after bone marrow transplantation.

$H_2$. Nurse-led art-based mandala intervention reduces hopelessness after bone marrow transplant patients.

$H_3$. Nurse-led art-based mandala intervention reduces trait anxiety in bone marrow transplant patients.

$H_4$. Nurse-led art-based mandala intervention improves psychological well-being among bone marrow transplant patients.

## Material and Method

### Design

This parallel-group, randomized controlled pilot study was conducted in the allogeneic and autologous transplant unit of a teaching and research hospital.

The trial was registered with under registration number NCT05488717.

### Study Setting and Participants

The G*Power-3.1.9.7 program was used to calculate the sample and power. Considering the study of Doğan (10); in order to determine the sample size, the mean hopelessness pre-test score of the experimental group was 5.05 (±3.72); the mean post-test score was 2.59 (±1.9). In this context, it was determined that a total of 42 bone marrow transplant recipients (21 per group) should be included in the study with 80% strength at the 5% type I error level. Assuming that each group will experience a 10% loss after the intervention, the final sample size was determined as 46.

Patients who were (1) between the ages of 18 and 65, (2) hospitalized for bone marrow transplantation, (3) not using antidepressants, anxiolytics, or antipsychotic drugs, (4) not having a physical disability for mandala dyeing and no allergy to mandala dyes, (5) not having done mandala work before, (6) not practicing spiritual practices such as yoga and meditation, and (7) being literate and volunteering enough to fill the scales were included. Patients who (1) had communication difficulties, (2) had psychiatric illnesses, or (3) received any psychological support during the bone marrow transplantation process were excluded from the study. Assurance has been given that all rights and information will be secured and kept. Informed consent was obtained from all patients. After the patients filled out this form, they completed the questionnaire and scale used in the research.

### Randomization and Blinding

The physician in charge of the allogeneic and autologous transplant unit reported the list of patients who met the inclusion criteria to the principal investigator Ayşe Çetin Üçeriz (A.Ç.Ü) on a daily basis. A.Ç.Ü. assessed each patient's eligibility and introduced the study protocol. Between January 15, 2022, and September 31, 2022, a total of 46 bone marrow transplant recipients were enrolled in the study, with 23 in the intervention group and 23 in the control group, randomized using IBM SPSS v.27 Package program. To ensure impartiality, an independent external investigator conducted randomization. Furthermore, the data were analyzed by an impartial statistician that was unaware of the intervention and control groups. The study involved random sample selection and blinded data reporting by the evaluator. The research's consolidated standards of reporting trials flowchart was created (Figure 1).

### Nurse-led Intervention and Data Collection

Mandala, which is an occupation that relaxes the human mind, was used in the cancer patient group because it is a kind of meditation therapy that allows the individual to evaluate the physical and psychological conditions, improves negative mood, protects, and improves the psychological well-being of individuals (5,6,9). In the research planned in this direction, ready-made stencil mandala coloring papers and 12 colored dry paints, crayons, and felt-tip crayons were provided to each participant in the experimental group by the researcher. The relevant

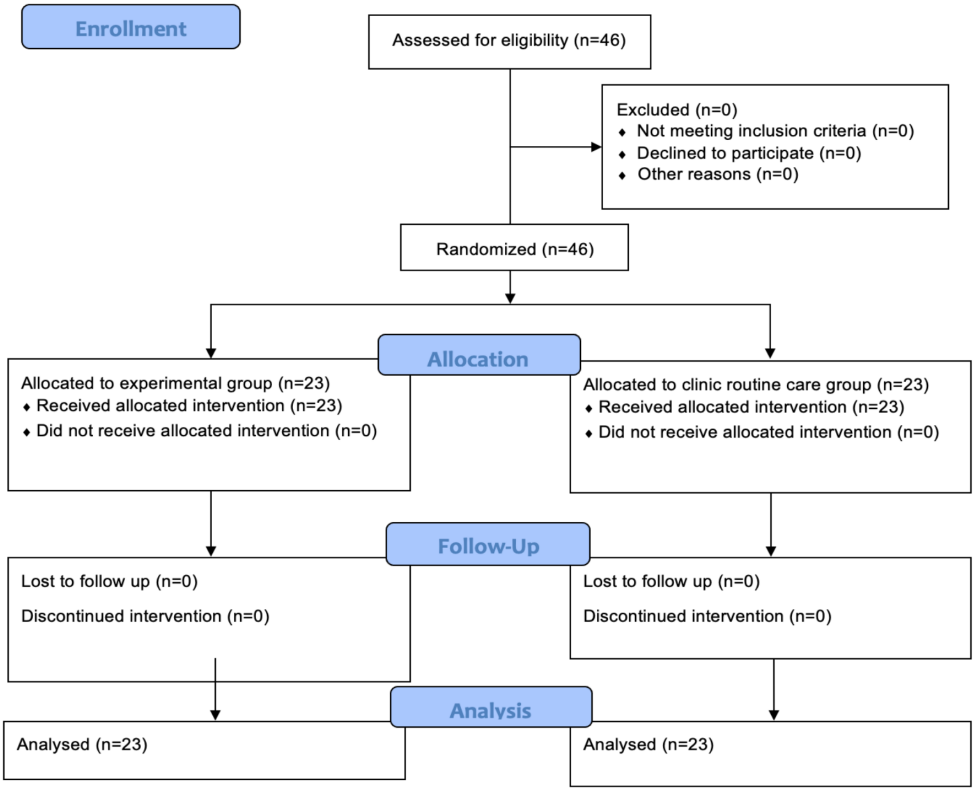


**Figure 1.**
**CONSORT flow diagram**
CONSORT=consolidated standards of reporting trials

literature states that counseling to be given to cancer patients during the treatment period can be given at least 6 or 8 face-to-face sessions (11). Subsequently, the patients in the experimental group were made to apply mandala with ready-made stencil mandala coloring papers for a total of 7 sessions for 30 minutes, accompanied by music containing nature or instrumental sounds (Figure 2). Music was used only during painting so that the patients did not feel as though they were in a hospital environment. No intervention was made by the researcher other than preparation of the environment and time management during staining.

The scales used in the study were completed by the intervention and control groups before the transplant, on the day of the transplant, and at the 48th hour after the transplant (Figure 3).

The data were collected using the patient information form, beck hopelessness scale, distress thermometer, psychological well-being scale and state-trait anxiety inventory (STAI).

**Patient Information Form**

The patient information form, which was developed by the researchers in accordance with the relevant literature, comprised 11 questions (1-3). These questions cover socio-demographic characteristics (such as gender, marital status, educational background, and socio-economic level), variables related to the disease process (including diagnosis, type of transplant, number of transplants, chemotherapy protocol used, and presence of additional chronic disease), and interest in any form of art (4,9-11).

**Beck's Hopelessness Scale**

The Beck hopelessness scale, which aims to measure a person's negative expectations or degree of pessimism for the future, was developed by Beck et al. (12). There are 20 expressions with yes or no answer options on the scale used to evaluate the hope/hopelessness of the individual. The answer to 11 statements on the scale is expected to be yes (2, 4, 7, 9, 11, 12, 14, 16, 17, 18, 20) and the answer to 9 statements is expected to be no (1, 3, 5, 6, 8, 10, 13, 15, 19). If the expected

**Figure 2.**
**Art-based Mandala Intervention Products for Bone Morrow Transplant Recipients**

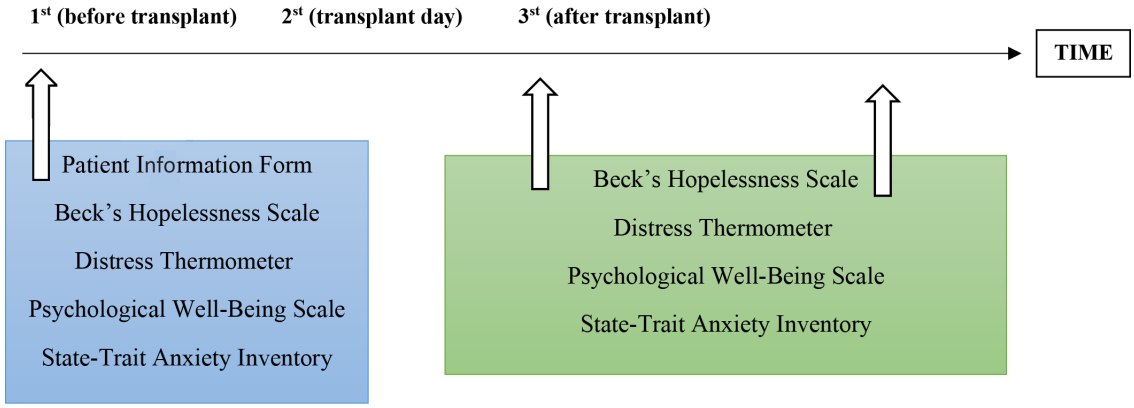


**Figure 3.**
**Study Measurements Outcome Measurements**

answers are given by the individual, 1 point is given to the statements, and 0 points are given if an unexpected response is given. By adding up the scores of the answers given, the total score of the scale, ranging from 0 to 20, is determined; a low score indicates a high level of hope, and a high score indicates a low level of hope (12). The reliability and validity of the scale, which was adapted to Turkish by Seber (13), has been studied several times by different researchers (14,15). Seber (13) evaluated Cronbach's alpha as 0.86 in depressed patients; Durak and Palabıyıkoğlu (15) found it to be 0.85 in psychiatric patients. In this study, Cronbach's alpha coefficient was 0.94.

**Distress Thermometer**

The distress thermometer, which was created by Roth et al. (16) to assess psychosocial distress in patients with cancer, is a visual analog scale resembling a thermometer, with numbers ranging from 0 to 10 for individuals to self-assess. This 3-level thermometer measures distress on a scale of 0-10 and prompts the patient to indicate the level of distress experienced over the past week. A score of 4 indicates clinically significant distress. In our country, Özalp et al. (17) established the validity and reliability of the distress thermometer, determining a distress cut-off point to be 4. This study showed that the scale could effectively differentiate between patients with cancer experiencing distress and those who did not. Additionally, the study obtained a Cronbach's alpha coefficient of 0.79.

**Psychological Well-being Scale**

The psychological well-being scale, initially developed by Diener et al. (18) was later renamed the "flourishing scale" in 2010 to better capture the essence of well-being. In this study, the original name "psychological well-being scale" was used due to the unavailability of an exact Turkish equivalent for the word "flourishing". The scale consists of eight positively expressed items, with responses ranging from 1 (strongly disagree) to 7 (strongly agree). The total score can range from 8 to 56, with a higher score indicating greater psychological well-being (19). A study conducted in our country found that the Cronbach's alpha internal consistency coefficient of the scale was 0.87, whereas in this study, Cronbach's alpha coefficient was 0.90.

**State-trait Anxiety Inventory (STAI)**

Developed by Spilberger in the United States in 1970 to assess state and trait anxiety, the STAI contains 40 statements; the first 20 address state anxiety, and the last 20 address trait anxiety. The section with persistent expressions of anxiety was used. The person answering the scale questions usually marks how he feels on a 4-point Likert-type scale, which includes the answer choices "almost never" (1), "sometimes" (2), "a lot of time" (3), "almost always" (4). Seven (1, 6, 7, 10, 13, 16, 19) of the trait anxiety statements are true statements, and 13 (2, 3, 4, 5, 8, 9, 11, 12, 14, 15, 17, 18, 20) are inverse. Inverse statements expressing positive emotions are scored, those with a weight value of 1 are converted to 4, and those with a weight value of 4 are converted to 1. When evaluating the scale, the point sum of the negative statements is subtracted from the point total of the positive statements, and a constant number 35 is added to the value found. The high score obtained indicates the high level of anxiety, the resulting score; it is classified as no anxiety between 0-19, mild anxiety between 20-39, moderate anxiety between 40-59, severe anxiety between 60-79, and panic and crisis state with a score of 80-79 (20). The adaptation of the STAI to Turkish in Turkey and its reliability validity were made by Oner and Le Compte (21). The test-retest reliability of the scale, which was applied twice to five different student groups, was 0.71-0.86; the internal consistency coefficient was found to be between 0.83 and 0.87. In this study, Cronbach's alpha coefficient was 0.85.

**Statistical Analysis**

The data were analyzed using the Statistical Package for the Social Sciences IBM 27.0 package data program. Whether the pre-analysis data met the values of the test used, the normality of the score distributions, the equality of the variances of the difference scores (sphericity), and the homogeneity of the slope were determined by the Kolmogorov-Smirnow test. Descriptive statistics of the variables (mean, standard deviation, median, minimum-maximum, frequency values and chi-square test results) are presented. Covariance analysis was used for repeated measurements. He argued that the f-test is resistant to normal deviations if there are more participants than the number of dependent variables in the cell with the smallest number of people and the number of people in the cells is equal. Since the number of participants in the experimental and control groups was equal and larger than the number of dependent variables, the analysis was assumed to be strong when the data deviated from normal. It recommends the use of the Greenhouse-Geisser test if the spoonerism count is not met. In accordance with this recommendation, statistical analyses were carried out in this research. Because the homogeneity of the slope was not met only in the psychological well-being variable, the measurements on the day of transplantation and after low and high levels of the covariate were compared. If the f-tests were found to be statistically significant, the Bonferroni test was applied as a post-hoc test to keep the global error rate (familywise error) at 0.05. The statistical significance level was determined as $p<0.05$.

**Ethical Considerations**

The data used in the submitted manuscript were obtained in accordance with the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity. The study will adhere to the ethical principles of the Declaration of Helsinki. Ethical approval for the study was obtained from the İstanbul Sabahattin Zaim University Scientific Research and Publication Ethics Committee (no: E-20292139-050.01.04-22860, date: 28.01.2022). Written permission was obtained from the İstanbul University, İstanbul Faculty of Medicine of

Internal Medicine, Department of Hematology (document ID: 675008), the institution where the study was conducted. Written permissions were received via e-mail from the respective authors of the scales.

## Results

### Demographic and Clinical Information

The socio-demographic characteristics of patients who underwent bone marrow transplantation were similar. Most of the included patients were female, married, and had a moderate income. The most common diagnoses were multiple myeloma (30.4%), lymphoma (28.3%), and acute lymphoblastic leukemia (13%). The most preferred high-dose chemotherapy protocol was the combination of melphalan and prednisolone (43.5). A total of 91.3% of the patients were hospitalized for bone marrow transplantation for the first time. In terms of transplant type, both groups had similar proportions of transplants. In addition to cancer, 18 patients (39.1%) with chronic diseases were included in the study. When the patients were evaluated in terms of their interest in art, 71.7% stated that they had not been involved in any artistic activity before (Table 1).

***Table 1.***
***Baseline Characteristics of the Intervention and Control Groups (n=46)***

| | **Intervention group (n=23)** | **Control group (n=23)** | **p value[a]** |
|---|---|---|---|
| **Gender** | | | |
| Female<br>Men | 11 (47.8%)<br>12 (52.2%) | 12 (52.2%)<br>11 (47.8%) | 0.768 |
| **Marital status** | | | |
| Married<br>Single | 16 (69.9%)<br>7 (30.4%) | 18 (78.3%)<br>5 (21.7%) | 0.502 |
| **Education level** | | | |
| Illiterate<br>Primary school<br>Secondary school<br>University and above | 10 (43.5%)<br>5 (21.7%)<br>4 (17.4%)<br>4 (17.4) | 7 (30.4%)<br>6 (26.1%)<br>7 (30.4%)<br>3 (13%) | 0.653 |
| **Perceived economic situation** | | | |
| Low<br>Medium<br>High | 7 (30.4%)<br>14 (60.9%)<br>2 (8.7%) | 3 (13%)<br>18 (78.3%)<br>2 (8.7%) | 0.890 |
| **Diagnosis** | | | |
| Multiple myeloma<br>Acute myeloid leukemia<br>Acute lymphoblastic leukemia<br>Chronic lymphocytic leukemia<br>Lymphoma<br>Chronic myeloid leukemia<br>Myelofibrosis | 9 (39.1%)<br>3 (13%)<br>2 (8.7%)<br>1 (4.3%)<br>7 (30.4%)<br>1 (4.3%)<br>0 (0%) | 5 (21.7%)<br>2 (8.7%)<br>4 (17.4%)<br>1 (4.3%)<br>6 (26.1%)<br>2 (8.7%)<br>3 (13%) | 0.804 |
| **Bone marrow transplantation** | | | |
| Autologous<br>Allogeneic | 16 (69.9%)<br>7 (30.4%) | 11 (47.8%)<br>12 (52.2%) | 0.134 |
| **Chemotherapy protocol** | | | |
| BuCyE (busulfan, cyclophosphamide, etoposide),<br>BuEM (busulfan, etoposide, melphalan)<br>TECAM (thiotepa, etoposide, cytarabine, cyclophosphamide, melphalan)<br>CBV (cyclophosphamide, etoposide, carmustine)<br>FLAG-IDA (fludarabine, cytarabine, idarubicin, G-CSF)<br>MP (melphalan and prednisolone combination),<br>VMCP (vincristine, melphalan, cyclophosphamide, and prednisolone)<br>Cyclophosphamide, ATG, G-CSF | 1 (4.3%)<br>2 (8.7%)<br>1 (4.3%)<br>0 (0%)<br>1 (4.3%)<br>13 (56.5%)<br>0 (0%)<br>5 (21.7%) | 0 (0%)<br>5 (21.7%)<br>4 (17.4%)<br>1 (4.3%)<br>1 (4.3%)<br>7 (30.4%)<br>1 (4.3%)<br>4 (17.4%) | 0.223 |

***Table 1.***
***Continued***

| | Intervention group (n=23) | Control group (n=23) | p value[a] |
|---|---|---|---|
| **Number of bone marrow transplants** | | | |
| 1<br>2 | 21 (91.3%)<br>2 (8.7%) | 21 (91.3%)<br>2 (8.7%) | 1 |
| **Additional chronic diseases** | | | |
| Yes<br>No | 8 (34.8)<br>15 (65.2) | 10 (43.5%)<br>13 (56.5%) | 0.546 |
| **Interest in art** | | | |
| Yes<br>No | 9 (39.1%)<br>14 (60.9%) | 4 (17.4%)<br>19 (82.6%) | 0.102 |

*[a]=independent sample t-test and chi-square test, G-CSF=granulocyte colony-stimulating factor*

### The Effects of Nurse-led Art-based Mandala on Hopelessness

When the pre-transplant hopelessness scores were controlled, the difference between the hopelessness scores of the experimental and control groups, consisting of the combination of the day of transplantation and after, was statistically significant (F1.43=76.03, p<0.00). In addition, the time-dependent change in mean hopelessness scores on the day of transplantation and after transplantation was statistically significant (F1.43=28.80; p<0.00). Similarly, the effect of the group on hopelessness scores varied depending on time and pre-transplant scores (F=7.99 vs. 23.67, p<0.05). When the results of the Bonferroni test were examined as a post-hoc test to determine which measurements caused the difference between the groups, it was revealed that the hopelessness scores were lower in the experimental group ($\bar{x}$=7.35) than in the control group ($\bar{x}$=14.00). A similar situation applies to post-transplant measurements. When the partial eta-squared ($\eta^2$) time and interaction effects were controlled, 0.65 of the variance in hopelessness scores was due to group membership (Table 2). As a result, although the mean scores of hopelessness at the beginning of the study did not differ between the experimental and control groups, the level of hopelessness on the day of transplantation decreased significantly after nurse-led mandala application in the experimental group and continued to decrease after transplantation. In the control group, mean scores for hopelessness before and after transplantation were higher than those in the experimental group (Table 3).

### Effects of Nurse-led Art-based Mandala on Distress

The difference between the pre-transplant distress scores and the composition of the experimental and control groups on and after the transplantation day was statistically significant (F=8.60, p<0.00). However, the time-dependent change in the mean scores of distress on the day of transplantation and after transplantation was not significant (F=0.52; p>0.05). According to the results of the Bonferroni test, which is used to determine the measurements caused by the difference between the groups, the distress scores obtained on the day of transplantation were lower in the control group ($\bar{x}$=8.00) than in the experimental group ($\bar{x}$=4.13). A similar situation applies to post-transplant measurements. When the partial eta-squared ($\eta^2$) time and interaction effects were controlled, 0.55 of the variance in distress scores was due to group membership (Table 2). As a result, the mean score of distress at the beginning of the study was above the limit value of 4 in both groups, although there was no difference between the experimental and control groups, and the level of distress on the day of transplantation decreased significantly after the nurse-led mandala application in the experimental group, but it was still above the limit value, and after the transplantation, it was seen that it fell approximately 50% below the limit value. In the control group, the mean pre- and post-transplant distress scores were high (Table 3).

### Effects of Nurse-led Art-based Mandala on Psychological Well-being

The difference in mean well-being scores between the experimental and control groups on and after transplantation was statistically significant (F1.43=43.19, p<0.00). However, the difference between the groups varied depending on the pre-test scores (F1.43=27.00, p<0.00) (Table 2). According to Figure 4, the well-being of the participants in the experimental group was higher on the day of transplantation and after transplantation than that of the control group. However, the measurements of patients with high pre-transplant well-being on the day of transplantation and after transplantation change less than those with low levels. As a result, when the study began, there were no significant differences in psychological well-being scores between the experimental and control groups. However, the nurse-led mandala intervention in the experimental group led to a notable increase in psychological well-being on the day of transplantation, and this positive effect continued after the transplantation. In contrast, both pre- and post-transplant psychological well-being scores in the control group were lower than those in the experimental group. In the control group, no change was observed on the day of transplantation, but improvement was evident after the transplantation (Table 3).

***Table 2.***
***Comparison of Hopelessness, Distres, Psychological Well-being, Trait Anxiety Intervention, and Control Groups Over Time (n=46)***

| | Distres | | | Trait anxiety | | | Hopelessness | | | Psychological well-being | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | F | p | $\eta^2$ | F | p | $\eta^2$ | F | p | $\eta^2$ | F | p | $\eta^2$ |
| Time | 0.52 | >0.05 | 0.01 | 0.66 | >0.05 | 0.02 | 28.80 | **<0.00** | 0.40 | 16.97 | **<0.00** | 0.29 |
| Group | 8.60 | **<0.00** | 0.55 | 10.82 | **<0.05** | 0.20 | 76.03 | **<0.00** | 0.65 | 43.19 | **<0.00** | 0.51 |
| Time*group | 2.42 | >0.05 | 0.05 | 00.06 | >0.05 | 0.00 | 7.99 | **<0.00** | 0.16 | 0.96 | >0.05 | 0.02 |

*F=mixed One-Way ANOVA (repeated measures with between subjects factor) test, p<0.00, values in bold are statistically significant*

***Table 3.***
***Mean scores of the Hopelessness, Distres, Psychological Well-being, Trait Anxiety Intervention and Control Groups Over Time (n=46)***

| | Before transplant | | Transplant day | | After transplant | |
|---|---|---|---|---|---|---|
| | Intervention ($\bar{x}$ ± SD) | Control ($\bar{x}$ ± SD) | Intervention ($\bar{x}$ ± SD) | Control ($\bar{x}$ ± SD) | Intervention ($\bar{x}$ ± SD) | Control ($\bar{x}$ ± SD) |
| Hopelessness | 13.87±3.31 | 13.83±0.83 | 7.35±5.67 | 14.00±0.74 | 5.17±5.44 | 13.78±0.60 |
| Distres | 6.34±0.51 | 6.96±0.44 | 4.13±2.85 | 8.00±2.02 | 2.26±1.86 | 6.83±2.04 |
| Psychological well-being | 32.74±0.20 | 28.13±0.73 | 45.74±1.84 | 28.13±6.82 | 50.26±1.91 | 33.65±1.15 |
| Trait anxiety | 59.30±3.64 | 60.30±3.02 | 48.43±3.19 | 51.13±4.39 | 44.57±4.40 | 47.83±5.21 |

*SD=standard deviation*

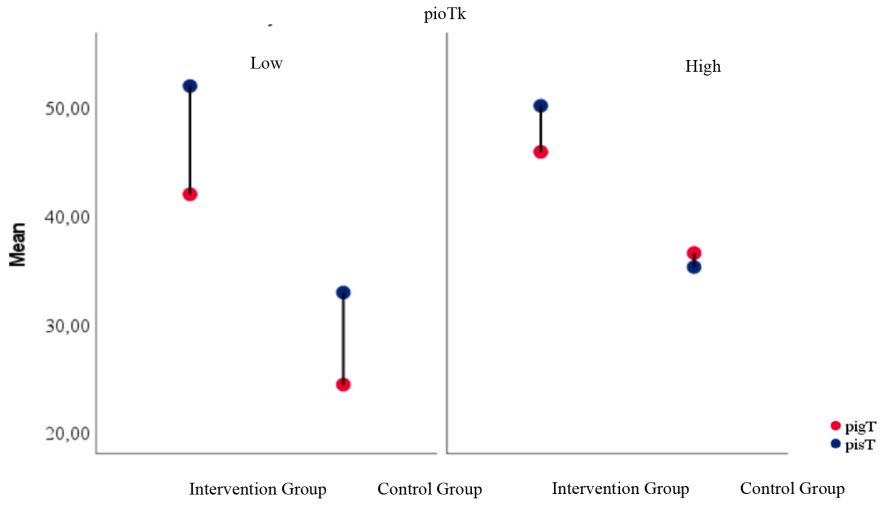


**Figure 4.**
**Drop-line Graph of Patients' Measurements on the Day of Transplantation and After the Transplantation According to Their Pre-transplant Psychological Well-being**
piogT=transplant day, piosT=after transplantation, pioTk=before transplantation

### Effects of Nurse-led Art-based Mandala on State-trait Anxiety

The difference in the mean scores of trait anxiety on the day of transplantation and after transplantation between the experimental and control groups was statistically significant (F=10.82, p<0.00). However, the time-dependent change in the mean trait anxiety scores on the day of transplantation and after transplantation was statistically insignificant (F=0.66; p>0.05). In addition, the effect of the group on trait anxiety scores did not change depending on time and pre-transplant score averages (F=0.06 and 0.34, p>0.05). The Bonferroni test was applied as a post-hoc test to determine which measurements caused the difference between the groups. The Bonferroni test revealed that trait anxiety scores obtained on the day of transplantation were lower in the experimental group ($\bar{x}$=48.43) than in the control group ($\bar{x}$=51.13). A similar situation applies to post-transplant measurements. When the partial eta-squared ($\eta^2$) time and

interaction effects were controlled, 0.20 of the variance in trait anxiety scores was attributed to group membership (Table 2). As a result, even though the average score of trait anxiety at the beginning of the study was similar between the experimental and control groups, both groups experienced moderate anxiety. After the nurse-led mandala application in the experimental group, the average trait anxiety scores decreased more than those in the control group on the day of transplantation. However, the anxiety levels continued to be classified as moderate (Table 3).

## Discussion

Stress is one of the most commonly reported psychiatric problems during bone marrow transplantation process (22). Stress, which varies between 15% and 40%, can be observed before, during, or after transplantation. In addition, studies have reported that the incidence of stress in the bone marrow transplantation process is high in the pre-transplant period and decreases on the day of transplantation and after transplantation (23-26). In our study, distress levels were high in both groups during the pre-transplant period. However, the highest level of stress was observed on the day of transplantation in the control group and before transplantation in the intervention group. On the day of transplantation, the stress level of the intervention group decreased, whereas that of the control group increased. This difference was assumed to be due to the fact that the control group received only routine care until the day of transplantation. The post-transplant distress scores show a 4-point difference between the intervention and control groups; that is, the nurse-led art-based mandala application is effective for patients in the long term. In the relevant literature, it has been stated that art-based practices provide an increase in coping resources and a significant decrease in stress level; it suggests that it can be used for relaxation, consolation, and healing in patients and reduces psychological symptoms, supporting our research results (26-28).

When studies on hopelessness are examined, approximately 23% of patients with cancer experience hopelessness (27,29). Although there are no clear data on the level of hopelessness of bone marrow transplant recipients, it is thought that the perception of cancer as a fatal disease causes cognitive and behavioral problems due to the uncertainty brought about by the current treatment, ignorance about the treatment process, and the post-treatment period, and therefore causes a sense of hopelessness in individuals (30-32). In the current study, it was determined that patients experienced hopelessness during the entire transplantation process, with the highest rate observed before transplantation in the intervention group and on the day of transplantation in the control group. The fact that the level of hopelessness decreased in the post-transplant period in both groups, but the statistically significant difference was in the intervention group, indicates that nurse-led art-based mandala practice is effective in reducing hopelessness. In support of our results, the literature reports that art-based practices contribute to inner progress by providing the individual's awareness and ego development, that creating an environment to spend time with the patient is beneficial for the patient, can contribute to the purification of negative thoughts, and thus is an effective method to increase the level of hope and well-being (28).

When the studies on anxiety are examined, it is stated that the rate of experiencing anxiety in individuals diagnosed with cancer varies between 6% and 34%, this rate can increase up to 49%, and 80% of patients experience anxiety, especially in the first period of the treatment process (24). Studies conducted in bone marrow transplant recipients suggest that the rate of anxiety increases by 29% and between 2% and 15% in the first year after transplantation (23,33). In the present study, although there was no statistically significant difference between time-dependent trait anxiety scores when trait anxiety scores were considered, there was a statistically significant difference was observed between the groups. It can be assumed that the reason for this is the difficulties faced by the patients (chemotherapy side effects, transplant complications, etc.), donor problems (lack of a suitable donor, whether the amount of product will be sufficient, etc.), the success rate of the transplant, uncertainties about the future, and the recurrence of the disease (29). Both groups initially experienced moderate anxiety, which is consistent with the emotional challenges of undergoing bone marrow transplantation (28). However, the experimental group showed a greater decrease in anxiety levels after using the mandala application, suggesting that this nurse-led art-based intervention may be more effective in reducing anxiety compared to standard care. Although anxiety levels remained moderate, the significant reduction indicates that the intervention had a notable impact on emotional regulation during the transplantation process. Contrary to the findings in the literature, both groups in our study exhibited increased anxiety during the post-transplant period. This discrepancy may be attributed to the limited duration of the post-transplant period in the current studies, which prevented a comprehensive assessment of long-term effects.

Studies on cancer and psychological well-being indicate that having a cancer diagnosis is negatively related to social, occupational functioning, and psychological well-being, and that the worsening of the course of the disease after an individual's cancer diagnosis poses a risk of negatively affecting psychological well-being (34,35). Similarly, at the beginning of our study, the psychological well-being of patients involved in the bone marrow transplantation process had the lowest level among both groups. It is stated that after the psychological support provided to bone marrow transplant recipients, patients often express many positive psychological emotions, especially gratitude, determination, and optimism (35-37). Family support, providing social support environments, and being able to participate in activities are sources of positive psychological experiences after transplantation. Cognitive

behavioral therapy interventions are beneficial, and art-based interventions are effective among the methods that provide short-term benefits in increasing psychological well-being, such as depression and anxiety (38-40). The findings of this study suggest that participating in a nurse-led art-based mandala practice can have a positive impact on the psychological well-being of individuals undergoing bone marrow transplantation. The significant increase in psychological well-being observed in the group practicing mandala art on the day of transplantation suggests that engaging in creative and reflective activities may help patients emotionally and mentally adapt to this challenging process. Furthermore, sustained well-being after transplantation indicates that these interventions may provide long-term benefits. In contrast, the control group had lower psychological well-being scores with no improvement on the day of transplantation, suggesting that standard care may not fully address the emotional needs of patients. The slower recovery observed in the control group after transplantation could be due to the natural healing process, but the difference in improvement compared with the group practicing mandala art highlights the potential benefits of early psychological interventions. Studies conducted with other patient groups using art-based mandala practice support our research results (8-10,16,41,42).

### Study Limitations

The study's major strength lies in its use of a randomized controlled trial design, which is known for reducing bias and confounding variables and providing more consistent causal effects. Additionally, this is the first study to report a nurse-led art-based mandala program tailored for bone marrow transplant recipients, both before and after transplantation. The involvement of A.Ç.Ü. experts in cancer care, who are trained in art-based mandalas, further strengthens the study. However, the study was limited by its implementation in a single center, preventing the generalization of the results to all bone marrow transplant recipients. Furthermore, the short follow-up period restricted the investigation of long-term effects, and the inability to use a double-blind method poses another challenge.

## Conclusion

Studies examining the effectiveness of nurse-led mandalas and other artistic activities on patients with cancer stated that they can reduce stress, process traumatic memories, gain a holistic perspective on the self, increase well-being, improve self-image, strengthen positive emotions, alleviate distress, clarify existential problems, and control emotional conflicts. In light of all this information, it has been determined that the nurse-led art-based mandala application in the bone marrow transplant patient group reduces the mean scores of distress, trait anxiety, and hopelessness before the transplant, on the day of transplantation, and after the transplant, and increases the psychological well-being scores of the patients. In addition, the materials used in the art-based mandala application are harmless, inexpensive, and easily accessible, making them suitable for use in bone marrow transplant recipients. Nurses can guide patients in the use of art-based mandalas during the bone marrow transplant process.

### Implications for Practice

The current study indicated that nurse-led art-based mandala practice significantly improves the care of bone marrow transplant recipients by addressing their psychosocial needs. Integrating this approach into clinical practice will allow nurses to provide more holistic support and enhance patients' overall well-being.

### Recommendations

It has been found that integrating art-based nursing practices into the care of bone marrow transplant recipients is beneficial. The use of art-based mandala intervention during bone marrow transplantation has been shown to reduce psychosocial symptoms and lead to positive clinical outcomes. Consequently, nurses should actively incorporate mandalas and other art-based practices into their clinical work, take the lead in making these practices more widely available, and support their use with high-quality research studies.

**Ethics Committee Approval:** The study will adhere to the ethical principles of the Declaration of Helsinki. Ethical approval for the study was obtained from the İstanbul Sabahattin Zaim University Scientific Research and Publication Ethics Committee (no: E-20292139-050.01.04-22860, date: 28.01.2022).

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### Footnotes

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ORIGINAL ARTICLE

# Attitudes and Awareness of Nursing Students in Developing Evidence-based Practices for Preventing Peripheral Venous Catheter-related Infections

## Hemşirelik Öğrencilerinin Periferik Venöz Kateter İlişkili Enfeksiyonların Önlenmesinde Kanıta Dayalı Uygulamaya Yönelik Tutum ve Farkındalıkları

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### Abstract

**Objective:** The aim of this study was to determine the attitudes and awareness of nursing students regarding evidence-based practices for the prevention of peripheral catheter-associated infections.

**Method:** This descriptive and cross-sectional study was conducted with 2nd, 3rd and 4th year nursing students (n=327) who were studying in the nursing department of a state university's health college and practicing clinical practice. Data were collected using student introduction form, evidence-based practices in the prevention of peripheral catheter-associated infections information form, and attitude scale toward the importance and use of evidence-based nursing for students.

**Results:** The mean total score of the attitude scale toward the importance and use of evidence-based nursing for students. was 69.94±16.26, and the mean knowledge score of evidence-based practices in the prevention of peripheral catheter-related infections was 12.37±2.64. Nursing students had the highest knowledge (97.2%) about the practice of "Aseptic technique should be followed during insertion and care of peripheral intravenous catheters", and the lowest knowledge (74.9%) about the practice of "Infusion sets used continuously in patients who are not given blood, blood products or lipid emulsions do not need to be changed more frequently than 96 hours, but should be changed at least every seven days".

**Conclusion:** Nursing students' attitudes toward the importance and use of evidence-based nursing are above the medium level, and their awareness of evidence-based practices in the prevention of peripheral catheter-related infections is high. To increase the attitudes and awareness of nursing students toward evidence-based practice, evidence-based nursing courses should be added to the nursing education curriculum and students should be encouraged to conduct scientific research and participate in scientific activities.

**Keywords:** Infection, awareness, nurse, student, peripheral venous catheter, attitude

### Öz

**Amaç:** Bu çalışmanın amacı, hemşirelik öğrencilerinin periferik kateter ilişkili enfeksiyonların önlenmesinde kanıta dayalı uygulamaya yönelik tutum ve farkındalıklarının belirlenmesidir.

**Yöntem:** Tanımlayıcı ve kesitsel nitelikteki araştırma, bir devlet üniversitesinin sağlık yüksekokulunun hemşirelik bölümünde öğrenim gören ve klinik uygulama yapan 2., 3. ve 4. sınıf hemşirelik öğrencileri ile gerçekleştirildi (n=327). Veriler öğrenci tanıtım formu, periferik kateter ilişkili enfeksiyonların önlenmesinde kanıta dayalı uygulamalar bilgi formu ve öğrenciler için kanıta dayalı hemşireliğin önemi ve kullanımına yönelik tutum ölçeği kullanılarak toplandı.

**Bulgular:** Hemşirelik öğrencilerinin öğrenciler için kanıta dayalı hemşireliğin önemi ve kullanımına yönelik tutum ölçeği toplam puan ortalaması 69,94±16,26, periferik kateter ilişkili enfeksiyonların önlenmesinde kanıta dayalı uygulamalar bilgi puanı ortalaması 12,37±2,64'tür. Hemşirelik öğrencileri, periferik kateter ilişkili enfeksiyonların önlenmesinde kanıta dayalı uygulamalardan "periferik intravenöz kateter takılması ve bakımı sırasında aseptik tekniğe uyulmalıdır" uygulaması hakkında en fazla (%97,2) bilgiye sahip iken "kan, kan ürünleri veya lipid emülsiyonları verilmeyen hastalarda devamlı kullanılan infüzyon setlerinin 96 saatten daha sık aralarla değiştirilmesi gerekli değildir fakat en azından her yedi günde bir değiştirilmelidir" uygulaması hakkında en az (%74,9) bilgiye sahiptir.

**Sonuç:** Hemşirelik öğrencilerinin kanıta dayalı hemşireliğin önemi ve kullanımına yönelik tutumları orta düzeyin üzerinde, periferik kateter ilişkili enfeksiyonların önlenmesinde kanıta dayalı uygulamalara yönelik farkındalıkları ise yüksektir. Hemşirelik öğrencilerinin kanıta dayalı uygulamaya yönelik tutum ve farkındalıklarını artırmak için kanıta dayalı hemşirelik dersinin hemşirelik eğitimi müfredatına eklenmesi ve öğrencilerin bilimsel araştırma yapma ve bilimsel etkinliklere katılmaya teşvik edilmesi önerilmektedir.

**Anahtar Kelimeler:** Enfeksiyon, farkındalık, hemşire, öğrenci, periferik venöz kateter, tutum

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## Introduction

The peripheral venous catheter (PVC) is frequently used for administration of drug therapy, peripheral parenteral nutrition, hemodynamic monitoring, prevention of fluid and electrolyte loss, transfusion of blood and blood products, and diagnostic procedures (1-3). The PVC is used in 58-87% of hospitalized patients during their treatment (3,4). Although PVCs are a vital tool when applied correctly and effectively, they can also cause many complications, such as infiltration, tissue damage, pain, and phlebitis, due to patient-related factors and malpractise. These complications may occur during PVC application or 24-96 hours after catheter removal (1). PVC complications lead to an increased risk of repeated failed PVC procedures and catheter-related bloodstream infections. PVC-associated infections constitute a significant proportion of bloodstream infections (5). The development of PVC-associated infections leads to increased exposure to diagnostic and therapeutic interventions, prolonged hospitalization, and stress for patients and their relatives. It also increases the workload of healthcare professionals and the cost of healthcare expenditures (4,6,7). Catheter-acquired infections account for 12-35% of the mortality rate in hospitals (8).

PVC-associated infections can be prevented when the causative agents are considered and necessary precautions are taken (4,5). Increasing nurses' compliance with evidence-based practice guidelines and the use of checklists are recommended to prevent PVC-related complications (2-4,9). Nurses are responsible for the insertion, care, and evaluation of PVC in line with evidence-based information (3,8,9). Nurses' knowledge and awareness of international evidence-based guidelines for the prevention of PVC-associated infections is extremely important in terms of guiding the nursing care process and supporting clinical decisions. However, it is reported in the literature that there are deficiencies and obstacles in nurses' and nursing students' knowledge of evidence-based guidelines and reflection on research results in clinical practice (4,10-12). The use of research results and evidence-based practice in clinical settings is strongly emphasized in nursing education, although there are various challenges and barriers for nurses and nursing students related to the translation of theoretical knowledge into practice (6,11,13,14).

There is limited evidence in the literature regarding nursing students' knowledge of PVC management. Assessing students' adequate knowledge of this procedure at different levels of nursing education is important in terms of documenting learning outcomes, preventing complications, and supporting patient safety (15,16). Therefore, this study aimed to determine the attitudes and awareness of nursing students toward evidence-based practice in the prevention of peripheral catheter-associated infections.

**Main Points**

- Evidence-based practices can improve the quality of healthcare.
- Nursing students should understand the importance of evidence-based nursing in their undergraduate education.
- Performing peripheral venous catheterization in accordance with evidence-based guidelines can prevent complications such as infection.

## Material and Method

### Aim and Description

This descriptive cross-sectional study was conducted to determine the attitudes and awareness of nursing students toward evidence-based practices for the prevention of peripheral catheter-related infections.

### Research Questions

What are the attitudes of nursing students toward evidence-based nursing?

What is the level of nursing students' awareness of evidence-based practices in the prevention of peripheral catheter-related infections?

### Participant

The study population consisted of 2nd, 3rd and 4th year nursing students who were studying at a state university's school of health in January-February 2024 and engaged in clinical practice (n=381). No sampling calculation was performed in the study; the aim was to reach the entire population. The sample consisted of 327 students (participation rate 85.8%) who voluntarily agreed to participate in the study and completed the questionnaire forms.

### Data Collection Tool

Student introduction form and information form on evidence-based practices in the prevention of peripheral catheter-associated infections and attitude scale toward the importance and use of evidence-based nursing for students were used for data collection. Research data were collected face-to-face from the students.

**Student introduction form:** This is a form prepared by the researchers to determine the socio-demographic and academic characteristics of nursing students, including age, gender, grade, taking research and biostatistics courses, taking evidence-based nursing courses, wanting to take postgraduate education, following scientific publications related to nursing, wanting to take part in scientific research, attending scientific meetings, and knowing how to search the literature, and consisting of a total of 10 questions (4,9,17,18).

**Evidence-based practices in the prevention of peripheral catheter-associated infections information form:** This form was prepared by the researchers in accordance with the Center for Disease Control and Prevention Guidelines for the Prevention of Intravenous Catheter Infections published in 2011 and the Turkish Society of Hospital Infections and Control National Vascular Access Management Guidelines

published in 2019 (17,18). The questionnaire comprises 14 questions to assess students' knowledge of evidence-based practices in the prevention of peripheral catheter-associated infections. Four of the items that make-up the form are related to the procedure of PVC insertion (1-4), three are related to the evaluation of PVC (5-7), four are related to PVC care (8-11) , and three are related to the frequency of PVC change (12-14). In the evaluation of the form, each application was considered as "I have knowledge (1 point)," "I have no knowledge (0 points)," and the evaluation was performed over the total number of known applications. The total score that can be obtained from the form varies between 0 and 14. The high number of items that the students evaluated as having knowledge indicated that their awareness of evidence-based practices in the prevention of peripheral catheter-associated infections was high. To ensure the content validity of the form, expert opinions were obtained from five faculty members specialized in the field of nursing principles and surgical diseases nursing, and a pilot study was conducted with 10 students outside the research group.

### Attitude Scale on the Importance and Use of Evidence-Based Nursing for Students

The scale developed by Yanıkkerem et al. (20) in 2023 comprises 18 statements. The scale statements are in a 5-point Likert-type structure scored as "strongly agree", "agree", "undecided", "disagree" and "strongly disagree". The scale has two sub-dimensions: the importance of evidence-based nursing and the use of evidence-based nursing. The total score that can be obtained from the scale varies between 18 and 90, with higher scores indicating higher levels of attitude toward the importance and use of evidence-based nursing. In the study of Yanıkkerem et al. (20) the Cronbach's alpha value of the scale was found to be 0.94. In this study, 0.97 was found.

### Data Collection Process

The data used in this study were collected from nursing students by the researchers. Students who voluntarily agreed to participate in the study were asked to read the questions carefully and answer them completely. It took approximately 5 minutes to answer the questionnaires.

### Statistical Analysis

The IBM Statistical Package for the Social Sciences (version 21.0) software was used for data evaluation. The numbers and percentages were used to evaluate categorical variables, and the mean and standard deviation were used for continuous variables. Independent samples t-test and One-Way Analysis of Variance tests were used to compare quantitative continuous data between independent groups. The threshold value of statistical significance was set as $p<0.05$.

### Ethical Consideration

Ethics committee approval was obtained from the Trakya University Non-Interventional Clinical Research Ethics Committee (no: 2023/518, date: 25.12.2023). The purpose of the study, the protection of personal information, confidentiality, and voluntary participation were explained to the participants in writing, and their informed consent was obtained. The Declaration of Helsinki was followed throughout the study. The principles of research and publication ethics were followed.

### Results

The mean age of the nursing students who participated in the study was 21.21±1.84 years, 35.2% were studying in the second year, and 68.2% were female. 34.6% of the students took research and biostatistics in nursing and 28.1% took evidence-based nursing courses. 54.4% of the students followed scientific publications related to nursing, 69.1% wanted to take part in scientific research related to nursing, and 30.6% attended scientific meetings related to nursing. 37.9% of the students stated that they knew how to search scientific literature and 60.9% of them wanted to receive postgraduate education (Table 1).

***Table 1.***
***Socio-demographic and Academic Characteristics of Nursing Students (n=327)***

| **Variables** | **Min-max** | **Mean ± SD** |
|---|---|---|
| **Age (years)** | **19-40** | **21.21±1.84** |
| | **n** | **%** |
| **Classroom** | | |
| 2nd grade<br>3rd grade<br>4th grade | 115<br>98<br>114 | 35.2<br>30<br>34.8 |
| **Gender** | | |
| Female<br>Male | 223<br>104 | 68.2<br>31.8 |
| **Research and biostatistics course in nursing** | | |
| Yes<br>No | 113<br>214 | 34.6<br>65.4 |

***Table 1.***
***Continued***

| Variables | Min-max | Mean ± SD |
|---|---|---|
| **Having completed an evidence-based nursing course** | | |
| Yes<br>No | 92<br>235 | 28.1<br>71.9 |
| **Follow scientific publications related to nursing** | | |
| Yes<br>No | 178<br>149 | 54.4<br>45.6 |
| **To participate in scientific research related to nursing** | | |
| Yes<br>No | 226<br>101 | 69.1<br>30.9 |
| **Participating in scientific meetings (congress, symposium) related to nursing** | | |
| Yes<br>No | 100<br>227 | 30.6<br>69.4 |
| **To learn how to search the scientific literature** | | |
| Yes<br>No | 124<br>203 | 37.9<br>62.1 |
| **Wishing to pursue postgraduate education** | | |
| Yes<br>No | 198<br>124 | 60.6<br>39.4 |

*Min=minimum, Max=maximum, SD=standard deviation*

The mean total score of the nursing students on the attitude scale toward the importance and use of evidence-based nursing for students was 69.94±16.26, the mean score of the sub-dimension of the importance of evidence-based nursing was 30.73±7.11, and the mean score of the sub-dimension of the use of evidence-based nursing was 39.21±9.29. The mean score of the students' knowledge of evidence-based practices in the prevention of peripheral catheter-related infections was 12.37±2.64, the mean score of PVC insertion was 3.44±0.96, the mean score of PVC evaluation was 2.70±0.69, the mean score of PVC care was 2.84±0.56 and the mean score of PVC change frequency was 3.37±1.01 (Table 2).

In this study, the mean scores of second-year nursing students on the total and sub-dimensions of the attitude scale toward the importance and use of evidence-based nursing for students were significantly lower than those of third- and fourth-year students ($p<0.05$). The mean scores of the students who had taken evidence-based nursing courses were significantly higher than those of the students who had not taken this course ($p<0.05$). There was no significant difference ($p>0.05$) between the mean scores of the students' gender, the status of taking research and biostatistics courses in nursing, the status of following scientific publications, the status of wanting to take part in scientific research, attending scientific meetings, even searching the scientific literature, and the status of wanting to receive postgraduate education and the mean scores of the total and sub-dimensions of the attitude scale toward the importance and use of evidence-based nursing for students (Table 3).

In this study, the mean knowledge score of evidence-based practices in the prevention of peripheral catheter-associated infections was significantly higher among second-year students than third-year students, female students than male students, students who followed scientific publications related to nursing than those who did not, students who wanted to take part in scientific research related to nursing than those who did not, students who attended scientific meetings related to nursing than those who did not, students who knew how to search scientific literature than those who did not, and students who wanted to take postgraduate education than those who did not ($p<0.05$). There was no significant difference between the mean scores of the students' knowledge of evidence-based practices in the prevention of peripheral catheter-associated infections and their status of taking research and biostatistics in nursing and evidence-based nursing courses ($p>0.05$) (Table 3).

Nursing students had the highest knowledge (97.2%) about the practice of "Aseptic technique should be followed during insertion and care of peripheral intravenous catheters" and the lowest knowledge (74.9%) about the practice of "It is not necessary to change the infusion sets used continuously in patients who are not given blood, blood products or lipid emulsions at intervals more than 96 hours, but they should be changed at least every seven days" (Table 4).

***Table 2.***
***Mean Scores of Nursing Students' Knowledge of Evidence-based Practices in the Prevention of Peripheral Catheter-associated Infections and Attitude Scale Scores for the Importance and Use of Evidence-based Nursing for Students (n=70)***

| | Scale range | Participant range | Mean ± SD |
|---|---|---|---|
| Attitude scale on the importance and use of evidence-based nursing for students | 18-90 | 18-90 | 69.94±16.26 |
| Importance of evidence-based nursing sub-dimensions | 8-40 | 8-40 | 30.73±7.11 |
| Use of evidence-based nursing sub-dimensions | 10-50 | 10-50 | 39.21±9.29 |
| Evidence-based practices in the prevention of peripheral catheter-associated infections information form | 0-14 | 0-14 | 12.37±2.64 |
| PVC installation | 0-4 | 0-4 | 3.44±0.96 |
| PVC evaluation | 0-3 | 0-3 | 2.70±0.69 |
| PVC care | 0-3 | 0-3 | 2.84±0.56 |
| The change frequency of PVC | 0-4 | 0-4 | 3.37±1.01 |

*PVC=peripheral venous catheter, SD=standard deviation*

***Table 3.***
***Comparison of Socio-demographic and Academic Characteristics of Nursing Students and Their Mean Scores of Knowledge of Evidence-based Practices in the Prevention of Peripheral Catheter-associated Infections Using the Attitude Scale Toward the Importance and Use of Evidence-based Nursing for Students***

| Variables | Attitude scale on the importance and use of evidence-based nursing for students | The importance of evidence-based nursing | Use of evidence-based nursing | Knowledge score for evidence-based practices in the prevention of peripheral catheter-associated infections |
|---|---|---|---|---|
| **Classroom** | | | | |
| 2nd grade<br>3rd grade<br>4th grade<br>F<br>p | 65.25±17.85<br>71.47±13.99<br>73.35±15.38<br>8.075<br>**0.000**<br>2<3.4 | 28.72±7.84<br>31.19±6.17<br>32.36±6.54<br>8.152<br>**0.000**<br>2<3.4 | 36.53±10.10<br>40.28±7.99<br>40.99±8.93<br>7.839<br>**0.000**<br>2<3.4 | 12.78±2.38<br>11.77±3.22<br>12.46±2.22<br>4.033<br>**0.019**<br>2>3 |
| **Gender** | | | | |
| Female<br>Male<br>t<br>p | 69.79±15.93<br>70.26±17.00<br>-0.246<br>0.806 | 30.58±6.97<br>31.04± 7.43<br>-0.545<br>0.586 | 39.20±9.10<br>39.22±9.74<br>-0.013<br>0.989 | 12.65±2.33<br>11.75±3.12<br>2.604<br>**0.010** |
| **Research and biostatistics course in nursing** | | | | |
| Yes<br>No<br>t<br>p | 71.47±16.37<br>69.13±16.18<br>1.240<br>0.216 | 31.60±7.08<br>30.27±7.10<br>1.606<br>0.109 | 39.87±9.43<br>38.85±9.22<br>0.940<br>0.348 | 12.54±2.43<br>12.27±2.74<br>0.888<br>0.375 |
| **Having completed an evidence-based nursing course** | | | | |
| Yes<br>No<br>t<br>p | 74.06±13.73<br>68.33±16.90<br>3.172<br>**0.002** | 32.59±6.02<br>30.00±7.38<br>3.272<br>**0.001** | 41.46±7.86<br>38.32±9.67<br>3.035<br>**0.003** | 12.65±1.84<br>12.25±2.88<br>1.457<br>0.146 |

***Table 3.***
***Continued***

| Variables | Attitude scale on the importance and use of evidence-based nursing for students | The importance of evidence-based nursing | Use of evidence-based nursing | Knowledge score for evidence-based practices in the prevention of peripheral catheter-associated infections |
|---|---|---|---|---|
| **Follow scientific publications related to nursing** | | | | |
| Yes | 70.97±17.00 | 31.28±7.42 | 39.68±9.66 | 13.06±1.85 |
| No | 68.71±15.28 | 30.07±6.68 | 38.64±8.83 | 11.54±3.15 |
| t | 1.261 | 1.552 | 1.016 | 5.166 |
| p | 0.208 | 0.122 | 0.310 | **0.000** |
| **To participate in scientific research related to nursing** | | | | |
| Yes | 70.51±17.34 | 30.98±7.62 | 39.53±9.85 | 12.72±2.21 |
| No | 68.66±13.51 | 30.17±5.82 | 38.48±7.91 | 11.57±3.29 |
| t | 1.047 | 1.044 | 0.944 | 3.208 |
| p | 0.296 | 0.297 | 0.346 | 0.002 |
| **Participating in scientific meetings (congress, symposium) related to nursing** | | | | |
| Yes | 69.63±17.53 | 30.73±7.73 | 38.90±9.89 | 12.89±2.06 |
| No | 70.08±15.70 | 30.73±6.84 | 39.34±9.04 | 12.14±2.83 |
| t | -0.222 | -0.006 | -0.387 | 2.683 |
| p | 0.824 | 0.995 | 0.699 | **0.008** |
| **To learn how to search the scientific literature** | | | | |
| Yes | 69.62±15.89 | 30.79±6.90 | 38.83±9.08 | 13.09±1.81 |
| No | 70.14±16.51 | 30.69±7.26 | 39.44±9.43 | 11.92±2.95 |
| t | -0.281 | 0.112 | -0.578 | 4.439 |
| p | 0.779 | 0.911 | 0.564 | **0.000** |
| **Wishing to pursue postgraduate education** | | | | |
| Yes | 69.71±17.71 | 30.63±7.78 | 39.08±10.05 | 12.74±2.22 |
| No | 70.29±13.78 | 30.89±5.96 | 39.40±8.03 | 11.79±3.09 |
| t | -0.330 | -0.341 | -0.315 | 3.037 |
| p | 0.742 | 0.733 | 0.753 | **0.003** |

*t=independent samples t-test, F=One-Way Analysis of Variance*

***Table 4.***
***Distribution of Nursing Students' Knowledge About Evidence-based Practices for the Prevention of PVC-associated Infections***

| Evidence-based practices for preventing PVK-associated infections | I have the information n (%) | No information n (%) |
|---|---|---|
| **PVC installation** | | |
| **1.** Only competent and trained personnel should be assigned for the insertion and maintenance of peripheral and central intravascular catheters. | 280 (85.6) | 47 (14.4) |
| **2.** In adults, peripheral catheters should be inserted into the veins of the upper extremities. A catheter inserted in the lower extremity should be removed as soon as possible, and a new catheter should be inserted in the upper extremity. | 265 (81) | 62 (19) |
| **3.** In pediatric patients, the back of the hand, foot, or scalp (in neonates and small infants) can be used for the insertion of peripheral catheters. | 278 (85) | 49 (15) |
| **4.** When selecting the catheter, the purpose of use, possible duration of use, known infectious and non-infectious complications (such as filebitis and infiltration), and experience of the person inserting the catheter should be taken into consideration. | 305 (93.3) | 22 (6.7) |

***Table 4.***
***Continued***

| Evidence-based practices for preventing PVK-associated infections | I have the information n (%) | No information n (%) |
|---|---|---|
| **PVC evaluation** | | |
| **5.** The knowledge and compliance of all personnel involved in the insertion and maintenance of peripheral intravenous catheters with current guidelines should be periodically evaluated. | 286 (87.5) | 41 (12.5) |
| **6.** The catheter entry site should be checked daily. In cases where gauze is used, the catheter entry site should be palpated over the gauze to assess tenderness. If a transparent cover is used, daily inspection of the catheter entry site is sufficient. If the patient has no clinical signs of infection, the gauze dressing should not be removed. In the presence of local tenderness or possible signs of infection, the gauze must be removed, and the site of insertion must be visualized and evaluated. | 303 (92.7) | 24 (7.3) |
| **7.** PVCs should be removed if the patient develops phlebitis (warmth, tenderness, erythema or palpable vascular trace), signs of infection, or catheter dysfunction. | 296 (90.5) | 31 (9.5) |
| **PVC care** | | |
| **8.** The aseptic technique should be followed during the insertion and maintenance of the peripheral intravenous catheter. | 318 (97.2) | 9 (2.8) |
| **9.** The skin should be wiped with an antiseptic solution (70% alcohol, tincture of iodine, iodophor or chlorhexidine gluconate) before inserting a peripheral intravenous catheter. | 311 (95.1) | 16 (4.9) |
| **10.** Sterile gauze or sterile, transparent, semi-permeable covers should be used to cover the catheter entry site. | 300 (91.7) | 27 (8.3) |
| **The change frequency of PVC** | | |
| **11.** The catheter dressing must be changed when it becomes moist, loosened (integrity is impaired), or visible contamination occurs. | 307 (93.9) | 20 (6.1) |
| **12.** In adult patients, peripheral catheters do not need to be changed at intervals shorter than 72-96 hours to reduce the risk of thrombophlebitis and infection. | 269 (82.3) | 58 (17.7) |
| **13.** In children, peripheral catheters should be changed in the presence of clinical indications. | 282 (86.2) | 45 (13.8) |
| **14.** In patients who do not receive blood, blood products, or lipid emulsions, continuous infusion sets do not need to be changed more frequently than every 96 hours, but should be changed at least every seven days. | 245 (74.9) | 82 (25.1) |

*PVC=peripheral venous catheter*

## Discussion

### Nursing Students' Attitudes Toward the Importance and Use of Evidence-based Nursing

Evidence-based nursing practices are an indispensable element for nurses, patients, and healthcare systems to improve the quality of healthcare (20). Evidence-based nursing is a problem-solving approach that evaluates the most current and best evidence with clinical expertise and considers the patient's preferences and needs (19,20). Evidence-based practices have been shown to reduce length of stay and cost of care, eliminate unnecessary practices, improve quality of care, and improve patient outcomes (9,20). Therefore, it is important to inform students about evidence-based nursing practices in undergraduate nursing education and to develop a positive attitude toward this issue (11,15,19). In this study, nursing students' attitudes toward the importance and use of evidence-based nursing were found to be above the middle level. Studies examining nursing students' attitudes toward evidence-based nursing have shown that students' attitudes are above the middle level (16,21-23). It is important to comply with evidence-based practices to prevent peripheral catheter-related infections. However, nursing students who participated in our study exhibited deficiencies regarding the importance and use of evidence-based practices.

The attitudes of 2nd grade nursing students toward the importance and use of evidence-based nursing were lower than those of 3rd and 4th grade students. It is believed that the knowledge and experience of 2nd grade students are lower than those of other grades, which led to this finding. In this study, we determined that students who took evidence-based nursing courses had higher attitudes toward the

importance and use of evidence-based nursing. In our country, evidence-based nursing courses are conducted either as elective courses or as a subject integrated into another course. Integrating evidence-based nursing courses into nursing education curricula will increase students' attitudes toward the importance and use of evidence-based nursing (24). In the institution where the study was conducted, an evidence-based nursing course is an elective course. Considering that students who take this course will have higher levels of knowledge about evidence-based nursing, their attitudes are positively affected in parallel.

**Nursing Students' Awareness of Evidence-based Practices for Preventing Peripheral Catheter-associated Infections**

PVC, a basic intervention in healthcare services, is the process of entering the patient's peripheral vein using a short catheter (4). It is the responsibility of nurses to ensure appropriate care of PVC application using evidence-based information and to provide the necessary follow-up information to prevent complications that may arise (4,6,8,18). In the present study, nursing students had a high awareness of evidence-based practices for the prevention of peripheral catheter-related infections. Nurses should improve their knowledge and skills to provide the necessary care for their patients. Knowledge and implementation of evidence-based practice guideline recommendations for the prevention of PVC-associated infections play an important role in the prevention of infection development (4,8). In our study, students had the highest awareness of PVC insertion and the lowest awareness of PVC replacement. In a study conducted by Dayan et al. (8) with nurses, it was reported that nurses had more knowledge about PVC insertion and less knowledge about PVC replacement.

The students had the highest awareness of evidence-based practices in the prevention of peripheral catheter-related infections based on compliance with the aseptic technique during peripheral intravenous catheter insertion and care. In the literature, it has been reported that nurses and nursing students have high levels of knowledge about ensuring hand hygiene before peripheral catheter insertion and compliance with aseptic technique (6-8). The main determinants of PVC-associated infections are hand hygiene, compliance with the aseptic technique, preparation of intravenous solutions, and duration of catheter stay (6,17,18). The necessity to comply with the aseptic technique in both PVC and all other nursing applications is one of the most emphasized aspects of education. Therefore, it is expected that students will have the highest rate of awareness for this item.

It was determined that the lowest awareness of the students regarding evidence-based practices in the prevention of peripheral catheter-associated infections was that it was not necessary to change the infusion sets used continuously in patients who were not given blood, blood products, or lipid emulsions more frequently than 96 hours, but at least every seven days. In the literature, it has been stated that the knowledge level of nurses and nursing students regarding the prevention of PVC-associated infections is not sufficient with the replacement of infusion sets more frequently than every 96 hours when neither lipid nor blood products are administered (3,8). The lack of sufficient evidence regarding the known optimum usage time can be considered as an important factor affecting the low level of knowledge on this subject. It is thought that determining and implementing a protocol regarding the frequency of change of infusion sets by utilizing evidence-based practices in clinical areas and informing students about this protocol will increase the awareness of students (6,15).

Among the nursing students who participated in the study, it was determined that students who followed scientific publications related to nursing, wanted to take part in scientific research related to nursing, attended scientific meetings related to nursing, knew how to scan scientific literature, and had a higher awareness of evidence-based practices in the prevention of peripheral catheter-related infections. It has also been reported in the literature that students who follow scientific publications and attend scientific meetings have higher attitude scores toward evidence-based nursing (22,23). To use evidence-based nursing practices, the ability to access and use scientific knowledge is essential. Participation in congresses and symposiums contributes to the foundation of nursing care practices and the development of professional developments. It is inevitable that students who follow scientific publications, participate in scientific meetings, and know how to access information will base their professional knowledge and practices on a more professional basis and use new information to perform their profession in the best way in line with evidence-based practices (22,24).

**Study Limitations**

The research data were based on the self-reports of the students, and no observation was made on whether the students applied evidence-based practices. The research was conducted in an institution; thus, the results of this study cannot be generalized to all nursing students.

**Conclusion**

Nursing students' attitudes toward the importance and use of evidence-based nursing are above the medium level, and their awareness of evidence-based practices in the prevention of peripheral catheter-related infections is high. The students had the highest awareness of PVC insertion and the lowest awareness of PVC replacement. Following scientific publications related to nursing, wanting to take part in scientific research related to nursing, attending scientific meetings related to nursing, and knowing how to scan scientific literature increase students' awareness of evidence-based practices in the prevention of peripheral catheter-related infections. Taking evidence-based nursing courses increases students' attitudes toward the importance and use of evidence-based nursing. To increase nursing students' attitudes and awareness toward evidence-based

practice in the prevention of PVC-associated infections, evidence-based nursing courses should be added to the nursing education curriculum as a compulsory course, and students should be encouraged to conduct scientific research and participate in scientific activities.

**Ethics Committee Approval:** Ethics committee approval was obtained from the Trakya University Non-Interventional Clinical Research Ethics Committee (no: 2023/518, date: 25.12.2023).

**Informed Consent:** Their informed consent was obtained.

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### Footnotes

**Authorship Contributions:** Concept – A.A.B., D.K.; Design – A.A.B., D.K.; Data Collection and/or Processing – A.A.B., D.K.; Analysis and/or Interpretation – A.A.B., D.K.; Literature Review – A.A.B., D.K.; Writing – A.A.B., D.K.

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ORIGINAL ARTICLE

# Bibliometric Analysis of Oral Health and Oral Care in Nursing by Visual Mapping Method (1981-2023)

## Hemşirelik Alanında Ağız Sağlığı ve Ağız Bakımı ile İlgili Araştırmaların Görsel Haritalama Yöntemiyle Bibliyometrik Analizi (1981-2023)

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**Abstract**

**Objective:** This study aimed to identify scientific literature on oral care and oral health by analyzing the bibliometric characteristics of studies on oral care and oral health in the field of nursing.

**Method:** The research is a descriptive and retrospective study. Research data were obtained from the Web of Sciences Core Collection database on February 12, 2024. The keywords "oral care", "mouth care", "oral health", or "oral hygiene" were searched. We analyzed 733 research articles that met the inclusion criteria. The science mapping and bibliometric analyses were performed using the "VOSviewer" software.

**Results:** The first article in this field was written by Reidun Daeffler in 1981. The most commonly used keywords in the field were "oral health", "oral care" and "nursing". The total number of citations was 9,446 and the average number of citations per article was 12.89.

**Conclusion:** The popular research areas and topics of the scientific literature on oral care and oral health in nursing. The results of the bibliometric analysis showed that the interest in oral health and oral care in the field of nursing has increased in recent years.

**Keywords:** Bibliometric analysis, oral care, oral health, nursing care

**Öz**

**Amaç:** Bu araştırma, hemşirelik alanında ağız bakımı ve ağız sağlığı ile ilgili yapılan araştırmaların bibliyometrik özelliklerini analiz ederek konuyla ilgili bilimsel literatürü ortaya koymak amacıyla yapıldı.

**Yöntem:** Bu araştırma, tanımlayıcı ve retrospektif bir çalışmadır. Araştırma verileri 12 Şubat 2024 tarihinde "Web of Sciences Core Collection" veri tabanından elde edildi. Araştırmada "oral care" or "mouth care" or "oral health" or "oral hygiene" anahtar kelimeleri ile arama yapıldı. Dahil edilme kriterlerini karşılayan 733 araştırma makalesi analiz edildi. Araştırmanın bilim haritalaması ve bibliyometrik analizleri, "VOSviewer" yazılım programı kullanılarak yapıldı.

**Bulgular:** Bu alanda ilk makale 1981 yılında Reidun Daeffler tarafından yazılmıştır. Alanda en çok kullanılan anahtar kelimeler "oral health", "oral care" ve "nursing" olmuştur. Yayınların toplam atıf sayısı 9.446, makale başına ortalama atıf sayısı ise 12,89 olarak belirlendi.

**Sonuç:** Bu araştırma, hemşirelik alanında ağız bakımı ve ağız sağlığıyla ilgili yapılmış bilimsel literatüre ilişkin popüler araştırma alanlarını ve konularını göstermektedir. Bibliyometrik analiz sonucunda hemşirelik alanında ağız sağlığı ve ağız bakımına olan ilgilin son yıllarda arttığı belirlendi.

**Anahtar Kelimeler:** Bibliyometrik analiz, ağız bakımı, ağız sağlığı, hemşirelik bakımı

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## Introduction

Oral health is defined as the absence of lesions or pain in the mouth, as well as a comfortable and functional oral structure that allows individuals to maintain their desired social role (1). Oral health and hygiene are known to be associated with general health, comfort, and well-being and to influence quality of life and overall well-being (1,2). The mouth is affected by various pathologies, such as periodontitis, gingivitis, and dental caries, which have a high prevalence in humans and are associated with changes in the oral microbiome. The site is also an important site for the development of other systemic diseases because it is the gateway to respiratory and digestive systems (3). Poor oral health is associated with impaired oral functions, such as speaking, chewing, and swallowing, malnutrition, dehydration, and pneumonia, as well as joint infections, atherosclerosis, cardiovascular disease, and poor glycemic control (4-6). In other words, poor oral health leads to a decrease in health-related quality of life, an increase in healthcare expenditures, and an increase in morbidity and mortality rates because it causes some non-communicable diseases. For all these reasons, oral hygiene and oral care are important parameters related to the reduction of disease risks and are important care practices that should be paid special attention to in all age groups (7,8).

Oral care is a complex set of practices that includes individualized care, such as assessing the oral cavity, reducing microorganisms in saliva, breaking down plaque, cleaning the inside of the mouth to prevent plaque-related diseases, maintaining oral hygiene, and maintaining psychological well-being (9,10). The primary goals of oral care are to maintain moisture, reduce microbial colonization in the mouth, and protect oral health (7,9,11,12). Oral care is an important part of nursing care and is one of the most important practices that affect the overall health and comfort of patients in all care settings (13,14). Many studies in different patient populations have shown that oral care practices provided by nurses are effective in preventing dry mouth, reducing ventilator-associated pneumonia, and protecting and improving oral health (7,12,15,16).

Bibliometrics is a research method that allows the identification and selection of studies on a topic. Although there are a limited number of bibliometric studies on oral care in the literature, the existing studies cannot reveal the global trends of studies on oral care and oral health practices in nursing practice in a comprehensive and detailed manner (17,18). Therefore, this study was conducted to analyze the bibliometric characteristics of studies on oral care and oral health in nursing to reflect the existing evidence, understand the research gaps, and guide future studies.

**Main Points**

- Oral care practices applied by nurses to patients are among the most important interventions for maintaining oral health and hygiene, providing comfort and well-being, and improving quality of life.
- Therefore, bibliometric and trend analyses of studies on oral care and health in nursing are of great importance for future research.

## Material and Method

### Research Questions

This study sought to answer the following questions:

1-What is the distribution of publications by years?

2-What is the impact of the included studies on the literature (total number of citations and H-index)?

3-Who are the leading authors, journals, countries, and institutions according to the number of publications and citations?

4-What are the collaborations between countries and institutions?

5-What are the trends in keywords and topics in the articles included in this study?

### Design, Data Collection, and Sample Collection

This research is a descriptive and retrospective study. In this study, bibliometric data analysis was used to achieve the research objective and answer the research questions. The bibliometric analysis method is used to reveal emerging trends in article and journal performance, patterns of collaboration, and research components, and to explore the study structure of a particular field in the existing literature (19). It also evaluates the productivity of authors, countries, institutions, journals, and international collaborations. The most commonly used databases for bibliometric analysis are Web of Sciences (WoS), PubMed, Embase, Scopus, SpringerLink, Google Scholar, and ScienceDirect. These databases have different features. The WoS is a bibliographic database that shows the impact of scientific journals in different disciplines, the number of citations received by published articles, the lists of authors' articles, and the references of articles. The dataset used in this study was obtained from the WoS database because it is comprehensive and up-to-date in the field of health sciences and is highly preferred by researchers. The research data were obtained by searching the WoS Core Collection (WoSCC) database on February 12, 2024 using the keywords "oral care", "mouth care", "oral health", or "oral hygiene". The keyword search yielded a total of 449,441 studies in all categories in the WoS database. Articles published in the nursing category (n=766) and in English from 1981 to 2023 comprised the study sample (n=733). After screening using keywords and restrictions, WoS publications were distributed as articles (n=733), review articles (n=79), editorial material (n=37), meeting abstracts (n=36), early access (n=12), proceedings papers (n=8), letters (n=12), book reviews (n=2), book chapters (n=2), news items (n=1), and corrections (n=1). The database included in the bibliometric analysis was downloaded to the researcher's personal computer as a file with the .txt extension.

### Statistical Analysis

Descriptive and bibliometric data analysis was conducted in this study. Descriptive data (distribution of publications by years, author with the most publications, country, institution, most cited publications, and journals) were tabulated using WoSCC. VOSviewer (Version 1.6.20, Center for Science and Technology Studies of Leiden University) software was used to create network maps and visualize the literature in the bibliometric analysis. "VOSviewer", an important bibliometric mapping application, is very useful for the analysis of large-scale data. Bibliometric analysis included citation analysis, co-author analysis, common word analysis, bibliographic matching, country, institution, and author collaboration.

In bibliometric mapping, each item is represented as a circle, and the higher the activity of an item, the larger the circle. The colors of the circles are associated with the clusters to which the items belong. The lines represent the connections between elements. A short distance or proximity between items emphasizes the strength of the relationship between them (20).

### Ethical Considerations

This was a retrospective review of studies published in WoS, and ethics committee approval was not required. The study adhered to the tenets of the Declaration of Helsinki.

## Results

### Distribution Characteristics of Relevant Literature

The first research on oral health and care in nursing was published in 1981 by Reidun Daeffler in the journal "Cancer Nursing" in the article titled "Oral hygiene measures for patients with cancer. III" by Reidun Daeffler in 1981.

The most articles in the field were published in 2019 (n=64 articles), second in 2023 (n=63 articles) and third in 2020 (n=55 articles) (Figure 1).

"Journal of Clinical Nursing" (47 articles, 837 citations, 217 total links strength), "Geriatric Nursing" (29 articles, 393 citations, 90 total link strengths) and "Australian Journal of Rural Health" (25 articles, 184 citations, 3 total link strengths) were the journals that published the most articles on oral health and oral care in the field of nursing (Table 1).

It was determined that the author who contributed the most to the field was "Ajesh George" (n=18 articles, 347 citations, 300 total link strengths), the country with the most publications was the USA (n=272 articles, 4302 citations, 681 total link strengths), and the institution with the most publications was "The University of Sydney" (26 articles, 359 citations, 289 total link strengths) (Tables 1, 2).

### Citation Analysis (Journal, Author, Article, and Country)

Citation network analysis counts direct citations from one document to another. The strength of the citation network increases as the number of citations increases. The first citation in the field was in 1986 (3 citations). If the number of citations of the articles is analyzed by years, the highest number of citations in the field was made in 2021 (1039 citations), second in 2022 (1005 citations), and third in 2023 (1001 citations). The total number of citations of the articles included in the bibliometric analysis was 9,446, the average number of citations per article was 12.89, and the H-index was 44 (Figure 1).

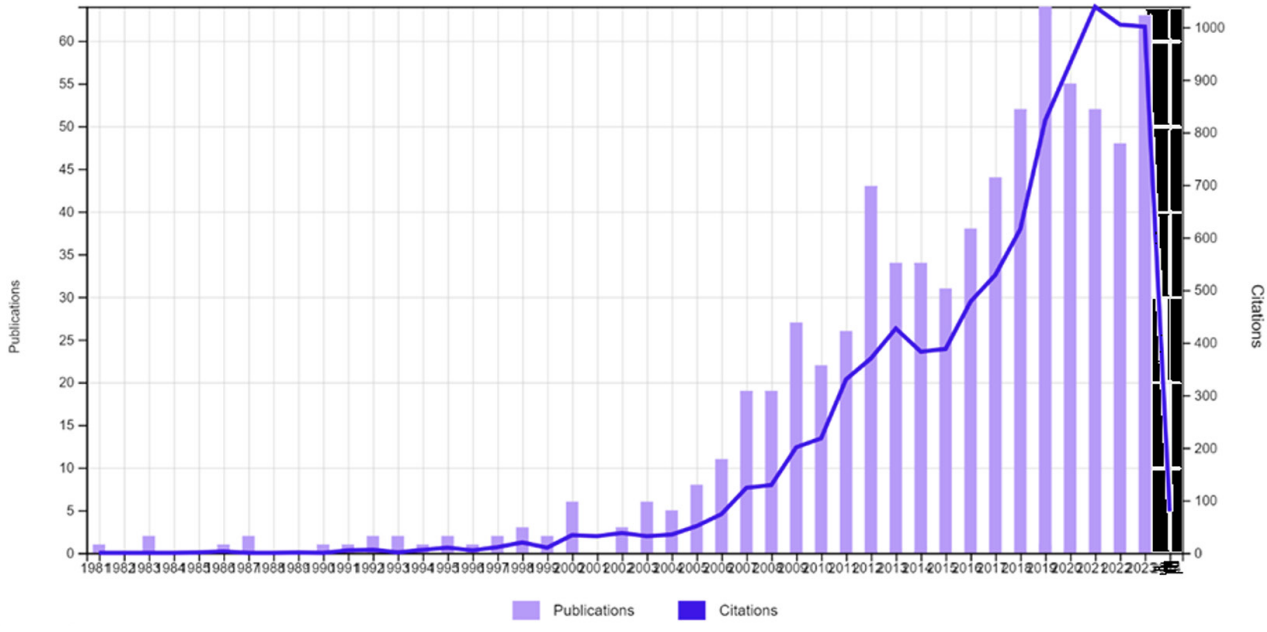


**Figure 1.**
**Number of Publications and Citations by Years (1981-2023)**

***Table 1.***
***Top 10 Authors, Countries, Institutions, and Journals***

| Author | Article count | Institution | Article count | Country | Article count | Journal | Article count |
|---|---|---|---|---|---|---|---|
| Ajesh George | 18 | University of Sydney | 26 | USA | 272 | Journal of Clinical Nursing | 47 |
| Shilpi Ajwani | 11 | New York University | 24 | Australia | 87 | Geriatric Nursing | 29 |
| Sameer Bhole | 11 | Virginia Commonwealth University | 14 | Brazil | 49 | Australian Journal of Rural Health | 25 |
| Mary Jo Grap: The Official Website | 11 | Western Sydney University | 13 | Sweden | 43 | American Journal of Critical Care | 23 |
| Cindy Munro | 10 | University of North Carolina | 12 | Turkey | 39 | Journal of Advanced Nursing | 22 |
| Rita Jablonski | 10 | Karolinska Institutet | 11 | England | 37 | Public Health Nursing | 16 |
| Anthony Blinkhorn | 8 | National Taiwan University | 11 | Taiwan | 32 | Journal of Gerontological Nursing | 16 |
| Maree Johnson | 7 | University Tasmania | 10 | South Korea | 28 | Scandinavian Journal of Caring Sciences | 16 |
| Mary Lou Sole | 7 | Chang Gung University, Science and Technology | 10 | Canada | 23 | Cancer Nursing | 15 |
| Mei-Yen Chen | 7 | Chang Gung University | 10 | People's Republic of China | 23 | Intensive and Critical Care Nursing | 14 |

When the journal and citation analysis was performed by limiting the number of journals publishing more articles in the field to a minimum of two publications and two citations, 107 journals were identified. The total number of journals that met the thresholds was 144. After this analysis, the most cited journal in the field of nursing related to oral health and oral care was the "American Journal of Critical Care" (235 articles, 1171 citations, 534 total link strengths). The second most cited journal was the "Journal of Clinical Nursing" (837 citations, total link strengths), and the third most cited journal was the "Journal of Advanced Nursing" (568 citations, 176 total link strengths) (Table 2, Figure 2).

The article "Oral Health and Care in the Intensive Care Unit: State of the Science" by Munro and Grap (21), published in "Chest" in 2009, was the most cited article in the field, with 146 citations. The article "Chlorhexidine, tooth brushing, and preventing ventilator-associated pneumonia in critically ill adults" published by Munro et al. (22) in the "American Journal of Critical Care" was the second most cited article with 136 citations. The article "Oral Care Interventions in Critical Care: frequency and documentation" by Grap et al. (23) in the "American Journal of Critical Care" was the third most cited article with 115 citations (Table 2).

When the citation analysis of publications related to oral health and oral care in the field of nursing was limited to at least two publications per author and at least two citations per publication, 1841 authors exceeded the threshold. The total number of authors who satisfied the thresholds was 16,367. The most cited author was "Grap Mary Jo" (11 articles, 645 citations, 42 total link strenghs), followed by "Cindy L. Munro" (10 articles, 612 citations, 24 total link strengths), and the third was "George Ajesh" (18 articles, 347 citations, 300 total link strengths) (Figure 3a).

**Co-author Analysis (Author, Institute, Country)**

Using the minimum number of publications and citations per author, the number of authors meeting the thresholds was 2721. When the threshold per author was limited to two publications and two citations, a total of 283 authors were identified. The author with the highest number of co-authored articles in the field was "George Ajesh" (18 articles, 347 citations, 20 links, 82 total link strengths), followed by "Ajwani Shilpi" (11 articles, 306 citations, 18 links, 63 total link strengths), and "Bhole Sameer" (11 articles, 306 citations, 18 links, 63 total link strengths) (Table 1, Figure 3a).

In the analysis of collaboration between co-authors and institutions, the total number of institutions that met the thresholds and collaborated was 1099. When the threshold per institution was limited to at least two publications and two citations, the total number of collaborating institutions was 234. According to the bibliometric analysis, the most collaborating institution was "The University of Sydney" (26 articles, 359 citations, 77 total link strengths), the second

***Table 2.***
***The Top 10 Most Cited Artciles and Journals***

| Article | Author-year | Total citations | Journal | Total citations |
|---|---|---|---|---|
| Oral health and care in intensive care: state of the science | Munro and Grap, (2004) | 146 | American Journal of Critical Care | 1171 |
| Chlorhexidine, toothbrushing, and ventilator-associated pneumonia prevention in critically ill adults | Munro et al., (2009) | 136 | Journal of Clinical Nursing | 837 |
| Oral care interventions in critical care: frequency and documentation | Grap et al., (2003) | 115 | Journal of Advanced Nursing | 568 |
| Qualified nurses lack adequate knowledge about oral health, resulting in inadequate oral care for patients in medical wards. | Adams R, (1996) | 111 | Geriatric Nursing | 393 |
| Oral health care: a low priority in nursing: in-depth interviews with nursing staff | Wårdh et al., (2000) | 102 | Cancer Nursing | 392 |
| Nurses' implementation of guidelines for ventilator-associated pneumonia from centers for disease control and prevention | Cason et al., (2007) | 92 | Scandinavian Journal of Caring Sciences | 341 |
| Oral health status and development of ventilator-associated pneumonia: a descriptive study | Munro et al., (2006) | 80 | International Journal of Nursing Studies | 267 |
| Assessment, management, and prevention of early childhood caries | Kagihara et al., (2009) | 78 | Intensive and Critical Care Nursing | 226 |
| Dysphagia and aspiration pneumonia in older adults | Eisenstadt ES, (2010) | 76 | The American Journal of Maternal and Child Nursing | 195 |
| Basic nursing care for non-ventilatory hospital-acquired pneumonia | Quinn et al., (2014) | 75 | Journal of Neuroscience Nursing | 188 |

was "Western Sydney University" (13 articles, 124 citations, 53 total link strengths), and the third was "South Western Sydney Local Health District" (10 articles, 104 citations, 43 total link strengths) (Figure 3b).

In the co-author-country collaboration analysis, the total number of countries that met the thresholds and collaborated was 52. According to the co-author country analysis, the most collaborating country was the "USA" (272 articles, 4302 citations, 41 total link strengths), followed by the "UK" (37 articles, 476 citations, 29 total link strengths), and "Australia" (87 articles, 1083 citations, 25 total link strengths) (Figure 3c).

**Bibliographic Coupling Analysis**

Documents identified in the reference lists as referring to one or more common sources are called bibliographically matched documents (24). The total number of documents that met the thresholds in the bibliographic match analysis was 733. When the thresholds were limited to 2 citations per document, the number of publications was determined to be 568. According to the bibliographic matching analysis of the documents, the citation links between Munro and Grap (21), Munro et al. (22), and Grap et al. (23) are high (Figure 4).

**Keyword Analysis**

Figure 5 shows a visual network map of the relationship between common words used in the publications included in the analysis. In the figure, the size of the circle represents the most studied topic, while the yellow regions represent more recent topics. According to this analysis, 1451 keywords were identified in articles published in this field. According to the common keyword network analysis, the most frequently used keyword is "oral health" (203 occurrences, 217 links, 547 total link strengths), followed by "oral care" (111 occurrences, 142 links, 337 total link strengths), and "nursing" (79 occurrences, 139 links, 283 total link strengths).

Other frequently used keywords in the keyword analysis were "oral hygiene" (64 occurrences, 176 total link strengths), "ventilator-associated pneumonia" (36 occurences, 109 total link strengths), "nursing care" (31 occurrences, 79 total link strengths), "pregnancy" (26 occurrences, 86 total link strengths) and "older people" (32 occurrences, 86 total link strengths) (Figure 5).

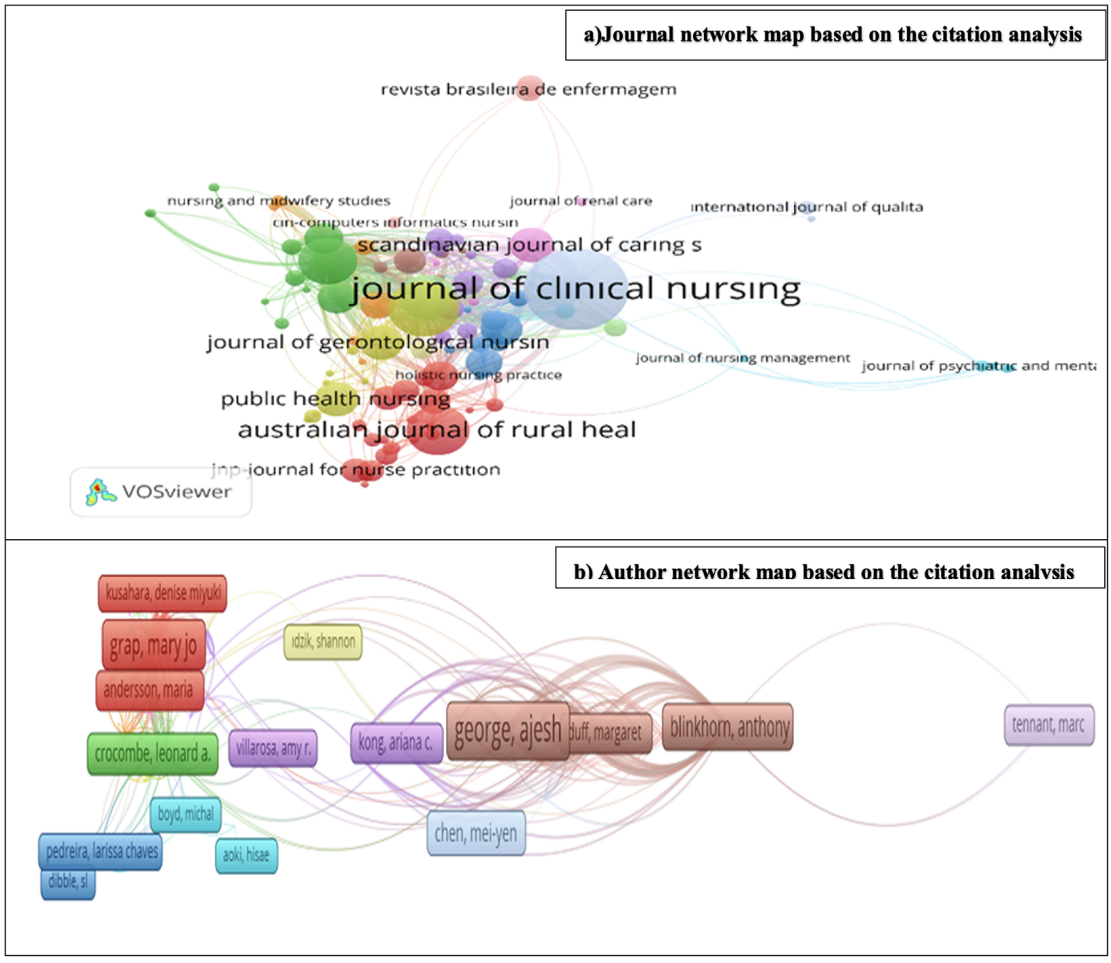


**Figure 2.**
**Authors and Journal Network Maps Based on Citation Analysis**

## Discussion

In this study, the status, development, and trends of oral health and oral care were examined by analyzing English-language nursing articles published in the "WoS database" in the area of oral health and oral care between 1981 and 2023. This study provides a retrospective perspective on scientific articles on oral health and oral care in nursing. According to the results of this bibliometric analysis, most studies on oral health and oral care in nursing were published under the title "articles". The first research in this field was published by Reidun Daeffler in 1981, and the number of articles has gradually increased since 1997 and reached a peak in 2021. In 1981, when the first article was published, only three articles were published. From 1981 to 1991, the number of published articles did not exceed one digit. The number of published articles increased rapidly after 2000 and peaked in 2021. From 1981, when the first research article was published, to 2000, a total of 163 articles were published and 370 citations were made. In 2023, the peak year for published articles and citations, a total of 374 articles were published, and 6444 citations were generated. This result shows that articles published in recent years on oral health and oral care in nursing have greatly attracted readers' attention and have had a significant impact on scientific studies. In addition, it is believed that the introduction and more frequent use of the Internet and the online environment in these years has significantly increased the number of studies.

Analyzing the countries, authors, and journals that produce the most scientific articles on the topic provides information about their productivity. The author, journal, institution, and country with the most relevant articles are considered the most productive in the field. In this study, the journal that published the most articles on the topic was "Journal of Clinical Nursing", the country was the United States, and the institution was "The University of Sydney". In addition, in the co-author analysis, the country with the highest number of collaborations was America, followed by "England, Australia, and Canada". This result will help researchers choose appropriate journals to publish their studies and appropriate countries to collaborate with and access information about the studies. The fact that the United States has the highest number of publications and

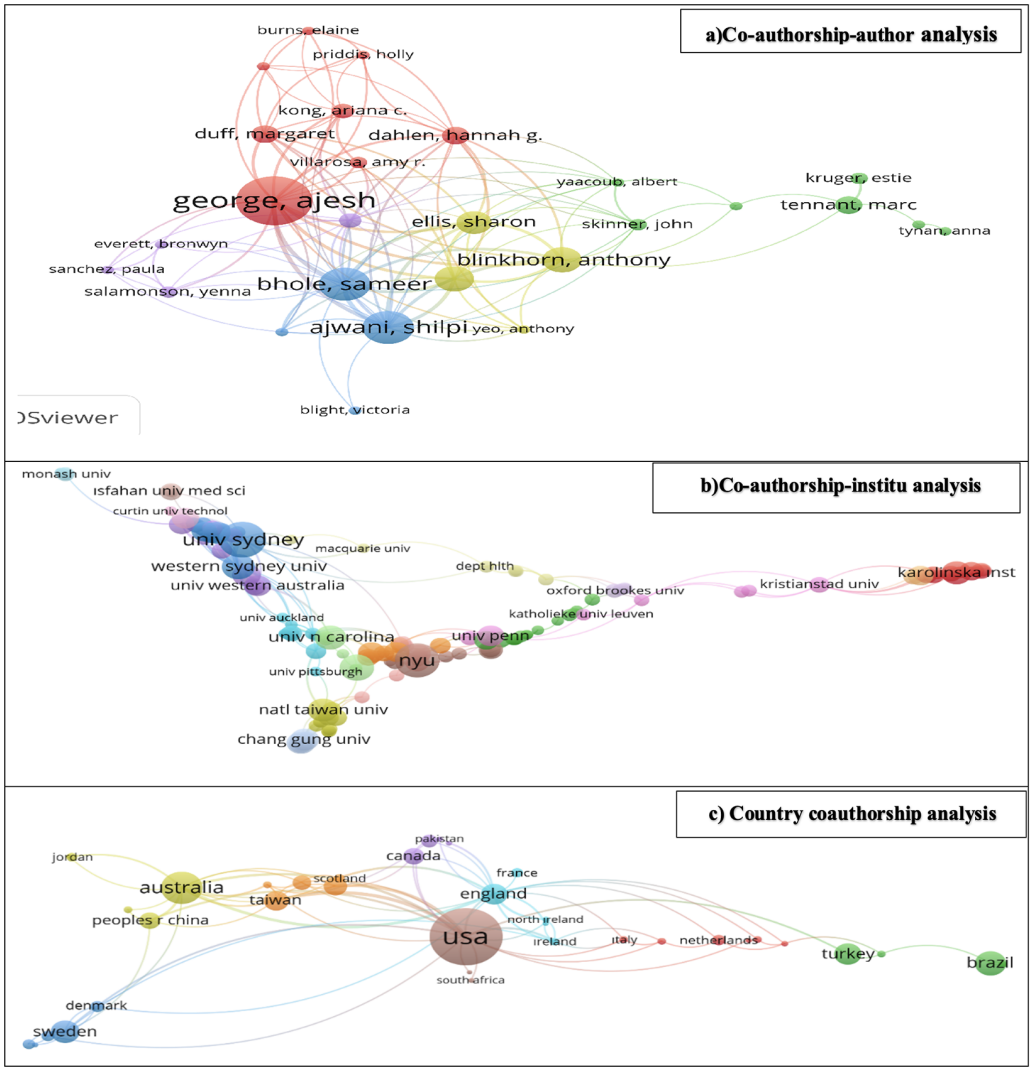


**Figure 3.**
**Co-author, Institution, and Country Analysis Network Map**

collaborations may be related to its size, the number of universities and authors, and its academic health system. Similar to the results of this study, many bibliometric analysis studies conducted on different topics in nursing have shown that the country with the highest number of scientific publications is the "USA".

Citation network mapping is a technique used to identify seminal research and the dissemination of an idea that has developed in a particular field or topic over a period of time (24,25). In this bibliometric analysis, a review article on oral care and oral health in intensive care units (ICU) written by Munro and Grap (21) was the most cited article in the field. We believe that this article is the most influential on oral care and oral health in nursing. Patients hospitalized in ICU are at high risk of developing systemic infections, such as poor oral health, dental plaque, oral infections, and ventilator-associated pneumonia (26). For this reason, many studies have been conducted on ICU patients, who represent the oral health risk group, to evaluate oral care practices and outcomes. This result demonstrates that research on oral care among patients hospitalized in ICU is a subject of interest and should be more scrutinized by the authors. The second most cited study revealed that providing oral care with a 0.12% chlorhexidine solution to adult patients in ICU helped prevent ventilator-associated pneumonia (22). Many studies have investigated which oral care solution is more effective in preventing ventilator-associated pneumonia, and while numerous studies have shown that chlorhexidine solutions between 0.12% and 0.2% are effective (27-30), there is less support in the literature for its role in preventing and managing periodontitis, dental caries, and the aerosolization of viruses (31). Recent guidelines do not recommend routine use of chlorhexidine gluconate for oral care in all patients on mechanical ventilation (32-34).

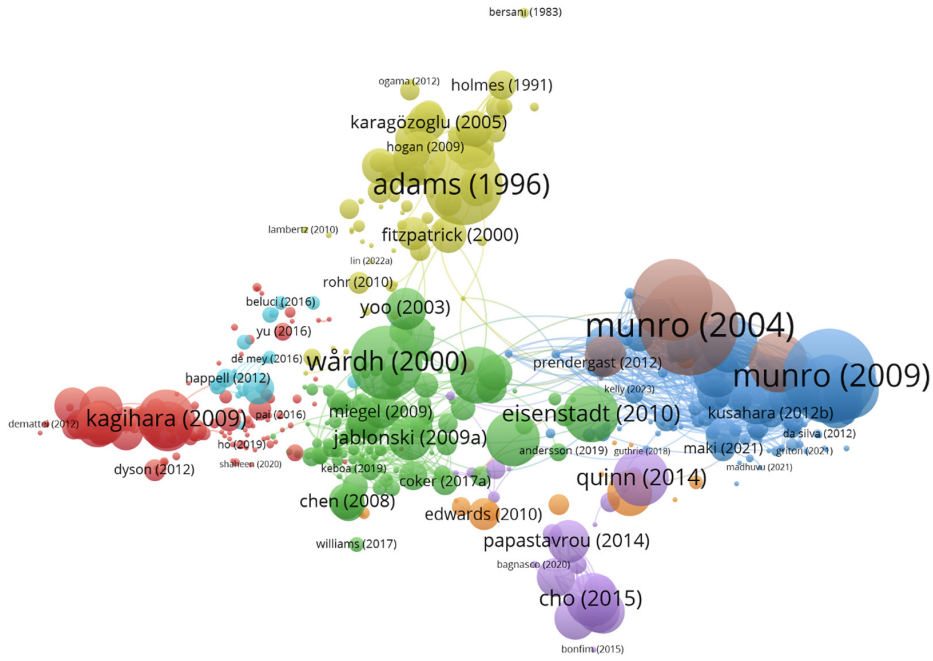


**Figure 4.**
**Bibliographic Coupling Map of Documents**

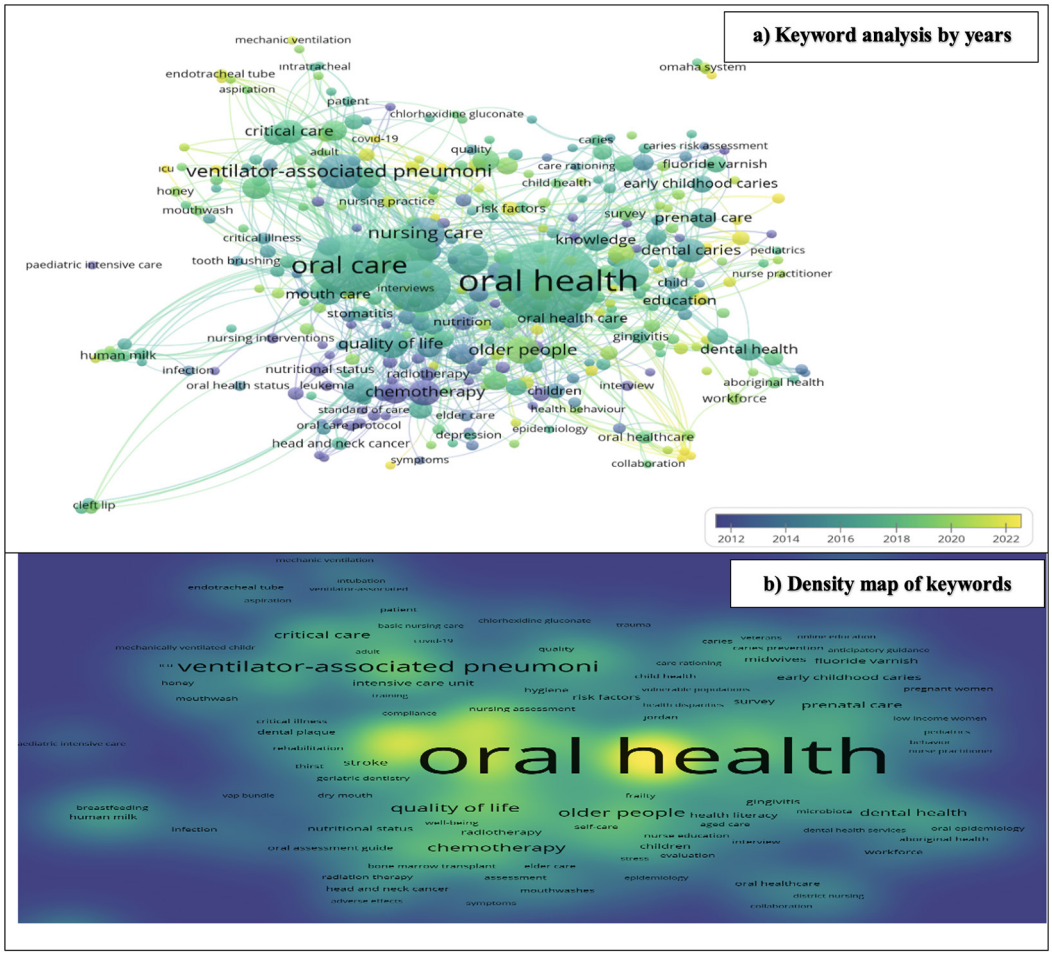


**Figure 5.**
**a) Keyword Analysis by Years, b) Density Map of Keywords**

Ventilator-associated pneumonia is particularly common in intensive care patients and is one of the leading causes of infection-related deaths (35). As a result, research on ventilator-associated pneumonia and its prevention has attracted significant interest from researchers in the field and is a subject of frequent study. The third most cited study in this field was a descriptive study aimed at determining the frequency of oral care interventions reported by nurses in various ICU. Despite evidence showing that sponge swabs are ineffective in removing plaque, they continue to be used for oral care, particularly in intubated patients in ICU. Additionally, although nurses reported performing oral care practices very frequently, the study revealed that very few of these practices were documented (23). From these results, we can conclude that in the field of nursing, the most researched and frequently cited topics related to oral care include oral care practices for intensive care patients, ventilator-associated pneumonia, products used for oral care, the frequency of care, and the documentation of these practices.

The main purpose of common word analysis is to identify keywords. Common word analysis shows the relationship between concepts or words in the titles, abstracts, or keywords of the studies in the bibliometric analysis (24). The keywords searched ("oral care", "mouth care", "oral health", "oral hygiene") in the research were common keywords used in the studies conducted in the field. In contrast to these keywords, other frequently used keywords were "ventilator-associated pneumonia", "pregnancy", "cancer" and "quality of life". Pregnant women, patients with cancer, and ventilator-associated ICU patients are considered vulnerable patient groups and risk groups for oral health (13,28). Ventilator-associated pneumonia is one of the most common and important causes of morbidity and mortality, especially in the ICU, when intubated patients do not receive adequate oral care (12,36). Dry mouth, mucositis, radiation caries, altered taste perception, fibrosis of the masticatory muscles, ulcerative lesions, and some oral complications are common in patients with cancer during and after treatment (37,38). Therefore, oral care practices are considered an important parameter of supportive care for preventing complications that may occur before and after treatment in patients with cancer (38). Oral care practices have been shown to prevent many oral complications, such as mucositis, and to improve oral comfort and quality of life in many studies involving patients with cancer (39). Physiological changes occurring in the body during pregnancy lead to an increased risk of gingivitis in the oral cavity and many oral-related adverse conditions. Untreated gingivitis can lead to periodontitis, loss of tooth attachment, and permanent damage to the supporting structures of the tooth (40,41). The literature reports that approximately 60-75% of pregnant women may develop periodontal disease, which not only damages the oral cavity but may also affect the health of the developing fetus and lead to adverse pregnancy outcomes (42). Therefore, oral care practices during pregnancy are crucial for maternal and fetal health. Oral health is also known to have a significant impact on an individual's overall psychophysical health and quality of life. Because oral health affects many daily activities, such as speaking, laughing, chewing, swallowing, tasting, and smiling, the quality of life of an individual is affected to varying degrees when oral health deteriorates (1). Many studies have shown that poor oral health negatively affects patients' perceptions of quality of life (43-45). According to the results of the keyword analysis, the fact that the words ventilator-associated pneumonia, pregnancy, cancer, and quality of life were used more frequently indicates that researchers are interested in these topics and that these topics will be among the important research areas for future studies.

Therefore, the content of published articles on oral health and care varies. For example, some studies investigated the oral health and care practices and behaviors of nurses and caregivers working in different centers (intensive care, home care, nursing homes, retirement homes, etc.) (8,37,46,47) some studies evaluated oral care and oral hygiene practices in the elderly (9,10), some studies evaluated different oral care solutions (5% sodium bicarbonate, 0.2% chlorhexidine, 0.12% chlorhexidine, saline solution, etc.) (11,28,48) or oral care protocols on oral hygiene and oral health, and some studies investigated the experiences of nurses and caregivers regarding oral care practices (49,50). In addition, in recent years, many international scientists have focused on investigating the impact of oral health on quality of life (51,52). The World Health Organization (WHO), in its strategic objectives for establishing a Global Strategy on Oral Health and achieving the Sustainable Development Goals by 2030, has outlined research priorities in areas such as health systems, applied sciences, workforce models, digital technologies, and the public health dimension of oral diseases and oral health status (53). Following the WHO's global strategy, health policies and future research in various countries are likely to focus more on these topics.

## Study Limitations

The research data were selected from the "WoS" database because it is one of the most accepted and preferred databases in the world, and the literature in its collection is of superior quality. The main limitation of this study is that the research database consists only of publications published in "WoS". However, some research in this area is also published in nursing journals that are not indexed in "WoS". If more articles had been included in the study, the results of the analysis might have been different. In addition, sources other than studies published as articles were not included in the study, and in-depth content analysis was not performed on the included studies. Instead, descriptive and bibliographic data analysis was performed.

## Conclusion

This research is important for providing information about the research and publication performance of countries and institutions on oral health and oral care in nursing. According to the results of this study, the number of articles and citations related to oral health and oral care in the field of nursing has increased rapidly in the last 10 years. It was

determined that there is more interest in articles that show the importance and effectiveness of oral care practices in the elderly and pregnant women, in the prevention of ventilator-associated pneumonia, and in improving quality of life, and more articles were published on these topics. Based on these results, it can be concluded that the number of publications on oral health and oral care and the interest in this field will continue to increase. However, less research has been conducted on newborns, children, and adolescents compared with other age groups. There is also a scarcity of studies examining oral care and practices among individuals with chronic illnesses and mental health disorders, as well as patients with oral health conditions (such as stomatitis, ulcerations, mucositis, dental caries, gingivitis, halitosis, and the use of dental prostheses, etc.). In alignment with the WHO's global objectives, we are likely to see an increase in comprehensive research focusing on the application of digital technologies in oral health and diseases, the effectiveness of oral health practices, and the public health implications of oral health. Future studies can be conducted more comprehensively using other databases, such as Scopus, ScienceDirect, and Google Scholar. In addition, broad-based studies, including study topics, study dates, citation status, and general orientation analyses, can be planned in the future.

**Ethics Committee Approval:** This was a retrospective review of studies published in WoS, and ethics committee approval was not required.

**Informed Consent:** Retrospective study.

### Footnotes

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ORIGINAL ARTICLE

# Investigation of the Effect of Risk Perception, Socio-demographic and Obstetric Factors on the Level of Decision-making of Pregnant Women via the Internet: Multiple Linear Regression Analysis Model

## Gebelerin İnternet Yoluyla Karar Alma Düzeyi Üzerine Risk Algısının, Sosyo-demografik ve Obstetrik Faktörlerin Etkisinin İncelenmesi: Çoklu Doğrusal Regresyon Analiz Modeli

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### Abstract

**Objective:** This study examines the effect of risk perception and socio-demographic and obstetric factors on the level of decision-making of pregnant women via the internet.

**Method:** This study employed a cross-sectional and analytical design and was conducted online with 384 pregnant women living in Turkey. Data were collected using descriptive information forms, such as the decision-making scale via the internet on pregnancy and the perception of pregnancy risk scale. Descriptive statistics, including percentages and means, as well as multiple linear regression analysis, were utilized to analyze the data.

**Results:** As the risk perception in pregnancy increased, the level of decision-making via the internet increased (β=0.118, p=0.000). Among pregnant women experiencing pregnancy-related health issues, a significant increase in decision-making via the internet was observed (β=0.092, p=0.046). As the age of women increased (β=-2.623, p=0.013) and income was perceived to be equal to expenses (β=-1.499, p=0.011) or more than expenses (β=-1.953, p=0.023), decision-making via the internet during pregnancy decreased. Unwanted pregnancy has a "reducing" effect of approximately two times on online decision-making (β=-1.919, p=0.026). The number of pregnancies, education and family type were found to have no statistical effect on decision-making (p>0.05).

**Conclusion:** As the risk perception increases in pregnant women, online decision-making also increases. Factors such as some socio-demographic and obstetric factors affect online decision-making of pregnant women.

**Keywords:** Pregnancy, online, decision-making, risk perception, Turkey

### Öz

**Amaç:** Bu çalışmada amaç, gebelerin gebelikle ilgili konularda internet yoluyla karar alma düzeyi üzerine risk algısının, sosyo-demografik ve obstetrik faktörlerin etkisini incelemektir.

**Yöntem:** Çalışma kesitsel tiptedir. Araştırma online olarak Türkiye'de yaşayan 384 gebe ile gerçekleştirilmiştir. Verilerin toplanmasında gebe tanıtıcı bilgi formu, gebelikte internet yoluyla karar alma ve gebelikte risk algısı ölçeği kullanılmıştır. Verilerin analizinde yüzdelik, ortalama gibi tanımlayıcı istatistikler ve çoklu doğrusal regresyon analizi kullanılmıştır.

**Bulgular:** Çalışmada gebelikte risk algısı arttıkça internet yoluyla karar alma düzeyinde artış olduğu bulunmuştur (β=0,118, p=0,000). Gebeliğe bağlı sağlık sorunu yaşayan gebelerde, internet yoluyla karar alma puanında artış olduğu saptanmıştır (β=0,092, p=0,046). Gebelerin yaşı arttıkça (β=-2,623, p=0,013) ve gelir gidere denk (β=-1,499, p=0,011) ve gelir giderden fazla olarak algılandığında (β=-1,953, p=0,023) gebelikte internet yoluyla karar almanın azaldığı saptanmıştır. Gebeliğini hiç istememe durumunun, online karar alma puanı üzerinde yaklaşık iki kat "azaltıcı" etkisinin olduğu belirlenmiştir (β=-1,919, p=0,026).

**Sonuç:** Gebelerde risk algısı arttıkça, online karar verme düzeyi de artmaktadır. Gebenin online karar verme düzeyini bazı sosyo-demografik ve obstetrik faktörler etkilemektedir.

**Anahtar Kelimeler:** Gebe, online, karar alma, risk algısı, Türkiye

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## Introduction

Pregnancy and childbirth, though considered physiological processes, are also recognized as periods marked by stress, complexity, and uncertainty, particularly for women. During this time, women actively seek comprehensive and reliable information to support their well-being and that of their unborn child (1). Health-seeking behaviors, especially among first-time mothers, tend to be highly pronounced as they navigate the transition to motherhood, adapt to the new experience, and engage in planning and preparation (1,2). Health-seeking behavior is an individual's response to a perceived health issue and can be categorized into three main types: traditional, professional, and online. Recently, there has been a notable increase in the prevalence of online health-seeking behaviors (3), wherein individuals utilize the internet to seek solutions to health-related concerns (4,5). Pregnant women benefit from a variety of information sources, including books, print, visual, and audio-visual media, and the internet, with healthcare professionals serving as primary resources for health-related decision-making (2,6,7). The term "decision" originates from Arabic, conveying meanings such as "stability, continuity, and soundness" (8). In Turkish, it is defined as "the process of identifying and selecting the most suitable option for a given situation" (9).

With advancements in globalization, innovation, and technology, notable changes have occurred in how individuals access, share, and process information, as well as in decision-making processes (10). According to Turkish Statistical Institute 2024 household information technologies usage survey, the rate of individuals using the internet was announced as 88.8% (11). Factors influencing internet usage among pregnant women include age, pregnancy history, education level, health perception, ease of internet use, and the availability of extensive resources online regarding pregnancy and childbirth (6,12). Pregnant women resort to a variety of health information resources to access accurate and reliable information, clarify conflicting information, and make informed decisions regarding their health and that of their baby (e.g., in the case of a concerning prenatal screening result). The internet is the most used source of online information, with usage rates among pregnant women ranging from 70% to 97% (13-15). A study conducted in Turkey revealed that the top three sources of information about pregnancy and labor for pregnant women were healthcare professionals (98.9%), the internet and social media platforms (80.7%), and family or friends (73.4%) (16).

Several factors, such as the increasing workload of healthcare professionals and the challenges in meeting all health-related needs of pregnant women, have contributed to the rising use of the internet in the decision-making process (17). Hadımlı et al. (18) found that pregnant women most frequently used the internet to obtain information on prenatal tests (29.9%), track fetal development, and identify danger signs (29.9%). Similarly, Oscarsson et al. (19) reported that the primary motivation for pregnant women's internet use was to obtain pregnancy-related information and benefit from the experiences of individuals in similar situations. In a web-based study by Lagan et al. (20), it was reported that nearly half of the participants (48.6%) turned to the internet due to dissatisfaction with the clarity and comprehensiveness of information provided by healthcare professionals.

Another study indicated that pregnant women often preferred the internet over consulting healthcare professionals for reasons such as considering some issues "too minor" to bring up, not wanting to disturb health personnel (11.1%), difficulty reaching healthcare providers in times of need (8.3%), and a perception that the information provided by professionals was insufficient (6.6%) (15). These findings highlight the internet's role as a frequently accessed resource for information and decision-making among pregnant women. However, it is essential to recognize that some of the online information sources may be unreliable, potentially leading to anxiety and decision-making challenges for pregnant women (21,22). For instance, a study conducted by Bjelke et al. (23) in Sweden reported that 65.9% of pregnant women felt anxious after accessing pregnancy-related information online, with forum pages identified as the primary web-based source contributing to these concerns.

The internet offers rapid and convenient access to a wealth of information, one of its significant advantages (24). However, it is essential to recognize that the reliability and validity of online information are not always assured. For pregnant women, this uncertainty can influence risk perception, as incomplete or inaccurate information may increase anxiety and perceived risks and impede sound decision-making (16,21). To ensure information security and access to accurate information, the development of health literacy and media literacy skills is crucial (16,25). Women with low health and media literacy may struggle to critically evaluate the accuracy and reliability of online information, which in turn raises the likelihood of making misguided decisions (16).

The pregnancy and childbirth period inherently involves risks for both the mother and fetus, requiring pregnant women to make prompt and informed decisions. Several conditions, such as pre-existing systemic diseases, pregnancy-related

**Main Points**

- Pregnant women's online decision-making total mean score is 36.76±5.59.
- The total score of risk perception during pregnancy is 51.19±14.30.
- As risk perception increases in pregnant women, the rate of decision-making via the internet also increases.
- The level of decision-making via the internet increases in pregnant women who have pregnancy-related health problems.
- As the ages and income levels of pregnant women increased, their ability to make decisions via the internet during pregnancy decreased.
- There is a decrease in the level of decision-making via the internet in unwanted pregnancies.

complications, ambiguous prenatal screening results, pregnancy-induced hypertension, placental anomalies, premature rupture of membranes, intrauterine growth restriction, cervical insufficiency, and preterm labor, can increase risk perception concerning the mother and fetus (25,26). Risk perception in pregnancy refers to the potential negative situations that pregnant women may anticipate and how they interpret the consequences of these situations. This perception is influenced by various psychological, physiological, individual, and environmental factors (27). Elevated risk perception during pregnancy can contribute to adverse obstetric outcomes, including compromised psychosocial health, weakened prenatal attachment, fetal neurodevelopmental issues, increased fear of childbirth, a higher likelihood of medical interventions, and a preference for cesarean delivery (27,28). Conversely, a lower risk perception enhances adaptation to pregnancy, facilitates coping with pregnancy-related challenges, reduces maternal stress, promotes perinatal mental health, and supports effective management of labor and the postnatal period (29). Reduced risk perception positively impacts maternal, fetal, neonatal, and community health (30,31).

Midwives and nurses providing prenatal care play a crucial role in guiding pregnant women and their families towards reliable online information sources and in strengthening health literacy skills, which are essential for maternal and fetal well-being (16,31). Access to accurate information online during pregnancy not only decreases risk perception but also contributes to reducing healthcare costs (31).

This study aims to investigate the impact of risk perception, socio-demographic factors, and obstetric variables on the level of online decision-making among pregnant women. Current literature includes a limited number of studies that descriptively explore the risk perception and online decision-making behaviors of pregnant women (32,33). However, no study has yet examined the combined influence of pregnancy-related risk perception, socio-demographic characteristics, and obstetric factors on online decision-making among pregnant women, as proposed in this study. This research seeks to address this gap in literature and provide a foundation for further studies on this topic. Additionally, findings from this study may support the World Health Organization's strategies to enhance the quality of antenatal care and foster positive pregnancy experiences.

## Material and Method

### Study Design

This research was designed as a cross-sectional study and analytical design.

### Study Setting and Sample

The study population included all pregnant women who voluntarily agreed to participate, regardless of gestational week, and who owned a smartphone and used social media. A sample size of 384 pregnant women was determined using power analysis in OpenEpi Version 3.01 software, based on a 50% prevalence and a 95% confidence interval. Inclusion criteria were being 20 years of age or older, living in Turkey, having a confirmed pregnancy diagnosis, and owning a smartphone. Exclusion criteria included being an immigrant or not being literate in Turkish.

### Data Collection

Data were collected online using the pregnant descriptive information form, the decision-making scale via internet on pregnancy, and the perception of pregnancy risk scale. Prior to completing these forms, pregnant women were introduced to the study through an online Google survey. They were informed that participation was voluntary, their data would remain confidential, would not be used for commercial purposes, and would be exclusively for scientific research. Participants were advised of their right to opt out, and only those who consented by selecting the option "I agree to participate in the study" were included in the research sample.

### Data Collection Tools

**The pregnant descriptive information form:** The form, developed by the researcher following a comprehensive literature review, collects information on the socio-demographic and obstetric characteristics of pregnant women (2,5,6,12,15,21,31).

**The decision-making scale via internet on pregnancy:** Developed by Koyun and Erbektaş (12) in 2018, this scale consists of 15 items with a Cronbach's alpha coefficient of 0.85. The scale uses a five-point Likert response format, ranging from "1 = strongly disagree" to "5 = strongly agree". Scores range from 15 to 75, with higher scores indicating a greater reliance on internet-based decision-making.

**The perception of pregnancy risk scale:** Originally developed by Heaman and Gupton to assess pregnant women's risk perception, this scale was adapted into Turkish by Evcili and Dağlar (26) in 2019. It consists of 9 items across two factors. Each item includes a 0-10 cm visual analog scale labeled with "no risk at all" and "extremely high risk". The overall score is calculated by summing the item scores and dividing by nine. A scoring of the scale factors can also be performed. The score for the "risk perception of the pregnant woman towards her baby" factor is calculated by summing the scores of the five items within this factor and dividing the total by five. Similarly, the score for the "risk perception of the pregnant woman towards herself" factor is derived by summing the scores of its four items and dividing by four. The scale does not have a cut-off point; higher scores indicate a stronger perception of risk concerning both the mother and her baby (26).

### Statistical Analysis

Data from the study were analyzed using Statistical Package for Social Sciences version 22.0 for Windows. Descriptive statistics, including frequency, percentage, mean, and

standard deviation, were applied to summarize the data. Multiple linear logistic regression analysis was conducted to assess the effect of risk perception and certain variables on the level of online decision-making among pregnant women. This method allows examination of the linear effect of multiple independent variables on a dependent variable (34). A 95% confidence interval was used, with statistical significance set at $p<0.05$.

### Ethical Consideration

Prior to the study, approval was received from the Gümüşhane University Scientific Research and Publication Ethics Committee (approval no: 2020/11, date: 08/12/2020). Additionally, permission was obtained from the researchers who had previously adapted the decision-making scale via internet on pregnancy and the perception of pregnancy risk scale into Turkish. To ensure data confidentiality, questionnaires were distributed to pregnant participants via a secure Google Forms link. Before completing the questionnaires and scales, participants were instructed to read an informed consent form, which omitted personal identifiers and detailed the study's purpose, and to indicate their consent by clicking an approval button. This study was conducted in alignment with the principles outlined in the Declaration of Helsinki.

### Results

The average age of pregnant women was 29.20±5.29 years. Nearly half held undergraduate or postgraduate degrees (47.1%). Most participants lived in nuclear families (91.6%) and were not employed (74.5%). 47.6% of the pregnant women expressed their income perception as "income is less than expenses". 60.4% of the pregnant women resided in the city centre. At the same time, 41.9% were experiencing their second pregnancy and the mean gestational week was 24.51±7.29. The rate of birth experience was found to be 55.7%. 51.1% of the pregnant women were in the second trimester and almost all of them attended antenatal check-up (95.6%). 70% of the pregnant women wanted to have this pregnancy and 61.4% had a health problem in this pregnancy. 31.7% of the pregnant women were undecided about something related to their pregnancy during pregnancy. 45.8% of the pregnant women described their emotional state during pregnancy as "moderate". Again, pregnant women mostly stated doctors as the source of information on pregnancy-related issues (21.4%). The rate of having experienced indecision about pregnancy was 68.3% and the majority of pregnant women (60.3%) received support from their husbands in decision-making. The most common issues of indecision during pregnancy were the choice of physician (38.3%) and the type of delivery (Table 1).

As shown in Table 2, the mean total score on the decision-making scale via internet on pregnancy was 36.76±5.59, while the mean total score on the perception of pregnancy risk scale was 51.19±14.30 (Table 2).

***Table 1.***
***Socio-demographic and Obstetric Characteristics of Pregnant Women (n=384)***

| **Descriptive characteristics** | **n (%)** |
|---|---|
| **Age (year)** | |
| 20-25 | 105 (27.3) |
| 26-30 | 144 (37.5) |
| 31-35 | 84 (21.8) |
| 36-43 | 51 (13.4) |
| **Education level** | |
| Primary school | 68 (17.7) |
| High school | 135 (35.2) |
| Undergraduate/postgraduate | 181 (47.1) |
| **Family type** | |
| Nuclear | 352 (91.6) |
| Extended | 32 (8.4) |
| **Employment** | |
| Yes | 98 (25.5) |
| No | 286 (74.5) |
| **Income perception** | |
| Income less than expenses | 183 (47.6) |
| Income equals expenses | 178 (46.4) |
| Income more than expenses | 23 (6.0) |
| **Place of residence** | |
| City | 232 (60.4) |
| District | 105 (27.4) |
| Village | 47 (12.2) |
| **Number of pregnancies** | |
| 1 | 130 (34.0) |
| 2 | 161 (41.9) |
| ≥3 | 93 (24.1) |
| **Birth experience** | |
| Yes | 214 (55.7) |
| No | 170 (44.3) |
| **Pregnancy trimester** | |
| 1. | 37 (9.6) |
| 2. | 196 (51.1) |
| 3. | 151 (39.3) |
| **Pregnancy check-up** | |
| Yes | 367 (95.6) |
| No | 8 (2.1) |
| Partially | 9 (2.3) |
| **Wanted pregnancy** | |
| Yes | 268 (69.7) |
| No | 70 (18.2) |
| Partially | 46 (12.1) |
| **Health problems during pregnancy** | |
| Yes | 236 (61.4) |
| No | 148 (38.6) |

***Table 1.***
***Continued***

| Descriptive characteristics | n (%) |
|---|---|
| **Emotional state in pregnancy** | |
| Very good | 74 (19.3) |
| Good | 107 (27.8) |
| Moderate | 176 (45.8) |
| Not good | 27 (7.1) |
| **Sources of information during pregnancy** | |
| Internet | 318 (18.5) |
| Midwife | 283 (17.1) |
| Nurse | 258 (14.6) |
| Doctor | 357 (21.4) |
| Family | 223 (13.3) |
| TV, journal, book | 242 (15.1) |
| **Experiencing uncertainty in pregnancy** | |
| Yes | 122 (31.7) |
| No | 262 (68.3) |
| **The person who guides the indecisive person** | |
| No one | 27 (14.7) |
| Spouse | 110 (60.3) |
| Healthcare professional | 40 (22.1) |
| Mother/mother-in-law | 4 (2.0) |
| Friend | 2 (0.9) |
| **Challenging areas for decision-making during pregnancy** | |
| Physician | 146 (38.2) |
| Birth mode | 111 (28.8) |
| Screening test | 69 (17.9) |
| Hospital | 58 (15.1) |
| | Mean ± SD |
| Age | 29.20±5.29 |
| Gestational week | 24.51±7.29 |

*SD=standard deviation*

***Table 2.***
***Total and Sub-dimension Mean Scores of the Decision-making Scale via Internet on Pregnancy and the Perception of Pregnancy Risk Scale***

| Scales | Mean ± SD | Minimum-maximum |
|---|---|---|
| **The decision-making scale via internet on pregnancy** | 36.76±5.59 | 10-47 |
| Perception of self-efficacy sub-dimension | 17.88±3.13 | 5-24 |
| Perception of self-control sub-dimension | 18.87±3.28 | 4-25 |
| **The perception of pregnancy risk scale** | 51.19±14.30 | 13-90 |
| Risk perception towards the baby sub-dimension | 28.41±8.96 | 5-50 |
| Risk perception towards herself sub-dimension | 22.78±5.99 | 4-40 |

*SD=standard deviation*

In Table 3, the results of the multiple linear regression analysis indicate that as the risk perception in pregnancy increased (β=0.118, p=0.000), the level of decision-making via the internet also increased. Conversely, as age (β=-2.623, p=0.013) and income levels of pregnant women increased (β=-1.953, p=0.023), their level of decision-making via the internet decreased. Additionally, an increase in unwanted pregnancy correlated with a decrease in online decision-making (β=-1.919, p=0.026). As the health problems among pregnant women increase (β=0.092, p=0.046), their level of decision-making via the internet also rises (Table 3).

## Discussion

This study examines the effects of factors such as risk perception and some socio-demographic and obstetric characteristics on pregnant women's online pregnancy-related decision-making levels. In the study, the average total score on the decision-making scale for pregnant women was 36.76±5.59. Given that the minimum score on this scale is 15 and the maximum is 75, this suggests that the level of online decision-making among pregnant women in this study is moderate. The highest possible score was calculated as 75-15=60, and the lowest value as 60/2=30, with the "moderate level range" defined as between 30-60 points. Thus, the average score of 36.76±5.59 places the level of online decision-making in the moderate range, though it is slightly above the minimum value. Several studies using the same scale show similar results, with Ünal et al. (2) reporting an average score of 36.1±6.4 and Palta and Kanbur (22) reporting 30.98±6.18. The findings from these studies align closely with our results.

Individuals frequently utilize the internet to access health information and support decision-making processes, driven by factors such as convenience, speed, and cost-effectiveness (13,16,17,32,35). In the present study, the average total score for risk perception during pregnancy was 51.19±14.30. In contrast, the study by Bor et al. (36) reported an average total score of 29.93±1.98 on the pregnancy risk perception scale, while Okyay and Sunay (35) found a score of 20.45±17.13. When compared to our findings, some studies show relatively lower levels of risk perception. This discrepancy may be attributed to differences in the socio-demographic, obstetric, and psychological characteristics of the pregnant women in each study. Additionally, the data collection for our study occurred during the second and third waves of the COVID-19 pandemic, which is likely to have influenced the heightened levels of online decision-making and risk perception observed among pregnant women in our sample as compared to those in some other studies. Previous research conducted during the pandemic has shown that pregnant women experienced increased stress related to their own and their babies' health, leading to increased perceptions of risk, deteriorated psychosocial health (37,38), and a greater reliance on online decision-making concerning antenatal tests and birth method preferences (37,39,40). These findings are consistent with the results of the current study.

***Table 3.***
***Multiple Linear Regression Results on the Decision-making Scale via Internet on Pregnancy***

| **Independent variables** | **The decision-making scale via internet on pregnancy** | | | |
|---|---|---|---|---|
| | **β** | **St. E.** | **t** | **p** |
| | 33.679 | 2.45 | 13.71 | 0.000 |
| **Age (year)** | | | | |
| 26-30<br>31-35<br>36-43 | -0.284<br>-0.599<br>-2.623 | 0.70<br>0.88<br>1.05 | -0.40<br>-0.68<br>-2.49 | 0.686<br>0.498<br>**0.013*** |
| **Education level** | | | | |
| High school<br>Undergraduate and postgraduate | 0.245<br>-0.660 | 0.79<br>0.80 | 0.31<br>-0.82 | 0.757<br>0.413 |
| **Place of residence** | | | | |
| District | -0.644 | 0.63 | -1.02 | 0.308 |
| City | -0.351 | 0.86 | -0.41 | 0.684 |
| **Income perception** | | | | |
| Income equals expenses<br>Income more than expenses | -1.499<br>-1.953 | 0.58<br>0.85 | -2.55<br>-2.28 | **0.011***<br>**0.023*** |
| **Birth experience** | | | | |
| No | -1.073 | 0.82 | -1.31 | 0.193 |
| **Pregnancy trimester** | 0.021 | 0.04 | 0.59 | 0.557 |
| **Number of pregnancies** | | | | |
| 2 | -0.0149 | 0.17 | -0.09 | 0.932 |
| ≥3 | -0.064 | 0.55 | -0.12 | 0.908 |
| **Wanted pregnancy** | | | | |
| Partially | -1.873 | 0.87 | -2.16 | **0.032*** |
| No | -1.919 | 0.86 | -2.23 | **0.026*** |
| **Health problems during pregnancy** | | | | |
| Yes | 0.092 | 0.046 | 2.00 | **0.046*** |
| **Emotional state in pregnancy** | | | | |
| Good | -0.374 | 0.82 | -0.45 | 0.651 |
| Moderate | 0.316 | 0.81 | 0.39 | 0.696 |
| Not good | -0.478 | 1.25 | -0.38 | 0.702 |
| **Experiencing uncertainty in pregnancy** | -0.537 | 0.58 | -0.93 | 0.356 |
| **The perception of pregnancy risk scale total score** | 0.118 | 0.02 | 5.38 | **0.000*** |
| Maximum VIF | 1.10 (no multi-connection problems) | | | |
| White test | p=0.32>0.05 (no heterogeneity problem) | | | |
| Shapiro-Wilk W normality test | p=0.26>0.05 (normal distribution) | | | |
| Ramsey reset test | p=0.096>0.05 (no model specification error) | | | |

**=p<0.05, VIF=variance inflation factor*

In this study, it was found that as the level of risk perception among pregnant women increased, their level of online decision-making also rose proportionally (β=0.118, p=0.000). This suggests a positive relationship, whereby an increase in online decision-making is associated with high risk perception. Consistent with these findings, studies by Ünal et al. (2), Yuill et al. (21), Gözüyeşil and Özertürk (41), and Sanders and Crozier (42) also reported a positive correlation between increased risk perception and online decision-making among pregnant women. This relationship can be interpreted as the decisions made by pregnant women based on online information-whether about themselves or

their babies-inducing anxiety and concern, which in turn increases their perception of risk. The nature of the online decision-making process could stem from either accurate or inaccurate interpretations of information. Both correct and incorrect interpretations of online information can contribute to a high sense of risk perception (16,43). For instance, a pregnant woman who receives a concerning result from a prenatal screening test might perceive an elevated risk to the fetus and decide to terminate the pregnancy based on information gathered from online sources. Conversely, an increased perception of risk may amplify anxiety and worry in the pregnant woman. In the study by Serçekuş et al. (44), some pregnant women experienced increased fear after gathering online information. Similarly, Maharramova (45) study revealed that heightened risk perceptions regarding the health of both the mother and baby were associated with increased stress levels. While internet sources can facilitate access to information during pregnancy, it is crucial that the information be accurate and reliable to maintain risk perception within a manageable range. Therefore, expectant mothers should verify online information by consulting healthcare professionals and tailor their decision-making processes accordingly. A perception of childbirth as risky and traumatic for both the mother and baby can lead to adverse obstetric outcomes, such as decisions regarding the mode of birth and a greater desire for medical intervention during childbirth (46-49).

This study showed that as the age and perceived income level of pregnant women increase, their reliance on internet -based decision-making during pregnancy decreases. This suggests that older women may prefer to seek information from sources outside the internet, and women with higher income levels may be more likely to utilize healthcare providers for information and support. Furthermore, the study revealed that as the unwanted status of pregnancy increases, the level of decision-making through the internet decreases. This may indicate that women experiencing unwanted pregnancies are more likely to engage in health-seeking behaviors. These findings highlight the importance of providing enhanced support to women with unwanted pregnancies and ensuring that they have easier access to the healthcare services they need. One of the findings of this study is that as the incidence of health problems during pregnancy increases, the level of decision-making through the internet also increases. This is consistent with the observation that as a woman's perception of risk during pregnancy rises, her reliance on online decision-making also increases. Palta and Kanbur (22) similarly reported that as pregnancy-related complaints increase, the level of online decision-making also rises, which supports the findings of our study. The research included both low-risk and high-risk pregnancies, with high-risk pregnancies typically associated with greater uncertainty and anxiety. Women facing increased risks during pregnancy are more likely to act out of anxiety and stress, potentially leading them to seek information from unreliable sources, which, in turn, increases their anxiety. High anxiety and stress levels during pregnancy have the potential to contribute to physiological complications (50).

In the study, the most common sources of information preferred by pregnant women were their physician (n=357), the internet (n=318), and their midwife (n=283). In a study, the most frequently shared information sources by pregnant women were recorded as doctors (n=217), internet (n=42), and midwives (n=35), similar to this study (51). The internet was a frequently utilized resource. The primary reasons for seeking online information included gaining knowledge, alleviating concerns, making more informed decisions, connecting with other women who share similar experiences, and benefiting from their shared knowledge (48-50). Online forums, social media, and support groups help reduce feelings of isolation and provide emotional support to pregnant women (49). Given these findings, midwives and nurses involved in preconception and antenatal care must plan educational sessions that enhance the health literacy and health-seeking behaviors of pregnant women and their families.

## Study Limitations

The main identified limitation of the study is the inclusion of pregnant women who use smartphones without distinguishing between those from low-risk and high-risk pregnancy groups.

## Conclusion

The study demonstrated that the level of risk perception and decision-making via the internet among pregnant women was moderate. An increase in risk perception during pregnancy positively influenced internet-based decision-making. As the age of pregnant women increases and their income is perceived to be equal to or greater than their expenses, the use of the internet for decision-making during pregnancy decreases. However, factors such as the number of pregnancies, education level, and family type did not appear to affect online decision-making. While accessing reliable information on the internet is not always guaranteed, pregnant women must receive education on how to seek accurate and trustworthy information during the antenatal period. In this regard, it is recommended to integrate social media and health literacy initiatives into prenatal care. Furthermore, identifying pregnant women with a high level of risk perception, closely monitoring their well-being, and referring them to appropriate healthcare units when necessary is important. Future research with larger sample sizes and mixed-method designs is needed to further explore the factors influencing risk perception and online decision-making during pregnancy.

**Ethics Committee Approval:** Prior to the study, approval was received from the Gümüşhane University Scientific Research and Publication Ethics Committee (approval no: 2020/11, date: 08/12/2020).

**Informed Consent:** Additionally, permission was obtained from the researchers who had previously adapted the decision-making scale via internet on pregnancy and the perception of pregnancy risk scale into Turkish.

## Footnotes

**Author Contributions:** Surgical and Medical Practices - S.A., T.Y.T., Ö.P.A., R.A.; Concept - S.A., T.Y.T., Ö.P.A., R.A.; Design - S.A., T.Y.T., Ö.P.A., R.A.; Data Collection and/or Processing - S.A., T.Y.T., Ö.P.A., R.A.; Analysis and/or Interpretation - R.A., S.A., T.Y.T., Ö.P.A; Literature Review - S.A., T.Y.T., Ö.P.A., R.A.; Writing - S.A., T.Y.T., Ö.P.A., R.A.

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ORIGINAL ARTICLE

# Comparison of Primary Dysmenorrhea, Anxiety, Depression, Sexual Experience, and Quality of Life in Women Receiving a Copper-containing and Levonorgestrel-releasing Intrauterine Device

## Bakır İçeren ve Levonorgestrel Salgılayan Rahim İçi Araç Uygulanan Kadınlarda Primer Dismenore, Anksiyete, Depresyon, Cinsel Deneyim ve Yaşam Kalitesinin Karşılaştırılması

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### Abstract

**Objective:** This study aimed to compare primary dysmenorrhea, anxiety, depression, quality of life, and sexual life in women who have inserted copper-containing intrauterine devices (TCu380A-IUD) and levonorgestrel-releasing intrauterine devices (LNG-IUD).

**Method:** This comparative, descriptive, cross-sectional study with a pre-test-post-test design was conducted on 160 women, including 80 who received TCu80A-IUDs and 80 who received LNG-IUDs. Data were collected using the visual analog scale, Spielberg state and trait anxiety, Beck depression, short form (SF) 36-quality of life, and Arizona sexual experiences. The data were analyzed by number, percentage, mean, standard deviation, chi-square test, Fisher's exact test, and t-test for independent/dependent samples.

**Results:** The pain level of the LNG-IUD group was lower at the last follow-up. The levels of anxiety and depression were moderate in both groups. The post-test scores of the SF 36-quality of life scale of the TCu380A-IUD group were statistically significantly higher than those of the LNG-IUD group in physical function, physical and emotional role difficulty ($p<0.05$). Furthermore, the post-test measures of the LNG-IUD group's SF 36-quality of life scale were significantly higher than the pre-test in pain, general health, energy/vitality, and mental health ($p<0.05$). It was noted that at the first follow-up, the ASEX scale scores were similar in both groups.

**Conclusion:** LNG-IUD insertion may be preferred in patients with increased pain and decreased quality of life. Health professionals should provide effective training and counseling services to women using IUDs.

**Keywords:** Anxiety, dysmenorrhea, intrauterine device, sexuality, women

### Öz

**Amaç:** Bu çalışmada, bakır içeren rahim içi araç (TCu380A-RİA) ve levonorgestrel salınımlı rahim içi araç (LNG-IUD-RİA) uygulanan kadınların primer dismenore, anksiyete/depresyon, yaşam kalitesi ve cinsel yaşantılarının karşılaştırılması amaçlandı.

**Yöntem:** Ön test-son test karşılaştırmalı tanımlayıcı ve kesitsel nitelikte olan bu araştırma TCu80A-RİA (n=80) ve LNG-RİA (n=80) uygulanan toplam 160 kadın ile tamamlandı. Veriler anket formu, görsel analog ölçeği, Spilberg durumluluk ve süreklilik anksiyete, Beck depresyon, kısa form (KF)-36-yaşam kalitesi ve Arizona cinsel yaşantılar ölçeği kullanılarak toplandı. Verilerin analizinde sayı, yüzde, ortalama, standart sapma, ki-kare, Fisher's exact test ve bağımsız/bağımlı örneklem t-testi kullanıldı.

**Bulgular:** Araştırmada, son izlemde LNG-RİA grubunun ağrı düzeyinin daha düşük olduğu tespit edilmiştir. Her iki grubun durumluluk, süreklilik kaygılarının ve depresyonlarının orta düzeyde olduğu belirlenmiştir. TCu380A-RİA grubunun KF 36-yaşam kalitesi ölçeğinin son test puanları fiziksel fonksiyon, fiziksel ve emosyonel rol güçlüğü alanlarında LNG-RİA grubundan istatistiksel olarak anlamlı derecede daha fazladır ($p<0,05$). Bununla birlikte, LNG-RİA grubunun

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KF 36-yaşam kalitesi ölçeğinin son test ölçümleri, ön test ile karşılaştırıldığında ağrı, genel sağlık, enerji/canlılık/vitalite ve mental sağlık alanlarında önemli ölçüde daha yüksek olduğu belirlenmiştir (p<0,05). Her iki grubun ilk izlemlerinde Arizona cinsel yaşantılar ölçeği puanlarının benzer olduğu belirlenmiştir.

**Sonuç:** LNG-RİA uygulaması, artan ağrı ve azalan yaşam kalitesi gibi durumlarda tercih edilebilir. Sağlık profesyonellerinin RİA kullanan kadınlara etkin olarak eğitim ve danışmanlık hizmetlerini sunmaları gerekmektedir.

**Anahtar Kelimeler:** Anksiyete, dismenore, rahim içi araç, cinsellik, kadın

## Introduction

In the world and Turkey, intrauterine devices (IUDs) are among the most common contraceptive methods (1,2). The copper-containing IUD (TCu380A-IUD) was developed as an IUD in 1960 (3). TCu380A-IUD was first approved by the United States Food and Drug Administration (FDA) in 1984 (four) and 1994 (ten) years (3,4). The levonorgestrel-releasing intrauterine device (LNG-IUD-Mirena®- Leiras Shering A.G.) was manufactured in Finland in 1990. It came into use in the United Kingdom in 1995 and in the United States in 2000 with FDA approval (5). FDA approved a 13.5 mg LNG-IUD in 2013 and a new 52 mg LNG-IUD in 2015 (6,7).

Randomized clinical trials have found that LNG-IUD reduced dysmenorrhea (8,9). In several studies, LNG-IUD was shown to reduce dysmenorrhea faster and earlier than TCu380A (9,10). Another study found that dysmenorrhea significantly decreased in LNG-IUD users compared with the first month and 6 months after TCu380A and LNG-IUD insertion (11).

LNG-IUD also causes depression and mood swings. The rate of depression and anxiety (18%) increased after using LNG-IUD in women who did not have mental health problems before using LNG-IUD (12). In a systematic review study examining the relationship between progestin-containing contraceptive methods and depression, it is shown that there is an association between progestin-only birth control pills, IUDs, and depression (13). The study by Worly et al. (14) reported that depression scores in patients who underwent LNG-IUD insertion decreased at month six compared with baseline. In another study, the use of LNG-IUD and oral progestin in women diagnosed with depression and taking antidepressants was found to weakly increase the risk of depression (15).

In a prospective study evaluating the quality of life of women using the 52 mg LNG-IUD, it was reported that the quality of life increased in women using LNG-IUD after 12 months (16). Another study found that LNG-IUD insertion was not associated with women's quality of life (17).

**Main Points**

- The levonorgestrel-releasing intrauterine devices (IUDs) group reported lower pain compared to the copper-containing IUDs (TCu380A-IUD) group, particularly at the final follow-up.
- Both groups exhibited moderate levels of anxiety and depression.
- The TCu380A-IUD group had higher scores in certain aspects of quality of life, such as physical function and difficulty with emotional roles.
- The study found no significant difference in sexual function between the two groups.

In another study, it was stated that there was no significant difference in the quality of life of women who were inserted with LNG-IUD and TCu380A-IUD (11).

At the same time, we found that most women could enjoy sexual activities more because using the IUD reduced their risk of pregnancy (11). In one study, it was determined that there was no difference between the sexual life of women who underwent LNG-IUD and TCu380A- IUD insertion (18). It was also found that the utilization of LNG-IUD was not associated with changes in women's sexuality (17). LNG-IUD was associated with poorer sexual satisfaction and increased sexual problems in women with menorrhagia (19).

This study aimed to compare primary dysmenorrhea, anxiety, depression, quality of life, and sexual life among women who underwent TCu380A and LNG-IUD insertion. Considering the purpose of the research, answers were sought to the following:

- How does affect that the use of TCu380A-IUD of women's primary dysmenorrhea, anxiety, and depression, quality of life, and sexual life?

- How does affect that the use of LNG-IUD of women's primary dysmenorrhea, anxiety, and depression, quality of life, and sexual life?

## Material and Method

### Design

This research was descriptive, cross-sectional, with a pre-test-post-test comparison.

### Participants

The study included women who underwent TCu380A-IUD insertion at the gynecology outpatient clinic of the Caucasus College Health Research and Application Center between July 2019 and July 2021 and women who underwent LNG-IUD-RIA insertion at the Kars Central Community Health Center. The power analysis was performed using G Power 3.1 software. The power analysis calculated that at a significance level of 0.05, effect width of 0.05, and power of 80%, at least 64 people per group were required to participate. While calculating the power analysis, Ramazanzadeh et al. (10) compared IUDs was taken as basis. The total sample of the study included 160 women.

The inclusion criteria were age 18 to above years, literate, having an IUD inserted and using it for at least 6 months,

body mass index between 19 and 30, and volunteering to participate in research.

The exclusion criteria were current pregnancy or lactation, any psychiatric disorder, use of antidepressant medication, and any disease that may affect sexuality (cancer, sexually transmitted disease, etc.).

### Data Collection Tools

#### Survey Form

This form consists of questions regarding the reason for the indication for TCu380A- IUD and LNG-IUD insertion, age, self-reported height/weight, obstetric history, menstrual duration, intensity and symptoms, menstrual life impairment, marital status, educational status, economic status, and sexual life, which were created by reviewing the relevant literature (20-22).

#### Visual Analog Scale (VAS)

This scale indicating painlessness at one end and most severe pain at the other, 0-10 or 0-100 is the most commonly used scale to quantify pain intensity, with "0" defining painlessness and "10" defining most severe pain. The VAS is more sensitive and reliable than other one-dimensional scales for measuring pain intensity. The person marks their pain on a scale. Measurements were taken in centimeters between the onset of pain relief and the point marked by the person. It is an easy-to-understand scale (23).

#### The State-Trait Anxiety Inventory (STAI)

This scale was adapted for the Turkish population by Oner and Le Compt (24). The STAI consists of 40 items and includes two separate scales. It was developed as a means to identify how an individual feels in general. The reliability coefficient determined by the alpha correlation was 0.83-0.87. The STAI is a scale that shows how an individual feels in a situation and in particular conditions. The reliability coefficient was 0.94-0.96. Oner and Le Compt (24) defined the normal anxiety level as between 36 and 42. Higher scores indicate higher levels of anxiety, whereas lower scores indicate lower levels of anxiety.

#### Beck Depression Inventory (BDI)

This form, which comprises 21 items on emotional, cognitive, behavioral, and physical indications, enables the comprehensive evaluation of depressive symptoms and cognitive status of individuals. It was developed by Beck in 1961 and is a self-assessment inventory. Each option has four questions and is scored from 0 to 3. If the total score is 9 or less, it is evaluated as "no depression", if it is between 10-16, it is evaluated as "mild depression". If it is between 17-23, it is "moderate depression" and 24 and higher score is accepted as "severe depression". This inventory was translated into Turkish by Hisli Sahin (25) in 1988.

#### Quality of Life Scale [Short Form (SF)-36]

Turkish validity and reliability studies on the SF-36 were performed by Koçyiğit et al. (26). The SF-36 consists of eight sub-parameters and 36 items. Scoring is performed over 100 points, and the scores are between 0 and 100 points for each sub-parameter (27). The eight multi-item scales are physical functioning, difficulty in coping, pain, general perception of health, energy/vitality, social functioning, difficulty in coping, and mental health. A high score indicates good quality of life. The total score can be calculated separately for each sub-dimension in the scale.

#### The Arizona Sexual Experience Scale (ASEX)

This form, developed by McGahuey et al. (2000), was adapted to Turkish by Soykan (28). It has separate forms for men and women. The form for women was used in this study. The scale is a 5-item, 6-grade Likert- type, self-assessment scale. The lowest score that participants obtained from the scale was 5, and the highest score was 30. The sum of the points obtained from the scale items constitutes the total scale score. Low scores on the scale indicate that sexual responses are strong, easy, and satisfying, whereas high scores indicate sexual dysfunction (28).

### Data Collection

The data, a questionnaire prepared for an initial assessment prior to IUD insertion, the BDI, the STAI, the SF-36, the ASEX, and the VAS were applied to women who registered at the gynecology outpatient clinic and the Kars Central Community Health Center for LNG-IUD and TCu80A- IUD insertion. Six months after both types of IUD insertion, for evaluation, the women interviewed were invited to the center where the application was performed. The same measurement tools were applied again. Informal consent was obtained from all women.

### Statistical Analysis

Data were analyzed using IBM Statistical Package for the Social Sciences 25.0. Means and percentages were calculated to evaluate descriptive data. The relationships between two independent categorical variables were tested using chi-square analysis. Fisher's exact test results were used in cases in which the expected value was not given in the chi-square analysis. The differences between the two independent groups were examined using the t-test. Differences between two dependent numeric variables were examined with the t-test for dependent samples.

### Ethical Considerations

Ethical approval was initially obtained from the Non-Interventional Research Ethics Committee of the Kafkas University Faculty of Health Sciences in Kars, Turkey (decision no: 2019/60, date: 31.05.2019). After the addition of a co-author, the committee was informed and renewed approval was given (decision no: 2023/6, date: 01.06.2023).

## Results

The distribution of the TCu380A and LNG-IUD groups according to their demographic characteristics is presented in Table 1. The groups were homogeneously distributed in terms of demographic characteristics.

The post-test STAI scores of the TCu380A-IUD group were significantly higher than those of the LNG-IUD group ($p<0.05$). In the LNG-IUD group, the STAI scores in the post-test were statistically significantly decreased compared to the pre-test ($p<0.05$). The pre-test BDI scores of the LNG-IUD group were significantly higher than those of the TCu380A-IUD group ($p<0.05$). Post-test VAS and ASEX scores of the TCu380A-IUD group were significantly higher than those of the LNG-IUD group ($p<0.05$). ASEX scores were statistically significantly decreased compared to the pre-test ($p<0.05$). In the LNG-IUD group, the VAS and ASEX scores were statistically significantly decreased in the post-test than in the pre-test ($p<0.05$; Table 2).

Post-test physical function, physical, and emotional role difficulty scores of the TCu380A-IUD group were statistically significantly higher than those of the LNG-IUD group ($p<0.05$). Post-test pain scores of the LNG-IUD group were significantly higher than those of the TCu380A-IUD group ($p<0.05$). Physical function and emotional role difficulty scores in the post-test in the TCu380A-IUD group were significantly decreased compared with the pre-test ($p<0.05$). Pain, general health, and energy/vitality scores in the post-test in the TCu380A-IUD group increased significantly compared with the pre-test ($p<0.05$). In the LNG-IUD group, the scores of physical function, physical, and emotional role difficulty in the post-test were statistically significantly decreased compared with the pre-test ($p<0.05$). Pain, general health, energy/vitality, and mental health scores in the post-test in the LNG-IUD group increased statistically significantly compared with the pre-test ($p<0.05$) (Table 3).

## Discussion

The pain level was lower in the LNG-IUD group than in the TCu380A-IUD group at the post-test (Table 2). In a study examining the effect of copper and levonorgestrel IUDs on dysmenorrhea, LNG-IUD insertion was found to significantly reduce dysmenorrhea (29). Lockhat et al. (30) found that 29 women with endometriosis significantly reduced pain intensity and frequency using VAS pain scoring due to LNG-IUD. Fadiloglu et al. (31) investigated the relationship between bleeding and dysmenorrhea and ultrasound findings in patients undergoing TCu80A-IUD. In this study, 70 of 267 patients reported dysmenorrhea before the procedure, whereas 86 reported dysmenorrhea at 6-week follow-up.

The state and trait anxiety level results of the TCu380A-IUD and LNG-IUD groups were similar and moderate in the 6$^{th}$ month before and after the procedure (Table 2). In a cohort study, women who underwent LNG-IUD insertion showed higher anxiety symptoms than those who underwent TCu380A-IUD (32). In a research examining copper IUD complications, LNG-IUD users had more anxiety and depressive symptoms than TCu380A- IUD users (31). In this research, it is suggested that anxiety levels were similar and moderate in both IUD users, which may be related to the fact that women in both groups experienced the effects and side effects (hormonal adverse effects, mood changes, nervousness) of the hormonal IUD to different degrees.

The TCu380A-IUD and LNG-IUD groups were moderately depressed (Table 2). Furthermore, this study found that the TCu380A- IUD group had higher depression scores at the final measurement (Table 2). LNG-IUD-inserted women experience symptoms of depression (17,33,34). LNG-IUD insertion in women in the postpartum period was associated with a lower risk of depression diagnosis (35). Keyes et al. (36) reported a decrease in depressive symptoms with LNG-IUD. Toffol et al. (37) did not find any relationship between LNG-IUD utilization and depression scores. Tazegul Pekin et al. (38) investigated depressive symptoms in women using LNG-IUDs that scored depression scores before and 6 months after LNG-IUD insertion in premenopausal women and found that LNG-IUDs had no effect on depression.

ASEX scores were similar between the TCu380A-IUD and LNG-IUD groups at the pre-test (Table 2). The cohort study conducted by Ferreira et al. (39) found no difference in sexual dysfunction between TCu380A- IUD and LNG-IUD users. Koseoğlu et al. (40) investigated the sexual function of two groups of women using TCU380A- IUD was compared with that of women not using contraceptives, and it was found that the scores of those using TCu380A- IUD were lower than those of the control group; however, the difference between them was insignificant. Moreover, this study found that the ASEX score of the TCu380A- IUD group was significantly higher than that of the LNG-IUD group in the post-test. In addition, ASEX scores were statistically significantly lower in the post-test than in the pre-test in both IUD groups (Table 2). In the studies performed, no significant difference was noted in sexual activity among women who underwent LNG-IUD insertion (24,25). Several studies have concluded that LNG-IUD insertion improves sexual function (18,41). In our study, comparing scores before and after IUD, sexual function was negatively affected. This suggests that IUD insertion negatively affects sexual function.

In this study, the TCu380A- IUD group's post-test scores on the SF-36 were statistically significantly higher than those of the LNG-IUD group in physical function, physical role difficulty, and emotional role difficulty ($p<0.05$; Table 3). Perelló-Capó et al. (42) found that the use of LNG13.5-IUD was associated with better quality of life compared with Cu380-IUD throughout the 3 years. Investigating the results of the research examining the effects of different IUDs on quality of life, the TCu380A- IUD group had a significantly lower score in physical health, environment, and overall quality of life than the LNG-IUD group (39,43).

***Table 1.***
***Distribution of Demographic Characteristics by Group***

| Traits | TCu380A-IUD (n=80) | | LNG-IUD (n=80) | | $\chi^2$ | p |
|---|---|---|---|---|---|---|
| | n | % | n | % | | |
| **Reasons for IUD use** | | | | | | |
| Menorrhagia | 0 | 0.0 | 14 | 17.5 | 15.342 | **0.000*** |
| Contraception only | 80 | 100.0 | 66 | 82.5 | | |
| **Age** | **Mean ± SD = 31.10±5.40** | | **Mean ± SD = 30.08±4.71** | | | |
| 18-23 years | 6 | 7.5 | 6 | 7.5 | | |
| 24-29 years | 24 | 30.0 | 30 | 37.5 | 2.731 | 0.435 |
| 30-35 years | 30 | 37.5 | 32 | 40.0 | | |
| above 35 | 20 | 25.0 | 12 | 15.0 | | |
| **Spouse age** | **Mean ± SD = 34.13±5.4** | | **Mean ± SD = 32.39±4.78** | | | |
| 22-30 | 26 | 32.5 | 31 | 38.8 | 0.929 | 0.629 |
| 31-35 | 26 | 32.5 | 26 | 32.5 | | |
| Above 35 | 28 | 35.0 | 23 | 28.7 | | |
| **Family type** | | | | | | |
| Extended family | 60 | 75.0 | 65 | 81.2 | 0.914 | 0.339 |
| Nuclear family | 20 | 25.0 | 15 | 18.8 | | |
| **Dependent parent** | | | | | | |
| Yes | 5 | 6.2 | 2 | 2.5 | 1.345$^{FE}$ | 0.443 |
| No | 75 | 93.8 | 78 | 97.5 | | |
| **Relationship with the spouse** | | | | | | |
| Very good | 27 | 33.7 | 23 | 28.7 | | |
| Good | 37 | 46.3 | 37 | 46.3 | 0.953$^{FE}$ | 0.878 |
| Medium | 14 | 17.5 | 18 | 22.5 | | |
| Bad | 2 | 2.5 | 2 | 2.5 | | |
| **Spouse employment status** | | | | | | |
| Employed | 72 | 90.0 | 80 | 100.0 | 8.421$^{FE}$ | **0.007*** |
| Unemployed | 8 | 10.0 | 0 | 0.0 | | |
| **Spouse educational status** | | | | | | |
| Literate | 0 | 0.0 | 0 | 0.0 | | |
| Primary school | 2 | 2.5 | 2 | 2.5 | 4.378$^{FE}$ | 0.108 |
| Elementary school-high school | 24 | 30.0 | 13 | 16.2 | | |
| University and above | 54 | 67.5 | 65 | 81.3 | | |
| **Health insurance presence** | | | | | | |
| Yes | 20 | 25.0 | 7 | 8.8 | 7.530 | **0.006*** |
| No | 60 | 75.0 | 73 | 91.2 | | |
| **Marital status** | | | | | | |
| Married | 80 | 100.0 | 80 | 100.0 | - | - |
| Single | 0 | 0.0 | 0 | 0.0 | | |
| **Marriage duration** | **Mean ± SD = 6.38±4.48** | | **Mean ± SD = 3.86±1.93** | | | |
| 1-5 years | 48 | 60.0 | 62 | 77.5 | 5.702$^{FE}$ | **0.017*** |
| More than 5 years | 32 | 40.0 | 18 | 22.5 | | |

***Table 1.***
***Continued***

| Traits | TCu380A-IUD (n=80) | | LNG-IUD (n=80) | | $\chi^2$ | p |
|---|---|---|---|---|---|---|
| | n | % | n | % | | |
| | **Mean ± SD = 6.38±4.48** | | **Mean ± SD = 3.86±1.93** | | | |
| **Employment status** | | | | | | |
| Yes | 15 | 18.8 | 24 | 30.0 | 2.746 | 0.097 |
| No | 65 | 81.2 | 56 | 70.0 | | |
| **Educational status** | | | | | | |
| Literate | 1 | 1.2 | 0 | 0.0 | | |
| Primary school | 9 | 11.3 | 3 | 3.7 | 7.837[FE] | **0.029*** |
| Elementary school-High school | 42 | 52.5 | 34 | 42.5 | | |
| University and above | 28 | 35.0 | 43 | 53.8 | | |
| **Income status** | | | | | | |
| Income more than expenses | 3 | 3.7 | 8 | 10.0 | | |
| Income equals expenses | 63 | 78.8 | 61 | 76.2 | 2.665 | 0.257 |
| Income less than expenses | 14 | 17.5 | 11 | 13.8 | | |
| | **Mean ± SD** | | **Mean ± SD** | | **t** | **p** |
| **Height** | 162.33±6.83 | | 162.73±6.94 | | -0.367 | 0.714 |
| **Weight** | 66.73±11.23 | | 65.81±8.82 | | 0.571 | 0.569 |
| **BMI** | 25.28±3.68 | | 24.87±3.14 | | 0.760 | 0.448 |

*t=independent sample t-test, [FE]=Fisher's exact test, *=p<0.05, TCu380A-IUD=copper-containing intrauterine devices, LNG=levonorgestrel-releasing intrauterine devices, SD=standard deviation, BMI=body mass index*

***Table 2.***
***Investigation of Differences in STAI, BDI, VAS, and ASEX Scores Between and within Groups***

| | TCu380A-IUD (n=80) | LNG-IUD (n=80) | t[a] | p |
|---|---|---|---|---|
| | **Mean ± SD** | **Mean ± SD** | | |
| SAI pre-test | 41.65±9.75 | 42.65±10.19 | -0.634 | 0.527 |
| SAI post-test | 39.57±9.56 | 36.65±8.30 | 2.066 | **0.040*** |
| t[b];p | 1.733;0.087 | 4.480;**<0.001*** | | |
| STAI pre-test | 47.54±8.06 | 46.54±7.69 | 0.803 | 0.423 |
| STAI post-test | 47.65±8.50 | 47.91±8.37 | -0.197 | 0.844 |
| t[b];p | -0.093;0.927 | - 1.122;0.265 | | |
| BDI pre-test | 14.54±10.26 | 18.02±10.98 | -2.076 | **0.039*** |
| BDI post-test | 16.79±10.72 | 15.30±9.54 | 0.927 | 0.355 |
| t[b];p | -1.460;0.148 | 1.558;0.123 | | |
| VAS pre-test | 4.25±2.06 | 4.07±1.54 | 0.609 | 0.544 |
| VAS post-test | 3.16±1.33 | 1.89±0.76 | 7.455 | **<0.001*** |
| t[b];p | 5.073;**<0.001*** | 13.490;**<0.001*** | | |
| ASEX pre-test | 12.75±4.07 | 12.79±4.31 | -0.057 | 0.955 |
| ASEX post-test | 10.95±2.52 | 8.59±2.04 | 6.530 | **<0.001*** |
| t[b];p | 5.076;**<0.001*** | 10.281;**<0.001*** | | |

*t[a]=independent sample t-test, t[b]=dependent sample t-test, *=p<0.05, TCu380A-IUD=copper-containing intrauterine devices LNG=levonorgestrel-releasing intrauterine devices, SD=standard deviation, SAI=state anxiety inventory, STAI=state trait anxiety inventory, BDI=Beck depression scale inventory, VAS=visual analog scale, ASEX=Arizona sexual experiences scale*

***Table 3.***
***Investigation of Differences in SF-36 Sub-dimension SF-36 Scores between and within Groups***

| Sub-dimensions | TCu380A-IUD (n=80) | LNG-IUD (n=80) | t[a] | p |
|---|---|---|---|---|
| | Mean ± SD | Mean ± SD | | |
| Physical function test | 70.13±14.41 | 66.94±15.56 | 1.344 | 0.181 |
| Physical function post-test | 25.94±10.10 | 15.81±7.00 | 7.370 | **<0.001*** |
| t[b];p | 24.171;**<0.001*** | 26.656;**<0.001*** | | |
| Physical role difficulty pre-test | 26.88±20.58 | 30.00±20.82 | -0.955 | 0.341 |
| Physical role difficulty post-test | 24.69±22.32 | 1.88±6.63 | 8.762 | **<0.001*** |
| t[b];p | 1.068;0.289 | 13.369;**<0.001*** | | |
| Pain pre-test | 62.31±15.60 | 60.15±16.22 | 0.859 | 0.391 |
| Pain post-test | 76.71±15.45 | 88.70 | 11.20±-5.619 | **<0.001*** |
| t[b];p | -8.737;**<0.001*** | -17.065;**<0.001*** | | |
| General health perception test | 47.43±11.81 | 46.62±11.17 | 0.440 | 0.660 |
| General health perception test | 56.66±8.25 | 57.09±6.70 | -0.358 | 0.721 |
| t[b];p | -7.707;**<0.001*** | -9.334;**<0.001*** | | |
| Energy/vitality pre-test | 42.38±7.83 | 44.94±9.92 | -1.813 | 0.072 |
| Energy/vitality post-test | 51.38±6.98 | 50.44±5.69 | 0.931 | 0.353 |
| t[b];p | -9.903;**<0.001*** | 5.160;**<0.001*** | | |
| Social function pre-test | 45.47±25.80 | 43.75±26.08 | 0.419 | 0.676 |
| Social function post-test | 46.41±15.69 | 48.13±9.35 | -0.842 | 0.401 |
| t[b];p | -0.408;0.684 | 1.752;0.084 | | |
| Emotional role difficulty pre-test | 31.67±31.78 | 27.50±32.16 | 0.824 | 0.411 |
| Emotional role difficulty in post-testing | 24.58±30.81 | 0.00±0.00 | 7.137 | **<0.001*** |
| t[b];p | 2.763;**0.007*** | 7.648;**<0.001*** | | |
| Mental health pre-test | 55.95±6.99 | 53.55±9.64 | 1.803 | 0.073 |
| Mental health post-test | 57.05±6.19 | 57.65±5.12 | -0.668 | 0.505 |
| t[b];p | -1.448;0.152 | -4.888;**<0.001*** | | |

*t[a]=independent sample t-test, t[b]=dependent sample t-test, *=p<0.05, TCu380A-IUD=copper-containing intrauterine devices LNG=levonorgestrel-releasing intrauterine devices, SD=standard deviation*

Abul et al. (43) specialty thesis in medicine examined the effect of oral dydrogesterone and LNG-IUD treatment on quality of life in patients with abnormal uterine bleeding. When the SF-36 scores of the LNG-IUD group and the oral dydrogesterone group were compared after at least 6 months of treatment, no significant difference was found in seven of the eight subgroups, and the energy/liveliness/vitality score was found to be higher in the oral dydrogesterone group (43). Skrzypulec and Drosdzol (44) detected that LNG-IUD users had a higher quality of life score than TCu380A- IUD users (18). However, this research suggests that the reason for the higher quality of life of women using TCu380A- IUD compared with those using LNG-IUD may be related to the hormone release of LNG-IUD. Likewise, LNG-IUD may rarely cause water retention and bloating due to the progesterone it contains.

Thus, our study revealed that the LNG-IUD group had significantly higher scores in pain, general health, energy/vitality, and mental health in the post-test measures of the SF-36 than the pre-test (p<0.05; Table 3). These findings indicate that LNG-IUD insertion increases the women's quality of life when measured six months later. Güzel (21) noted a significant improvement in SF-36 points in the group with LNG-IUD (26). Studies have demonstrated that the use of LNG-IUD increases quality of life (18,28,43). In a study by Déa et al. (45) comparing women of reproductive age who used hormonal, non-hormonal, and no contraceptive methods, the quality of life domain was lower in women in the hormonal contraceptive group than in women in the non-hormonal contraceptive group, and women in the hormonal contraceptive group had lower sexual function satisfaction, reduced arousal, and heightened pain, as well as higher anxiety and depression levels, increased pain, and poorer overall health. Regarding contraceptive methods, women using copper IUDs had better sexual function, including higher rates of arousal and lower anxiety, than those using oral contraceptives (45).

### Importance of Midwives and Nurses

Nurses and midwives know that whether IUDs are used as a birth control method or for therapeutic purposes, some unexpected or possible negative effects may occur. The use of contraceptive methods is an important issue that should be seriously addressed in all healthcare services, especially primary healthcare. Specifically, effective and long-term contraceptive methods, such as IUD insertion, require careful implementation and follow-up. Nurses and midwives should consider conditions, i.e., dysmenorrhea history, anxiety and depression levels, quality of life, and sexual function/dysfunction of healthy/ill women when planning and implementing contraceptive education and counseling services. In primary healthcare institutions, midwives and nurses are the first health professionals that women consult regarding this issue. It is necessary to raise awareness among midwives and nurses who provide family planning services regarding this issue by creating training programs in the light of the literature on the effects of family planning methods on women's lives.

### Study Limitations

The fact that only IUD use was compared is a limitation of the study. Further studies may be needed including comparisons of other family planning methods.

### Conclusion

LNG-IUD insertion may be preferred in cases such as increased depression and pain and decreased libido. Therefore, health professionals should consider conditions i.e. dysmenorrhea history, anxiety and depression levels, quality of life, and sexual function/dysfunction of healthy/ill women when planning and implementing contraceptive education and counseling services. It is anticipated that the results obtained will contribute to the education and counseling services that health professionals will provide, particularly before and after using IUDs. In developing countries like Turkey, the use of both effective and cost-effective methods is of critical importance in terms of accessibility and economic sustainability in family planning services. For this purpose, health professionals must provide more comprehensive services and education about IUDs and help women make informed choices.

**Ethics Committee Approval:** Ethical approval was initially obtained from the Non-Interventional Research Ethics Committee of the Kafkas University Faculty of Health Sciences in Kars, Turkey (decision no: 2019/60, date: 31.05.2019). After the addition of a co-author, the committee was informed and renewed approval was given (decision no: 2023/6, date: 01.06.2023).

**Informed Consent:** Informal consent was obtained from all women.

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### Footnotes

**Author Contributions:** Surgical and Medical Practices – R.T.D., Conception – R.T.D., T.S., H.Ç., F.T.; Design – R.T.D., H.Ç., F.T.; Data Collection and/or Processing – R.T.D., H.Ç.; Analysis and/or Interpretation – R.T.D., T.S.; Literature Review – R.T.D., T.S.; Writing – R.T.D., T.S., H.Ç., F.T.

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ORIGINAL ARTICLE

# Evaluating the Effects of Popular Music on Cardiopulmonary Resuscitation Training in Nursing Students: A Randomized Controlled Study

## Hemşirelik Öğrencilerinde Popüler Müziğin Kardiyopulmoner Resüsitasyon Eğitimi Üzerindeki Etkilerinin Değerlendirilmesi: Randomize Kontrollü Bir Çalışma

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### Abstract

**Objective:** This study aimed to analyze the short- and long-term effects of musical memory created using a national popular song on achieving the recommended compression rate, depth, and compression-breath rate for nursing students who received cardiopulmonary resuscitation (CPR) training.

**Method:** This study had an experimental, randomized post-test control group design. The study was conducted between February and June 2018 on 49 third-year nursing students who received CPR training for the first time. The control group received standard CPR training, whereas the intervention group received CPR training using a nationally popular song. The study evaluated compression rate and depth, satisfaction with CPR training, and arm pain during CPR. Data were collected immediately after CPR training (short-term) and six weeks after training (long-term).

**Results:** The differences between the control and intervention groups regarding the correct and incorrect breath rates were not statistically significant (p>0.05). In addition, there was no significant difference between the control and intervention groups in terms of compression and breathing rates measured six weeks after CPR training was not statistically (p>0.05). Satisfaction with CPR training was higher in the control group.

**Conclusion:** Although existing studies suggested that popular music is an effective tool for achieving the recommended compression rate, this study did not find any significant impact of popular national music on chest compression performance.

**Keywords:** Cardiopulmonary resuscitation, training methods, music, nursing students

### Öz

**Amaç:** Bu çalışmanın amacı, ulusal popüler müzik kullanılarak oluşturulan müzikal hafıza ritminin, kardiyopulmoner resüsitasyondaki (KPR) solunum sayısı, göğüs kompresyonu sayısı ve derinliği üzerine kısa ve uzun dönemdeki etkisinin incelenmesidir.

**Yöntem:** Araştırma; deneysel, randomize, son test kontrol gruplu araştırma tasarımına uygun yapıldı. Araştırma, ilk kez KPR eğitimi alan 49 hemşirelik okulu üçüncü sınıf öğrencisi ile Şubat-Haziran 2018 arasında yürütüldü. Girişim grubuna yerel müzik ile kontrol grubuna standart KPR eğitimi uygulandı. Araştırmada; göğüs basısı sayısı, derinliği, KPR eğitimine yönelik memnuniyet, KPR uygulaması sırasında kol ağrısı değerlendirildi. Veriler, KPR eğitimi sonrası (kısa dönem) ve eğitimden altı hafta sonra (uzun dönem) olmak üzere toplandı.

**Bulgular:** Eğitim sonrası ilk değerlendirmede, müdahale ve kontrol grubu arasında doğru kompresyon hızı ve yanlış solunum hızı sayıları arasında anlamlı farklılık saptanmadı (p>0,05). Eğitimden altı hafta sonraki değerlendirmede müdahale ve kontrol grupları arasında kompresyon ve solunum hızı sayıları arasında fark bulunmadı (p>0,05). KPR eğitiminden memnuniyet düzeyi kontrol grubunda daha yüksek saptandı.

**Sonuç:** Mevcut çalışmalarda, popüler müzik kullanımının önerilen kompresyon oranını elde etmek için etkili bir araç olduğu belirtilse de, bu çalışma da ulusal popüler müziğin göğüs kompresyonları performansı üzerinde önemli bir etkisi bulunmadı.

**Anahtar Kelimeler:** Kardiyopulmoner resisütasyon, eğitim yöntemleri, müzik, hemşirelik öğrencileri

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## Introduction

The incidence of out-of-hospital cardiac arrest has increased in parallel with an increase in the prevalence of coronary artery disease. Cardiopulmonary resuscitation (CPR) after out-of-hospital cardiac arrest decreases mortality rates and triples discharge rates (1,2). Effective and high-quality CPR before and at the hospital has positive effects on patient outcomes and the return of spontaneous circulation (3,4). Patient survival and CPR effectiveness depend on the optimal rate and depth of chest compression (5-9).

Nursing education aims to prepare students with the knowledge, skills, and attitudes necessary to provide quality patient care in the future (10). CPR training is one of the most basic skills that a nursing student must be trained in. Nurses are the first responders to initiate CPR on a patient during cardiac arrest in the clinic. Therefore, effective CPR training of nursing students and ensuring the quality of nursing education are vital for students to fulfill their roles in the future (11). Effective CPR training includes correct hand position, compression rate and depth, and chest wall recoil (12). Considering that traditional teaching methods have limited effectiveness in terms of learning and training management, it may be beneficial to use innovative methods in CPR training (12). Music therapy is recommended for effective CPR training as a tool to learn the CPR compression rate, to help remember the rate, and to adjust the rate of actual compression (12,13).

The American Heart Association (AHA) Guidelines for Basic Life Support and CPR recommended that rescuers perform CPR chest compression at a rate of 100-120/min and to a depth of at least 5 cm while avoiding chest compression depth >6 cm (14). Different methods, including the music tempo, have been used to achieve the optimal compression rate. Popular songs with at least 100 beats/min, such as, “Stayin Alive”, “Nellie the Elephant”, and “Macarena” are chosen to perform the recommended compression rate (15,16). Since the rhythm and emphasis of these songs are constant, they are easy to remember and may be used as mental metronomes to perform the optimal compression rate during CPR training (17-19).

Clinical guidelines recommend using popular music as a mental metronome during the CPR training (20,21) However, the songs recommended by the AHA are not popular in all countries. Rescuers may find it difficult to remember the rhythm of these songs. For this reason, we used a popular Turkish song, entitled, “Senden Daha Güzel” and performed by Duman, to create a musical memory to be used as a mental metronome and analyzed the short- and long-term effects of using popular national songs on achieving recommended compression rate, depth, and compression-breath rate for nursing students who received CPR training and performed CPR on high-fidelity simulation mannequins for the first time.

**Main Points**

- The effectiveness of cardiopulmonary resuscitation (CPR) depends on the optimal rate and depth of chest compression.
- Clinical guidelines recommended using popular music as a mental metronome during the CPR training.
- There is no study that used a popular Turkish song to impact musical memory on CPR performance.

## Material and Method

### Study Design and Setting

This study had an experimental, randomized post-test control group design. This research was conducted at the Department of Nursing at the Eastern Mediterranean University, Faculty of Health Sciences between February and June 2018. Trial Registration was completed (clinicaltrials.gov) with registration no.: NCT06557109.

### Sample Size and Randomization

The study population comprised 70 third-year nursing students who were enrolled in the nursing department of the faculty of health sciences at East Mediterranean University in the spring semester of the 2017-18 academic year and who did not receive prior CPR training. The sample size was calculated using G*Power software (version 3.1.9.2). Tastan et al. (17) on the impact of music on cardiac resuscitation found that the chest compression rates for the intervention and control groups were 107.33±7.29/min and 121.47±12.91/min, respectively. Based on these findings, the effect size was d=1.35. The sample of the study was calculated as 26 for 95% power, 95% confidence interval, and d=1.35 effect size with 13 participants in the experimental and control groups. Fourteen students that did not agree to participate were excluded, and all the remaining 56 students were allocated to the intervention (n=29) and control (n=27) groups using the block randomization method. Nine students that did not participate in the second evaluation were excluded, and the study was finalized with 20 and 27 students in the intervention and control groups, respectively (Figure 1).

### Data Collection Tool

We developed a form to record age, gender, smoking habits, daily exercise, body mass index, arm circumference, compression rate, and depth during CPR, and satisfaction with the CPR training. The intensity of arm pain during CPR was measured using a 10 cm visual analog scale.

### Intervention

Nursing students who agreed to participate received two hours of theoretical lectures on basic life support for healthcare professionals. The training was based on the 2015 AHA guidelines for CPR and Emergency Cardiovascular Care (ECC) and was provided by an emergency medical expert with an AHA first aid trainer certificate. Following the theoretical lecture, participants were allocated to the intervention and control groups and performed at least 5 cycles of CPR (1 cycle=2 minute) on a high-fidelity simulation mannequin at the practice laboratory. During

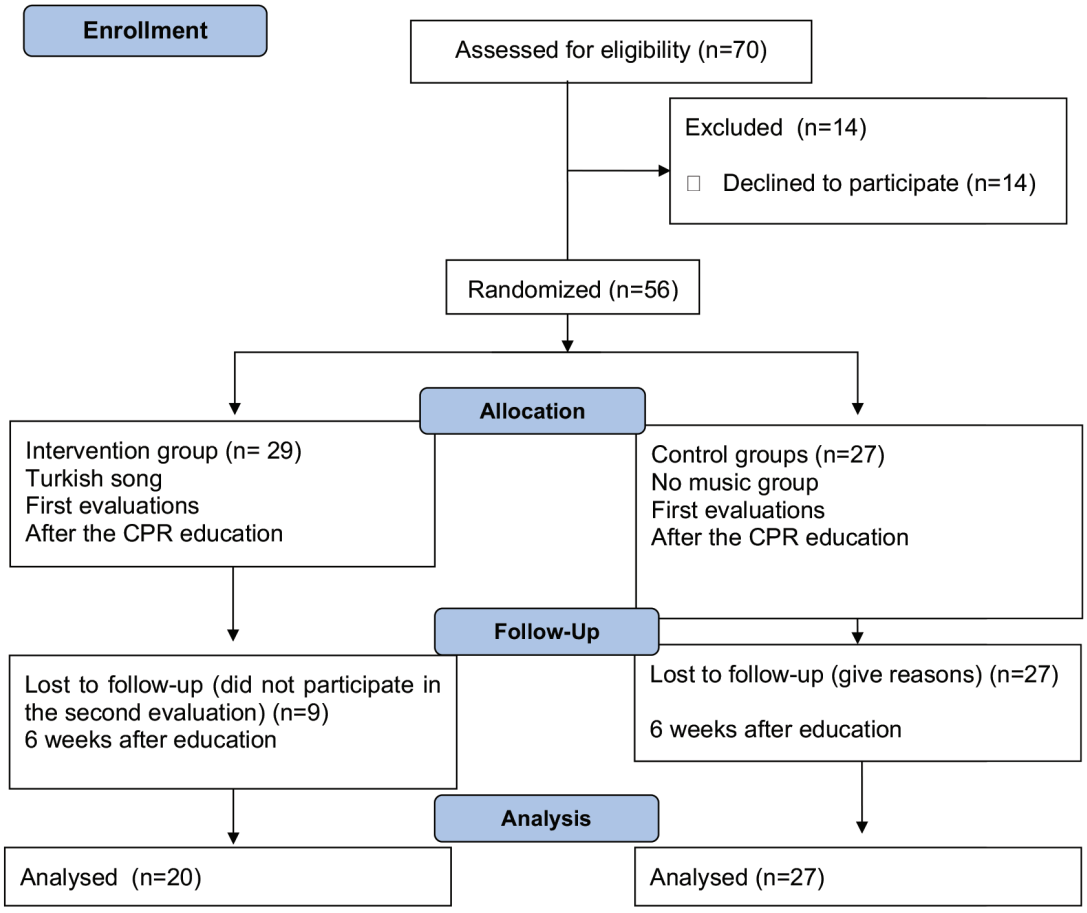


**Figure 1.**
**The Flow Diagrams of the Participants Through Each Stage of the Study**
CPR=cardiopulmonary resuscitation

the performance, one student delivered rescue breaths using a bag valve mask, while the other student performed compressions. Participants switched positions after each cycle with 120 compression.

After the training, the students in the control group received standard CPR training, whereas the students in the intervention group listened to the song to be used in CPR and then performed CPR while listening to the song. A funky D mix version of a popular Turkish song by group Duman entitled "Senden Daha Güzel", which had 104 beats/min, was used during the CPR training of the intervention group. The CPR performance of the participants was evaluated just after the CPR training (short-term) and six weeks after the training (long-term).

### Measures

Following training, students were taken to the practice laboratory in groups of two and were asked to perform five cycles of CPR for two minutes with 30 chest compression and 2 breaths in each cycle. Participants performed CPR using a high-fidelity simulation mannequin entitled Advanced Wireless CPR Training Manikin (General Doctor® Model: GD/CPR10350, Honglian Medical, Shanghai, China).

### Outcomes

In line with the recommendations of the 2015 AHA guidelines for CPR and ECC, the primary outcome was expected to be a compression rate of 100-120/min and a depth of 5-6 cm. Data on the compression rate and depth, as well as the percentages of the compression-breath rate and correct compression rate, were provided by the mannequin. The secondary outcomes of this study were arm pain intensity during CPR and satisfaction with the CPR training.

### Ethical Issues

We obtained permission from the Scientific Research and Publication Ethics Committee of Eastern Mediterranean University (no: 2018-55-08, date: 12.03.2018). The nursing students were informed about the aim and scope of the research, and written informed consent was obtained. We informed the students that their decision not to participate in the research would not affect their education.

### Statistical Analysis

The data collected were analyzed using the Statistical Package for the Social Sciences (SPSS version 15.0). We used mean and standard deviation for the analysis of

descriptive data that met normal distribution and median and interquartile range for descriptive data that did not meet normal distribution. Mann-Whitney U and t-test were used for intergroup comparison. Chi-square test and Fisher's exact test were used to compare categorical variables. The Wilcoxon test was used to compare pre-training and post-education data. Statistical significance was set at $p<0.05$.

## Results

Characteristics of the nursing students The research was conducted with the participation of 20 and 27 nursing students in the intervention and control groups, respectively. There were no statistically significant differences between the two groups in terms of age, weight, height, and left and right arm circumference. In addition, the differences between the groups in terms of gender, smoking habits, educational status, daily exercise, and prior witness to basic life support were not statistically significant (Table 1).

### Intergroup Comparison

The difference between the intervention and control groups regarding the total and correct compression rates during one cycle (2 min) was not statistically significant ($p>0.05$). The false compression rate was higher in the intervention group than in the control group. There were no statistically significant differences in reasons such as depth of compression ($p>0.05$). The intervention and control groups did not significantly differ in parameters such as total and correct number of rescue breaths and compression-breath ratio were no statistically significant (Table 2). After the second measurement, there were no significant differences between the groups regarding the parameters of compression and breath were no statistically significant ($p>0.05$) (Table 2).

### Intragroup Comparison

Comparison of the first and second measures for the control group showed that incorrect compression and breath rates six weeks after the initial measurement were higher, whereas the correct compression rate was lower. There

***Table 1.***
***Descriptive Characteristics of the Nursing Students***

| | **Intervention (n=20)** | **Control (n=27)** | **p** |
|---|---|---|---|
| Age* | 22 (21-22.8) | 21 (21-22) | 0.506 |
| Weight* | 55.7 (47.5-68) | 57.2 (53-68.4) | 0.323 |
| Height¶ | 163.4±10.2 (160.6-170.1) | 162.4±9.4 (158.8-166) | 0.604 |
| Right arm circumference¶ | 25.3±3.5 (23.7-26.9) | 26.6±3.2 (25.4-27.8) | 0.195 |
| Left arm circumference¶ | 25.3±3.4 (23.7-26.9) | 26.0±3.1 (24.8-27.2) | 0.448 |
| Gender - n (%) | | | |
| Female | 15 (75.0) | 22 (75.9) | 1.0 |
| Male | 5 (25.0) | 7 (24.1) | |
| Education - n (%) | | | |
| High school | 13 (65.0) | 14 (48.3) | 0.441 |
| Anatolian/science high school | 6 (30.0) | 14 (48.3) | |
| Other | 1 (5.0) | 1 (3.4) | |
| Prior witness to BLT- n (%) | | | |
| Yes | 2 (10.0) | 6 (20.7) | 0.455 |
| No | 18 (90.0) | 23 (79.3) | |
| Daily exercise - n (%) | | | |
| Yes | 5 (25.0) | 11 (37.9) | 0.375 |
| No | 15 (75.0) | 18 (62.1) | |
| Smoking - n (%) | | | |
| Yes | 5 (25.0) | 7 (24.1) | 1.0 |
| No | 15 (75.0) | 22 (75.9) | |

**=Median (interquartile range), ¶=mean ± standard deviation (95% confidence interval)*

***Table 2.***
***Comparison of Intervention and Control Group Students' Data after CPR Training and Six Weeks Later***

| Variables | | Intervention (n=20) | Control (n=27) | p |
|---|---|---|---|---|
| | | Median (IQR) | Median (IQR) | |
| **Total compression/2 min** | **The first evaluation** | 177.0 (168.2-183.8) | 168.0 (133.0-181.0) | 0.113 |
| | **Six weeks later** | 180.5 (159.5-200.4) | 180.0 (153.0-188.8) | 0.421 |
| | **p** | 0.263 | 0.304 | |
| **Correct compression/2 min** | **The first evaluation** | 139.5 (109.8-150) | 140 (105.5-150) | 0.745 |
| | **Six weeks later** | 128.5 (119.3-150) | 123 (94-150) | 0.523 |
| | **p** | 0.868 | 0.201 | |
| **Wrong compression/2 min** | **The first evaluation** | 38.5 (29.3-59.3) | 28 (15.5-43.5) | **0.033** |
| | **Six weeks later** | 55 (30.3-60) | 45 (33-63.5) | 0.919 |
| | **p** | 0.654 | **0.000** | |
| **Percentage of correct compression -% (correct compression/total compression*100)** | **The first evaluation** | 78.9 (62.5-82.2) | 83.3 (71.4-90.6) | 0.097 |
| | **Six weeks later** | 71.8 (66.0-82.2) | 72.7 (61.4-82.0) | 0.935 |
| | **p** | 0.455 | **0.001** | |
| **Depth of chest compression >6 cm** | **The first evaluation** | 9.5 (3.3 -13.8) | 3 (2-10) | 0.073 |
| | **Six weeks later** | 8 (3.3-13.5) | 7 (2.5-14.5) | 0.799 |
| | **p** | 0.663 | 0.140 | |
| **Depth of chest compression <5 cm** | **The first evaluation** | 17.5 (7.3-24.3) | 10 (6-23) | 0.489 |
| | **Six weeks later** | 21.5 (5.8-37.5) | 19 (8.5-26) | 0.548 |
| | **p** | 0.112 | 0.066 | |
| **Total breath 2 min** | **The first evaluation** | 10 (7.3-11) | 10 (8.5-10.5) | 0.685 |
| | **Six weeks later** | 10 (8.3-11) | 10 (8-13) | 0.766 |
| | **p** | 0.656 | 0.787 | |
| **Compression/breath rate** | **The first evaluation** | 18.4 (15.1-21.8) | 16.6 (13.2-21.3) | 0.189 |
| | **Six weeks later** | 19.4 (14.1-21.4) | 15.9 (13.7-20.9) | 0.387 |
| | **p** | 0.370 | 0.510 | |

*IQR=interquartile range, CPR=cardiopulmonary resuscitation*

was no statistically significant difference regarding other parameters (p>0.05) (Table 2). Regarding the compression-breath rate, there was no statistically significant difference between the initial and second measures in the intervention and control groups (p>0.05). Regarding arm pain intensity after CPR, there was no difference between the two groups measured in the short and the long terms (p>0.05). Satisfaction with the CPR training was significantly higher among the control group (p<0.05). In the intergroup comparison, the differences between the first and second evaluations for the groups were not statistically significant (p>0.05) (Table 3).

## Discussion

Studies on the impact of music on chest compression included approximately 40 popular songs (22). Although studies on the relationship between national songs and CPR performance are limited (20,23), we did not find any studies that used a popular Turkish song to evaluate the impact of musical memory on CPR performance. Despite the fact that music is universal, there is a relationship between music and the language spoken (24). A study that compared the effectiveness of metronome and popular national songs in CPR training found that CPR training using a popular song was more effective than metronome-guided training in helping laypersons to maintain recommended compression rates after 6 months (23). The study of Ho et al. (20) on the impact of culture-specific popular music to achieve the recommended compression rates of 100-120/min found that most of the participants could not achieve the recommended rates. The authors recommend using national songs to achieve an optimal compression rate during the training of lay persons. This brief review of the literature shows that the limited number of studies on the impact of national songs on CPR training mostly focused on

***Table 3.***
***Comparison of Arm Pain Intensity and Satisfaction with the CPR Education***

| | | Intervention (n=20) | Control (n=27) | p |
|---|---|---|---|---|
| | | **Median (IQR)** | **Median (IQR)** | |
| **Arm pain** | **The first evaluation** | 1.5 (0.3-3.8) | 2 (0-4) | 0.701 |
| | **Six weeks later** | 2 (0.3-4) | 1 (0-3) | 0.236 |
| | **p** | 0.643 | 0.167 | |
| **Satisfaction** | **The first evaluation** | 9 (8-10) | 10 (10-10) | **<0.001** |
| | **Six weeks later** | 9 (8-10) | 10 (10-10) | **<0.001** |
| | **p** | 0.785 | 0.739 | |

*IQR=interquartile range, CPR=cardiopulmonary resuscitation*

compression rate. Thus, further studies on other dimensions of CPR training are required. This randomized trial to fill the gap in the literature found no statistically significant difference between the intervention and control groups regarding the compression and breath rates measured just after and six weeks after the CPR training. Besides, contrary to our expectations, we found that training via a popular Turkish song had a negative impact on satisfaction with the CPR training.

Studies that evaluated the impact of music on CPR training and performance showed that chest compression rates were >100/min (6,15,17,25-27). In this study, there was no statistically significant difference between the first and second compression rates of the control and intervention groups. Although the AHA recommended a compression rate of 100-120/min, the mean compression rates of the intervention groups were 177 and 168 for the initial cycle of two minutes and 180.5 and 180 for the second evaluation (Table 2). These findings are far below the recommended values. Compression rate below 100/min is a frequent problem in actual CPR performance (28). Using songs to create a mental metronome is suggested to overcome this problem (17,26). Contrary to expectations, using a popular national song in our study did not help the participants in the intervention group meet the recommended compression rate. The visual perception of the participants in correcting this problem was also inadequate. Therefore, real-time visual feedback computer tools can be used to increase the rate and the efficiency of compression (14,29). A recent randomized controlled trial reported that these tools increased the survival rate of patients (30).

We found no statistically significant difference between the initial and second evaluation of total and correct compression rates in either group. Advanced cardiac life support guidelines recommend 10 breaths for two minutes with 30 compressions and 2 rescue breaths in each of five cycles (31). In our study, participants in the control and intervention groups performed the optimal compression rates just after and six weeks after the training, so there was no statistically significant difference between the two groups. In addition, most participants provided sufficient breath. This relatively high rate of success in providing sufficient breath may be explained by the fact that the practice requires less effort. Nevertheless, our findings indicate the ease of learning artificial respiration.

Although the satisfaction of the participants in the control and intervention groups was relatively high, participants in the control group, who received standard CPR training, had statistically significantly higher satisfaction (Table 3). Given the fact that the participants found it easier to learn artificial respiration, compulsory learning of a song may have an impact on their satisfaction with the training.

### Study Limitations

This study has several limitations. First, this study was conducted at a single center; thus, the findings of the study may not be generalizable. Second, the high-fidelity simulation mannequins used in the study prevented the participants from switching unless they correctly performed the CPR with 30 compressions and 2 breaths in each cycle, which, in turn, may have influenced the findings on compression rates and the rate of the wrong compression. Finally, participants in the intervention group performed CPR on low-fidelity simulation mannequins, whereas participants in the control group performed CPR on high-fidelity simulation mannequins before data collection. Given that the two groups used high-fidelity simulation mannequins during the research practice, we may doubt that the students in the control group became used to performing practices using a high-fidelity simulation mannequin. Further studies on the impact of national music may use the same simulation mannequin during the training and evaluation periods.

### Conclusion

In conclusion, although existing studies have suggested that the use of popular music is an effective tool to achieve the recommended compression rate, this study did not find

any significant impact of popular national music on chest compression performance.

**Ethics Committee Approval:** The study obtained permission from the Scientific Research and Publication Ethics Committee of Eastern Mediterranean University (no: 2018-55-08, date: 12.03.2018).

**Informed Consent:** The nursing students were informed about the aim and scope of the research, and written informed consent was obtained.

### Footnotes

**Authorship Contributions:** Surgical and Medical Practices – G.S.D., S.T., B.B., N.Ç.; Concept – G.S.D., S.T., B.B., N.Ç.; Design – G.S.D., S.T., B.B., N.Ç.; Data Collection and/or Processing – G.S.D., S.T.; Analysis and/or Interpretation – B.B., N.Ç.; Literature Review – G.S.D., S.T., B.B., N.Ç.; Writing – G.S.D., S.T., B.B., N.Ç.

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ORIGINAL ARTICLE

# The Effects of Perceptions of Illness on Anxiety Specific to Surgery Levels of Patients Who Are Planned for Open Heart Surgery: A Descriptive and Correlational Study from Turkey

## Açık Kalp Ameliyatı Planlanan Hastaların Ameliyata Özgü Kaygı Düzeylerinin Hastalık Algıları Üzerine Etkisi: Türkiye'den Tanımlayıcı ve İlişkisel Bir Çalışma

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**Abstract**

**Objective:** To determine the effect of illness perception on surgery-specific anxiety levels among patients scheduled for open heart surgery.

**Method:** This study was conducted as a descriptive and correlational study in the cardiovascular surgery intensive care unit and ward of a university hospital in the capital city of Turkey in 2022. The study data were collected through the personal information form, illness perception questionnaire (IPQ), and anxiety specific to surgery questionnaire. The study sample consisted of 92 patients who met the research criteria. T-tests, analysis of variance, Pearson correlation, and regression tests were used in the analysis of the study.

**Results:** The timeline (acute/chronic), consequence, and uncontrolled bodily attributions of IPQ positively affect surgery-specific anxiety (beta=0.429; beta=0.178; beta=0.246; p=0.05). 63.7% of the variation in the IPQ is explained by these dimensions.

**Conclusion:** There was a positive and significant relationship between patients' perceptions of illness and surgery-specific anxiety levels. It is important for nurses to evaluate patients' perceptions of their preoperative illness and anxiety. More effective support can be provided by focusing on individual perceptions and anxiety levels of patients during presurgical counseling.

**Keywords:** Cardiac surgical procedure, illness perception, anxiety, nursing

**Öz**

**Amaç:** Açık kalp ameliyatı planlanan hastaların ameliyata özgü kaygı düzeylerinin hastalık algıları üzerine etkisini belirlemektir.

**Yöntem:** Çalışma, 2022 yılında Türkiye'nin başkentinde bulunan bir üniversite hastanesinin kardiyovasküler cerrahi yoğun bakım ünitesi ve servisinde tanımlayıcı ve ilişkisel olarak yürütülmüştür. Çalışma verileri kişisel bilgi formu, hastalık algısı ölçeği (HAÖ) ve ameliyata özgü kaygı ölçeği aracılığıyla toplanmıştır. Çalışma örneklemi araştırma kriterlerini karşılayan 92 hastadan oluşmuştur. Çalışmanın analizinde t-testleri, varyans analizi, Pearson korelasyon ve regresyon testleri kullanılmıştır.

**Bulgular:** HAÖ'nün zaman çizelgesi (akut/kronik), sonuç ve kontrol edilemeyen bedensel atıfları ameliyata özgü kaygıyı olumlu yönde etkiler (beta=0,429; beta=0,178; beta=0,246; p=0,05). HAÖ'deki değişimin %63,7'si bu boyutlarla açıklanmaktadır.

**Sonuç:** Hastaların hastalık algıları ile ameliyata özgü kaygı düzeyleri arasında pozitif ve anlamlı bir ilişki olduğu bulunmuştur. Hemşirelerin hastaların hastalık algılarını ve olumsuz algılardan kaynaklanan kaygılarını ameliyat öncesi dönemde değerlendirmeleri önemlidir. Ameliyat öncesi danışmanlık süreçlerinde hastaların bireysel algılarına ve kaygı düzeylerine odaklanılarak daha etkili destek sağlanabilir.

**Anahtar Kelimeler:** Kardiyak cerrahi işlemi, hastalık algısı, anksiyete, hemşirelik

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## Introduction

Cardiovascular diseases (CVD) in Turkey are an essential life-threatening disease despite improvements in prevention and treatment activities (1,2). CVDs are a group of disorders of the heart and blood vessels, consisting of coronary artery disease, hypertension, cerebrovascular disease, rheumatic heart disease, peripheral artery disease, congenital heart disease, heart failure, and cardiomyopathies. It has been reported that approximately 19.1 million deaths worldwide in 2020 will be due to CVD (2). CVD has been reported as one of the two leading causes of death in the United States since 1975, with 1 in 4 deaths, and it is still ranked as the leading cause of death (3). According to 2022 statistics, 342.3% of deaths due to CVDs in Turkey were due to ischemic heart disease, 23.5% to other heart diseases, 19.2% to cerebrovascular diseases, and 9.9% to hypertensive diseases (1).

Different treatment methods for CVD include medication, percutaneous coronary intervention, and surgery (2,4). Various techniques are used for the surgical treatment of CVD. Open heart surgery is one of the most commonly used techniques (5-7). In patients who receive treatment/care and follow-up in the intensive care unit after open heart surgery, serious health problems such as pain, infection, bleeding, atrial fibrillation, acute renal failure, pulmonary problems, ventricular dysfunction requiring inotropic support, stroke, gastrointestinal problems, anxiety, depression, delirium, and early sleep disorders can be observed (5,7-9). Cardiac surgery is a stressful life experience associated with physical and psychological disorders, such as fear, depression, and pain. Although traditional approaches focus primarily on surgical and anesthetic techniques, somatic comorbidities, diet, and physical activity, increasing evidence indicates the importance of psychological preparation for improving postoperative outcomes in cardiac surgery (10,11).

The individual's perception of the illness affects his/her views and perceptions about the treatment, coping behaviors, course of treatment, and the development and control of complications. In this respect, it is stated that the perception of illness is the most important factor affecting treatment (12-14). Patients' perceptions of their illness change in direct proportion to the anxiety and stress they experience. If patients think their illness is chronic, difficult to heal, difficult to treat, and cannot manage this process well, they may experience anxiety (14,15). In the study of Thagizadeh et al. (16) in Iran to determine the perception of illness and cardiovascular risk factors in patients with myocardial infarction who underwent percutaneous coronary intervention. It has been observed that patients' negative perceptions of their illness can lead to psychological consequences, such as stress, anxiety, and depression.

Due to the vital meaning and importance of the heart, the fact that the heart will be intervened in the individuals' life causes fear of death in patients and increases the anxiety state before and after cardiac surgery. To make presurgical preparations for open-heart surgery, patients are hospitalized a few days before. This process may create a more stressful waiting period for patients than the preparation phase (9,11,17-19).

Nurses are those who stay with patients for the longest time before, during, and after surgery, plan their physical, psychological, and social needs, and implement interventions related to this process. While nurses evaluate patients holistically in the presurgical period, it is necessary to evaluate patients' perceptions and concerns about their illness and plan their education and information regarding these perceptions. The implementation of these interventions is important for preventing the development of complications in the postoperative period. Patients' perceptions of the illness may be necessary for the training given by nurses in the presurgical period to be effective (20,21). In the literature review, very few similar studies have evaluated the effect of patients' and nurses' perceptions of the illness in the preoperative period on the level of anxiety specific to surgery and nurses' perceptions (22,23). This study was conducted to determine the effect of illness perceptions of patients scheduled for open-heart surgery on their levels of anxiety specific to surgery.

**Main Points**

- This study found that the surgery-specific anxiety levels of patients scheduled for open heart surgery were affected by their perception of the disease.
- It was determined that individuals with a positive perception of illness experienced less anxiety.
- In clinical practice, it is important for nurses to evaluate patients' anxiety and perceptions of the surgical process and plan their care accordingly.

## Material and Method

### Study Design

This descriptive and correlational study was conducted to determine the effect of illness perceptions of patients who were planned for open-heart surgery on their levels of anxiety specific to surgery levels.

### Settings and Participants

The research was carried out between 30.01.2022 and 30.11.2022 in the cardiovascular surgery intensive care unit and service of a university hospital in Turkey's capital. Patients scheduled for open-heart surgery are usually admitted to the cardiovascular surgery service one or two days in advance. In cases where there is no place in the cardiovascular surgery service or patients need to be closely followed before surgery, patients can also be hospitalized in the cardiovascular surgery intensive care unit. An average of 150 coronary artery bypass grafting (CABG) and heart valve surgeries are performed annually in the hospital where the study was conducted.

The study population consists of patients who are planning for open-heart surgery in our hospital. The study sample consisted of patients in the population who met the criteria for participation in the study and were informed about the study, among patients who were admitted to this hospital at least 1 day before the date of surgery and planned.

As a result of the literature review, the minimum sample size for the study was calculated by an expert. G*Power analysis was used for sample selection. The minimum size of the samples to be included in the study was calculated based on the number of patients in the last year. When the test power was taken as 80% and the confidence level as 95%, the minimum sample size to cover the entire study was 90 patients. A total of 105 patients were reached in the preoperative period, but 93 volunteered to participate in the study. When the validity of the questionnaires was evaluated, the study was completed in 92 patients because one patient did not complete the questionnaire.

Inclusion criteria for the research sample;

- Eighteen years and older,
- CABG and heart valve surgery,
- Turkish language literacy,
- First-time open heart surgery,
- Patients who voluntarily participated in the study were included.

Exclusion criteria for the research sample;

- Those who were planned for open-heart surgery due to heart transplantation, trauma, tumor, etc., patients who did not complete the questionnaires.

**Data Collection**

In the study, data were collected using the personal information form, the illness perception questionnaire (IPQ), and the anxiety specific to surgery questionnaire (ASSQ).

**Personal Information Form**

The personal information form was prepared using the literature to determine the socio-demographic characteristics of the patients who will participate in the study and their characteristics related to the illness (15,18,21,24). A form was created with questions to determine the participants' socio-demographic characteristics, such as age, gender, income levels, health habits, and illness processes. The form comprises 13 questions in total. There are 9 socio-demographic questions and 4 disease-related questions in the form. There are questions related to the disease, such as previous surgery, duration of the disease that caused the surgery, presence of open heart surgery in the family, and presence of chronic disease.

**Illness Perception Questionnaire**

The IPQ was developed in 1996 by Weinman et al. (25) identified important areas requiring renewal in the dimensions of the IPQ, which was renewed in 2002. The Turkish adaptation, validity, and reliability study was performed by Kocaman et al. (24). IPQ; consists of three dimensions: Identity, opinions about the illness, and causes of illness.

The identity dimension is evaluated by the patient associating the illness's symptoms with the illness. Fourteen basic symptoms (pain, burning in the throat, nausea, difficulty breathing, weight loss, fatigue, joint stiffness, burning in eyes, wheezing, headaches, stomach complaints, sleep difficulties, dizziness, loss of strength) are questioned. The dimension of opinions on the illness includes seven sub-dimensions. These were named timeline (acute/chronic), consequences, personal control, treatment control, illness coherence, timeline cyclical, and emotional representations. In the content of the sub-dimensions, the person's beliefs about the severity of their illness and its possible effects on their physical, social, and psychological functioning; personal control, the patient's perception of control over the duration and treatment of the illness; treatment control, the patient's confidence in the treatment; illness coherence, how much the person understands or comprehends their illness; emotional representations assess emotional impacts from illness. The illness cause dimension consists of 4 sub-dimensions. Psychological attributions, risk factors, immunity, accident, and chance. When the sub-dimensions are examined; in personal attributions, the individual considers his behavior, mood, personal characteristics, and the effect of body resistance as the cause of illness; external attributions, attributing the cause of the illness to the outside, attributing to external factors; and lifestyle attributions predict one's lifestyle as the cause of illness. Uncontrollable bodily attributions include attributing the cause of illness to variables that the patient cannot control; chance refers to seeing a bad chance or chance as the cause of illness. Total points are not taken in the evaluation of the scale, and each sub-dimension is evaluated over the average (24).

The internal reliability of all sub-dimensions of the IPQ was high, and Cronbach's alpha values ranged from 0.60 to 0.85. In the test-retest group, the internal validity of all sub-dimensions of the IPQ was high, and the Cronbach's alpha values were 0.65-0.93 (24). In this study, Cronbach's alpha values varied between 0.63 and 0.86.

**Anxiety Specific to the Surgery Questionnaire**

Karanci and Dirik (26) developed the ASSQ in 2003. The ASSQ is a scale that is applied to adult patients who will undergo surgery, without time limit. The scale comprises 10 items in total. The items are intended to measure pain and fear of dying during surgery, as well as anxiety of complications and limitations that may occur after surgery. ASSQ score is obtained due to the sum of the responses given to all

items. Only item 8 is rated in reverse before being added. The scores to be obtained from the scale range from 10 to 50. High scale scores reflect concerns about experiencing high levels of pain, dying during surgery, and complications and limitations that may occur after surgery. Karanci and Dirik (26) found the Cronbach's alpha value of the scale to be 0.79. In this study, the Cronbach's alpha value was found to be 0.80.

Lists containing the surgery dates of patients who met the research criteria were obtained daily from the responsible nurses. The patients participating in the study were visited in the patient rooms of the cardiovascular surgery intensive care unit and service one day before the planned operation date by the researcher. Patients were informed verbally and in writing about the study, and consent forms were filled out by each patient. The questionnaires were answered by the patients in the ward in the patient rooms and by the patients in the intensive care unit in the arena. It took approximately 20-30 minutes for the questionnaires to be answered by the patients.

### Statistical Analysis

The data analysis was performed using the Statistical Package for the Social Sciences 21.0 package and was performed at a 95% confidence level. The Kurtosis and Skewness coefficients were examined to determine the conformity of the scores to the normal distribution. According to the scale values, the Kurtosis and Skewness coefficients of each value were between -3 and +3, and the scores showed a normal distribution. The variation in scale scores based on demographic characteristics was examined using t-tests and One-Way Analysis of Variance (ANOVA). Pearson's correlation coefficient was employed to assess the relationship between variables, while the regression test was utilized to analyze the corresponding effects. $P<0.05$ was considered significant. Multiple linear regression analysis was performed to evaluate the effect of illness perception on surgery-specific anxiety. In the multiple linear regression analysis, after the normality assumption was provided for the sub-dimensions of ASSQ and IPQ, they were included in the regression model using the enter method. The valid model was created by taking the variables for which the one-way ANOVA statistics showed significance at the p=0.001 level for each scale. It was determined that there was no multicollinearity [variance inflation factor: 1.2-2.3 (N)] or autocorrelation (Durbin-Watson: 1.796) problem in the models obtained for each scale, and the standard residuals were between (-3 +3) in the 95% confidence interval (CI), thus meeting the regression analysis conditions (27).

### Ethical Considerations

The study was approved by the Medical and Health Sciences Research Board and Ethics Committee of the Başkent University (desicion no: 22/06, date: 26.01.2022). Necessary permissions were obtained from the chief physicians of the hospital where the research would be conducted. Permission to use the scales was obtained from the authors who determined the validity and reliability of the scales used in the study. Written informed consent was obtained voluntarily from the patients who planned to be included in the study by providing written and verbal information about the subject and that their names would be kept confidential. This research was conducted in compliance with the guidelines of the Declaration of Helsinki (2013 revision). Permission for use was obtained from those who performed the validity and reliability of the IPQ and ASSQ scales.

## Results

The mean age of the patients participating in the study was 59.57 years; 33.7% were under the age of 55 years and over the age of 65 years, 66.3% were male, 85.9% were married, 43.5% were primary school graduates, 44.6% lived in a province, and 35.9% were working. 47.8% of the patients stated that their income was less than their expenses, 51.1% smoked, and 75% of them did not use alcohol. 48.9% of the patients stated that had a chronic illness, 31.5% had a previous operation, 68.4% had the illness that caused this surgery for more than 1 year, and 37% had a family history of open heart surgery (Table 1).

Symptoms experienced by patients since the beginning of the illness; fatigue 78.3%, 66.3% breathlessness; 63% pain; 54.3% dizziness; 53.3% were determined as headaches and loss of strength. 57.6% of the patients thought that the symptoms of pain, 55.4% of the symptoms of fatigue, 52.2% of the feelings of dizziness and wheezing, and 50% of the symptoms of difficulty in breathing were related to their current illness (Table 2). The patients participating in the study stated that the most common cause of illness was overwork and that the least accident or injury 27.2-56.5%.

Illness symptoms sub-dimension mean score was found to be 4.72±2.86. The mean scores of the sub-dimensions of opinions about the illness were as follows; timeline (acute/chronic) 17.49±5.84; consequence 19.37±4.53; personal control 16.17±4.23; treatment control 11.45±3.71; time cyclical 10.08±2.39; emotional representations 19.66±4.49; illness coherence was found to be 7.85±3.05. In the sub-dimension of the causes of illness, the mean scores are; personal attributions 21.87±5.64; external attributions 10.40±3.14; lifestyle attributions 8.23±2.79; uncontrolled bodily attributions 9.23±2.32; and chance factor was found as 3.21±1.25 (Table 3).

Most of the patients, respectively; they worry that they will have a lot of pain after the operation they will (3.65±1.15). They believe that they will get rid of all their pains and problems after the operation (3.52±1.08). They frequently think of dying (3.21±1.32). It was determined that they felt anxiety because of this. The mean ASSQ score was 23.37±7.46 (Table 4).

When the relationship between the ASSQ, the IPQ, and age was examined, there was a weak positive correlation between the ASSQ and illness identity (r=0.230); a strong

***Table 1.***
***Demographic and Illness Characteristics of the Patients (n=92)***

| Demographic and illness characteristics | | n | % |
|---|---|---|---|
| **Age** | ≤55 | 31 | **33.7** |
| | 56-65 | 30 | 32.6 |
| | >65 | 31 | **33.7** |
| The average age=59.57±11.33<br>Min: 28; max: 83 | | | |
| **Gender** | Female | 31 | 33.7 |
| | Male | 61 | **66.3** |
| **Marital status** | Married | 79 | **85.9** |
| | Single | 13 | 14.1 |
| **Education status** | Only literate | 15 | 16.3 |
| | Primary school | 40 | **43.5** |
| | Secondary education | 8 | 8.7 |
| | High school | 21 | 22.8 |
| | Bachelor's and above | 8 | 8.7 |
| **Living place** | Province | 41 | **44.6** |
| | District | 39 | 42.4 |
| | Town/village | 12 | 13.0 |
| **Working status** | Yes | 33 | 35.9 |
| | No | 59 | **64.1** |
| **Income rate** | Income less than expenses | 44 | **47.8** |
| | Income equals expenses | 38 | 41.3 |
| | Income more than expenses | 10 | 10.9 |
| **Smoking status** | Yes | 47 | **51.1** |
| | No | 45 | 48.9 |
| **Alcohol use status** | Yes | 23 | 25.0 |
| | No | 69 | **75.0** |
| **Chronic disease status** | Yes | 45 | 48.9 |
| | No | 47 | **51.1** |
| **Prior surgery status** | Yes | 29 | 31.5 |
| | No | 63 | **68.5** |
| **Duration of the disease causing the surgery** | 1 year and less | 29 | 31.6 |
| | More than 1 year | 63 | **68.4** |
| **Having a relative who has undergone open heart surgery in the family** | Yes | 34 | 37.0 |
| | No | 58 | **63.0** |

*Min=minimum, Max=maximum*

positive correlation between timeline (acute/chronic) (r=0.673); a moderate positive relationship between emotional representations (r=0.539); a moderate positive relationship between the consequence (r=0.496); a moderate positive relationship between treatment control (r=0.341); a moderate positive relationship between personal attributions (r=0.483); a weak positive correlation between external attributions (r=0.223); and a moderate positive relationship (r=0.384) between uncontrolled bodily attributions. A weak positive correlation between age and personal attributions (r=0.219) (Table 5).

The model established to examine the effect of the IPQ sub-dimensions on the ASSQ is significant ($p<0.05$). When the results are examined, the timeline (acute/chronic); consequence and uncontrolled bodily attributions positively affect the ASSQ (beta=0.429; beta=0.178; beta=0.246 $p<0.05$). 63.7% of the variation in the IPQ is explained by these dimensions (Table 6).

## Discussion

The concept of illness perception refers to how illness experiences are understood by the individual. The perceptions of patients about their illness are very important for the course of the illness and the process of treatment adherence (13,28,29).

***Table 2.***
***Illness-identity Dimension Illness Symptoms (n=92)***

| Symptoms | This symptom has been present since the beginning of the illness (%) Yes* | This symptom is related to my illness (%) Yes* |
|---|---|---|
| Pain | **63.0** | **57.6** |
| Burning throat | 29.3 | 15.2 |
| Nausea | 28.3 | 19.6 |
| Breathlessness | **66.3** | **50.0** |
| Weight loss | 30.4 | 27.2 |
| Fatigue | **78.3** | **55.4** |
| Stiff joints | 22.8 | 10.9 |
| Sore eyes | 18.5 | 6.5 |
| Wheezing | 51.1 | **52.2** |
| Headaches | **53.3** | 38.0 |
| Upset stomach | 40.2 | 10.9 |
| Sleep difficulties | 44.6 | 34.8 |
| Dizziness | **54.3** | **52.2** |
| Loss of strength | **53.3** | 41.3 |

**=more than one option is marked*

***Table 3.***
***Distribution of Patients' Mean Scores on the Illness Perception Questionnaire (n=92)***

| **Illness perception questionnaire** | | | |
|---|---|---|---|
| | | **Min-max** | **Mean ± SD** |
| **Identity** | | 0-10 | 4.72±2.86 |
| **Opinions on the illness** | Timeline (acute/chronic) | 6-30 | 17.49±5.84 |
| | Consequence | 10-30 | 19.37±4.53 |
| | Personal control | 7-26 | 16.17±4.23 |
| | Treatment control | 5-22 | 11.45±3.71 |
| | Timeline cyclical | 3-15 | 10.08±2.39 |
| | Emotional representations | 7-30 | 19.66±4.49 |
| | Illness coherence | 3-15 | 7.85±3.05 |
| **Illness causes** | Personal attributions | 7-34 | 21.87±5.64 |
| | External attributions | 4-20 | 10.40±3.14 |
| | Lifestyle attributions | 3-14 | 8.23±2.79 |
| | Uncontrollable bodily attribution | 3-15 | 9.23±2.32 |
| | Chance | 1-5 | 3.21±1.25 |

*Min=minimum, Max=maximum, SD=standard deviation*

In this study, the mean scores of the sub-dimensions of the IPQ were 4.72±2.86 in the illness identity (symptoms) sub-dimension; in the opinions about the illness sub-dimension, the highest emotional representations sub-dimension, illness coherence sub-dimension, in the probable causes of illness sub-dimension, the highest personal attributions sub-dimension were found in the lowest chance sub-dimension. In a study investigating illness perception in men and women after open heart surgery; being female was associated with an increased likelihood of worse illness perception on the items timeline [odds ratio (OR): 2.06; 95% CI: 1.25-3.41], personal control (OR: 2.07; 95% CI: 1.24-3.43), identity (OR: 1.96; 95% CI, 1.17-3.28), understanding (OR: 1.80; 95% CI: 1.06-3.05), and emotional response (OR: 2.09; 95% CI: 1.27-3.46). Length of stay was associated with an increased likelihood of worse illness perception in the items personal control (OR: 1.08; 95% CI: 1.01-1.16) and concern (OR: 1.09; 95% CI: 1.01-1.17) (13). As a result of Bayad's (22) study on detecting illness perception and anxiety in preoperative surgery patients, the highest IPQ was 8.77±1.94 in the sub-dimension of illness coherence, and the lowest was 2.24±2.45. It was observed that the findings of the studies examined in the literature review were similar to our study (15,16,22,23). It can be said that the patients participating in this study perceived their illness as negative and chronic due to their thoughts and behaviors and did not see the source of their illness as luck.

Although anxiety is important for all patient groups, it can be particularly important for patients hospitalized in surgical clinics. The fear of death, being disabled, feeling pain, losing body control, not getting the necessary care, negative social life, falling in economic status, reaching a life-threatening diagnosis, not being enough for himself and his family, staying away from loved ones and activities, and sexual competence may lead to the development of fears such as loss of operability. When the surgery is open-heart surgery, the psychological effects of the surgery can be experienced more intensely. It has been reported that preoperative anxiety negatively affects surgery, anesthesia, and postoperative recovery (18,30-32).

In this study, the patients' ASSQ score was 23.37±7.46 stated that the thoughts of dying frequently come to my mind (3.21±1.32). In a study evaluating preoperative anxiety in patients undergoing heart surgery; a moderate level of anxiety was noted in these patients (19). As a result of another prospective study evaluating the depression and anxiety of patients who will undergo CABG surgery, the anxiety level of the patients was determined as (8.12±5.44) (33). In a study by Sigdel et al. (34) in which anxiety was evaluated in Nepalese adult patients awaiting heart surgery in 2020, preoperative anxiety was found in 58.5%. In a study examining the effect of preoperative individualized education on anxiety and pain severity in patients after open-heart surgery, patients reported the most common sources of anxiety to be lack of information, being away from family, risk of death, and pain (20). The results support the literature review findings.

In surgical patients, perceptions of the illness in the preoperative period affect preoperative anxiety, postoperative pain, complications, healing, and treatment compliance. In this context, the perception of illness is an important factor that affects the treatment process for patients (14,15,23). Timeline (acute/chronic), consequence,

and uncontrollable bodilistic attributions, which are dimensions of IPQ, positively affect the ASSQ. These dimensions explain 63.7% of the variation in the IPQ. In a study conducted by Bayad (22) on preoperative surgery patients, when the relationship between anxiety and perception of illness was evaluated; A positive correlation was found between the level of being affected by the illness, the level of anxiety, the level of emotional involvement, and the total score of the IPQ and the anxiety score, and a weak-moderate correlation was found between the treatment coherence and the anxiety score in the negative direction (22). Patients with high anxiety stated that their illness affected their lives more. Patients with high anxiety about their illness also have higher levels of emotional involvement, and their belief in treatment decreases. In the regression analysis of a different study, preoperative anxiety levels were found to be high in patients with a high perception of serious illness before surgery (23).

***Table 4.***
***Mean Scores for Anxiety Specific to Surgery Questionnaire Mean Scores (n=92)***

| | Min-max | Mean ± SD |
|---|---|---|
| 1. Thoughts of dying frequently come to mind. | 1-5 | 3.21±1.32 |
| 2. If something happens to me, my family and children will remain helpless. | 1-5 | 2.57±1.43 |
| 3. I am afraid that I will not be able to regain consciousness after the surgery. | 1-5 | 3.11±1.24 |
| 4. I worry that I may die during the operation due to bleeding or other reasons. | 1-5 | 2.82±1.29 |
| 5. I worry that I will not recover completely after the surgery because of inflammation or other issues. | 1-5 | 2.61±1.12 |
| 6. I am afraid that after the operation, I will not be able to walk again and/or I will not be able to care for myself as I previously did. | 1-5 | 2.8±1.23 |
| 7. I worry that I will have a lot of pain after the operation I will. | 1-5 | 3.65±1.15 |
| 8. I believe that I will get rid of all my pain and problems after the surgery. | 1-5 | 3.52±1.08 |
| 9. I am afraid that I will be physically disabled by the operation. | 1-5 | 2.47±1.23 |
| 10. I think I will feel pain during the operation. | 1-5 | 2.66±1.22 |
| Anxiety specific to the surgery questionnaire. | 13-49 | 23.37±7.46 |

*Min=minimum, Max=maximum, SD=standard deviation*

It was determined that as the anxiety level increased, the perception of illness also increased negatively. Moreover, as the negative perception of illness increased, the level of anxiety also increased. No other study has examined the relationship between illness perception and anxiety before open heart surgery. When examining studies from different fields; in a study examining the relationship between illness perception, anxiety, and depression in tuberculosis patients; negative illness perceptions were clearly related to reports of mood symptoms (35). The results of the mediation

***Table 5.***
***Relationship between Anxiety Specific to Surgery Questionnaire, Illness Perception Scale, and Age (n=92)***

| | | Anxiety specific to the surgery questionnaire | Age |
|---|---|---|---|
| Identity personal control | r | **0.230*** | 0.098 |
| | p | 0.027 | 0.353 |
| Personal control | r | 0.193 | -0.031 |
| | p | 0.066 | 0.769 |
| Timeline (acute/ chronic) identity | r | **0.673**** | 0.197 |
| | p | 0.000 | 0.060 |
| Emotional representations | r | **0.539**** | 0.194 |
| | p | 0.000 | 0.064 |
| Illness coherence | r | 0.023 | 0.032 |
| | p | 0.826 | 0.761 |
| Consequence | r | **0.496**** | 0.115 |
| | p | 0.000 | 0.276 |
| Treatment control | r | **0.341**** | 0.085 |
| | p | 0.001 | 0.421 |
| Timeline cyclical | r | 0.018 | 0.084 |
| | p | 0.868 | 0.424 |
| Personal attributions | r | **0.483**** | **0.219*** |
| | p | 0.000 | 0.036 |
| External attributions | r | **0.223*** | 0.165 |
| | p | 0.033 | 0.117 |
| Lifestyle attributions | r | -0.018 | -0.155 |
| | p | 0.862 | 0.140 |
| Uncontrollable bodily attribution | r | **0.384**** | **0.220*** |
| | p | 0.000 | 0.035 |
| Chance | r | -0.111 | -0.003 |
| | p | 0.291 | 0.978 |
| Age | r | 0.158 | |
| | p | 0.132 | |

**=p<0.05, **=p<0.01*

***Table 6.***
***Effect of Patients' Perception of Illness on Anxiety Specific to Surgery (n=92)***

| Dependent variable | Independent variable | Unstandardized coefficients | | Standardized coefficients | t | p | $R^2$ |
|---|---|---|---|---|---|---|---|
| | | B | SE | Beta | | | |
| Anxiety specific to the surgery questionnaire | Constant | -1.691 | 4.675 | | -0.362 | 0.719 | 0.637 |
| | Identity | -0.025 | 0.216 | -0.010 | -0.115 | 0.909 | |
| | Personal control | -0.188 | 0.151 | -0.107 | -1.241 | 0.218 | |
| | Timeline (acute/chronic) | 0.548 | 0.127 | 0.429 | 4.317 | **0.000*** | |
| | Emotional representations | 0.230 | 0.162 | 0.139 | 1.416 | 0.161 | |
| | Illness coherence | -0.175 | 0.200 | -0.071 | -0.874 | 0.385 | |
| | Consequence | 0.293 | 0.146 | 0.178 | 2.009 | **0.048*** | |
| | Treatment control | 0.376 | 0.193 | 0.187 | 1.951 | 0.055 | |
| | Timeline cyclical | -0.056 | 0.236 | -0.018 | -0.239 | 0.812 | |
| | Personal attributions | 0.114 | 0.136 | 0.087 | 0.840 | 0.404 | |
| | External attributions | 0.098 | 0.207 | 0.041 | 0.476 | 0.636 | |
| | Lifestyle attributions | 0.066 | 0.218 | 0.025 | 0.301 | 0.764 | |
| | Uncontrollable bodily attribution | 0.790 | 0.249 | 0.246 | 3.169 | **0.002*** | |
| | Chance | -0.090 | 0.474 | -0.015 | -0.190 | 0.850 | |

*Model: F=10.535, p=0.000, *=p<0.05, SE=standard error*

analysis of a study examining the role of illness perception in the relationship between gastrointestinal symptoms and anxiety suggested that illness perception partially mediated the association between the severity of gastrointestinal symptoms and anxiety symptoms, with a mediating ratio of 25.3% (36). A study examining the relationship between illness perception and anxiety level in cancer patients; it was found that illness perception affected anxiety (37). The literature shows that the disease and surgery process changes the perceptions of patients, and their anxiety is affected. For the perioperative process to be managed well by nurses, the perceptions and anxieties of patients during the preoperative period should be comprehensively evaluated.

### Study Limitations

As a limitation, although the results obtained from this study are limited to patients who were scheduled for open-heart surgery in the university hospital where the study was conducted, the findings must be generalized to the sample.

### Study Implications

This study examined the effects of patients' perceptions of their illness on surgery-specific anxiety levels before open heart surgery. These findings may provide information for nurses to evaluate patients' presurgical perceptions and, if necessary, develop strategies to correct these perceptions. In this way, it can be aimed at reducing patients' concerns about the surgical process by providing presurgical counseling and support. Adopting a more personalized approach in clinical practice can improve patient needs. More effective support can be provided by focusing on patients' individual perceptions and anxiety levels during presurgical counseling.

### Conclusion

As a result, it was determined that the illness perceptions of patients who were scheduled for open-heart surgery affected their preoperative anxiety levels. Factors such as patients' perception of the illness as negative, chronic, unmanageable, poor results, previous negative experiences, and the aging process can create anxiety in patients during the preoperative period. In addition, the thought that patients will experience a lot of pain after surgery and that the thought of death will cause them to experience anxiety in the preoperative period. In this context, the healthcare team must be aware of the perceptions of the illness and anxiety levels regarding surgery during the preoperative and postoperative periods. Nurses should reduce negative perceptions of the illness and anxiety experienced by patients scheduled for open heart surgery. In this context, planning and implementing individual and situation-specific nursing interventions can contribute positively to the postoperative process.

**Ethics Committee Approval:** The study was approved by the Medical and Health Sciences Research Board and Ethics Committee of the Başkent University (desicion no: 22/06, date: 26.01.2022).

**Informed Consent:** Patients were informed verbally and in writing about the study, and consent forms were filled out by each patient.

### Footnotes

**Author Contributions:** Concept - H.O., S.A.I.; Design - H.O., S.A.I.; Data Collection and/or Processing - H.O.; Analysis and/or Interpretation - H.O., S.A.I.; Literature Review - H.O., S.A.I.; Writing - H.O., S.A.I.

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ORIGINAL ARTICLE

# Impact of Caring for Children with Congenital Heart Disease on Nurses' Lives: A Qualitative Study

## Konjenital Kalp Hastalığı Olan Çocuklara Bakım Vermenin Hemşirelerin Yaşamlarına Etkisi: Nitel Bir Çalışma

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### Abstract

**Objective:** Advances in technology have improved survival rates for children with congenital heart disease (CHD), leading to additional surgery and longer hospital stays. Nurses are essential healthcare professionals involved in these challenging processes. This study aimed to explore the impact of caring for children with CHD on the lives of nurses.

**Method:** A qualitative-descriptive research design was employed. The study was conducted with 15 nurses caring for children with CHD at a foundation university hospital in Turkey. Data were collected using a "demographic information form" and a "semi-structured interviews" through face-to-face interviews. Nurses were asked to discuss the positive and negative effects of caring for children with CHD on their own lives. The interviews were recorded and professionally transcribed. Two researchers thematically analyzed the transcripts using MAXQDA. The study was conducted using the consolidated criteria for reporting qualitative research criteria.

**Results:** The average age of the nurses was 30.53±5.14 years, and 73.33% had more than 5 years of experience caring for children with CHD. The results of the individual interviews revealed five main themes and 14 subthemes. These main themes are (i) Strengthening knowledge and skills, (ii) Interaction with the child, (iii) Psychosocial empowerment, (iv) Emergence of negative impacts, and (v) Overcoming challenges in professional life.

**Conclusion:** Caring for children with CHD positively and negatively impacts nurses' lives. To mitigate the negative effects on nurses, providing physical and psychological support and empowerment are crucial.

**Keywords:** Child, nursing care, congenital heart disease, qualitative research

### Öz

**Amaç:** Teknolojideki ilerlemeler konjenital kalp hastalığı (CHD) olan çocuklarda sağkalım oranlarını yükselmekte, bu durum ise ek cerrahi ve uzayan hastane yatışlarını beraberinde getirmektedir. CHD olan çocukların bakımından sorumlu olan hemşireler, bu zorlu süreçlere dahil olan sağlık profesyonelleridir. Bu çalışmada CHD olan çocuklara bakım vermenin hemşirelerin yaşamlarına etkisini incelemek amaçlanmıştır.

**Yöntem:** Çalışmada niteliksel-tanımlayıcı araştırma deseni kullanılmıştır. Türkiye'de bir vakıf üniversitesi hastanesinde CHD olan çocuklara bakım veren 15 hemşire ile araştırma yürütülmüştür. Veriler "tanıtıcı bilgi formu" ve "yarı yapılandırılmış görüşme formu" ile yüz yüze görüşme tekniği ile toplanmıştır. Hemşirelerden CHD olan çocuklara bakım vermenin, kendi yaşamları üzerindeki olumlu ve olumsuz etkilerini tartışmaları istenmiştir. Görüşmeler ses kaydına alınmış ve profesyonel olarak yazıya dökülmüştür. Transkriptler MAXQDA kullanılarak iki araştırmacı tarafından tematik olarak analiz edilmiştir. Araştırma nitel çalışmaların raporlanmasında kullanılan nitel araştırma raporlama için birleştirilmiş kriterleri doğrultusunda yürütülmüştür.

**Bulgular:** Hemşirelerin yaş ortalaması 30,53±5,14 yıl ve %73,33'ü beş yıldan fazla CHD olan çocuğa bakma deneyimine sahipti. Bireysel görüşmeler sonucunda 5 ana ve 14 alt tema belirlenmiştir. Bu ana temalar şunlardır: (i) Bilgi ve becerilerin güçlenmesi, (ii) Çocuk ile etkileşim, (iii) Psiko-sosyal güçlenme, (iv) Olumsuz etkilerin ortaya çıkması ve (v) Profesyonel yaşamdaki zorlukların üstesinden gelmek.

**Sonuç:** Bu çalışma, CHD olan çocuklara bakım vermenin hemşirelerin yaşamları üzerinde hem olumlu hem de olumsuz etkileri olduğunu ortaya koymuştur. CHD olan çocuklara bakım vermenin hemşireler üzerindeki olumsuz etkilerini azaltmak amacıyla, hemşirelerin fiziksel ve psikolojik açıdan desteklenmesi ve güçlendirilmesi büyük önem taşımaktadır.

**Anahtar Kelimeler:** Çocuk, hemşirelik bakımı, konjenital kalp hastalığı, nitel araştırma

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## Introduction

Congenital heart disease (CHD) is an anomaly that often leads to neonatal mortality. According to the American Heart Association, the incidence of CHD is approximately 12.3 per 1,000 live birth (1). In Turkey, the annual number of infants born with CHD ranges from 11,000 to 17,000 (2). Advancements in technology and surgical expertise have significantly improved the survival of children with CHD (1). Despite improvements in survival rates, the recovery process often involves additional surgeries or medical interventions, resulting in extended hospital stays among children (3). Although it is expected that these children will fully recover and return home, some succumb to complications despite advanced medical and surgical interventions. Consequently, healthcare professionals address the physiological needs of children and provide emotional and psychosocial support to both children and their families, increasing caregiving responsibility (4).

The care of children with CHD in hospitals is heavily dependent on the crucial role of nurses. It has been reported that nurses are among the leading healthcare professionals in helping to establish positive caregiving strategies in families of children with CHD (5). Nurses have constant interactions with children and their parents, and as a result, they frequently witness challenging moments, such as children enduring pain and distress (6). In addition to providing care for critically ill children, nurses are responsible for making critical care decisions and supporting families with challenging choices, which have a significant impact on their professional and personal lives (5,7).

Nurses caring for children with CHD are at risk of experiencing physical and psychological health effects, including burnout, compassion fatigue, secondary trauma, and moral distress (5,8). These experiences can impact their professional and social relationships, job satisfaction, and motivation, potentially leading to increased absenteeism and a decline in the quality of care provided (8,9). Recent studies have highlighted similar challenges internationally. For instance, Bagnasco et al. (9) found that burnout rates among pediatric cardiology nurses were significantly higher in countries with limited staffing and resource allocation than in countries with robust support systems. Tito et al. (10) found that symptoms of tension, irritability, and anxiety were common among pediatric cardiology nurses, emphasizing the need for protective measures for their mental health.

The well-being of health professionals directly affects patient care, especially when caring for children with CHD. It was demonstrated that the skills of pediatric cardiology nurses were associated with fewer complications following pediatric cardiac surgeries (11). By creating a healthy work environment for these nurses, they can better identify issues early and provide thorough disease management (12). Recent evidence indicates that supportive supervision and access to counseling services effectively mitigate compassion fatigue and enhance resilience in pediatric cardiology units (13).

**Main Points**

- Caring for children with congenital heart disease fosters nurses' professional growth and resilience.
- Emotional bonds with children can bring fulfillment but also lead to compassion fatigue and exhaustion.
- The demanding nature of the work results in physical strain for nurses.
- Institutional support, mental health services, and team collaboration are crucial for managing these challenges.

However, there is limited knowledge about how increased caregiving burden, compassion fatigue, and mental health issues impact nurses' lives. This study aims to fill these gaps and identify specific nurses' needs for organizational support, motivation, and stability. The primary focus here was on examining how caring for children with CHD influences the lives of these nurses.

## Material and Method

### Study Design

In this study, a phenomenological qualitative research design was used to reveal, understand, and conceptualize the subjective experiences of nurses more deeply because of the limited resources in the literature regarding the impact of nurses caring for children with CHD on their lives. The researchers adhered to the consolidated criteria for reporting qualitative research (COREQ) checklist to ensure the accuracy and precision of their qualitative study.

### Study Setting

This study was conducted within the pediatric cardiology clinic of Başkent University Ankara Hospital, which serves 400 pediatric cardiology patients annually in Turkey from March 1, 2024, to June 1, 2024. The Başkent University Ankara Hospital Pediatric Cardiology Department, which is a center for cardiac referrals from all over the country, was considered a suitable parameter for this study.

### Selection and Recruitment of Participants

A purposive sample was used to obtain in-depth information on the characteristics of information-rich and dense cases. In qualitative analysis, purposive sampling is commonly employed to identify and select particularly informative participants, thus optimizing the available options (14). The study sample comprises 15 nurses. The participant's average working time with pediatric cardiology patients was six months, aged 18 or older, willing to participate in the study, and knew the Turkish language. Nurses were contacted and invited to participate in the study, and interviews were conducted by planning the appropriate time and place for the participants.

### Ethical Considerations

This study was approved by the Başkent University Medicine and Health Sciences Research Board (approval no.: KA24/62, date: 06.02.2024) and was approved by Başkent University

Hospital Nursing Directorate Services. This study was conducted using the Principles of the Declaration of Helsinki. The purpose of the research was explained to the nurses before the study. The "informed consent form" prepared by the researchers was read to the participants before the interview. In this form, nurses were assured of the confidentiality of their identities and voice recordings. After the nurses were informed about the purpose and methodology of the study, verbal and written consent was obtained. Participants were informed that they could withdraw from the study without reason. Confidentiality and anonymity were upheld through anonymizing data and its secure storage, which were accessible solely to the research team.

**Data Collection**

The study sample was determined based on theoretical saturation, which indicates the point at which data collection yields sufficient detail for thorough analysis. The researchers iteratively assessed the data to achieve theoretical saturation until no new information emerged and all relevant concepts were fully developed. Data collection concluded after reaching this saturation point, as indicated by the absence of new information or codes (15,16).

The researchers (AA, İEK) established the criteria for including eligible nurses in the study. They held meetings with potential participants to ask questions about the study and obtain informed consent. The following consent, interviews were scheduled. Before the interviews, the participants completed a questionnaire to provide socio-demographic information, including age, gender, educational level, and length of employment. This information is summarized in Table 1.

The data were collected through a semi-structured, in-depth interview. In-depth individual interviews were preferred for this study because they are suitable for exploring personal experiences, discussing sensitive topics, minimizing group influence, and uncovering complex issues (17). The interviews were conducted in a designated room within the pediatric cardiology service, which was chosen for its environment in which participants could speak freely. This room provided a quiet space for recording and minimized distractions. A single researcher (AA), a female academic from the pediatric nursing department with prior qualitative research experience, conducted all the interviews. There was no pre-existing relationship between the researcher and the participants; each participant met the researcher and was informed of the study objectives during the interview.

The data collection phase of the study ended when data saturation was reached, as indicated by the receipt of similar responses from the participants. The sample consisted of 15 nurses who met the inclusion criteria. The interview duration ranged from 30 to 60 minutes, and all sessions were recorded using a device with audio recording capabilities. Each participant was asked to explain their feelings and experiences regarding the impact of working with pediatric cardiology patients. Research data were collected using the "semi-structured interview form" developed by the researchers in line with the relevant literature review (5,7). The researcher was interviewed using semi-structured questions. The semi-structured questions were designed to deeply examine the impact of caring for children with CHD on the lives of nurses and to guide the participants. The interview questions are presented in Table 2. Following the observation of the entire process, the researcher posed supplementary questions and requested further clarification while documenting significant non-verbal cues (e.g., facial expressions, tone of voice, gestures) to mitigate potential errors. Additionally, to address possible issues with audio recordings, such as low batteries or volume inconsistencies, the researcher meticulously recorded the interviewees' responses. All interviews were transcribed, and thematic analysis was conducted to evaluate the recordings.

**Rigor and Trustworthiness**

This study applied the concepts of sensitivity to context, rigor, transparency, and impact as outlined by Yardley (18). We achieved sensitivity to context by using verbatim

***Table 1.***
***Descriptive Characteristics of Nurses***

| **Characteristics** | **Mean ± SD** | |
|---|---|---|
| **Age** | 30.53±5.14 | |
| **Working years** | 12±3.85 | |
| **Working years with children with CHD** | 9±4.16 | |
| | **n** | **%** |
| **Marital status** | | |
| **Married** | 9 | 60% |
| **Single** | 6 | 40% |
| **Educational level** | | |
| **Bachelor's degree** | 11 | 73% |
| **High school** | 4 | 27% |
| **Status of CHD training** | 0 | 0% |

*SD=standard deviaiton, CHD=congenital heart disease*

***Table 2.***
***The Interview Questions***

| |
|---|
| What is it like to care for children with CHD? |
| How has caring for children with CHD changed your life? |
| What are the positive effects of caring for children with CHD? |
| What are the negative effects of caring for children with CHD? |
| Considering the effects of caring for children with CHD on your life, what are your expectations regarding the care and treatment process? |

*CHD=congenital heart disease*

questions, amplifying participants' voices, and allowing readers to trace their interpretations. Our interviewer, Dr. AA, a female researcher with a PhD in nursing and experience in pediatric cardiology, enhanced the trustworthiness and rigor of our qualitative analysis. She fostered a relaxed, open atmosphere through open-ended questions and reflexivity to mitigate bias. Dr. AA took notes, observations, and experiences to understand the study's context better, enrich the collected data, and contribute to the analysis process. Participants' reactions, gestures, facial expressions, and other notable elements were also recorded in the interview field notes. All participants provided their consent to participate in the study. Dr. AA was the sole mediator of the interviews to ensure compliance. The three researchers independently identified the primary themes and subthemes and engaged in discussions until they reached a consensus, ensuring the quality and reliability of the findings. We also extracted direct quotes from the interviewees' responses.

### Statistical Analysis

Interviews were recorded using a voice recorder and were meticulously transcribed verbatim by two independent researchers (İEK and AG). The researchers listened to the recordings multiple times to ensure accuracy and consistency in the transcriptions. The transcribed data were subsequently imported into MAXQDA software (version 2020) for coding and thematic analysis. This approach, grounded in the frameworks of Braun and Clarke (19), is a widely accepted method for identifying, analyzing, and interpreting patterns in qualitative data. To enhance the reliability of the analysis, several steps were implemented (19): (i) one researcher (AG) initially organized the raw data and employed MAXQDA software version 2020.2.2 for coding and analysis; (ii) the research team (AA, İEK, AG) collaboratively examined and refined the codes, subthemes, and their definitions until consensus was reached; (iii) codes were consolidated into overarching thematic categories, ensuring data saturation; (iv) the identified themes underwent validation through peer review by a multidisciplinary team comprising physicians and nurses; (v) the first author conducted a comprehensive review of the thematic structure; and (vi) all data were synthesized to draft the final report. In the final stage, the researchers collaboratively reviewed and refined the themes, subthemes, and associated descriptions, resolving any discrepancies in the definitions through consensus. They determined that data saturation was achieved by organizing related themes into broader themes. The team reached an agreement on the finalized themes, culminating in the development of a core framework or theory that synthesized the key insights derived from the data. After the themes and subthemes were finalized, the participants were invited to review and confirm the findings. All participants endorsed the identified themes and subthemes without requesting modifications or providing additional feedback.

## Results

Fifteen nurses with experience caring for children with CHD participated in the study. The average age of the participants was 30.53±5.14, and most (73%) had a bachelor's degree. The mean professional experience of the participants was 12±3.85 years, while the mean experience in caring for CHD patients was 9±4.16 years. The detailed characteristics of the nurses are summarized in Table 1. The findings of this qualitative study revealed that nurses caring for children with CHD had positive and negative impacts on their lives. Our analysis revealed five main themes describing these impacts in their life: (i) Strengthening knowledge and skills, (ii) Interaction with the child, (iii) Psychosocial empowerment, (iv) Emergence of negative impacts, (v) Overcoming challenges in professional life. All main themes and subthemes are presented in Table 3.

### Theme 1: Strengthening knowledge and skills

Our findings revealed that nurses caring for children with CHD strengthened their professional knowledge and skills. Nurses expressed that they felt robust, well-rounded, and skilled because they faced many challenging experiences during their professional experience. This theme included three subthemes: being a person to be consulted, gaining self-confidence, and giving meticulous care.

**Being a person to be consulted:** The nurses stated that their relatives had consulted them, especially regarding heart diseases. A nurse who had been caring for children

***Table 3.***
***Main Themes and Subthemes***

| Themes | Sub-themes |
|---|---|
| **Strengthening knowledge and skills** | - Being a person to be consulted<br>- Gaining self-confidence<br>- Giving meticulous care |
| **Interaction with the child** | - Development in the approach to pediatric patients<br>- Strengthening communication with the family<br>- Avoidance of communication |
| **Psychosocial empowerment** | - Practicing patience<br>- Understanding the value of life |
| **Emergence of negative impacts** | - Afraid of having a sick child<br>- Reflection of the emotional burden in daily life<br>- Despair toward recovery<br>- Physical disorders |
| **Overcoming challenges in professional life** | - Team collobration<br>- Institutional support |

with CHD for many years expressed the complex feelings she experienced when her friends' children were diagnosed with CHD as a result of her referral in the following words:

*"I had friends' children whom I referred and unfortunately diagnosed with CHD as a result. However, because of this, they started treatment early. It may be a bad situation, but I feel lucky to work in this department. I have benefited my friends, relatives, and children (N5)."*

Nurses felt themselves as robust, well-rounded, and competent when they were consulted. Two nurses also expressed this situation as follows:

*"I am the first person my friends want to consult. I see myself as a superhero in such situations (N3)."*

*"Because it is an exceptional department, people with children ask questions." Sometimes, if I notice an abnormal situation, I can refer the patient to a doctor. We can be a source of information for people. It makes me feel professionally robust and competent (N12)."*

**Gaining self-confidence:** The nurses stated that providing care for children with CHD was a challenging experience. However, they also noted that their critical decision-making abilities, knowledge, and skills underwent significant growth as a result of this demanding experience, empowering them to make crucial decisions in their practice. Consequently, they reported increased self-confidence and were ready to care for patients in various clinical settings. The nurses expressed their views as follows:

*"Nursing is a profession that requires sudden decisions. I think that when I care for a child with CHD, I can care for all patients. I have attained significant self-confidence, and my knowledge and skills have increased a lot (N8)."*

*"The experience of caring for these patients has significantly increased my self-confidence. Seeing patients walking healthily and attaining control provides a source of encouragement and reinforces self-confidence and motivation (N11)."*

*"I find that working in a specific field, such as pediatric cardiac surgery, boosts my self-confidence because I witness patients recovering after surgery. I reassure myself that we will completely heal the patients and send them home. Witnessing these patients recover and leave instills a unique sense of self-assurance in me (N14)."*

**Giving meticulous care:** Nurses caring for children with CHD must be attentive and sensitive in their care and treatment. Nurses support patients both physiologically and psychologically throughout the process. The nurse emphasized the importance of ensuring that patients do not become tired during their care:

*"Devotion is essential for all patients, but children with CHD require extra attention because of their susceptibility to respiratory distress. Therefore, it is important to handle these cases with great care and caution, avoiding actions that could cause harm or fatigue. Even the slightest exertion can lead to respiratory distress in these children; therefore, we must be extremely vigilant. Our focus should always be on them, as even a moment of carelessness can lead to dangerous situations (N1)."*Some nurses highlighted the significance of nutrition for the speedy recovery of children with CHD. Nurses play a crucial role in preserving the nutritional well-being of children with CHD:

*"It is important to provide extra care and attention to children with this disease, as they require more support than healthy children or those with other health issues. Specifically, children with nutritional deficiencies require careful monitoring because developmental delays are common in these cases. We have to calculate their calorie needs, closely monitor their weight, and regularly check their blood values (N6)."*Nurses take a holistic approach to caring for children with CHD. They stated that having multiple skills is essential for providing care for these patients as follows:

*"You need to have a thorough understanding of every detail. You must be extremely sensitive. We must consider the child as a whole. Pain, psychology, nutrition, and breathing are all included in this holistic approach. We are responsible for the patient's well-being from head to toe (N15)."*

**Theme 2: Interaction with the Child**

The theme of the study, titled "interaction with the child" focuses on nurses' communication with children and families. Effective communication increased the confidence of children with CHD and their families and improved their days in the hospital. On the other hand, despite the positive effects, some nurses avoided communicating with children with CHD and their families to protect themselves. The "interaction with the child" theme included three subthemes: development in the approach to pediatric patients, development in the approach to pediatric patients, strengthening communication with the family, and avoidance of communication.

**Development in the approach to pediatric patients:** Caring for children with CHD has positively impacted nurses' social lives by enhancing their communication skills with children. The nurses' improved communication skills have made it easier to use in their personal lives, enabling them to communicate more effectively and healthily with their families and children. The nurses expressed their views as follows:

*"Since working in this clinic, I have been connected better with children. I understand their needs, so they feel more comfortable around me. I appreciate their trust in me. This has also improved my relationship with my nieces and nephews (N13)."*

**Strengthening communication with the family:** Nurses who care for children with CHD often form strong connections with families because of prolonged hospital stays and repeated surgeries. This enhanced communication allows families to develop trust, ask questions without hesitation, and receive education more effectively. However, the long-term interaction with these families can lead to nurses experiencing negative emotions, such as helplessness and fear that the families may experience, thus impacting the nurses' personal lives. The nurses expressed their views as follows:

*"We have been together with moms and dads for a long time and have become a family." We also need to provide psychological support to the very worried families. It is challenging for them to care for a child, especially one with a difficult disease. Therefore, we need to provide them with great support. However, this can also be psychologically challenging for people (N2)."*

*"Families are understandably worried about this process. When they come here for the first time and do not know the environment, they naturally ask questions and make different demands. I empathize with them. If the families had been a little more understanding and patient, our working environment and psychology would have been better (N4)."*

The nurse mentioned the positive aspects of strong communication with the family as follows:

*"From a positive perspective, for example, I love talking to families. They consult with us on many issues, such as respiratory distress, drug use, and wound care. Training them on this subject will keep them updated in terms of knowledge. While it benefits families, it also strengthens us. In this respect, I also think having strong communication with family members is beneficial (N10)."*

**Avoidance of communication:** Nurses play a crucial role in providing holistic care, support, and guidance to patients and their families. However, constant communication with patients and families can sometimes lead to negative effects, such as overempathizing with the feelings of families and carrying those emotions into their personal lives. As a result, some nurses may limit their communication with patients and families to protect themselves. The nurses expressed their views as follows:

*"After some time, I began to feel psychologically unwell. I was constantly unhappy at home, and my thoughts always focused on the hospital. As a result, I started to limit my communication. I chat less with patient relatives to empathize less (N12)."*

*"I make an effort to keep my distance from the relatives of the patients. I get very sad when I form too strong a bond. I think it is healthier not to form strong emotional attachments with children to protect myself (N15)."*

**Theme 3: Psychosocial empowerment**

The theme of this study, "psychosocial empowerment", examined the impact of caring for children with CHD on the values of nurses. Nurses were psychosocially empowered during professional experiences. It was the children they cared for who truly enriched their lives, teaching them about the value of life, the importance of hope, and the resilience to make the most of every situation. This theme comprised two subthemes: practicing patience and understanding the value of life.

**Practicing patience:** Nurses are crucial in supporting children and their families during long treatment processes, recurring surgeries, and unpredictable disease courses. A patient approach to the healing process of children and the concerns of families is an essential aspect of nurses' caregiving roles. While being patient contributes to the healing process in nurses' professional lives, it has also led them to better understand their social lives. The nurses expressed their views as follows:

*"Children are the only group in the world who should not be sick, but unfortunately, they are. This realization has completely shifted my perspective of life. I have become more patient with my own children. Even if they do not well eat or are not successful in traditional terms, I no longer consider these things very important. What matters most to me is that they are healthy (N5)."*

*"I have learned to be more patient and not get angry with children over trivial things. My priorities have changed. For example, I realized there is no point in getting angry and pressing them just because they are not studying. I understand that they might have more important problems (N6)."*

**Understanding the value of life:** While nurses observe the difficult struggles of children and their families, they also witness the fragility of life. These experiences change how nurses view their lives and lead them to appreciate the value of small moments and health more. Nurses state that, inspired by the stories of hope and resilience of patients and their families, they evaluate every moment of life in a more conscious and meaningful way. This awareness adds a deeper meaning to their personal and professional lives and reminds them that human life is. The nurses expressed their views as follows:

*"I have children of my own, and I keep thinking about them. I am thankful that they are in good health and can pursue their desires, which has helped me understand the true meaning of life (N1)."*

*"One mother said: "Just listening to him breathe day after day is a miracle for us; one more day together is more precious than anything else." I always remember this sentence when I feel tired and overwhelmed by everyday problems (N9)."*

**Theme 4: Emergence of negative impacts**

The theme "emergence of negative impacts" addresses the emotional, psychological, and physiological difficulties faced by nurses caring for children with CHD. Nurses are under intense stress and emotional burden because of the severe health conditions and uncertain prognoses of their patients. Prolonged hospitalizations and repeated surgeries increase the workload of nurses, leading to negative effects such as empathy fatigue and burnout syndrome. Nurses often experience feelings of hopelessness, anxiety, and helplessness during this process. This theme comprised four subthemes: Afraid of having a sick child, reflection of emotional burden in daily life, dispair toward recovery, and physical disorders.

**Afraid of having a sick child:** Nurses caring for children with CHD often have concerns about their own maternal roles or their future dreams of becoming parents because of the challenging care processes. Witnessing the serious health problems experienced by children and the helplessness of their families deeply affected these nurses, leading them to worry about the health of their children. Many nurses have expressed fear that their children might be born with similar health problems in the future based on the cases they have encountered at work. Nurses expressed their views on this issue as follows:

*"The most profound impact on me was experiencing fear; fear for my children, myself, and my relatives. My own child required intensive care. Going through that process felt like I was experiencing the same things as the children I care for and the same helplessness as their families. I was constantly worried that my child might need to be intubated or might experience a medical emergency (N11)."*

*"My husband also has a CHD." That is why I feel much more fearful than other nurses. I wake up at night to check if my children are breathing. I am very afraid that they might also have heart disease. But if I didn't know these things, if I didn't work in such a clinic, I wouldn't be affected at all (N13)."*

*"I was constantly worried about my child's health during my pregnancy, to the point where I had multiple fetal echo scans done. Seeing other children only heightened my anxiety, and even the smallest signs of illness in my family caused me to panic (N14)."*

**Reflection of the emotional burden in daily life:** The emotional burden of nurses caring for children with CHD extends beyond professional life and profoundly affects their personal lives. Nurses express that they are unable to disconnect mentally and emotionally from their responsibilities outside working hours. This constant state of anxiety about the well-being of their patients can disrupt the peace and serenity in the daily lives of nurses and their families. Simultaneously, this emotional burden limits nurses' time to themselves, negatively affecting their psychological and physical health.

*"We spend so much time with ill children here that I cannot stop thinking about them. When I go home, I feel unhappy (N3)."*

*"I constantly have ill children in my mind. Sometimes, in the evenings, I call to find out what has happened and the situation. I frequently tell my husband about my children at the hospital. My husband is also psychologically affected and very upset this time. This situation increases my emotional burden. I feel under pressure and exhausted at times (N4)."*

*"Sometimes, negative things from work follow me home. I have a headache, feel weighed down, and lack the energy to spend time with my children. I feel overwhelmed by my emotional burden (N6)."*

**Despair toward recovery:** Nurses caring for children with CHD experience a deep sense of hopelessness and helplessness, especially for children who struggle to respond to treatment. Despite nurses' best efforts, the chronic nature of the disease and occasional inadequacy of treatments can dampen their hopes for the children's recovery. This sense of hopelessness affects their emotional well-being and affects their professional and personal lives. In addition, witnessing the worsening of the patient's condition adds to the psychological burden experienced by nurses.

*"There are children who receive treatment for a very long time and undergo repeated operations. While trying to instill hope in the families, we were despairing ourselves. This despair in the hospital affects my entire life; it changes my perspective. Perhaps psychological support can be given to employees (N10)."*

*"You are happy to see the children grow up, but now we know that, except for ASD and some VSDs, all children come again and again with a different diagnosis. It saddens me that the child you have bonded with for a long time repeatedly goes through the same processes and worries and becomes more aware as he grows up. I will try not to be hopeless, but I cannot help. Now, I look at many things in life more hopelessly (N14)."*

**Physical disorders:** Nurses caring for children with CHD face significant physical challenges. They work long hours, lift heavy patients, and stand for extended periods, leading to various health problems, such as back, waist, and neck pain. The intense work pace and heavy care processes can also lead to fatigue and exhaustion, negatively impacting nurses' overall quality of life. Therefore, nurses must receive physical support and protection while performing their duties.

*"We lift and care for overweight children by ourselves, changing their diapers, and giving them baths. Our necks and backs are constantly in pain. Regardless of the child's weight or whether they have COVID-19, we immediately took them to the intensive care unit without considering the*

*challenges of their weight, COVID-19, or physical discomfort. This puts patients at great risk of infection and physical strain (N1).*"

*"We experienced leg, back, and neck pain. Due to our heavy workload, we do not have time to rest. We are all here every day, working 12 hours a day. When we leave, we are very tired. Physically, we are all exhausted. If we had more nurses, we could relax physically (N7).*"

*"It is strictly forbidden to sleep during our night shifts at this hospital. Insomnia is very difficult for us, as we are constantly on duty and monitor patients in morning. This greatly tires the human brain and body. No matter how much I sleep, I cannot wake up rested when I leave the shift (N8).*"

**Theme 5: Overcoming challenges in professional life**

The theme of the study "overcoming challenges in professional life" focuses on the significance of teamwork and institutional support. Nurses caring for children with CHD encounter numerous challenges in their professional lives, and they employ various strategies to overcome these challenges. Nurses emphasize the importance of unity and collaboration within their teams to manage the demands of intensive care, heavy workloads, and emotional stress. Sharing knowledge and experiences with colleagues is crucial for overcoming these difficulties. This theme comprised two sub-themes: team collaboration and instutional support.

**Team collaboration:** Nurses caring for children with CHD must emphasize the critical role of team collaboration in overcoming care-related challenges. They stressed that effective communication and teamwork among staff members speeded up and improved patient care. Nurses highlight the significance of collaborative teamwork, particularly in complex cases, and underscore that leveraging the knowledge and expertise of various disciplines enhances patient care. They also noted that open and regular communication and workload sharing reduced emotional and physical burnout.

*"Children's needs must be comprehensively addressed." Physiological needs such as nutrition and physical activity are as important as medical treatment and surgery. We rely on the expertise of physiotherapists and dieticians for support. When the team collaborates effectively, the workload becomes more manageable, leading to better patient care and greater satisfaction for us (N2).*"

*"Caring for a child with CHD requires teamwork and effort." Nurses, physicians, dieticians, and staff all play crucial roles. Collaboration is essential for the best patient care. When we support each other, it eases our psychological burden. Working together as a team to care for a sick child significantly enhances professional satisfaction (N5).*"

**Instutional support:** Nurses caring for children with CHD stressed the importance of institutional support in assisting children in coping with the challenges they encounter in their professional lives. They emphasized that the support received from healthcare institutions is crucial in preventing physical, emotional, and professional burnout. Specifically, managers' support in addressing issues such as understaffing, long hours and heavy workloads is instrumental in strengthening nurses' professional resilience.

*"As members of a profession that significantly impacts our lives, we require support from our managers. Considering how much time and effort we dedicate to our profession, financial support is especially important to us. We also seek satisfaction in terms of financial compensation. At the same time, shorter working hours and increased vacation time serve as motivational incentives and help mitigate the negative impacts on our lives (N3).*"

*"Our working conditions are challenging, and as a result, we have certain expectations from our managers. Meeting staff needs, showing more understanding, and meeting financial expectations are crucial for meeting our basic needs. Reducing the number of patients receiving care can also enhance the quality of care (N11).*"

Nurses emphasized the importance of providing psychological support:

*"The sense of hopelessness we experience because of chronic illness and repeated hospitalizations also affects our own lives. Therefore, hospital management can provide regular psychological support (N6).*"

*"We have patients who we follow for long periods, and sometimes, they deteriorate or pass away. This can be very difficult for some nurses, leading to psychological distress. While we try to give them time off, our staffing levels are low, and they often must continue to work. Perhaps we could provide psychological support to help our nurses during such challenging times (N12).*"

## Discussion

Caring for children with CHD is a challenging and arduous task. The treatment involves a multitude of issues, including complexity, lifelong management, challenges related to growth and development, exercise tolerance, nutrition, psychosocial well-being, transition of care, and the risk of complications, such as heart failure (1,20). This requires specialized comprehensive care approaches that are distinct from those for other chronic diseases. Parents of children with CHD are significantly more likely to experience psychological problems such as anxiety, depression, caregiver burden, and poor quality of life when their caregiving needs are not met by healthcare professionals (21-23). Therefore, as members of a multidisciplinary care team, nurses play an important role in addressing the care needs of patients and families (20). A previous study demonstrated that higher nursing skills and experience

were significantly associated with fewer complications after pediatric cardiac operations (11). The impact of nursing care on children with CHD and their families has been extensively studied (21,24,25). However, there is a lack of research on how caring for children affects nurses' lives. Therefore, taking into account the experiences from all aspects of nurses' lives can offer a more comprehensive understanding of a person-centered approach to care. This approach can also serve as a foundation for integrated health services that emphasize the unique needs and preferences of these nurses, guiding the development of quality care. Working in pediatric cardiology clinics can be challenging and stressful for healthcare professionals (6). Although most previous research has predominantly focused on the negative effects of caring for this patient population on healthcare providers (6,9,10,26), our study is the first to explore and establish a correlation between both the positive and negative impacts of caring for children with CHD on nurses' lives. The impact of caring for children with CHD on nurses was analyzed. The results showed that caring for children with CHD had both positive and negative effects on nurses' lives, whether emotional, psychosocial, or professional. Moreover, nurses encountered physical challenges that required institutional and psychosocial support.

Our results revealed that meticulous care for children with CHD empowered nurses' professional and personal lives in terms of their self-confidence, knowledge, and skills. Studies have examined the impact of working in pediatric units that require intensive nursing care on nurses' professional lives and found that it increases job satisfaction and skills (26,27). Nurses in the present study also highlighted that nurses working in pediatric cardiology units should continuously enhance their skills and focus on providing specialized care for children. Pediatric cardiology nurses need to have a clear understanding of CHD, including the cardiac structure, pathophysiology, and care demands of these patients (7). This understanding will enable clinicians to provide better and more holistic care to pediatric cardiology patients and their families. In addition to these findings, our study revealed that working in pediatric cardiology units provided the opportunity to consult children in nurses' social environments, such as their friends and relatives. Although this phenomenon has not been widely documented in prior studies (9,10), it underscores the broader societal impact of pediatric cardiology nurses' specialized skills. This finding may reflect the nurses' strong sense of responsibility and commitment to extend their professional knowledge beyond the workplace, a perspective that warrants further exploration in future research.

In this study, "interaction with the child" emerged as an important aspect of nurses' experiences caring for children with CHD. Nurses in the study frequently highlighted the strong communication they developed with children under their care. This finding is consistent with the existing literature, which emphasizes the critical role of pediatric nurses in providing continuous support to patients and managing their emotional processes (28,29). Our findings revealed that interactions with these patients, while emotionally intense, form a crucial part of the caregiving experience and deeply influence nurses, both professionally and personally. Similarly, a previous study demonstrated that enhancing pediatric nurses' communication with families and patients positively impacted the care provided to the children and the nurses' communication with their children (30). Nurses fulfill their professional responsibilities while also providing emotional support and connecting with the children they care for on a personal level (31). However, emotional devotion also poses challenges (6). Nurses described the difficulty of balancing caring deeply for the child and maintaining professional detachment to avoid emotional burnout. Nurses also noted that they occasionally limited their communication with children to maintain emotional balance and protect themselves.

Caring for children with CHD also contributes significantly to nurses' personal development. Nurses frequently noted that caring for these vulnerable children required them to cultivate greater patience in their clinical tasks and interactions with patients and families. This heightened sense of patience stemmed from the long-term nature of CHD treatment, which often involves extended periods of hospitalization and complex care regimens. This finding is consistent with the existing literature suggesting that patience is a crucial skill for nurses in critical care settings, where care's emotional and physical demands are particularly high (32,33). This personal growth enhanced their professional capabilities and improved their interactions with colleagues, family members, and children. The ability to remain patient in adversity reflects these nurses' deeper emotional resilience, underscoring the positive psychosocial impact of caring for critically ill children. Nurses frequently described how witnessing the resilience of these young patients, many of whom face life-threatening conditions, led them to develop a deeper appreciation for life's fragility and significance. Nurses noted that their experiences caring for CHD patients had a lasting effect on their values, often prompting them to re-evaluate their priorities and relationships. This shift in perspective is consistent with findings from other studies, which showed that healthcare professionals working in critical care environments often experience a heightened awareness of the value of life and the importance of making the most of everyday moments (27,28). Similarly, a study examining nurses' experiences in intensive care units emphasized that nurses caring for children with complex health problems focused more on the value of life (34). This experience not only reinforced the value of life but also motivated nurses to provide the highest quality of care, knowing that their efforts could make a significant difference in the lives of these children (35). Additionally, the emotional insight gained from these experiences often extended beyond the workplace, with nurses reporting that they became more empathetic and mindful in their personal lives, recognizing the importance of cherishing their loved ones.

The results of our study are crucial for understanding the adverse effects of caring for children with CHD among nurses. This is consistent with previous studies that have observed that nurses are especially susceptible to negative mental health effects, such as increased anxiety levels and emotional fatigue when working with children (36,37). Moreover, previous studies have shown that pediatric nurses working in excessively stressful conditions are more susceptible to physical exhaustion and health problems (38,39). Furthermore, our results resonate with Tito et al. (10), who identified symptoms of tension, irritability, and anxiety as common among pediatric cardiology nurses. This reflects broader findings in the literature, which indicate that healthcare workers in high-stress environments often struggle with emotional burnout and difficulty establishing a work-life balance (40,41). These findings emphasize the need for mental health protection measures, such as stress management training, peer support programs, and access to professional psychological services. Therefore, health professionals should be adequately supported through various individual and group psychological interventions to help them feel productive and valued and improve their social and motivational attitudes (37,39).

Nurses often experience deep emotional impacts because of their work with CHD. Many nurses expressed heightened anxiety about their children's health or the possibility of having a child with a serious condition in the future. The constant exposure to severe cases of CHD and witnessing the suffering and struggles of families deeply affected nurses' perceptions of parenthood and their concerns for their children's well-being. Similarly, studies have shown that healthcare professionals frequently develop heightened fears and anxieties related to the health of their loved ones when exposed to critical illness in their professional environment (42,43). A unique finding of our study was the impact of caring for children with CHD on nurses' perspectives of parenthood, particularly regarding raising concerns about their children's well-being. Although similar emotional effects have been documented in other groups, the specific influence of parenting perceptions within this population has been less frequently explored. Nurses frequently expressed feelings of hopelessness when patients failed to respond to treatments or experienced chronic relapses despite ongoing efforts. The emotional strain of managing long-term, complex cases, coupled with the uncertainty of recovery outcomes, left many nurses feeling disheartened and emotionally drained. This sense of despair is a well-documented phenomenon in healthcare settings where professionals work with critically ill patients, often leading to compassion fatigue and emotional exhaustion (44,45).

Nurses caring for children with CHD overcome many challenges in their professional lives. Team cooperation and institutional support play an important role in coping with such challenges (46). Nurses emphasized that working closely with physicians, dietitians, physiotherapists, and other healthcare professionals was essential for delivering comprehensive care to children with CHD. The interdisciplinary approach helped to share the workload and improved patient outcomes by ensuring that all aspects of the child's care were addressed. This finding aligns with those of previous studies, demonstrating that teamwork in healthcare settings leads to better patient care and reduces the emotional and physical strain on individual nurses (45,46). By fostering a culture of open communication and mutual support among team members, nurses could feel more confident in their professional roles, contributing to job satisfaction and resilience in the face of challenges (47-49). The findings of the present study align with those of Bagnasco et al. (9), who reported higher burnout rates among pediatric cardiology nurses in countries with limited staffing and resource allocation compared to those with robust support systems. Moreover, nurses noted that adequate staffing levels, access to mental health resources, and supportive management were vital in preventing burnout and maintaining their ability to provide high-quality care. Nurses particularly valued managers who were responsive to their concerns, whether by addressing staffing shortages or facilitating opportunities for professional development. A systematic review emphasized that organizational support, including mental health services and appropriate workload, is crucial for reducing burnout and improving nurse retention in high-stress environments (50). This parallel underscores the critical impact of institutional and systemic factors on nurses' well-being.

This study underscores the dual impact of caring for children with CHD on nurses' lives. While it leads to professional growth and psychosocial empowerment, it also imposes significant emotional, psychological, and physical demands. The findings point to the need for healthcare institutions to provide comprehensive support, including adequate staffing, psychological services, and mechanisms for emotional relief, to ensure the well-being of nurses and maintain the quality of care they provide.

**Study Limitations**

The current study is the first to determine the impact of caring for children with CHD on nurses' lives. In this context, this study's findings may fill in the information gap in the literature by identifying these effects to bolster the healthcare system and patient care approaches. Adherence to the COREQ checklist is a significant strength of this study, contributing to its methodological rigor and quality of reporting. However, this study is limited to a single hospital, and future research should explore nurses' experiences in different settings to enhance the generalizability of the findings. Additionally, the current study focused only on nurses, and future studies could include other healthcare professionals to gain a more comprehensive understanding of the impact of caring for children with CHD.

## Implications of Practice

The findings of this study highlight the critical need for institutional support to address the emotional, psychological, and physical challenges experienced by nurses caring for children with CHD. Healthcare institutions should implement mental health services, team-based support systems, and professional development opportunities. Integrating mental health services and peer support groups can offer nurses a safe space to process their experiences, thereby providing psychological support and fostering teamwork that can mitigate the emotional burden and reduce burnout among nurses. Furthermore, by ensuring adequate staffing, fair compensation and access to ongoing education, institutions can create a sustainable work environment, enhance nurses' resilience and job satisfaction and improve patient care quality. These changes are necessary to create a sustainable work environment where pediatric nurses can thrive professionally and personally. Developing specialized training programs, such as covering advanced topics like managing complex cardiac conditions, delivering family-centered care, and addressing the psychosocial needs of both patients and families, and the objectives focusing on enhancing clinical competencies, improving communication skills, and fostering resilience through stress management techniques for nurses working with children with CHD is crucial not only to improve care outcomes for children with CHD but also to support the professional and personal growth of pediatric nurses, aligning clinical practices with broader policy development goals.

## Conclusion

Caring for children with CHD has both positive and negative impacts on nurses' lives, affecting them emotionally, professionally, and personally. While nurses gain significant professional knowledge, skills, and psychosocial resilience, they experience compassion fatigue, emotional exhaustion, and physical strain. The strong emotional bonds formed between patients and families can lead to both fulfillment and emotional burdens. Institutional support, mental health services, and team collaboration are vital for managing these challenges. This study emphasizes the importance of creating supportive and well-structured work environments to ensure nurses' well-being and the continued provision of high-quality care for children with CHD.

**Ethics Committee Approval:** This study was approved by the Başkent University Medicine and Health Sciences Research Board (desicion no.: KA24/62, date: 06.02.2024). and was approved by Başkent University Hospital Nursing Directorate Services. This study was conducted using the Principles of the Declaration of Helsinki.

**Informed Consent:** The nurses were informed about the purpose and methodology of the study, verbal and written consent was obtained.

## Footnotes

**Author Contributions:** Conception – A.A., İ.E.K., A.G.; Design – A.A., İ.E.K., A.G.; Data Collection and/or Processing – A.A., İ.E.K., A.G.; Analysis and/or Interpretation – A.A., İ.E.K., A.G.; Literature Review – A.A., İ.E.K., A.G.; Writing – A.A., İ.E.K., A.G.

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ORIGINAL ARTICLE

# Identification of Women's Knowledge and Practices about Cervical Cancer Risk Factors and Early Diagnosis Methods

## Kadınların Serviks Kanseri Risk Faktörleri ve Erken Tanı Yöntemlerine İlişkin Bilgi ve Uygulamalarının Belirlenmesi

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### Abstract

**Objective:** This study was conducted as a cross-sectional survey between 2015-2016, to determine the cervical cancer risk factors, early diagnosis, knowledge and practices of women over the age of 18.

**Method:** The study was conducted using face-to-face interviews in the gynecology outpatient clinics of one state and two private hospitals in the Famagusta district. The population of the study consisted of women who applied to the polyclinic during the study period, and in the study, n=232 women who met the criteria and volunteered to participate in the study were reached using the convenient sampling method. The research data were collected with a questionnaire (n=34) created according to the literature, and the data analysis was performed using the SPSS 20 software. For descriptive data, the terms number, percentage, mean, median were used in data analysis, and the chi-square test was applied in the evaluation of categorical data.

**Results:** In the study, the cervical cancer risk knowledge level of women was found to be high with 7.36±2.23. There was a statistically significant difference in the level of education and age groups with Papanicolaou test (Pap smear test) ($p<0.05$). In the advanced analysis, it was found that the difference was due to women with a university education and over 41 years of age. In addition, a statistically significant difference was found between having the Pap smear test done at the right time and economic status ($p<0.05$). It was determined that this difference occurred among women whose income was less than their expenses.

**Conclusion:** It was determined that both the timing and frequency of initiating Pap smear tests were not sufficient for women who had knowledge about those tests. It is important to plan trainings for enhancing the knowledge and practices of women at risk (low education, over forty years of age, etc.) regarding early diagnosis and treatment of cervical cancer.

**Keywords:** Cervical cancer, risk factors, early diagnosis, Pap smear test

### Öz

**Amaç:** Bu çalışmada, 2015-2016 yılları arasında, 18 yaş üstü kadınların serviks kanseri risk faktörleri, erken tanı, bilgi ve uygulamalarının belirlenmesi amacıyla kesitsel tipte bir araştırma olarak yapılmıştır.

**Yöntem:** Çalışma, Gazimağusa ilçesinde bulunan bir devlet ve iki özel hastanenin jinekoloji polikliniklerinde yüzyüze görüşme tekniği ile gerçekleştirilmiştir. Çalışmanın evrenini çalışma döneminde polikliniğe başvuran kadınlar oluşturmuş, çalışmada, uygun örnekleme metodu kullanılarak, kriterleri karşılayan ve çalışmaya katılmaya gönüllü olan n=232 kadına ulaşılmıştır. Araştırma verileri, literatüre göre oluşturulan bir anketle (n=34) toplanmış, verilerin analizi SPSS 20 paket programında yapılmıştır. Veri analizi, tanımlayıcı veriler için sayı, yüzde, ortalama, ortanca kullanılmış ve kategorik verilerin değerlendirilmesinde ki-kare testi uygulanmıştır.

**Bulgular:** Araştırmada kadınların serviks kanseri risk bilgi düzeyi 7,36±2,23 ile yüksek bulunmuştur. Papanicolaou testi (Pap smear test) yaptırma ile eğitim düzeyi ve yaş grupları arasında ilişki istatistiksel anlamlı fark bulunmuştur ($p<0,05$). İleri analizde farkın üniversite eğitimli ve 41 yaş üstündeki kadınlardan

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kaynaklandığı bulunmuştur. Ayrıca Pap smear test zamanını doğru sürede yaptırma ile ekonomik durum arasında istatistiksel anlamlı fark bulunmuş (p<0,05), farkın geliri giderinden az olan kadınlarında olduğu belirlenmiştir.

**Sonuç:** Pap smear testi hakkında bilgisi olan kadınların hem Pap smear testine başlama zamanı hem de sıklığının yeterli olmadığı belirlenmiştir. Serviks kanseri erken teşhis ve tedavisine yönelik, riskli kadınların (az eğitimli, kırk yaş üstü vs.) bilgi ve uygulamalarına yönelik eğitimler planlanmasının önemli olduğu değerlendirilmektedir.

**Anahtar Kelimeler:** Serviks kanseri, risk faktörleri, erken tanı, Pap smear test

## Introduction

Cervical cancer is the fourth most common cancer that threatens women's lives worldwide, after breast cancer (1). Globally, cervical cancer is the fourth most common cancer in women, with around 660,000 new cases in 2022 (2). Cervical cancer is the tenth most common cancer in Turkey (4), but Northern Cyprus, it is the second most common cancer (5). Cervical cancer is more prevalent in women with high-risk human papillomaviruses (HPV), an early age of first sexual intercourse, a history of smoking, obesity, multiple childbirths, low socio-economic status, and a polygamous lifestyle of either the woman or her husband (3,6-9).

Cervical cancer can be diagnosed at an early stage. The preinvasive stage of this type of cancer allows diagnosis and effective treatment, making cervical cancer the most preventable type of cancer (10-13). However, it remains a major problem in developing countries due to inadequate screening. Since cervical cancer is a disease that can be diagnosed and treated at an early stage, such studies are crucial for early diagnosis (3,14-17).

The Papanicolaou test (Pap smear test) is a reliable and inexpensive method for early diagnosis of cervical cancer, making it an ideal screening tool. It is easily applicable and has high sensitivity and selectivity. Regular performance of this simple procedure plays a crucial role in the early detection of cervical cancer (8,10,18). Early diagnosis significantly increases the chance of treating cervical cancer, with a success rate of almost 100%, and reduces cervical cancer-related mortality by 50% (14,18). In a study conducted in Turkey, it was determined that women with good education and income levels who are living in the city had higher levels of knowledge about HPV, the HPV vaccine, Pap smear test, and cervical cancer (p<0.05) (19).

Nurses play a crucial role in identifying gynecologic cancer risks and educating women on the significance of prevention and early diagnosis. Given that cervical cancer is the second most common cancer in women after breast cancer (5) and there are limited studies on cervical cancer in the Turkish Republic of Northern Cyprus (TRNC), this study was conducted to determine women's knowledge and practices regarding cervical cancer risk factors and early detection methods. The study aims to answer the following questions:

1. What is women's level of knowledge about risk factors of cervical cancer and Pap smear test?

2. Is there a relationship between women's knowledge and practice of Pap smear test?

**Main Points**

- According to the research findings, the majority of women are knowledgeable about cervical cancer risk factors and early diagnosis methods.
- More than half of women have had a pap smear test before.
- It was determined that the source of information for very few people was a nurse.
- In order to protect and improve women's health, it is recommended that nurses take a more active role and women's awareness of cervical cancer should be increased.

## Material and Method

### Design

In this study, a cross-sectional study is conducted.

### Population and Sampling

The study population consisted of 343 women who sought medical attention at the Gynecology Outpatient Clinic of Famagusta State Hospital and at the gynecology outpatient clinics of two private hospitals in Famagusta, TRNC, between December 1, 2015, and February 28, 2016. No sampling was conducted.

### Variables of the Study

#### Independent Variable of the Study

- Socio-demographic characteristics of women.

#### Dependent Variables of the Study

- Cervical cancer causes of knowledge,
- Frequency of pubic smear, knowledge of the reason and application status.

#### Inclusion Criteria for the Study

- Age 18 and above,
- Not having had a hysterectomy,
- Having had sexual experience before,
- Being able to communicate in Turkish,
- Being willing to participate in the study.

### Exclusion Criteria for the Study

- Being diagnosed with cervical cancer,
- Having a psychiatric diagnosis.

### Data Collection Tools

Data were collected in a survey that the researcher prepared according to the literature (8,11,20). The questionnaire was composed of two parts. The first part includes questions about women's socio-demographic characteristics, such as age, educational status, marital status, and employment status. The second part of the questionnaire includes questions about women's knowledge and practices related to risk factors and early diagnosis of cervical cancer.

### Procedures

Firstly, a pilot study was conducted with 28 participants to determine the comprehensibility and applicability of the questionnaire. Based on the results of the pilot study, guiding comments were added to improve the clarity of the questions. The data obtained from the pilot study were not included in the data analysis.

Data were collected through face-to-face interviews with female participants who provided written informed consent between December 1, 2015, and February 28, 2016. The questions were read to the participants by the researcher, and their answers were marked on the questionnaire. On average, it took 20 minutes to complete the questionnaire. The interviews were conducted in a suitable waiting room.

### Ethics

Ethical approval was obtained from the Near East University Scientific Research Ethics Committee (decision no: 233, date: 17.09.2015). Institutional approval was obtained from the two private hospitals. Consent was obtained from all participants.

### Statistical Analysis

Data were evaluated using the SPSS 20.0 package program. Number, percentage, mean, standard deviation, and median were used to describe the descriptive data. Categorical data were evaluated using the chi-square test to compare groups, and the Bonferroni test was used to determine differences between groups. Analyses were conducted with 5% alpha error and a 95% confidence interval.

## Results

Of the participants, 33.62% were aged 31-40, 42.24% were 41 years or older, 2.8% were high school graduates, 31.47% were university graduates and 52.16% were TRNC-TR nationals. Among the female participants, 53.02% were employed, 68.97% of them reported that their income was sufficient to cover their expenses, and 66.81% of the women had social security.

Table 1 presented the mean scores for women's knowledge of cervical cancer risk factors. The mean score was 7.36, indicating a high level of knowledge.

Table 2 shows a statistically significant difference in the rate of Pap smear testing among women of different age groups ($p<0.05$). Women aged 30 and below were more likely to undergo Pap smear testing at the recommended time compared to women in other age groups. Women aged 41 years and over were less likely to know when to start Pap smear testing compared to women in other age groups. Additionally, there was a statistically significant difference, based on age groups, in women starting the Pap smear test at the appropriate age ($p<0.05$). Women aged 41 years and above were less likely to undergo the Pap smear test at the appropriate age compared to women in other age groups.

Table 3 shows a statistically significant difference in the frequency of having Pap smear tests according to the level of education ($p<0.05$). Women who were university graduates had a higher frequency of correctly performed Pap tests compared to those with other levels of education.

Table 4 presents a statistically significant difference between women's knowledge of the appropriate time to start a Pap test and their income status ($p<0.05$). Women with lower income than their expenses were less likely to know when to start the test than those whose income equaled their expenses. Additionally, there was a statistically significant difference in the age of starting to get a Pap test at the recommended time based on income status ($p<0.05$). Women whose income was lower than their expenses had a lower rate of adhering to recommended Pap test schedules compared to women with equal income and expenses. Finally, we found a statistically significant difference between income status and knowledge of the recommended frequency of Pap tests ($p<0.05$). Women with incomes lower than their expenses had a lower knowledge about the frequency of Pap smear tests, compared to women with incomes equal to their expenses.

## Discussion

Cervical cancer is a significant gynecologic cancer and ranks fourth in frequency among women worldwide. It is the leading cause of cancer-related deaths in women, particularly in Sub-Saharan countries (20). Early detection is possible. Cervical cancer has a pre-invasive stage, which allows for effective screening and early diagnosis (10,13).

***Table 1.***
***Mean Scores for Women's Knowledge of Cervical Cancer Risk Factors (n=232)***

| | n | Mean | SD | Min. | Max. |
|---|---|---|---|---|---|
| Knowledge score of risk factors for cervical cancer | 232 | 7.36 | 2.23 | 0 | 10 |

*SD=standard deviation*

However, lack of regular screening makes it a major problem in developing countries. Therefore, studies on this subject are important for early diagnosis (3,14,15).

The mean knowledge score of the women regarding risk factors for cervical cancer was 7.36 out of 10, indicating a good level of knowledge among the participants (Table 1). Arabaci and Ozsoy (21) found that women mostly identified

***Table 2.***
***Knowledge and Practice of Pap Test Among Women of Different Age Groups (n=232)***

| | ≥30 | | 31-40 | | ≤41 | | $X^2$ | p |
|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | | |
| **Knows the age to start getting a Pap test** | | | | | | | | |
| Yes | 28 | 50.00 | 35 | 44.87 | 26 | 26.53 | 10.41 | 0.01* |
| No | 28 | 50.00 | 43 | 55.13 | 72 | 73.47 | | |
| **Started getting Pap test at the recommended age (n=136)** | | | | | | | | |
| Yes | 19 | 76.00 | 28 | 52.83 | 16 | 27.59 | 17.95 | 0.00* |
| No | 6 | 24.00 | 25 | 47.17 | 42 | 72.41 | | |
| **Knows the recommended frequency of Pap test** | | | | | | | | |
| Yes | 32 | 57.14 | 56 | 71.79 | 56 | 57.14 | 4.72 | 0.09 |
| No | 24 | 42.86 | 22 | 28.21 | 42 | 42.86 | | |
| **Adheres to the frequency of Pap test (n=136)** | | | | | | | | |
| Yes | 17 | 68.00 | 33 | 62.26 | 30 | 51.72 | 2.34 | 0.31 |
| No | 8 | 32.00 | 20 | 37.74 | 28 | 48.28 | | |
| **Knows who should have a Pap test** | | | | | | | | |
| Yes | 48 | 85.71 | 66 | 84.62 | 74 | 75.51 | 3.39 | 0.18 |
| No | 8 | 14.29 | 12 | 15.38 | 24 | 24.49 | | |

**p<0.05, $X^2$=chi-square*

***Table 3.***
***Knowledge and Practice of Pap Test Based on Education Level (n=232)***

| | Primary school and below | | Secondary and high school | | University and above | | $X^2$ | p |
|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | | |
| **Knows the age to start getting a Pap test** | | | | | | | | |
| Yes | 22 | 32.35 | 33 | 36.26 | 34 | 46.58 | 3.29 | 0.19 |
| No | 46 | 67.65 | 58 | 63.74 | 39 | 53.42 | | |
| **Started getting Pap test at the recommended age (n=136)** | | | | | | | | |
| Yes | 8 | 28.57 | 24 | 42.11 | 31 | 60.78 | 8.25 | 0.02* |
| No | 20 | 71.43 | 33 | 57.89 | 20 | 39.22 | | |
| **Knows the recommended frequency of Pap test** | | | | | | | | |
| Yes | 39 | 57.35 | 48 | 52.75 | 57 | 78.08 | 11.95 | 0.00* |
| No | 29 | 42.65 | 43 | 47.25 | 16 | 21.92 | | |
| **Adheres to the frequency of Pap test (n=136)** | | | | | | | | |
| Yes | 15 | 53.57 | 31 | 54.39 | 34 | 66.67 | 2.08 | 0.35 |
| No | 13 | 46.43 | 26 | 45.61 | 17 | 33.33 | | |
| **Knows who should have a Pap test** | | | | | | | | |
| Yes | 51 | 75.00 | 73 | 80.22 | 64 | 87.67 | 3.74 | 0.15 |
| No | 17 | 25.00 | 18 | 19.78 | 9 | 12.33 | | |

**p<0.05, $X^2$=chi-square*

***Table 4.***
***Knowledge and Practice of Pap Smear Test Based on Income Status (n=232)***

| | Equal to expenses | | Less than expenses | | $X^2$ | p |
|---|---|---|---|---|---|---|
| | n | % | n | % | | |
| **Knows the age to start getting a Pap test** | | | | | | |
| Yes | 69 | 43.12 | 20 | 27.78 | 4.94 | 0.02* |
| No | 91 | 58.87 | 52 | 72.22 | | |
| **Started getting Pap test at the recommended age (n=136)** | | | | | | |
| Yes | 52 | 51.48 | 11 | 31.43 | 4.21 | 0.03* |
| No | 49 | 48.52 | 24 | 68.57 | | |
| **Knows the recommended frequency of Pap test** | | | | | | |
| Yes | 109 | 68.12 | 35 | 48.61 | 8.01 | 0.00* |
| No | 51 | 31.88 | 37 | 51.39 | | |
| **Adheres to the frequency of Pap test (n=136)** | | | | | | |
| Yes | 62 | 61.39 | 18 | 51.43 | 1.06 | 0.20 |
| No | 39 | 38.61 | 17 | 48.57 | | |
| **Knows who should have a Pap test** | | | | | | |
| Yes | 134 | 83.75 | 54 | 75.00 | 2.47 | 0.08 |
| No | 21 | 16.25 | 18 | 25.00 | | |

**p<0.05, $X^2$=chi-square*

having more than one sexual partner and lack of genital hygiene as risk factors for cervical cancer. Similarly, Sönmez et al. (22) reported that the majority of women (86%) identified having more than one sexual partner, starting sexual intercourse at an early age, and incorrect genital hygiene habits as risk factors. In the study conducted by Kashyap et al., (23) risk factors for cervical cancer were: lack of education, not paying attention to personal hygiene, frequent use of old clothes, place of residence, marriage at an early age, not washing the genital area after sexual intercourse, the spouse having many sexual partners, a history of sexually transmitted diseases, and genital warts. Our study's findings align with these results. Understanding the risk factors associated with cervical cancer is crucial in protecting women from the disease and promoting healthy behaviors to mitigate these risks.

The study found that women's knowledge of when to start Pap smear testing based on age groups varied significantly (p<0.05). Women aged 41 years and over had lower rates of knowing when to start Pap smear testing compared to women in other age groups. The same pattern was observed in women starting the Pap smear test at the appropriate age based on age groups (p<0.05). Women aged 41 years and above were less likely to undergo the Pap smear test at the appropriate age compared to women in other age groups (Table 2). In the study of Garg et al., (24) as the age of the participants increased, the knowledge about cervical cancer risk factors increased; however, the relationship was not found to be significant. Women whose marriage age is under 18 have been found to have good knowledge of cervical cancer risk factors. According to Reichheld et al., (25) it was found that women aged 41 years and younger had better knowledge than women over the age of 41, and there was no significant relationship between this knowledge and religion, education, profession, socio-economic status, and marital status. Hacıhasanoğlu Aşılar et al. (26) observed that there was no difference between age groups in terms of women's knowledge level regarding the performance of the Pap smear test. Our study found that women aged 41 and above had low levels of knowledge and practice, suggesting that this age group may be less likely to use mass media and be distant from this information. In the study also found that the level of education and the age that the participants affected to start getting a Pap test and the knowledge of the recommended frequency of Pap tests (p<0.05). Women with a university degree were more likely to appropriately schedule and understand the frequency of Pap smear tests compared to other women (Table 3). According to Bal's (8) research, there was a difference between women's education and their knowledge about Pap smear tests. Ak et al. (20) found that as women's education level increased, their awareness of Pap smear tests also increased from 38.5% to 61.5%. The findings of other studies and our study, show that as the level of education increases, women are more likely to know the appropriate time to have a Pap test, indicating a correlation between education and health protective behaviors.

Finally, between the level of income and the knowledge of the age to start the Pap test relationship was important (p<0.05). Women with a lower income than their expenses had a lower level of knowledge about when to start having a Pap smear test compared to women in other income groups

(Table 4). Ünalan et al. (12) found that the percentage of women who knew when to start Pap smear tests increased with the income level, suggesting that higher income may provide greater access to health facilities and information. Unlike our study results, Reis (27) found in the literature that women with lower income levels had higher knowledge of the age and implementation of Pap smear tests than those with higher income. Hacıhasanoğlu Aşılar et al. (26) found that women with higher income than expenses had a lower mean score compared to those with lower income. Previous studies and our study suggest that as women's income level increases, so does their likelihood of knowing when to have a pap smear. Therefore, it is important for nurses to closely monitor women with lower income levels and raise awareness about early diagnosis methods. It is thought that this difference between the literature and our study is due to the different research location and sample.

### Study Limitations

This study was conducted in only one district of the country, and its results can be generalized only to women living in this region.

### Conclusion

This study found that most women were aware of cervical cancer risk factors and early detection methods. Participants' age, education, and income level affected starting to have Pap tests at the appropriate age and knowing the frequency of having the test. Based on these results, it is recommended that high-risk groups receive continuous and periodic training to prioritize cervical cancer screening and early diagnosis. Cervical cancer risk factor awareness and screening should be prioritized in women in risk groups such as those with low education levels, those who are married, and those aged forty and over. It is recognized that nurses have important roles and responsibilities in protecting and improving women's health in society, particularly in the context of cervical cancer.

**Ethics Committee Approval:** Ethical approval was obtained from the Near East University Scientific Research Ethics Committee (decision no.: 233, date: 17.09.2015).

**Informed Consent:** Consent was obtained from all participants.

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### Footnotes

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ORIGINAL ARTICLE

# Nursing Diagnoses Determined by Students in Consultation-liaison Psychiatric Nursing Practice Areas: A Retrospective and Descriptive Study

## Konsültasyon Liyezon Psikiyatri Hemşireliği Uygulama Alanlarında Öğrencilerin Belirledikleri Hemşirelik Tanıları: Retrospektif ve Tanımlayıcı Bir Çalışma

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### Abstract

**Objective:** This study aimed to determine the nursing diagnoses that nursing students identified in the care plan they prepared for the patients they cared for. This took place during the clinical practice of consultation-liaison psychiatric nursing within the context of the mental health and diseases nursing course.

**Method:** In this retrospective study, nursing care plans prepared by nursing students (n=66) in the clinical practice of consultation-liaison psychiatric nursing who took the mental health and diseases nursing course in the spring semester of 2022-2023 were examined.

**Results:** Of the patients for whom a nursing care plan was prepared, 27.3% were treated in the neurology clinic, 24.2% in the physical therapy and rehabilitation clinic, 25.8% in the infection clinic, and 22.7% in the oncology clinic. Students identified 497 nursing diagnoses in 66 cases. The most commonly identified diagnoses were risk for falls (66.2%), anxiety (45.5%), pain (45.5%), disturbed sleep pattern (45.5%), risk of infection (45.5%), self-care deficit (42.4%), and impaired physical mobility (33.3%).

**Conclusion:** When the nursing diagnoses identified by the students were evaluated, it was found that they identified more diagnoses related to physiological domains than to psychosocial domains and had problems addressing the patient holistically. However, it was observed that student nurses identified very few or no nursing diagnoses related to sexuality and principles of life patterns.

**Keywords:** Care planning, nursing, mental health, psychiatric nursing, students

### Öz

**Amaç:** Bu araştırmada, hemşirelik öğrencilerinin ruh sağlığı ve hastalıkları hemşireliği dersi kapsamında konsültasyon-liyezon psikiyatri hemşireliği klinik uygulaması sırasında bakım verdikleri hastalara yönelik hazırladıkları bakım planlarında saptadıkları hemşirelik tanılarının belirlenmesi amaçlanmıştır.

**Yöntem:** Retrospektif özellikte yürütülen çalışmada, 2022-2023 bahar döneminde ruh sağlığı ve hastalıkları hemşireliği dersini alan hemşirelik öğrencilerinin (n=66) konsültasyon-liyezon psikiyatri hemşireliği klinik uygulamasında hazırlamış oldukları hemşirelik bakım planları incelenmiştir.

**Bulgular:** Hemşirelik bakım planı hazırlanan hastaların %27,3'ü nöroloji kliniğinde, %24,2'si fizik tedavi ve rehabilitasyon kliniğinde, %25,8'i enfeksiyon kliniğinde, %22,7'si onkoloji kliniğinde tedavi görmekteydi. Öğrenciler, 66 olguda 497 hemşirelik tanısı belirlemiş ve en sık belirlenen beş hemşirelik tanısı; düşme riski (%66,2), anksiyete (%45,5), ağrı (%45,5), uyku düzeni bozukluğu (%45,5), enfeksiyon riski (%45,5), öz bakım eksikliği (%42,4) ve fiziksel hareketlilik bozukluğu (%33,3) olmuştur.

**Sonuç:** Öğrencilerin belirledikleri hemşirelik tanıları değerlendirildiğinde, psikososyal alandan çok fizyolojik alanla ilgili tanılar belirledikleri ve hastayı bütüncül olarak ele almada sorun yaşadıkları görülmüştür. Bununla birlikte öğrenci hemşirelerin cinsellik ile değerler ve inançlar örüntüsüne ilişkin çok az hemşirelik tanısı belirledikleri ya da hiç belirlemedikleri görülmüştür.

**Anahtar Kelimeler:** Bakım planı, hemşirelik, ruh sağlığı, psikiyatri hemşireliği, öğrenci

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## Introduction

Providing high-quality healthcare to society constitutes the main purpose of nursing (1). The nursing process, which is an essential part of nursing education, standards, and implementation legislation across the nation, provides high-quality nursing care. According to the American Nurses Association, the nursing process provides the basis of nursing practices that offer patient-centered, holistic care, and bring together nurses working in different places (2). The nursing process is an approach that consists of data collection, diagnosis, planning, implementation, and evaluation steps, and ensures the systematic delivery of nursing care (3). This approach is also defined as involving problem-solving and decision-making processes to provide qualified and individualized nursing care (4). Nursing diagnoses encompass the individual's current health problems, potential risks, and health promotion needs and these diagnoses are classified according to the North American Nursing Diagnosis Association - International (NANDA-I) taxonomy. The data collection and diagnosis stages of the nursing process enhance students' critical thinking and clinical decision-making skills, contributing to the delivery of individualized and quality nursing care (3,5).

Professional nursing education is the process of acquiring theoretical practical education (6). The nursing process is a major part of practical nursing education, and during this education, students are expected to utilize the nursing process to make interventions for the needs of each patient (7). The goal of written nursing care plans is to guide students to focus on providing individualized nursing care (8); therefore, they are an indispensable part of nursing education (9). The goal of care plans as an educational tool is to develop critical thinking skills in students through data analysis and evaluation, verification of problems caused by nursing diagnoses or complications, goal setting, development of realistic interventions, and assessment of the effectiveness of the care plan (2). In the study by Taşkın Yılmaz et al. (10) examining student-prepared nursing care plans, 65.9% of the students stated that the use of the nursing process in patient care was necessary, while 34.1% stated that it was not necessary. In a study, nursing students had difficulty determining the correct nursing diagnosis, while applying the nursing process (11).

In non-psychiatric clinics, consultation-liaison psychiatry (CLP) nursing provides an understanding of the patient's physical illnesses and enables the inclusion of psychological and social factors (12). At the same time, it ensures that psychiatric nursing services become widespread in general health services. In other words, it deals with the patient, through a biopsychosocial model. The holistic evaluation of the patient allows the patient's psychosocial problems to be recognized, the treatment process to be individualized and better managed (13). As a result, the patient's stress and anxiety decrease, and their participation in treatment increases, positively affecting the healing process (14). In a study involving nurses working in non-psychiatric clinics, it was determined that nurses had difficulty providing nursing care to patients with mental problems (13). The main purpose of the CLP nurse is to prevent and reduce psychiatric disorders in patients hospitalized in medical services, to treat them, to guide the individual to cope with the disease and the life problems that arise as a result of the disease, and to provide a holistic approach to the patient (12).

Therefore, it has an important place as the clinical practice area of the mental health and diseases nursing course. The aim of mental health nursing undergraduate education and clinical practice is to help students acquire professional behaviors such as teamwork, communication skills, and interaction with patients and their families. In mental health nursing clinical practice, it is important to encourage the development of cognitive, affective, and behavioral skills and to fulfill the tasks in line with the learned skills (15). Controlling the tasks expected to be fulfilled by student nurses is done by implementing the nursing process, by implementing nursing care plans. In a study, it was determined that the diagnoses by the students were mostly related to physical health problems and that they did not address the patient holistically (14). When we examined other studies in the literature, it was revealed that nursing students had deficiencies in applying the nursing process and did not address the patient holistically (16,17).

CLP nursing clinical practice offers an area where students can evaluate the patient's biopsychosocial state. Therefore, the purpose of this study was to identify the nursing diagnoses indicated by nursing students for the patients they cared for during CLP nursing clinical practice within the scope of the mental health and diseases nursing course.

**Main Points**

- Risk of falls, anxiety, pain, disturbed sleep pattern, risk of infection, self-care deficit, and deterioration in physical mobility were the most common nursing diagnoses made by students.
- Sexuality and life principles were the areas in which students identified the fewest or no nursing diagnoses.
- According to Gordon's functional health patterns, students identified nursing diagnoses most frequently in the pattern of activity/rest, nutrition, perception/cognition, health promotion, and role relationships.

## Material and Method

### Design of Study

This was a retrospective and descriptive study in which nursing diagnoses made by undergraduate students during the nursing course on mental health and diseases were determined. The population of this study consisted of the nursing care plans prepared by undergraduate students studying in the nursing undergraduate program of the faculty of health sciences of a university. These plans were prepared in the CLP nursing clinical practice within the scope of mental health and diseases nursing practice education in the spring semester of the 2022-2023 academic year. Rather than employing purposive sampling, the entire population

was targeted (n=66). Ethical approval was obtained for the study from the Trakya University Faculty of Medicine Non-Interventional Scientific Research Ethics Committee (approval no: 12/21, date: 28.08.2023). In addition, informed consent was obtained from the students who agreed to use their nursing care plans for the study.

### Data Collection

The data were obtained from the nursing care plans, prepared according to the NANDA diagnosis list and based on the activities of daily living, used by the students in the mental health and diseases nursing training. The clinical implementation of the training was carried out in four clinics neurology, medical oncology, infectious diseases, physical therapy, and rehabilitation in a medical faculty hospital between February and May 2023.

Each student group conducted clinical practice two days a week for four weeks. In order for the students' care plans to be evaluated, they were required to follow-up for at least two weeks with the patients for whom they prepared nursing care plans and implement the nursing process. In this way, the minimum care time that each student provided to their patient was maintained equal. The data were obtained from the nursing care plans that the students prepared at the end of their clinical practice period according to their clinical rotation schedules. According to the clinical rotation plans, students submitted their nursing care plans to the responsible faculty member on the first Monday following the week they left the CLP clinics. The students' identification of patient problems in their nursing care plans was evaluated by the researcher and categorized according to NANDA criteria based on activities of daily living. The care plans were reviewed, and the nursing diagnoses were evaluated. The students prepared the nursing care plan for one patient; in addition, they contributed to other nursing practices in the clinic.

### Statistical Analysis

In the evaluation of the data, the NANDA-I Taxonomy-II and the "Nursing Diagnoses Handbook" written by Carpenito-Moyet and translated into Turkish by Erdemir and Türk (5) were used as a guide. If the diagnoses written in the care plans were not included in Taxonomy II or expressed differently, the diagnoses were accepted as incorrect. The major and minor diagnoses required to make the diagnosis in the "Handbook of Nursing Diagnoses" were evaluated to determine whether the data related to each diagnosis were sufficient or not. Minor descriptive characteristics were evaluated. The number of nursing diagnoses identified by the students, and the frequency with which the diagnoses were made, expressed as numbers and percentages in, the SPSS 25.0 program, was used for the evaluation.

## Results

The clinics where the students practiced as part of their mental health and disease nursing training are given in Table 1. When the clinics where the students submitted care plans were analyzed, 27.3% were neurology clinics, 24.2% in the physical therapy and rehabilitation clinic, 25.8% in the infection clinic, and 22.7% in the oncology clinic (Table 1).

The 49 nursing diagnoses identified by the students in general clinics within the scope of mental health and disease nursing practice are given in Table 2. When the NANDA nursing diagnoses were analyzed according to Gordon's FSS model, a total of 497 nursing diagnoses in 11 patterns were identified by the students. According to the functional health patterns, 18.3% of the students identified nursing diagnoses in the areas of nutrition, 19.7% in the activity/rest pattern, 13.3% in the perception/cognition pattern, 10.5% in the health promotion pattern, and 8.9% in the role relationship pattern. When we look at the most common diagnoses, we see that the risk for falls (66.2%), anxiety (45.5%), pain (45.5%), disturbed sleep pattern (45.5%), risk of infection (45.5%), self-care deficit (42.4%), and deterioration in physical mobility (33.3%) are prevalent (Table 2).

When we examined the mental status assessment section of the data collection form, it was found that students mostly evaluated posture (42.4%) and emotional facial expression (40.9%) in appearance/general behaviour, attention/concentration (37.9%) in cognition, process (43.9%) in thought, mood (66.7%) in affect, and capacity of calculate (66.7%) in special skills and competence (Table 3).

***Table 1.***
***The Clinics Where the Students Practiced within the Context of the Mental Health and Diseases Nursing Training***

| **The clinics where the students practiced** | **Number (%)** |
|---|---|
| Neurology | 18 (27.3) |
| Physical therapy and rehabilitation | 16 (24.2) |
| Infection | 17 (25.8) |
| Oncology | 15 (22.7) |
| Total number of students | 66 (100) |

***Table 2.***
***Nursing Diagnoses Most Frequently Used by Undergraduate Students***

| **Gordon's functional health patterns nursing diagnoses categorized under** | | **Number (%)** |
|---|---|---|
| **Health promotion** | Ineffective health maintenance | 3 (4.5) |
| | Non-compliance to treatment | 1 (1.5) |
| | Risk for injury | 4 (6.1) |
| | Risk for falls | 44 (66.7) |
| **Nutrition** | Imbalanced nutrition: more than body requirements | 5 (7.6) |
| | Imbalanced nutrition: less than body requirements | 14 (21.2) |
| | Impaired swallowing | 2 (3.0) |
| | Risk of infection | 30 (45.5) |
| | Risk of transmission of infection | 8 (12.1) |
| | Risk for unstable blood glucose level | 4 (6.1) |
| | Impaired skin integrity | 14 (21.2) |
| | Impaired oral mucous membrane integrity | 6 (9.1) |
| | Deficient fluid volume | 8 (12.1) |
| **Elimination and exchange** | Diarrhea | 4 (6.1) |
| | Constipation | 7 (10.6) |
| | Urge urinary incontinence | 3 (4.5) |
| **Activity/rest** | Activity intolerance | 20 (30.3) |
| | Decreased involvement in recreational activities | 4 (6.1) |
| | Impaired physical mobility | 22 (33.3) |
| | Risk for bleeding | 13 (19.7) |
| | Self-care deficit | 28 (42.4) |
| | Sedentary lifestyle | 2 (3.0) |
| | Ineffective breathing pattern | 9 (13.6) |
| **Sleep/rest** | Disturbed sleep pattern | 30 (45.5) |
| **Perception/cognition** | Risk for aspiration | 1 (1.5) |
| | Knowledge deficit | 14 (21.2) |
| | Disturbed sensory perception | 2 (3.0) |
| | Disturbed thought process | 9 (13.6) |
| | Impaired memory | 5 (7.6) |
| | Impaired comfort | 1 (1.5) |
| | Acute pain | 30 (45.5) |
| | Chronic pain | 1 (1.5) |
| | Nausea | 3 (4.5) |
| **Self-perception** | Anxiety | 30 (45.5) |
| | Disturbed body image | 8 (12.1) |
| | Situational low self-esteem | 15 (22.7) |
| | Powerlessness | 6 (9.1) |
| | Fear | 3 (4.5) |
| | Hopelessness | 6 (9.1) |
| | Fatigue | 17 (25.8) |

***Table 2.***
***Continued***

| Gordon's functional health patterns nursing diagnoses categorized under | | Number (%) |
|---|---|---|
| **Role relationship** | Dysfunctional family processes | 15 (22.7) |
| | Impaired verbal communication | 5 (7.6) |
| | Ineffective role performance | 9 (13.6) |
| | Impaired social interaction | 8 (12.1) |
| | Social isolation | 6 (9.1) |
| | Risk for loneliness | 1 (1.5) |
| **Sexuality** | Sexual dysfunction | 3 (4.5) |
| **Coping/stress tolerance** | Risk for other-directed violence | 12 (18.2) |
| | Ineffective coping | 2 (3.0) |
| **Life principles** | - | - |

***Table 3.***
***The Most Areas Evaluated by the Students in the Mental Status Examination***

| Mental status assessment | | Number (%) |
|---|---|---|
| **Appearance/general behaviour** | Appearance/dress | 10 (15.2) |
| | Posture | 28 (42.4) |
| | Eye contact | 12 (18.2) |
| | Emotional facial expression | 27 (40.9) |
| | Speech | 17 (25.8) |
| | Walking | 34 (51.5) |
| | Behavior characteristics | 22 (33.3) |
| **Cognition** | Consciousness | 4 (6.1) |
| | Sensorium/orientation | 7 (10.6) |
| | Hallucinations | 11 (16.7) |
| | Memory | 15 (22.7) |
| | Attention/concentration | 25 (37.9) |
| | Conceptualization and abstraction | 5 (7.7) |
| | Judgement and insight | 4 (6.1) |
| **Thought** | Process | 29 (43.9) |
| | Obsessions | 6 (9.1) |
| | Delusion | 6 (9.1) |
| | Phobia | 18 (27.3) |
| **Affect** | Mood | 41 (62.1) |
| | Anxiety level | 44 (66.7) |
| **Special skills and competence** | Capacity to calculate | 11 (66.7) |
| | Capacity to read and write | 3 (4.5) |

## Discussion

This study was conducted to determine the nursing diagnoses that nursing students identified in their nursing care plans, in CLP nursing clinical practice within the context of the mental health and diseases nursing course.

When we consider the diagnoses determined by the students, first of all, among the diagnoses determined according to functional health patterns, 19.7% fell into the activity/rest pattern, 18.3% into the nutrition pattern, 13.3% into the perception/cognition pattern, 10.5% into the health promotion pattern, and 8.9% into the role relationship

pattern. It was found that 0.6% of the students identified a diagnosis in the sexuality pattern and none in the life principles pattern. Similarly, in Kaçmaz and Tektaş's (14) study, which examined the care plans of nursing students, it was stated that students did not make any diagnosis in the pattern of life principles and made very few diagnoses in the field of sexuality. Similar results were found in many studies (18-20). It is a striking result that the students identified only three nursing diagnoses in the sexuality pattern and none in the life principles area. In the theoretical course and practice of mental health and disease nursing, it is emphasized that both the sexual dimension and the value and belief dimension of the individual should be addressed. It should also be taken into consideration that the individual's value and belief system affect health behaviors. In particular, the fact that sexual topics are seen as taboo by our society and that talking about them is believed to be shameful may have made it difficult for students to both ask questions and get answers in this area. Taşkın Yılmaz et al. (10) found in their study to determine nursing students' views on the data collection phase and the difficulties they experienced that sexuality and life principles patterns were two of the three patterns where students felt inadequate and had difficulty with data collection.

It was determined that the most frequently used nursing diagnoses among 49 different nursing diagnoses in students' nursing care plans were fall risk, anxiety, pain, disturbed sleep pattern, infection risk, self-care deficit, and impaired physical mobility. In a study conducted by Kaçmaz and Tektaş (14) in which they examined the diagnoses that students identified for CLP nursing in general clinics, it was found that the risk of infection, acute pain, disturbed sleep pattern, anxiety, and risk of falls were prevalent. In another study, the use of nursing diagnoses by intern students was examined and it was found that students mostly used acute pain, disturbed sleep pattern, and infection risk diagnoses (19). In a study conducted by Karaçay Yıkar and Nazik (21), it was found that students mostly used the diagnoses of infection risk, knowledge deficit, imbalanced nutrition, constipation, fatigue, and fear. In a similar study examining the care plans prepared by the students, it was found that the students mostly identified the diagnoses of activity intolerance, acute pain, and disturbed sleep patterns (20). In a study conducted by Taşdemir and Kızılkaya (22) on the nursing diagnoses determined by students in the clinical practice of mental health and diseases nursing course, it was found that the most common diagnoses in CLP clinics were infection risk, change in sleep pattern, anxiety, activity intolerance, ineffective coping, and trauma risk. In this study, similar to the literature, it was determined that the nursing diagnoses made by the students belonged to the physiological dimension of the individual, and the diagnoses related to the psychosocial dimension were less frequent. This situation also reveals the difficulties experienced by students in the nursing process. In many studies, students stated that they had difficulty with the data collection and diagnosis steps of the nursing process (10,23,24). A study addressing the problems experienced by students in using the nursing process and determining diagnoses identified the lack of theoretical knowledge, lack of communication skills, ineffective use of time in clinical practice, and insufficient data obtained from the patient as the reasons for the difficulties they experienced (25). The care plans in this study, made within the scope of CLP nursing clinical practice, suggest that the students experienced inadequacy in evaluating the patient holistically.

### Study Limitations

The limitations of this study include that it was conducted in a single center, included student nurses' care plans in the content of the study for one semester, and had an insufficient number of instructors for a more comprehensive evaluation of care plans in the clinics due to the high number of students.

## Conclusion

As a result of this study, it is recommended that students should develop skills in determining the nursing diagnoses by using different teaching methods to gain a holistic perspective in evaluating the patient, to conduct case studies frequently, and to convey that nursing care is an important tool in basing the nursing profession on scientific foundations.

**Ethics Committee Approval:** Ethical approval was obtained for the study from the Trakya University Faculty of Medicine Non-Interventional Scientific Research Ethics Committee (approval no: 12/21, date: 28.08.2023).

**Informed Consent:** Informed consent was obtained from the students who agreed to use their nursing care plans for the study.

## Footnotes

**Author Contributions:** Concept – S.Ö.K., N.A.S.; Design – S.Ö.K., N.A.S.; Data Collection and/or Processing – S.Ö.K., N.A.S.; Analysis and/or Interpretation – S.Ö.K., N.A.S.; Literature Review – S.Ö.K.; Writing – S.Ö.K.

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