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Female university students' metaphorical perceptions of menstruation

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ABSTRACT

Aims: This study aims to describe the metaphorical perceptions of university students towards menstruation through metaphors and was conducted with metaphor analysis technique based on phenomenological method.
Methods: This research has been conducted with metaphor analysis technique based on phenomenological methods. Data included 169 university students who agreed to participate in the study. The data of the study was collected between March-April 2024 with a questionnaire form prepared by the researchers. In the first part of the questionnaire, questions about socio-demographic characteristics were included, and in the second part, the sentence "Menstruation is like, because." was included to determine the metaphors developed by the students about menstruation.
Results: Students produced a total of 164 valid metaphors related to the concept of menstruation. The metaphors revealing the students' perceptions of the concept of menstruation were grouped under 5 categories: "terrible pain and suffering", "emotional and spiritual change", "a natural part of life", "renewal and purification", and "feeling of discomfort and fatigue". In the study, it was determined that the category in which the most metaphors were generated was "terrible pain and suffering".
Conclusion: In the study, university students provided metaphors containing both positive and negative concepts related to menstruation. It is important to provide health education within primary health care and as a course in elementary, high school, and university settings to improve negative perceptions about menstruation.
Keywords: Menstruation, university students, metaphor, perception

INTRODUCTION

Menarche, which is accepted as the beginning of the reproductive age in women, and menstruation, which means periodic shedding of the endometrium, is a natural process specific to women and continues throughout the reproductive age (Can, 2016). However, beyond its medical definition as a natural event related to the female body, menstrual period is a term loaded with many different cultural and religious meanings (Venkatesan & Peter, 2020).

Menstruation is a complex and multi-faceted phenomenon that differs from woman to woman, where physical and emotional changes can be experienced differently in each cycle, and is an experience that is difficult to think outside of pregnancy and childbirth due to the dominance of scientific discourse that associates it with reproduction (Agnew & Sandretto; Hennegan et al., 2021; Malefyt & McCabe, 2016). Menstruation influences some women's perceptions of their bodies, and some women see menstruation as a missed opportunity for motherhood (Hennegan et al., 2021). Studies have described women's experiences during menstruation as not exciting or enjoyable, their feelings and struggles during this period not being understood by men, and women feeling sad, lonely, moody, unattractive, and more sensitive to what people say (Malefyt & McCabe 2016; Hennegan et al., 2021).

Different societies have defined menstruation, which is a biological phenomenon specific to women and whose meaning, and experience is influenced by cultural structure, as emotional changes as well as physical changes such as fatigue, cramps, bloating, abdominal pain, lower back pain and chest pain (Malefyt & McCabe, 2016). Women describe this process as "period", "curse", "red moon", "rag", "visitor", "that time again", "wreckage", "failed production" and "waste product", "what my mother forgot to teach me", "shame and stress", "ritually unclean", "dirty", "improper", "cleaning the abdomen for future pregnancies", "smelly", "disgusting" (Altıntaş et al., 2021; Abdel-Raheem 2024; DeMaria et al., 2020; Hennegan et al., 2019; Vora, 2020). Metaphors, which are used to describe one thing with another, are concepts that are used to provide better understandings of certain concepts, are very present in our daily lives, vary from culture to culture, and are neither completely objective nor absolutely true (Parın, 2017).

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Metaphors have been described as indispensable parts of our lives. Because many concepts in daily life are abstract or unclear in people's experiences, they need to understand them through other concepts, and this need leads to metaphorical definitions (Parın, 2017). In a study, Paula Knight, author of the memoir "the facts of life", describes herself during her menstrual period with the metaphor of a "werewolf", while depicting the physical and cultural anxieties experienced by menstruating women, it is also emphasized that an understanding of menstruation filled with silence, shame and stigma has persisted for centuries (Venkestan & Peter; 2020).

It is important to develop effective lifelong education programs by health professionals to inform and empower women, as menstruation experiences are virtually unchanging across generations, cultures, and the lifespan. These programs should include information about menarche expectations, menstruation management, and methods to reduce myths and stigmas about menstruation (DeMaria et al., 2020). In a qualitative study examining the knowledge, attitudes, behaviors and menstruation experiences of 70 women between the ages of 19-78, it was stated that inadequate education about menstruation in the family and at school led to difficult menstruation experiences in women, and that women's and girls' perceptions and experiences have been negatively affected because women and girls see menstruation as a "private" and taboo subject that cannot be discussed openly, although they have learned about the menstrual period (DeMaria et al., 2020). In a systematic scoping review of 44 school-based studies investigating the knowledge and experiences of girls aged 10-14 years from 12 low- and middle-income countries on puberty and menstruation, it has been determined that girls have insufficient knowledge about menstruation, first menstruation plays a triggering role in learning about menstruation, have negative feelings about menarche and menstruation, and are not adequately prepared for puberty and menstruation (Coast et al., 2019).

Knowledge and behavior acquired at a young age can affect individuals for life. Therefore, appropriate education at these ages is important in preventing health-related problems (Torondel et al., 2018). Nurses have responsibilities related to the protection and maintenance of reproductive health of young people within the scope of preventive health services due to their roles as both educators and counsellors. Firstly, nurses should have information about what young people know about this issue and how they behave. Afterwards, they should prepare a training plan according to their needs and evaluate the effectiveness of the training. Based on these ideas, the aim of this study is to understand the perceptions of female university students towards menstruation and how they define menstruation through metaphors. Determining the knowledge and perceptions of adolescents about menstruation will be guiding and important for the health education to be provided in this direction.

Metaphors can be used in everyday life without requiring a great deal of mental activity and largely determine how we go about our lives. Therefore, it is important to understand the metaphors created by female students about menstruation to reveal their feelings and thoughts that they were not aware of before. Although there are studies in the literature to determine women's perception of menstruation, qualitative studies evaluating the thoughts of female university students about the concept of menstruation are limited (Abdel-Raheem, 2024; Altıntaş et al., 2021; Barrington et al., 2021; DeMaria et al., 2020; Hennegan et al., 2019; Rubinsky et al., 2020; Vancauwenbergh & Franco, 2023; Yılmaz & Şahin, 2019). Therefore, the research has been conducted to understand how female university students view menstruation and how they define menstruation through metaphors.

METHODS

Ethics

Before conducting the research, ethics committee approval was obtained from the Aksaray University Human Researches Ethics Committee (Date: 28.02.2024, Decision No: 2024/01-10). Moreover, written informed consent has been obtained from the students who agreed to participate in the study, and the principles of the Declaration of Helsinki have been adhered to throughout the study.

Study Design

This research has been conducted with metaphor analysis technique based on phenomenological methods. "Metaphor analysis" is a technique based on the phenomenological research method within qualitative research methods. Metaphor analysis is a research technique used to learn abstract concepts that are difficult to understand by making analogies with known concepts (Merriam, 2013). By using easy-to-understand sentences, it offers a different perspective and approach to the target audience. In other words, metaphors are an effective method in revealing individuals' perceptions, problem solving and creating mental models (Yıldırım & Şimşek, 2016).

Participants

The population consisted of 700 university students staying in a female student dormitory in a city in Central Anatolia region of Turkiye. The sample initially consisted of 169 students who agreed to participate in the study. This study used the purposive random sampling method, which allows for the purposeful classification of systematically and randomly selected case studies in line with the purpose of the study (Marshall & Rossman, 2016). The data of 1 student who gave incomplete answers to the survey questions, 1 student who stated that she did not know the subject and 3 students who could not generate metaphors were not included in the study. Thus, the research has been completed with 164 students. Students were informed that their participation was entirely voluntary. Throughout the data collection process, the researchers ensured neutrality by avoiding any influence on the students and neither confirming nor denying their statements.

The inclusion criteria for this study were as follows: being enrolled in a university program and volunteering to participate. Students who did not produce appropriate metaphors were not in class when the data were collected and were absent were excluded from the study.

Data Collection

The data of the study has been collected with metaphors, which is a frequently used data collection method for describing and understanding experiences and perceptions. The aim of data collection with metaphors is to obtain in-depth information about how individuals perceive events through the metaphors obtained through interviews and the meanings attributed to metaphors (Yıldırım & Şimşek, 2016).

The data of the study was collected between March-April 2024 with a questionnaire form prepared by the researchers. While the first part of the form included demographic questions such as age, the department of study and class, the second part included the sentence "menstruation is like ......, because ......" to determine the metaphors developed by the students about menstruation. The students have been asked to compare menstruation to something else (entity, living being, object, etc.) and briefly state the reason for this comparison. These handwritten writings of the students have been used as the main data source in this study. Filling out the form took approximately 15 minutes. Before starting the research, the researcher informed the participating students about the purpose of the research and the questions to be asked during data collection. The study data were collected in the classroom through face-to-face interviews conducted by a female academic researcher from the Department of Nursing, who holds a PhD in Women's Health Nursing and specializes in women's health research (Figure).

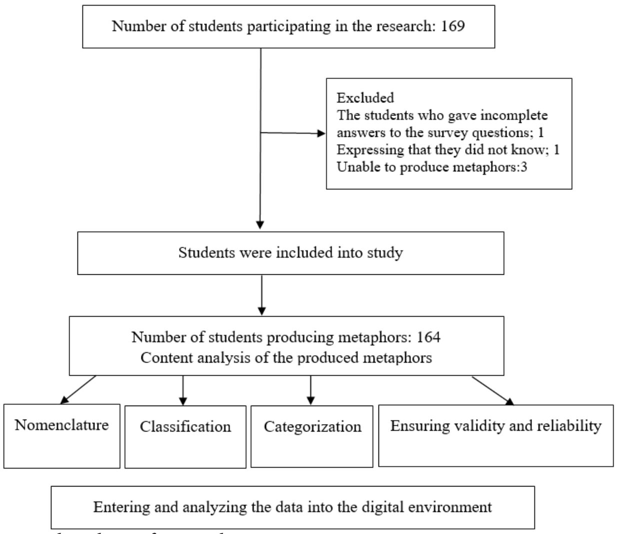

Figure. Flowchart of research

Statistical Analysis

Content analysis has been used in the evaluation of the metaphors generated by the students regarding the concept of menstruation. Content analysis is based on bringing together similar data within the framework of determined themes and concepts and interpreting them in an understandable way (Yıldırım & Şimşek, 2016; Suter, 2012). It is performed in five steps (Moser, 2000; Saban, 2009). These steps are nomenclature, classification, categorization, ensuring validity and reliability, and digitalization of the data. At the nomenclature stage, the metaphors created by the students have been listed. In the classification stage, the similarities and differences of the metaphors have been evaluated and ranked. In the categorization stage, five different categories have been formed according to the metaphor list and grouping classification. The metaphors and categories obtained in the validity-reliability stage have been presented to two experts to match each metaphor with a category, and the matchings of the researchers and experts have been compared. After determining the number of agreement and disagreements in the comparisons, reliability has been calculated using Miles and Huberman's (1994) formula reliability=(agreement)/(agreement+disagreement). The concordance has been determined as 89%. Furthermore, two lecturers were consulted to ensure that the metaphors given under different categories represented a conceptual category. Cohen's Kappa coefficient reflecting the concordance between the coders has been calculated and evaluated. Accordingly, the agreement rate in this study has been found to be 0.91, which indicates a good level of concordance. As a result, four experts evaluated the validity and reliability of the study. The majority has been taken as a basis where there is a difference between the researchers and experts. In the last stage, all data was digitized. The metaphors that have emerged as a result of the research have been categorized by considering their common features and analogical aspects. In the analysis of demographic data of students, frequency, percentage, mean and standard deviation have been calculated using IBM SPSS Statistics 24.0.

RESULTS

The findings section is presented in two chapters. The first chapter includes the descriptive characteristics of the students. In the second chapter, the conceptual categories based on the metaphors have been presented supported by sample expressions.

Descriptive Characteristics of Students

The average age of the students participating in the study has been determined as 20.96±1.58. Demographic characteristics of 164 students who participated in the study are given in Table 1.

Table 1. Socio-demographic characteristics of female students

Descriptive characteristics		Frequency	%
Mean age: 20.96, SD: 1.58 (min: 18, max: 25)	18 years	11	6.7
	19 years	20	12.2
	20 years	29	17.8
	21 years	45	27.4
	22 years	35	21.3
	23 years	14	8.5
	24 years	7	4.3
	25 years	3	1.8
Department studied in	Health-related department	86	52.4
	Department other than health	78	47.6
Age at first menstruation Mean: 13.30 SD: 1.56 (min: 10, max: 17)	10 years	4	2.4
	11 years	13	7.9
	12 years	36	22.0
	13 years	42	25.6
	14 years	36	22.0
	15 years	16	9.8
	16 years	12	7.3
	17 years	5	3.0
Regular menstruation	Yes	122	74.4
	No	42	25.6
Experiencing menstrual pain	Yes	138	84.1
	No	26	15.9
Problems experienced before or during menstruation (n: 721)*	Tension, nervousness	131	18.2
	Cramping pains in the lower abdomen	126	17.5
	Feeling of bloating	111	15.4
	Fatigue	101	14.0
	Chest pain	76	10.5
	Food cravings	75	10.4
	Headache	48	6.7
	Vomiting	38	5.3
	Back-lumbar pain	9	1.2
	Leg pain	6	0.8
Total		164	100

*More than one option was marked, percentages are based on 721 answers

Metaphors Generated by Students Related to the Perception of "Menstruation"

The metaphors generated by the students about the concept of menstruation and the categories formed from these metaphors are given in the table. The students have generated a total of 88 valid metaphors related to the concept of menstruation. Students have generated metaphors both as words (ordeal, break, miracle, death, breathing etc.) and as word groups (dying from pain, emotional explosion, being paralyzed etc.). Some of the metaphors generated by the students have been used in different meanings. Therefore, the same metaphors have been evaluated in more than one category. In the findings obtained, the metaphors revealing the students' perceptions of the concept of menstruation have been analyzed in terms of their common characteristics and grouped into 5 categories. These categories are terrible pain and suffering; emotional and spiritual change; a natural part of life; renewal and purification; feeling of discomfort and fatigue. Then, direct quotations from the metaphors generated by the students have been reported (Table 2). Quotations from the students are indicated with the letter "S" and the survey order.

Category 1. Terrible pain and suffering: The prominent characteristic of the metaphors in this category is that menstruation is extremely painful. Sample metaphor expressions related to this category are given below:

"Menstruation is like dying from pain because I am in so much pain that I cannot move." (S2)

"It is similar to having one side torn apart, because the pain comes repeatedly, and it is intense in one area." (S12)

"It is like giving birth, because I am in intense pain." (S30)

"It is a strange, disgusting and bad feeling because I can feel my blood coming out of my body and it is a disgusting feeling, the pain is unbearable." (S47)

"Being sick, because when I have my period, I cannot get out of bed without taking 2 painkillers during the day." (S57)

"It is like being tortured, because I cannot move, and I cannot continue my life because I have to take a break from my life, and I feel like I will faint from the pain at any moment." (S71)

"Having a heart attack, because every part of your body hurts." (S84)

"It is feeling on edge, not only is it painful, but it is also disturbing." (S94)

"It is as if the whole world has collapsed around me, I am in so much pain, and I feel awful and exhausted." (S111)

"It's death, because I feel like dying. I have a lot of pain." (S117)

"It is to die while I am alive, because I cannot stand still or stand up because of the pain." (S145)

"It is cruelty because it is a difficult, painful and complex process." (S159)

Category 2. Emotional and spiritual change: The prominent feature of the metaphors in this category is that menstruation causes mental problems. Sample metaphor expressions in this category are given below:

"It is like depression, I cannot enjoy what I do." (S19)

"It is eating unnecessary food, I usually feel bloated, I feel restless." (S49)

"It is the pips in tangerines, annoying you when you are happy." (S102)

"My period is a boring tradition, I'm tired of it, but I get it even if I do not want to." (S132)

"It is to use a term of endearment in the middle of an argument, even though it is frustrating, it feels good." (S136)

"It is cruelty, it ruins your day every moment." (S156)

Category 3. A natural part of life: In this category, students see the concept of menstruation as something that is normal and should be experienced. Sample metaphor expressions in this category are given below:

"It is a kind of indicator it shows that we are healthy." (S11)

"It is like a gifted treat because it is supposed happen for us, our health and womanhood." (S61)

"It is the removal of material and spiritual diseases; menstruation is the most natural thing for women." (S101)

Table 2. Distribution of metaphors developed by female students for the concept of menstruation according to categories

Category	Metaphors	Frequency	%
Terrible pain and suffering	Pain, dying of pain, undergoing surgery, terrible, being stabbed (2), having one side torn off, having a stone dropped from a kidney, loss of life, ordeal (3), labor pain (3), giving birth without giving birth, giving birth (7), giving birth but never giving birth, to be beaten, to have one's flesh torn from one's fingernails, to be tortured (2), to be paralyzed, something strange, disgusting, something that makes you feel bad, to work hard for days on end, not a good thing, to be sick (4), to be ruined every month, worse than dying, needle prick, disgusting (2), torture (11), heart attack (2), abdominal pain (3), stab wound in the abdomen, stabbed in the groin, broken bone (2), feeling on the edge, bad (2), bad pain, cramp, fainting with cramps, the whole world collapsed on me at that moment, death (11), thief who stole a day from our life, a painful process (2), dying while alive, tyranny, cruelty (10)	93	56.7
Emotional and spiritual change	Having a chocolate crisis, depression (2), emotional outburst, emotionally confused person, emotional, emotional discharge, a different era, eating unnecessary food, suffering (3), seeds in a watermelon, bad, pips in a tangerine, bomb with the pin pulled, disturbance, boring tradition, acne, cause of stress, committed a crime, using a term of endearment in the middle of an argument, poisoning, persecution (2)	25	15.2
A natural part of life	Being a family, some kind of indicator, giving birth, something unique, proof that you are really a woman, gift treat, urinating, part of human life, feeling that you are a woman, feeling healthy, letting go of material and spiritual illnesses, a break, miracle, breathing, normal (4), being healthy (3), being reborn	22	13.4
Renewal and purification	Purification, holiday, refresh, cleanse (4), cleansing of the body, life, renewal (3)	12	7.3
Feeling discomfort and fatigue	Severe flu, having an operation, being paralysed (2), having flu (2), weakness, being sick (2), unhappiness, problem, persecution	12	7.3
Total		164	100

"It is a miracle, a place for the formation of a baby." (S104)

"It is like breathing, because it is as natural as that." (S106)

"It is being healthy, a biological necessity." (S129)

Category 4. Renewal and purification: The prominent feature of the metaphors in this category is that menstruation creates renewal. Sample metaphor expressions in this category are given below:

"It is purification, we get rid of the dirt inside us." (S7)

"It is to be cleaned because I remove the dirty blood from my body." (S141)

"It is life, it constantly cleans itself." (S144)

"It is renewal, the ovaries renew themselves every month, it is a miraculous innovation." (S148)

Category 5. Feeling of discomfort and fatigue: The prominent feature of the metaphors in this category is that menstruation causes discomfort. Sample metaphor expressions in this category are given below:

"It is like severe flu, because I feel very weak and tired." (S3)

"It is to be sick I feel weak." (S60)

"It is being unhappy. Gets very tiring during my daily life." (S105)

"It is cruel because I get tired." (S155)

DISCUSSION

This study revealed university students' perceptions of the concept of "menstruation" through metaphors and grouped them under conceptual categories and discussed them in the light of the existing literature. Among 169 university students participating in the study, 164 students generated metaphors about the concept of "menstruation" and the metaphors generated have been grouped into five conceptual categories. When the metaphors generated by the students have been analyzed, it has been determined that 130 of the metaphors have negative themes and 34 of them have positive themes. It is seen that similar to the findings of the study, different meta-analyses and qualitative meta synthesis studies in the literature, in which metaphors related to menstruation are evaluated, negative meanings and experiences related to menstruation are contained the most (Abdel-Raheem, 2024; Barrington et al., 2021; Fernández-Martínez et al., 2020; Hennegan et al., 2019).

The concept of menstruation has been defined as an experience with physiological and psychological dimensions affected by cultural differences across generations (DeMaria et al., 2020). Factors influencing this experience include religion, community and age-old beliefs, taboos about menstruation, and perceptions of the cleanliness, safety, and privacy of the physical environment (Hennegan et al., 2021). The category in which the most metaphors have been generated in the study is the category of "terrible pain and suffering". The main theme of the metaphors in this category is the feeling of physical and emotional pain caused by severe pain and cramps that occur with menstruation. Menstrual pain, defined as "dysmenorrhea", which significantly affects daily life, is a common problem during menstruation and affects both young and adult women (Fernández-Martínez et al., 2022). According to the findings of a cross-sectional study with a sample of 42.879 women, which determined menstrual symptoms and their effects on quality of life and daily activities; the most common discomfort during the menstrual period was determined to be menstrual pain (85%), psychological complaints (77%) and fatigue (71%). It has also been observed that 38% of women cannot perform all their normal daily activities due to menstrual disorders, and many women do not initially consult a doctor when they experience menstrual symptoms (Schoep et al., 2019). Parallel to the main theme of the metaphors generated by young girls, in a qualitative study conducted with nursing students (n=33), it has been reported that the students perceived menstruation as "a discomfort or disease", that they experienced severe and intense pain especially in the first few days of menstruation, and that they described this feeling as a terrible thing, a kind of "living hell" experienced with a sense of doom. Some students in the study stated that they saw themselves as "sick" during this period due to the perspective arising from sociocultural traditions (Fernández-Martínez et al., 2020). In a qualitative study investigating the attitudes of 70 women aged 18-78 towards menstruation, women most frequently described menstruation as "worrying" due to cramps and low energy and described the discomfort and especially the experience of pain during this period as a real and difficult experience that affects their lifestyle and health (DeMaria et al., 2020). In a study conducted with university students, it has been reported that severe pain due to menstruation causes absenteeism from university, loss of concentration in classes, and a negative effect on sports and social activities (Orhan et al., 2018).

The second category of the study is "emotional and spiritual change". In this category, menstruation has been conceptualized as a situation of stress that causes emotional and psychological changes. In parallel with the metaphors generated in this study, in a qualitative study, nursing students described menstruation as limiting, affecting the way they dress and relate to others, and as body and mood changes that make them feel less attractive (Fernández-Martínez et al., 2020). In a similar study, it was reported that women felt sad, lonely, moody, unattractive and more sensitive to what people said during their menstrual period (Malefyt & McCabe, 2016). Existing qualitative and quantitative studies have revealed that poor menstruation experience negatively affects young girls' and women's physical and psychological health, educational achievement and social interactions, that many girls have many misconceptions about physiological changes during menstrual periods, that they learn most of this information from their mothers, television, friends and teachers, and that these beliefs often affect the emotional state, mindset, lifestyle and health of both girls and women (Aktürk & Erci, 2023; Hennegan et al., 2019).

The third category of the study is "a natural part of life", which includes metaphors containing positive themes about menstruation and includes metaphors such as "being healthy", "a normal part of women's life", "a kind of gift". Similarly, 12 metaphors about menstruation being a process of "renewal and purification" formed the fourth category. These two categories consist of positive metaphors for menstruation. Similar to this view of young girls who consider menstruation as a positive emotional experience, it has been reported in the literature that menstruation has different meanings for each woman, and in a qualitative study (n=27) conducted with girls and women of different age groups; it has been reported that menstruation is seen as a part of maturation, having a baby and life, and it has been determined that the change in physical and mental state during this period is perceived as a natural part of the menstrual experience (Hasson, 2016; Malefyt & McCabe, 2016). Women's positive emotional responses to menstruation are pride in being a woman, an indicator of adulthood, a process they experience every month that allows them to relax, and a sign that they are not pregnant (Barrington et al., 2021; Rubinsky et al., 2020). In contrast to the dominant negative view of menstruation, some women perceive this process as a self-cleansing and purification process that provides a physical power to feel calm and balanced (Malefyt & McCabe, 2016; Mondragon & Txertudi, 2019). A widespread view, accepted by some women, that menstruation is a "fact of life" and a pain they have to live with, along with menstrual pain, supports the findings of our study (Serrahima & Martínez, 2023).

Individuals use metaphors to describe abstract or complex phenomena with more concrete or experienced phenomena (Ektem & Aytekin, 2020). In this study, some of the university students have defined menstruation in the category of "feeling of discomfort and fatigue" with metaphors including different themes. Sociocultural norms such as negative experiences related to the first menstruation, making menstruation feel like a shameful situation that should be experienced in secret, and considering menstruation as dirty can trigger the feeling of discomfort during this period (Coast et al., 2019; Rubinsky et al., 2020). There is a strong interaction between attitudes towards the concept of menstruation and linguistic expressions towards menstruation, which in many languages, including English, contain mostly negative metaphorical expressions such as "curse", "trouble", "wrong time of the month" and "bad time". Consequently, expressions of menstruation used in a negative sense in society may reinforce women's negative feelings and perceptions about menstruation (Sveen, 2016; Vancauwenbergh & Franco, 2023).

Menstruation, which is a symbol of reproductive age and a physiological process, is perceived and experienced differently in every society depending on social and cultural characteristics (Altıntaş et al., 2021). Understanding the stereotypes associated with menstruation and knowing how this concept is socially and emotionally handled will provide a valuable resource for creating health education materials that will provide a positive understanding of menstruation and develop a positive perspective. It is the first study in Turkiye to metaphorically describe female university students' perspectives and perceptions of menstruation in different departments. According to the findings obtained from this study, it is predicted that the perception of menstruation determined by metaphors will contribute to other studies as literature.

In this study, it is seen that the meanings that young girls attribute to the concept of menstruation have physiological, social and psychological aspects. With this, in which the metaphorical perceptions of female university students towards menstruation were evaluated, it has been determined that the metaphors generated by the students mostly contain negative themes. Due to the different economic, social and cultural structure in Turkiye, girls' transition to menstruation can be seen as a negative phenomenon that should be hidden both within the family and in society. Accordingly, it is not expected for girls to act naturally and share about their menstrual period. Women raised in this way experience their menstrual periods in secrecy until menopause, and even if their work and quality of life are affected due to severe pain, they have to keep it secret (Nüket et al. 2023). However, metaphors with positive themes have been generated in which menstruation is interpreted as a normal part of women's life, a process of renewal and purification. Negative perceptions about menstruation are factors that can be improved as a result of health education. It is important to provide information to reduce negative perspectives on menstruation by using narratives that focus on women's menstrual experiences, including not only the management and treatment of menstruation and menstrual pain, but also an assessment that focuses on the needs of women with a biocultural approach (DeMaria et al. 2020).

Limitations

Although qualitative research designs provide participants with the opportunity to share their own perspectives and perceptions, the data obtained based on students' verbal expressions, as in this study, may be affected by their sociodemographic characteristics, myths, sociocultural and religious factors. Therefore, the results of the study cannot be generalized to the population.

The research has been conducted to understand how female students studying at university view menstruation and how they define menstruation through metaphors. This study provides one of the first pieces of evidence investigating the metaphorical perceptions of university students towards menstruation through metaphors in Turkiye.

CONCLUSION

We conducted our study with female university students, and approximately half of the students were studying in departments that provide education in the field of health, while the other half were the educated segment of the society, even if they were not in the field of health. This situation ensures that even though they are exposed to social and gender taboos, their perceptions of menstruation are different from the general society, and they think consciously and modernly about menstruation. There are girls and women in society at different levels of education and in different age groups. Therefore, there seems to be a need for more qualitative research to determine the perspectives and perceptions of women of different generations towards menstruation. Menstrual period is a term loaded with many different cultural and religious meanings. Different societies have defined menstruation, which is a biological phenomenon specific to women, whose meaning and experience are affected by cultural structure, as emotional changes as well as physical changes. It is important for health professionals to develop effective lifelong education programs to inform and empower women, as menstruation experiences are virtually unchanging across generations, cultures, and the lifespan. Metaphors can be used in everyday life without requiring a great deal of mental activity and largely determine how we go about our lives. Therefore, it is important to understand the metaphors created by female students about menstruation to reveal their feelings and thoughts that they were not aware of before.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was carried out with the permission of the Aksaray University Human Researches Ethics Committee (Date: 28.02.2024, Decision No: 2024/01-10).

Informed Consent

All university students signed an open and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

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

Author Contributions

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

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Evaluating the postoperative pain of video-assisted thoracoscopic sympathectomy patients by Four Pain Scales

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ABSTRACT

Aims: The evaluation of postoperative pain levels in patients undergoing video-assisted thoracoscopic sympathectomy is a crucial requirement for the development of effective pain management protocols. The aim of this study is to identify the scale that best reflects patients' pain levels and to examine the consistency among the scales used.

Methods: This single-center study was conducted with an observational-descriptive design. The study was completed with 41 patients in the thoracic surgery clinic of a training and research hospital in the fall of 2019 and spring of 2020. The questionnaire form included questions about the descriptive and pain characteristics of the participants. Pain levels were questioned using 4 Pain Scales [These scales were Numeric Rating Scale (NRS, Visual Analog Scale (VAS), Faces Pain Scale revised (FPS-R), and Color Analog Scale (CAS)]. before and approximately 1-2 hours after the administration of postoperative painkillers. The scale that best reflected their pain was questioned.

Results: Before the administration of analgesics, the pain characteristics were assessed when patients reported experiencing postoperative pain. Accordingly, most of the participants (36.6%, n=15) stated that they had "back pain at the incision line of the anterior chest wall", 19.5% had pain in the upper anterior aspect of the chest, and 9.8% had anterior chest pain. He stated that 34.1% had pain spreading to other regions, and 6 patients had pain radiating to the back. 39% (n=16) reported stinging pain, 19.5% (n=8) tingling, and 17.1% (n=7) sharp pain. A very strong and significant positive correlation was found between NRS and VAS in four scale correlations with pre-analgesic pain level. It turned out that the best tool was the NRS.

Conclusion: In this patient group, the comparison of Four Pain Scales before and after analgesia showed that the highest mean score was obtained from the NRS, followed by the VAS, CAS, and FPS-R. However, given the absence of an objective reference standard for pain, it cannot be concluded that the NRS or any other scale represents the most accurate measurement tool. These findings therefore reflect only the relative differences among the scales and should be interpreted in light of the inherent limitations of pain assessment methods.

Keywords: Sympathectomy, pain, Pain Scale, postoperative, thoracic, nursing

INTRODUCTION

Video-assisted thoracoscopic sympathectomy (VATS) is a surgical method with various potential advantages used for the treatment of lung cancer and other pulmonary diseases (Campos et al., 2016). Compared to the traditional thoracotomy, the VATS can reduce trauma, shorten surgery and anesthesia time and decrease the incidence of cardiopulmonary complications (Kong et al., 2020). VATS is a simple and safe technique used for the treatment of primary hyperhidrosis in recent years (Campos et al., 2016).

Primary or essential hyperhidrosis is a pathological disorder characterized by excessive and uncontrolled sweating, particularly in the palms, feet, axillae and face. It may have genetic predisposition or may be caused by emotional stress or other psychological factors. Primary hyperhidrosis significantly impacts the quality of life, leading to psychological and social problems (Dias et al., 2005). Primary hyperhidrosis can be treated with medical and surgical methods (Campos et al., 2016; Vannucci et al., 2017; VATS, 2023). Treatments for primary hyperhidrosis include removal of the eccrine and apocrine glands in the armpits, and this method can have potential complications. VATS has been increasingly used in the treatment of primary hyperhidrosis. The basic principle of the VATS procedure is to interrupt the cholinergic sympathetic innervation to the eccrine glands (Stefaniak & Ćwigoń, 2013; Raposio & Caruana, 2015). Postoperative pain remains the primary clinical concern during the rapid recovery period

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following VATS (Cok et al., 2011). Postoperative pain after VATS is an important problem, although it is less tiring than traditional thoracic surgery (Kong et al., 2020; Bolotin et al., 2000; Fiorelli et al., 2010; Duzel, 2008). Evaluation of postoperative pain by using proper instruments and analgesics to reduce or eliminate pain holds an important place in postoperative pain management (Arslan & Celebioglu, 2004).

Although Pain Assessment Scales are generally reliable, some patients may not accurately describe their pain. Therefore, various tools are utilized in pain assessment (Mark et al., 1986). Unidimensional Scales, which are employed to assess pain in the early postoperative period (days 1-3), directly measure the intensity of pain and rely on patient self-reporting. While these scales differ in terms of grading, expressions, and visual representations, they are consistent with each other in evaluating pain severity (Jensen, 2010; Temiz & Özer, 2015).

In recent years, various studies have been conducted to determine the most reliable method for pain assessment. Gurkan et al. (2020) compared four Different Pain Scales to assess postoperative acute pain intensity. The scales were found to be consistent with each other and recommended the NRS as the primary choice. Li et al. (2007) compared the psychometric properties and applicability of Four Different Pain Scales with Chinese postoperative adults: they concluded that four scales were suitable options for reporting pain intensity, but the FPS-R was the most effective. It was suggested that instruments should be selected according to individual needs or preferences for pain management.

In conclusion, investigating which Pain Assessment Scale most accurately and effectively reflects the pain levels experienced by patients will help determine which scale best represents the pain felt by specific patient groups. This study was designed to evaluate the effectiveness of Different Pain Scales used to assess postoperative pain levels in patients undergoing VATS sympathectomy, to examine the consistency among these scales, and to identify the scale that best reflects patients' pain levels.

Research Questions

- Which Pain Assessment Scale (NRS, VAS, CAS, FPS-R) best reflects postoperative pain levels in patients undergoing video-assisted thoracoscopic sympathectomy?
- What is the level of consistency and correlation among the Four Pain Scales used before and after the administration of analgesics?
- What are the most common characteristics (location, type, and distribution) of postoperative pain reported by these patients?

METHODS

Ethics Approval

The study protocol was approved by the University of Health Sciences Non-interventional Researches Ethics Committee (Date: 30.10.2019, Decision No: 19/273). Institutional permission and ethics committee approval were obtained. The study was conducted in accordance with the principles of the Declaration of Helsinki.

This single-center study was conducted with an observational-descriptive design. The study was conducted in the thoracic surgery clinic of a training and research hospital in Ankara/Turkiye between September 2019 and June 2020.

Population and Participants

Patients, who were diagnosed with hyperhidrosis, hospitalized at the thoracic surgery department and underwent VATS, constituted the population.

A power analysis was performed to determine the number of people to be included in the study. This analysis was performed using the G*power 3.1 program. The effect size was accepted as 0.50 at a high level based on the correlation analysis suggested by Cohen (1988). The power of the study was targeted to be 95% or higher. Accordingly, because of the analysis conducted for a significance level of 5% and an effect size of 0.50, it was determined that a sample size of at least 38 people should be reached (Cohen, 1988).

Voluntary hyperhidrosis patients at the age of 18 years and above, who underwent VATS, were conscious, did not have any psychiatric diseases and audial or visual problems, and had postoperative pain, were included to the study. On the other hand, the patients with color blindness and motor and sensory loss were excluded. Since the patients may find it difficult to express their pain experiences, we assumed that a clinical experience of at least six months was sufficient to evaluate pain experiences of the patients. We intended to reach at least 80% of the population but 41 patients agreed to participate.

Data Collection Instrument

The data collection instrument was composed of three parts. The first part included questions on the descriptive characteristics of the participants, including age, gender and education level. The second part had questions on the characteristics of pain, including pain site and the travel of pain. The final part included the findings about pain intensity measured by Four Unidimensional Scales before and after analgesia during the first 24 postoperative hours. These scales were NRS, VAS, FPS-R, and CAS).

All patients included in the sample group were asked to describe their pain levels/intensities one by one with Four Unidimensional Scales after they stated that they were in pain, and finally the patients were asked; "Which scale do you find best to express yourself in evaluating your current pain?" and rank the others from best to least... The front side of each scale was prepared with its own original measurement method, while the back side of all scales had a straight line of 0-100 mm (10 cm). This method was used to obtain standard numerical results and to obtain the numerical value measured on the back side of the selected part on the front side of each scale. An algology specialist doctor's opinion was obtained on this subject. Data obtained from each patient individually using four scales within 0-100 mm were recorded on the data collection form and eventually converted to a decimal system, sample scores were collected, averaged, and reflected in the findings with n-% values (**Figure**).

Numeric Rating Scale (NRS): The NRS is a horizontal line with eleven numbers, ranging from 0 (no pain) to 10 (worst pain possible). Participants were asked to indicate the number that best describes the intensity of pain. The NRS was considered as the golden standard to measure pain intensity since it is a reliable and valid instrument commonly used

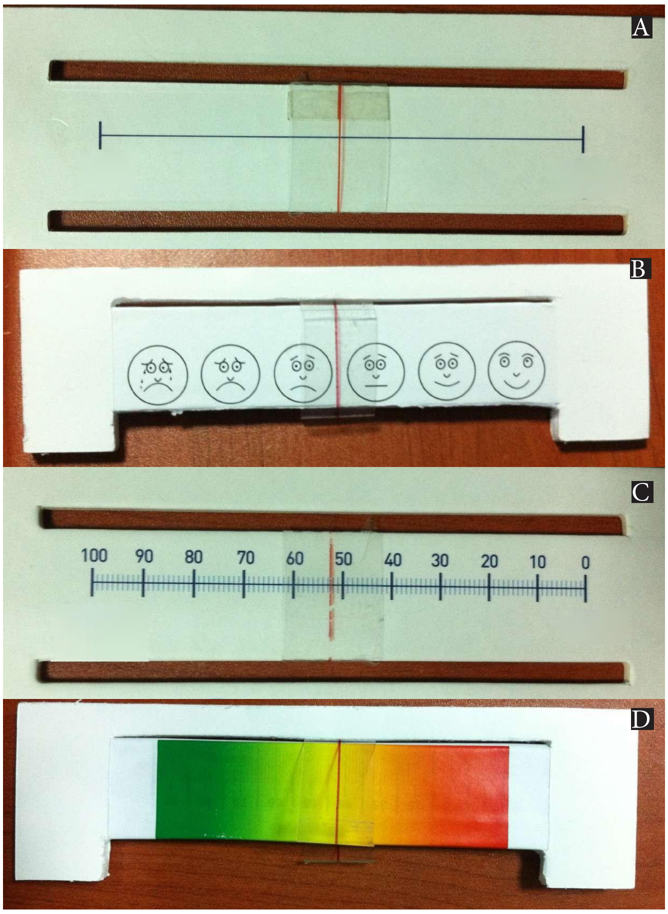

Figure. A. Visual Analog Scale, B. Faces Pain Scale revised, C. Numeric Rating Scale, D. Color Analog Scale

in clinical practices (Mark et al., 1986). NRS is a valid and reliable measurement tool for the evaluation of postoperative acute pain intensity in adults and elderly patients, as well as elderly patients with mild to moderate cognitive impairment (Zhou et al., 2011; van Dijk et al., 2012).

Visual Analog Scale (VAS): The VAS is a 10-cm line with the end points 0 (no pain) and 10 (worst pain). Participants were asked to mark the number that best describes pain intensity. The VAS is an instrument commonly used in research and clinical practices and various studies demonstrated the reliability and validity of the scale. Pain intensity measured by the VAS is significantly correlated with other verbal and numerical scales. The primary advantage of the VAS is its ratio scale properties, whereas its disadvantages include that it is time-consuming and needs abstract thinking, which makes it difficult to understand and complete, especially in older people (Li et al., 2007). This situation can particularly complicate the understanding and completion of the scale in older adults due to factors such as "cognitive decline, insufficient ability to understand and interpret numerical values, and reduced visual skills." Nurses can explain how to use the VAS in simple and understandable language, guiding patients on how to complete the scale. In addition to the VAS, they can also encourage the use of alternative scales that may be easier for older individuals to understand, such as scales representing facial expressions. This approach creates a supportive environment for patients and fosters a better caregiving atmosphere. VAS has been accepted in the literature as a valid and reliable measurement tool for the evaluation of postoperative acute pain intensity (Chou et al., 2016).

Faces Pain Scale Revised (FPS-R): The FPS-R is based on various facial depictions to evaluate the intensity of pain. It was first developed to evaluate pain in children. FPS-R is a Horizontal Scale that includes seven line-drawn faces. Since it is based on facial depictions, FPS-R does not require literacy and may be used for illiterate patients. Absence of pain is mostly shown by a smiling face whereas the worst pain is shown by a face in tears (Li et al., 2007; Yesilyurt & Faydalı, 2020).

FPS-R is accepted as a valid and reliable measurement tool for the evaluation of postoperative acute pain intensity in adult patients, including children and the elderly with mild to moderate cognitive impairment (Zhou et al., 2011; Mandysová & Kadlečková, 2015).

Color Analog Scale (CAS): The CAS is a valid and reliable tool for assessing acute pain in children 5 years of age and older. This rapid and low-cost instrument is also ideal for busy emergency department settings. The CAS was designed to augment the capabilities of the VAS and demonstrate its utility and has been suggested for pediatric use. It is also possible to use the CAS in individuals with Alzheimer's disease (Tsze et al., 2013). The CAS is 10 cm long and uses a color spectrum ranging from white (no pain) to red (worst possible pain). Disadvantages of the CAS include that colors can fade, or patients may be color blind (Bulloch et al., 2009).

Implementation

All participants were first informed about the aim and procedures of the study and written informed consent was obtained. Generally, pleura pain is experienced at the lumbar 4th vertebrae after VATS. Patients undergoing VATS are required to stay at the thoracic surgery clinic for at least 24 hours. If there is pain, analgesics are mostly administered in the 6 to 8 hours after surgery. Besides, as a part of the clinical pain management procedures, analgesics may be administrated at 8:00 and 20:00 hour if there is pain. Due to the negative effects of analgesics on kidney and liver functions, high-dose analgesics is avoided in some patients. These patients receive diclofenac sodium intramuscular. If this intervention is inadequate, (pain severity higher than 30 in NRS, Tramadol 0.1 mg/kg or paracetamol 10 mg/kg IV treatment is used.

The pain intensity of the VATS patients with pain was evaluated by using the Four Pain Scales for the first 24 postoperative hours. Scales were completed before analgesic administration, which took place at 8:00 or 20:00 hour. If the patient received analgesics other than these periods, scales were also completed. For example, if the patient underwent surgery in the afternoon and had pain at 22:00 hour, the patient was also included to the study. Before the application of analgesia, descriptive and pain characteristics information of the sample group was collected by face-to-face interview method and patients were asked to evaluate the postoperative pain intensity on Four Pain Scales: NRS, VAS, FPS-R and CAS. Analgesia was then applied to the patients. One hour after the application of analgesia, the sample group patients were visited and asked to fill in the Pain Scales again.

Statistical Analysis

The data obtained in the study were analyzed using the SPSS (Statistical Package for the Social Sciences) Windows 22.0

software. Descriptive statistical methods such as frequency, percentage, mean, and standard deviation were used to evaluate the data. The differences in the proportions of categorical variables between independent groups were analyzed using Chi-Square tests. To assess whether the research variables followed a normal distribution, kurtosis and skewness values were examined. According to the relevant literature, for variables to show a normal distribution, kurtosis and skewness values should be between +1.5 and -1.5 (Tabachnick & Fidell, 2013) or between +2.0 and -2.0 (George & Mallery, 2010). For example, before the drug application, the kurtosis value was -0.401 and the skewness value was -0.034 for the numerical scores. After the drug application, these values for the same variable were 0.542 and 1.114, respectively. Similarly, for visual scores, the kurtosis value was -0.984 and the skewness value was 0.087 before the application, and 0.414 and 0.859 after the application.

It was determined that the variables followed a normal distribution. As a result, parametric methods were used for data analysis. A paired T test was applied to compare within-group measurements, and Pearson correlation analysis was used to examine the relationships between pain scores. The correlation coefficients (r) were interpreted as follows: 0.00-0.25 very weak; 0.26-0.49 weak; 0.50-0.69 moderate; 0.70-0.89 strong; 0.90-1.00 very strong (Kalaycı, 2006, p.116).

RESULTS

When examining the demographic characteristics of the patients, the average age was found to be 23.71±6.44 years (min. 18, max. 46), with 82.9% being male and 58.1% holding a higher education degree. The characteristics of the pain experienced by the patients were assessed when they reported feeling pain after being admitted to the clinic post-surgery and while at their bedside. From the moment the pain intensified, analgesic treatments were administered according to the clinic's analgesic protocol. A large proportion of the patients (36.6%, n=15) experienced "chest wall anterior incision line back pain," 19.5% had pain in the upper right side of the chest, and 9.8% reported pain in the left anterior chest. Additionally, 34.1% of the patients experienced pain that radiated to other areas, with six patients reporting pain radiating to the back. Among the participants, 39% (n=16) described the pain as stabbing, 19.5% (n=8) reported tingling, and 17.1% (n=7) felt sharp pain.

When evaluating the scale that best represented the patients' pain, 51.2% (n=21) indicated that the NRS was the most Accurate Pain Scale, while 26.8% (n=11) preferred using the CAS. According to the correlation analysis in Table 1, significant and strong relationships were identified between measurements taken with Different Pain Scales before the administration of analgesic medication. Pearson correlation coefficients demonstrated that the NRS was highly correlated with other measurement methods. Specifically, the correlation coefficient between the NRS and VAS scores was r=0.856, indicating a strong relationship. Similarly, the correlation coefficient between the NRS and CAS scores was r=0.831, and the correlation between VAS and CAS scores was r=0.821, showing consistency between these methods.

In Table 2, the correlation analysis between Different Pain Scale measurements after the administration of analgesic medication revealed significant relationships between pain scores. Pearson correlation coefficients indicated that the NRS pain score was highly correlated with other measurement methods. Notably, the correlation coefficient between the NRS and VAS scores was r=0.859, showing a strong relationship between these two methods. After medication administration,

Table 1. Correlation analysis between pain scores before analgesic drug administration

		Numeric Rating Scale score	Visual Analog Scale score	Color Analog Scale score	Faces Pain Scale revised score
Numeric Rating Scale score	r	1.000			
	p	0.000			
Visual Analog Scale score	r	0.856**	1.000		
	p	0.000	0.000		
Color Analog Scale score	r	0.831**	0.821**	1.000	
	p	0.000	0.000	0.000	
Faces Pain Scale revised score	r	0.757**	0.764**	0.820**	1.000
	p	0.000	0.000	0.000	0.000

**<0.01; Pearson correlation analysis

Table 2. Correlation analysis between pain scores after analgesic drug application

		Numeric Rating Scale score	Visual Analog Scale score	Color Analog Scale score	Faces Pain Scale revised score
Numeric Rating Scale score	r	1.000			
	p	0.000			
Visual Analog Scale score	r	0.859**	1.000		
	p	0.000	0.000		
Color Analog Scale score	r	0.650**	0.616**	1.000	
	p	0.000	0.000	0.000	
Faces Pain Scale revised score	r	0.765**	0.651**	0.676**	1.000
	p	0.000	0.000	0.000	0.000

**<0.01; Pearson correlation analysis

the correlation coefficient between the NRS and CAS scores was r=0.650, and between VAS and CAS scores, it was r=0.616. While these values are lower compared to the previous table, they still indicate a moderate relationship between the measurement methods.

Table 3 compares the changes in pain scores before and after the administration of analgesic medication. According to the data in the table, there was a significant reduction in pain scores across four different measurement methods after medication administration. The NRS pain score decreased from a pre-administration mean of 49.976±20.057 to 22.415±13.159 post-administration, a statistically significant reduction (t=11.297, p<0.001). Similarly, the VAS pain score dropped from a pre-administration mean of 44.488±22.698 to 19.561±12.818 post-administration, showing a significant difference (t=8.336, p<0.001). The CAS score decreased from 47.854±18.821 pre-administration to 23.439±12.992 post-administration, with this reduction also being statistically significant (t=10.567, p<0.001). Lastly, the FPS-R score dropped from 47.244±19.588 pre-administration to 20.732±12.446 post-administration, and this decrease was statistically significant as well (t=10.538, p<0.001). These findings indicate that pain scores, as assessed by four different methods, significantly decreased after the administration of analgesic medication, demonstrating the effectiveness of the intervention in pain management.

DISCUSSION

The primary aim of the management of postoperative pain is to maintain patient comfort. Despite random patient selection, adequate sample size, determination of pain evaluation process and the measurement of pain intensity with valid and reliable instruments, pain management is still a problem in the postoperative care of surgical patients, who may experience moderate-to-severe pain, even in the late postoperative period (Svensson et al., 2000). Various studies have been conducted to determine the most reliable pain evaluation instrument due to the subjective characteristics of pain. However, the best pain evaluation method to reflect the exact intensity of pain is still a point of debate. A significant number of Pain Scales have been used to evaluate pain intensity. This study used Four Different Scales to measure the intensity of pain experienced by the patients who underwent VATS and found that the NRS and VAS were the best instruments to reflect postoperative pain.

Many unidimensional and multidimensional scales are utilized to assess pain intensity. Numerous scales that are validated and reliable, and based on the patient's self-report, including numerical, verbal, and visual tools, have been developed to quantify postoperative acute pain and guide treatment (Gurkan et al., 2020; Li et al., 2007; van Dijk et al., 2012; Chou et al., 2016).

In this study, Four Different Scales were used to measure the pain intensity experienced by patients undergoing VATS, and it was found that the NRS and VAS are the best tools for reflecting postoperative pain. Primary hyperhidrosis occurs in about 2% of the world's population, affects men and women equally and is more frequent in young people (Campos et al., 2016; Vannucci et al., 2017; VATS, 2023). In our study, the participants were predominantly male (82.9%) and young people.

Postoperative pain is a common complication after VATS. A study using two ports of 5- and 10-mm diameter reported that the incidence of pain in VATS patients after hospitalization was 78%. Level 2 analgesics (codeine, propoxyphene alone or in combination with propoxyphene) were used to control pain in the study (Campos et al., 2016). Our study also found that the same group of patients undergoing VATS surgery experienced moderate pain at most, and most of the participants in our study (36.6%, n=15) reported "anterior chest wall incision line back pain", 19.5% reported pain in the upper anterior part of the rib cage, and 9.8% reported pain in the anterior left side of the chest. In a study of 283 patients undergoing thoracic sympathectomy, pain intensity was analyzed with VAS and the recurrence of sweating in the primary location was evaluated. The study reported a high frequency of side effects such as intercostal pain and compensatory sweating (Stefaniak & Ćwigoń, 2013). In our study, it was determined that 34.1% of the participants had radiating pain to other areas and 6 patients felt pain radiating to their back. 39% (n=16) of the participants reported stinging pain, 19.5% (n=8) tingling, and 17.1% (n=7) sharp pain.

A similar prospective clinical study, which aimed to determine the psychometric properties and applicability of Four Pain Scales in 173 Chinese patients aged from 18 to 78 years, found that the Four Pain Scales, namely VAS, NRS, FPS-R and VDS had good reliability and validity when used with Chinese adults. The study reported that the intraclass correlation coefficients of the four scales across current, worst, least and average pain on each postoperative day were high (0.673-0.825) and all scales were sensitive in evaluating analgesic efficacy (Li et al., 2007). Similarly, the comparison of the correlation between the Four Pain Scales before analgesics in our study revealed highly strong, positive and statistically significant relationship between the NRS and VAS. On the other hand, we found a strong, positive and statistically strong relationship between the NRS, CAS and FPS-R. Correlations were also the same after analgesics.

Another study on 64 patients, who were hospitalized in the cardiovascular surgery intensive care unit (ICU) in Turkiye, assessed the preferences of patients for Three Pain Scales. The study concluded that VRS may be integrated with the currently used pain scales and the preferences of the patients on pain scales should be taken into consideration (Karahan et al., 2012). In our study, on the other hand, 51.2% (n=21) of the participants stated that the NRS was the best instrument to express pain intensity, which was followed by the CAS with a percentage of 26.8% (n=11).

Table 3. Mean pain scores before and after analgesic drug application

	Before analgesic drug application		After analgesic drug application				
	Mean	SD	Mean	SD	n	t	p
Numeric Rating Scale score	49.976	20.057	22.415	13.159	41	11.297	0.000
Visual Analog Scale score	44.488	22.698	19.561	12.818	41	8.336	0.000
Color Analog Scale score	47.854	18.821	23.439	12.992	41	10.567	0.000
Faces Pain Scale revised score	47.244	19.588	20.732	12.446	41	10.538	0.000

Aziato et al. (2015) collected qualitative data from 17 patients and 25 nurses for pain assessment in postoperative adult patients, and quantitative data were collected from 150 patients who received postoperative care. In addition to the NRS and FPS-R, the researchers used the Colored Circle Pain Scale (CCPS) as a new pain scale. All scales were sensitive to changes in the intensity or level of pain experienced before and after analgesia, and the researchers concluded that sociocultural factors should be taken into account due to the subjective nature of pain. It is particularly emphasized that nurses need to understand the sociocultural context of patients in order to effectively learn appropriate pain assessment tools and pain management techniques. In another study, a total of 147 patients from different surgical clinics were included. As a result of the study; all pain scales had a strong positive linear relationship with each other, and the most preferred scale was found to be the VRS (Yurtseven et al., 2021). Similarly, Bas and Ayhan (2024) evaluated the pain intensity of patients undergoing open heart surgery using four different pain scales and compared patient preferences. According to the study, the scale preferences of the patients were as follows: NRS, VDS, VAS and Thermometer Pain Scale. It was observed that all scales gave similar results in terms of pain intensity and scores, and it was recommended that the scale selection be made according to patient preferences and individual characteristics.

Similarly, the comparison of the scores obtained from the Four Pain Scales before and after analgesia in our study showed that the highest mean score was obtained from the NRS, which was followed by VAS, CAS and FPS-R, respectively. Besides, the analysis of the four scales revealed that the intensity of pain before analgesia decreased after analgesic administration. Although the scores obtained from the four scales did not differ significantly, the NRS was the instrument with the best pain evaluation.

Limitations

The study was conducted at a single center and the number of participants was limited. Routine treatment of pain may differ in different clinical settings. Analysis of the pain treatment protocol of the thoracic surgery department in this study revealed that traditional pain management methods were performed on patients with similar characteristics, including diagnosis, type of surgery and age group. This study reflected the characteristics of a specific patient group. Further studies with higher sample sizes in different centers might be conducted.

CONCLUSION

In the study, patients' pain was assessed using Four Different Pain Scales before and after analgesia. The findings indicated that the highest mean score was obtained from the NRS, followed by the VAS, CAS, and FPS-R, respectively. However, due to the absence of an objective reference standard for pain, it cannot be concluded that the NRS or any other scale represents the most accurate measurement tool. Therefore, these results reflect only the relative differences among the scales and should be interpreted in light of the inherent limitations of pain assessment methods. It is recommended that changes in the intensity of postoperative acute pain be evaluated using a measurement tool that is easily understood, feasible, and preferred by patients. Healthcare professionals are advised to select the scale most appropriate for their patient population, and further studies are warranted to clarify this issue.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was carried out with the permission of the University of Health Sciences Non-interventional Researches Ethics Committee (Date: 30.10.2019, Decision No: 19/2735).

Informed Consent

Written informed consent was obtained from the patient, his/her parents and/or legal guardians.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

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

Author Contributions

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

Data Sharing Statement

Data supporting the findings of this study are available from the corresponding author upon reasonable request. Availability of data and materials and data transparency are available.

Software Application or Code

No computer program or software was used in the research, only research data was analyzed with SPSS program.

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The effects of mindfulness-based stress reduction program on pregnant women

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ABSTRACT

In recent years, the mindfulness-based stress reduction program has been implemented in pregnant women to cope with mental problems such as anxiety and depression, reduce fear of childbirth, alleviate physical symptoms, strengthen the bond between mother and baby, increase self-compassion and self-efficacy levels, and reduce the risk of postpartum depression. Mindfulness involves paying attention to what is happening in the present moment, noticing the quality of that attention, and accepting all that is noticed without hasty judgment. It consists of three components: intention, attention, and attitude. The mindfulness-based stress reduction program reduces anxiety by increasing awareness, improving emotional regulation, using body awareness and relaxation techniques, providing a supportive group environment, and providing cognitive restructuring. However, systematic reviews and meta-analyses show that these programs have some limitations, such as inconsistent effectiveness, methodological limitations, and cultural and practical barriers. Therefore, in this review article, we have tried to draw a roadmap for health professionals who will work in the field.

Keywords: Mindfulness, stress, pregnancy, women, anxiety, health professionals

INTRODUCTION

Pregnancy is a period of intense physical and emotional changes, and for some women, stress, anxiety, and mood fluctuations increase. The implementation of mindfulness-based stress reduction program (MBSR) increases during this period. Mindfulness is reported to lead to various positive psychological effects, including increased subjective well-being, reduced psychological symptoms and emotional reactivity, and improved behavioral regulation (Aldbyani, 2025). It has been said that mindfulness-based interventions consistently work better than non-evidence-based treatments like health education, relaxation training, and supportive psychotherapy at easing the severity of anxiety and depression symptoms. They also work about as well as cognitive-behavioral therapy (Hofmann & Gómez, 2017).

The aim of this study was to provide information about the use and outcomes of a MBSR program in pregnant women. First, the definition of mindfulness was made, and information about its components was given. Afterwards, the main benefits of using Mindfulness-Based Stress Reduction programs in pregnant women were grouped under six headings, and each of them was explained separately: 1) Reducing stress and anxiety, 2) Promotion of physical health, 3) Reducing the fear of childbirth, 4) Strengthening the mother-baby bond, 5) Increased self-compassion and self-care, 6) Reduced risk of postpartum depression (Güney et al., 2022; Şiir-Dağlar & Hotun-Şahin, 2021; Wang et al., 2023). Finally, information on the anxiety-reducing mechanisms of mindfulness is provided.

DEFINITION OF MINDFULNESS

Mindfulness involves paying attention to what is happening in the present moment, noticing the quality of that attention, and accepting all that is noticed without hasty judgment. Mindfulness is not just about living in the present moment and noticing the present moment; it has two dimensions that need to be understood. The first dimension is noticing what is happening in the present moment, and the second dimension is the way we welcome what we notice with an open, loving, and compassionate heart (Atalay, 2019).

As we practice mindfulness exercises, we notice changes on autopilot, from being distracted, anxious, and worried about the past or the future to being alert, open, and channeled in the present; from being reactive in challenging moments to being able to take a breath and respond with dignity and kindness; and from getting lost in thoughts and judging situations and people to seeing things as they are with an open and clear warmth (Cameron, 2021).

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COMPONENTS OF MINDFULNESS

Mindfulness has three main components: intention, attention, and attitude.

Intention

This is the core element of mindfulness, which involves a conscious decision to cultivate awareness and be present in the moment. Setting an intention helps individuals focus their mindfulness practice and guides their actions throughout the day (Cameron, 2021; Gülden & Yalçın, 2024).

Attention

Attention refers to the ability to focus on the present moment, including sensations, thoughts, and feelings. This component emphasizes non-detailed observation, where one observes experiences without judging or over-analyzing them. It requires both fixing attention on current experiences and the ability to shift focus when necessary (Hofmann & Gómez, 2017).

Attitude

The attitude component involves taking a non-judgmental, curious, and accepting stance towards one's experiences. This includes embracing both positive and negative thoughts and feelings without labeling them as good or bad. A mindful attitude fosters a sense of openness and acceptance that is crucial for effective mindfulness practice (Gülden & Yalçın, 2024).

THE EFFECTS OF MINDFULNESS-BASED STRESS REDUCTION (MBSR) PROGRAM ON PREGNANT WOMEN

The effects of MBSR program on pregnant women are given in **Figure**.

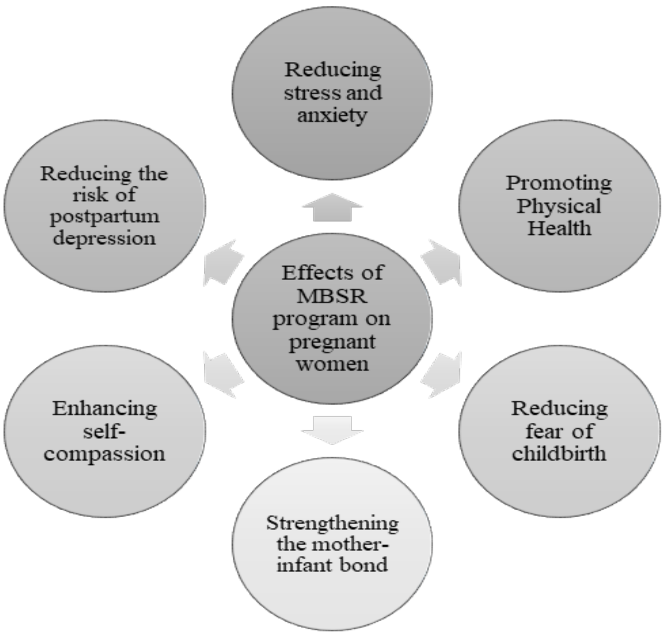

Figure. Effects of MBSR program on pregnant women
MBSR: Mindfulness-based stress reduction

Reducing Stress and Anxiety

Scientific studies have shown that MBSR program implemented during pregnancy have positive effects on the stress and anxiety levels of expectant mothers. For example, eight-week MBSR program have been found to reduce perceived stress, anxiety, and depressive symptoms in pregnant women, as well as increase mindfulness and self-compassion levels (Şiir-Dağlar & Hotun-Şahin, 2021). In a study examining the relationship between mindfulness levels and depression, anxiety, and stress levels in pregnant women, it was found that as mindfulness levels increased, depression, anxiety, and stress levels decreased (Yüksel et al., 2020). In another study, MBSR program applied to pregnant women with COVID-19 reduced women's stress and anxiety levels (Güney et al., 2022). In another study conducted with high-risk pregnant women, MBSR program reduced stress and anxiety levels of pregnant women (Ibici-Akca et al., 2023). These findings suggest that mindfulness-based interventions are an effective method to reduce stress and anxiety during pregnancy.

Promoting Physical Health

High stress levels during pregnancy can lead to an increase in stress hormones such as cortisol, which can lead to risks such as preterm delivery or low birth weight. MBSR program practices can reduce these risks by stabilizing cortisol levels (Wang et al., 2023). Mindfulness-based interventions, such as mindfulness-based yoga, have been effective in reducing pregnancy-related lower back and pelvic pain. Studies have shown that engaging in mindfulness practices can help pregnant women cope with discomfort and improve their overall physical health (Beddoe et al., 2009).

It has shown that mindfulness training can alleviate the negative effects of poor sleep by reducing the cognitive and emotional response to stressors. An 8-week mindfulness program showed significant improvements in sleep quality among participants and led to reductions in perceived stress and depressive symptoms (Felder et al., 2018). Additionally, mindfulness yoga has been associated with better sleep quality and lower levels of anxiety and depression (Shamabadi et al., 2023).

Mindfulness practices promote relaxation and stress reduction, which can alleviate feeling of fatigue (Dhillon et al., 2017). By encouraging acceptance of physical sensations and emotional states, mindfulness helps pregnant women develop resilience to the fatigue often experienced during pregnancy (Van der Meulen et al., 2023).

Another study focusing on pregnant Indian women found that mindfulness meditation significantly reduced perceived stress scores and improved autonomic functions, which are linked to sympathetic nervous system regulation. Results showed a marked reduction in blood pressure responses and an increase in heart rate variability, suggesting increased parasympathetic activity due to mindfulness practices (Muthukrishnan et al., 2016).

Reducing Fear of Childbirth

Mindfulness techniques help to reduce fears and anxieties about the birth process. It allows expectant mothers to approach the moment of birth with a more prepared and calmer mind. In the MBSR program study applied to pregnant women with COVID-19, women's stress and anxiety levels decreased, and their fear of childbirth decreased (Güney et al., 2022). Another study found a significant decrease in fear of childbirth scores among participants who received MBSR program training compared to those who did not participate in such programs (Pour-Edalati et al., 2017). This reduction is crucial to encourage women who are hesitant to consider future pregnancies due to fear. In another study, it was also mentioned that MBSR program can reduce anxiety in pregnant women and increase their self-efficacy in coping with childbirth (Zarenejad et al., 2020). The education provided through MBSR program helps participants develop better coping strategies to deal with the stresses of childbirth. Women learn to recognize and accept their fears without judgment, which can prevent negative thoughts from turning into overwhelming anxiety (Ibici-Akca et al., 2023).

Strengthening the Mother-Infant Bond

Being aware of the moment helps the expectant mother to establish a stronger emotional bond with her baby and allows her to experience baby movements and pregnancy experiences more consciously. MBSR program applied to high-risk pregnant women decreased stress and anxiety and increased prenatal attachment (Ibici-Akca et al., 2023). One study suggested that mindfulness may positively influence a mother's emotional connection with her fetus, noting that higher levels of mindfulness are associated with stronger mother-fetus bonding (Tsao et al., 2019).

Pregnancy stress has emerged as a critical factor affecting mother-fetus attachment. The same study found that while mindfulness enhanced mother-fetus attachment, stress during pregnancy had a strong negative effect on attachment (Tsao et al., 2019). Mindfulness practices can help reduce stress, thus indirectly promoting a stronger bond between mother and baby. A randomized controlled trial showed that pregnant women who received mindfulness training in combination with routine antenatal care exhibited improved attachment scores compared to those who received standard care alone (Gheibi et al., 2020).

Enhancing Self-Compassion and Self-Care

Mindfulness encourages individuals to be kinder and more understanding towards themselves (Atalay, 2019). Self-compassion is defined as showing compassion to oneself in situations of perceived inadequacy, failure, or suffering; it involves treating oneself with kindness and understanding instead of criticizing oneself (Neff, 2009). In a study, it was reported that self-compassion has an indirect effect on physical health and that taking a kind, accepting, and mindful stance towards one's flaws and failures may have benefits in reducing stress and promoting health behaviors (Homan & Sirois, 2017). We can say that mindfulness-based practices increase self-compassion and self-care.

Mindfulness-based practices significantly impacted women's mental health, reducing fear of childbirth, depression, anxiety, and stress levels while increasing psychological well-being, self-efficacy, self-compassion, and mindfulness (Özer & Dişsiz, 2025). An online self-directed mindfulness-based intervention program was reported to show improvements in mindfulness skills and self-compassion, although it did not significantly reduce pregnancy distress (Hulsbosch et al., 2023). Another study showed that the three dimensions of mindfulness (describing, acting with awareness, and non-judgment) and self-compassion were significantly associated with depression in pregnant women as a whole (Fourianalistyawati et al., 2018).

Reduced Risk of Postpartum Depression

The MBSR program offers a promising alternative or complementary treatment for postpartum depression. Its effectiveness in reducing symptoms has been supported by several studies suggesting that integrating mindfulness practices into postnatal care can significantly benefit maternal mental health (Worku et al., 2025; Yang et al., 2023). It has been emphasized that mindfulness-based interventions can alleviate maternal depressive and anxiety symptoms, especially for the prevention of postpartum depression in healthy pregnant women, but they may not work the same for everyone, so caution is needed (Min et al., 2023).

A quasi-experimental study of four hundred and ten new mothers showed that mindfulness training significantly reduced symptoms of postpartum depression. Beck Depression Inventory scores in the experimental group decreased from 24.75 before the test to 18.5 after the intervention (Sheydaei et al., 2017). Another study emphasized that adapting mindfulness techniques during pregnancy led to clinically significant reductions in depression and anxiety, with benefits extending into the postpartum period (Badker & Misri, 2017). Given the difficulties many mothers face in accessing traditional therapy, mobile health (mHealth) mindfulness programs have been proposed as a viable alternative. A study evaluating a self-paced mHealth mindfulness intervention found it to be acceptable and potentially effective for postpartum women with moderate depressive symptoms (Avalos et al., 2020).

ANXIETY REDUCTION MECHANISMS OF MINDFULNESS

The MBSR program reduces anxiety by increasing mindfulness, improving emotional regulation, using body awareness and relaxation techniques, providing a supportive group environment, and cognitive restructuring.

Increased Awareness

MBSR program teaches individuals to focus on the present moment, which helps to reduce thinking and worrying about future uncertainties related to pregnancy and childbirth (Güney et al., 2022; Ibici-Akca et al., 2023).

Enhanced Emotional Regulation

Mindfulness practice promotes better emotional regulation. Pregnant women learn to observe their thoughts and feelings without judgment, which can reduce the intensity of their emotional responses to stressors. This enhanced emotional awareness allows for healthier coping strategies when faced with anxiety-provoking situations (Goodman et al., 2014).

Body Awareness and Relaxation Techniques

MBSR program includes various techniques such as body scans and mindful breathing that promote relaxation and reduce the physiological symptoms of anxiety. These practices help pregnant women become more attuned to their bodies, which can lead to a reduction in the physical tension associated with anxiety (Güney et al., 2022; Ibici-Akca et al., 2023).

Supportive Group Environment

Many MBSR program are conducted in group settings, providing social support and shared experiences among participants. This communal aspect can increase feelings of safety and belonging and further reduce anxiety levels during a period that can be isolating for some women (Ibici-Akca et al., 2023).

Cognitive Restructuring

MBSR program promotes a change in perspective regarding stressors. By developing a non-judgmental awareness of thoughts, women can challenge negative thought patterns that contribute to anxiety, leading to a more positive outlook towards their pregnancy experience (Goodman et al., 2014).

LIMITATIONS OF MINDFULNESS-BASED INTERVENTIONS IN PREGNANT WOMEN

Although mindfulness-based interventions have been shown to have benefits in pregnant women, systematic reviews and meta-analyses have reported some limitations and disadvantages.

Inconsistent Activity

The efficacy of these interventions has not been consistent. While some studies reported improvements in anxiety and depression, others reported insufficient efficacy in people with severe depressive symptoms before delivery (Min et al., 2023; Sarı et al., 2023). Notably, studies have shown limited efficacy for high-risk pregnant women suffering from severe depressive symptoms (Min et al., 2023), suggesting that these interventions may not be appropriate for all demographics in the pregnant population.

Methodological Limitations

Many studies included in meta-analyses have demonstrated considerable heterogeneity in terms of intervention duration, timing, and content, complicating the ability to draw firm conclusions about the effectiveness of interventions (Abdolalipour et al., 2023; Sarı et al., 2023). This variability can lead to difficulties in standardizing treatment protocols. Some reviews have also highlighted that many studies suffer from small sample sizes and lack robust randomized controlled trials, which limits the reliability of their findings (Min et al., 2023; Özer & Dişsiz, 2025).

Cultural and Practical Barriers

The implementation of mindfulness-based interventions can be influenced by cultural beliefs and practices related to pregnancy and mental health. This can affect participants' engagement in mindfulness practices and potentially limit their effectiveness (Sarı et al., 2023). Barriers such as cost, availability of trained practitioners, and social stigma against mental health treatment may prevent pregnant women who could benefit from them from accessing mindfulness-based interventions (Özer & Dişsiz, 2025; Reangsing et al., 2021).

CONCLUSION

The MBSR interventions applied during pregnancy have positive effects on the mental and physical health of pregnant women, as well as on reducing fear of childbirth, strengthening mother-infant bonding, and reducing the risk of postpartum depression. However, some systematic review and meta-analysis studies have revealed some limitations regarding the effectiveness of these practices. Therefore, the following recommendations were made in line with these studies;

- MBSR interventions should be implemented by people trained in this field.
- In those with high-risk pregnancies in terms of mental illnesses, the intervention should be implemented by mental health professionals trained in this field.
- The intervention should be applied in larger samples in terms of the reliability of the results.
- Randomized controlled studies on the subject should be focused on.
- Before interventions are applied, the culture of the pregnant woman and her perspective on such practices should be evaluated, and people with negative attitudes should not be rushed to intervene, and the attitudes of the person should be worked on first.

ETHICAL DECLARATIONS

Referee Evaluation Process

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The authors have no conflicts of interest to declare.

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

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Professional bereavement concept in nursing

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ABSTRACT
Working with terminally ill patients is difficult for nurses who provide care for the patient, but since the relationship involves the concepts of life and death, the relationship established also has an emotional aspect. When a nurse begins to develop a relationship with a patient and experiences the loss of the patient or a perceived loss, nurses begin to go through the bereavement process. This bereavement experience is called "professional bereavement." Professional bereavement has various effects on nurses in terms of physical, psychological and social aspects. Determining the situations of professional bereavement and related factors is important in order to take measures to protect and improve the health of nurses, to identify groups that are likely to experience difficulties, and to plan psychosocial support services for nurses experiencing bereavement.
Keywords: Burnout, bereavement, grief, nurse, sorrow, terminal care

INTRODUCTION
Bereavement is defined as an individual's reaction to the loss of something they once possessed, such as a loved one or a close relationship; it encompasses both the emotional and psychological responses that arise following such a loss. (Humphrey & Zimpfer, 2007). The concept of grief is related to bereavement but does not carry the same meaning (Hudson et al., 2018). Grief represents the pain and suffering experienced after a loss, namely the psychological aspect of loss (Shear, 2015). Bereavement, on the other hand, encompasses both the individual's psychological reaction, which is referred to as grief, and the social expression of this reaction, which is known as mourning. (Gharmaz & Milligan, 2006). In this context, the term bereavement was deemed appropriate for use in our study, as it reflects a more comprehensive approach encompassing both individual and social dimensions. While bereavement is a natural emotional response to the death of a loved one, it is also a complex process (Robalo Nunes et al., 2018; Shear, 2015). Nurses who work with terminally ill patients also experience bereavement after the loss of their patients, which is referred to in the literature as professional bereavement (Du et al., 2020; Eryüksel & Özbaş, 2023). Frequent exposure to patient death has both short- and long-term effects on nurses (Chen & Chow, 2021; Eryüksel, 2022). Identifying nurses' experiences of professional bereavement allows for the enhancement of individual coping mechanisms and the implementation of institutional-level preventive strategies (Anderson et al., 2015). The aim of this review is to draw attention to the phenomenon of bereavement experienced by nurses in their professional lives due to patient loss and to contribute to the recognition of the concept of professional bereavement at the national level.

GRIEF
Although grief has been defined in various ways in the literature, from a holistic perspective, it can be described as a natural emotional response to the loss of a loved one, as well as a dynamic, pervasive, intense, complex, and individualized process (Robalo Nunes et al., 2018; Shear, 2015). The first formal definition of grief was offered by Sigmund Freud in his 1917 article Mourning and Melancholia, in which he conceptualized grief as a response to the loss of a loved person or a symbolic substitute (Freud, 1917).

Following Freud, various theorists and theories have provided different perspectives on grief (Bowlby, 2008; Freud, 1917; Kübler-Ross, 1986; Lindemann, 1944; May & Yalom, 1989). According to the psychoanalytic model, human life and nature are unique, and the grieving individual finds experiences that allow them to continue life with new symbolic objects that substitute the lost one (Shapiro, 1996). The existential-humanistic theory argues that grief reveals one's existential concerns and allows the individual to derive meaning from the loss (May & Yalom, 1989). From a cognitive-behavioral perspective, grief is not merely an emotional process but also involves cognitive and behavioral adaptation to the consequences of loss (Boelen et al., 2006). According to Freud, the function of grief is to withdraw all libidinal attachments from the lost object once reality confirms the loss (Freud, 1917). This process is often met with resistance, as it is difficult for individuals to detach from a position of emotional investment (Shapiro, 1996). In some cases, individuals may refuse to accept the reality of the loss and continue to cling to the deceased (Freud, 1917). Bowlby, in turn, described grief as a response of intense anxiety and emotional protest following

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the loss or threatened loss of an attachment figure (Bowlby, 2008).

Although various theoretical frameworks explain the grief experience, it is widely recognized that grief is a profoundly difficult process that can significantly affect the lives of those left behind, manifesting in a wide range of behavioral, emotional, physical, and cognitive symptoms (Shear, 2015). Behavioral symptoms may include social withdrawal and avoidance; physical symptoms may include hyperarousal, fatigue, and headaches; emotional symptoms can involve hopelessness, sadness, guilt, anger, and longing for the deceased; and cognitive symptoms may include difficulty concentrating, learning difficulties, and forgetfulness (Humphrey & Zimpfer, 2007; Shear, 2015). The grief process begins when the bereaved perceives the reality of the loss (Humphrey & Zimpfer, 2007). However, numerous individual and societal factors such as the relationship between the bereaved and the deceased, cultural norms, and societal expectations influence the experience and expression of grief, particularly in cases where the personal characteristics of the deceased or their relationship with the bereaved do not align with societal norms, leading the community to overlook or fail to acknowledge the loss (Spidell et al., 2011).

PROFESSIONAL BEREAVEMENT

In the literature, bereavement has long been conceptualized solely as a process experienced following the loss of a loved one and has traditionally been confined to the family, friends, and close circles of the deceased (Robalo Nunes et al., 2018; Shear, 2015). However, over the past 45 years, attention has been drawn to the responses of healthcare professionals following the death of their patients, leading to the emergence of the concept of professional bereavement (Lerea & Limauro, 1982; Saunders & Valente, 1994; Shanfield, 1981). Professional bereavement refers to the mourning experienced by healthcare professionals following the death of their patients (Brosche, 2007; Chen & Yang, 2020). A review of the literature on professional bereavement among healthcare workers reveals a particular focus on nurses (Esplen et al., 2022). The reason for this is that nurses develop relationships with their patients centered on themes of life and death and engage in prolonged and intensive care processes (Du et al., 2020). In this context, working with terminally ill patients is not only challenging for the nurses providing care but also inherently emotional (Beauvais et al., 2019). When a nurse loses a patient with whom they have established a care relationship, they begin to experience the process of professional bereavement (Du et al., 2020; Chen & Chow, 2021). Professional bereavement may signify the loss of a bond formed with the patient, the empathetic distress experienced in response to another's loss, or the reactivation of past personal losses, while also encompassing the loss of professional goals and expectations or assumptions related to future professional plans and the ideal professional identity. (Chen et al., 2019; Chen & Chow, 2021).

For many years, the bereavement experienced by nurses after the loss of their patients has been conceptualized as familial bereavement (Faschingbauer et al., 1987; Pereira et al., 2020; Rubin et al., 2009; Hogan, 2001), or has remained unacknowledged and classified under disenfranchised grief (Doka, 2009). The emotional responses experienced by nurses following the loss of their patients have often remained unrecognized, as they were neither understood nor acknowledged by society, professionals, administrators, or even by the nurses themselves (Spidell et al., 2011). Consequently, many nurses have felt compelled to suppress their own bereavement, have been unable to access the support they needed, and have faced difficulties in coping with their grief (Papadatou, 2009).

The concept of disenfranchised grief was first introduced by Kenneth Doka in 1989 and refers to the experience of those whose loss is either not recognized or, even if acknowledged, is not openly accepted, publicly mourned, or socially validated (Doka, 2009). This form of grief is characterized by the lack of societal recognition of the loss, insufficient support, the isolating emotions that the bereaved cannot express, and the societal denial of the circumstances surrounding the death (Spidell et al., 2011). Examples of such losses include deaths related to extramarital affairs, same-sex relationships, suicide, AIDS, or substance abuse (Doka, 2009; Spidell et al., 2011). Disenfranchised grief is not typically addressed through therapeutic means; instead, it often remains hidden, unacknowledged, and unresolved (Papadatou, 2009; Doka, 2009). Doka described healthcare professionals grieving their patients as "hidden mourners," who are denied the right to grieve (Doka, 2009).

As both ordinary individuals and healthcare professionals, nurses experience patient deaths from a dual perspective, which renders professional bereavement a complex process that transcends the boundaries between their personal and professional lives (Du et al., 2020). A review of the literature on professional bereavement among nurses indicates that approximately 40% of nurses report experiencing such grief and the highest rates of bereavement are observed among nurses working in intensive care units (33%) and pediatric departments (20%) (Gilart et al., 2022). Another study reported that 57.9% of nurses had experienced professional bereavement (Rahmani et al., 2023). In a quantitative study conducted with nurses, 86% reported experiencing bereavement, 9.4% of whom experienced high levels of grief, and 4% exhibited severe grief reactions also the study also found that nurses working in pediatric settings had a higher risk (35.3%) of experiencing professional bereavement compared to those working in other departments (Sharif et al., 2025). The literature largely focuses on nurses working in high-risk areas with frequent exposure to patient death, such as oncology, intensive care, pediatrics, and palliative care units (Anderson & Gaugler, 2007; Beaune et al., 2018; Robalo Nunes et al., 2018; Rodriguez et al., 2020).

Evidence from these studies highlights that nurses are significantly affected by patient loss, both in the acute and long-term phases, and that they exhibit a wide range of physical, psychological, and social symptoms (Du et al., 2020; Gerow et al., 2010). When examining the acute symptoms observed in the short term, grief manifestations include physical symptoms such as crying, inability to accept the patient's death, persistent rumination on the loss, headaches, feeling physically unwell, lack of concentration, loss of appetite, fatigue, a sense of failure, and sleep disturbances; psychological symptoms such as anxiety, sadness, anger, helplessness, frustration, fear, guilt, emotional numbness, vulnerability, insecurity, and hyperarousal; and social symptoms such as withdrawal from family and friends and a desire for solitude (Andersson et al., 2016; Barnes et al., 2020; Betriana & Kongsuwan, 2020; Chen & Chow, 2021; Chen et al., 2021; Du et al., 2020). Long-term cumulative bereavement symptoms emerge when nurses repeatedly experience patient losses, feel that their grief is overlooked, and struggle to cope with death and loss effectively, which consequently leads to problems in both their professional and personal lives over time (Chen & Chow, 2021). Rather than engaging in a healthy grieving process, many nurses may adopt ineffective coping mechanisms, such as avoidance and emotional suppression, which can result in burnout as well as various physical and psychological difficulties (Gerow et al., 2010). In the long term, repeated exposure to patient deaths tends to accumulate in nurses' lives and careers (Robalo Nunes et al., 2018), which may lead to emotional withdrawal and desensitization toward others (Du et al., 2020). As a result of the long-term effects of professional bereavement, nurses may experience a decrease in the quality of care provided and lower job satisfaction, which is often accompanied by increased levels of burnout and a heightened intention to leave the profession (Anderson et al., 2015). In a study conducted by Eryüksel and Atlı Özbaş (2023), it was revealed that nurses experience professional bereavement, and this experience significantly affects their levels of burnout and compassion fatigue (Eryüksel, 2022; Eryüksel & Atlı Özbaş, 2023).

COPING WITH PROFESSIONAL BEREAVEMENT

It is considered essential to implement both individual and institutional measures in addressing professional bereavement, as such efforts play a significant role in supporting nurses in coping with their grief (Phillips et al., 2025). In terms of the individual perspective, strategies such as the recognition of professional bereavement, awareness of its manifestations, acceptance of the grieving process, and the creation of a space where such experiences can be openly discussed are considered important (Hawes & Wang, 2024). Additional measures include acknowledging the loss, encouraging psychological counseling for nurses who experience difficulties in coping, developing an understanding of the nature of professional bereavement, sharing grief-related experiences with colleagues, commemorating deceased patients through personal rituals, and striving to attribute meaning to the experienced loss (Fallek et al., 2019; Hawes & Wang, 2024; Phillips et al., 2025). At the institutional dimension, the incorporation of assessment tools specifically designed to identify professional bereavement, particularly among nurses engaged in continuous care relationships with patients, is of critical importance since integrating these tools into organizational policies facilitates the systematic recognition of bereavement among healthcare professionals. (Chen & Chow, 2022; Eryüksel & Atlı Özbaş, 2023). Given that nurses working in pediatric, intensive care, and palliative care units are regarded as being at heightened risk for experiencing professional bereavement (Beaune et al., 2018; Robalo Nunes et al., 2018; Rodriguez et al., 2020), prioritizing institutional screenings aimed at the identification and prevention of bereavement in these units constitutes a key preventive strategy (Yazdan et al., 2023). Additional institutional interventions may include providing designated time and space to grieve after patient loss, allowing leave following particularly distressing deaths, enabling participation in structured psychoeducational and peer support groups, implementing awareness-raising programs, and offering access to professional bereavement counseling services (Esplen et al., 2022; Mary Esplen et al., 2022; Otis et al., 2025).

CONCLUSION

Nurses experience professional bereavement, which affects both their personal and professional lives. Identifying the conditions under which professional bereavement occurs and the associated factors is essential for implementing measures to protect and improve nurses' well-being, identifying groups that are likely to struggle, and planning psychosocial support services for nurses experiencing bereavement. When planning health-protective and health-promoting interventions for nurses, institutions are advised to conduct screenings to identify professional bereavement. It is also recommended to include the concept of professional bereavement in nursing undergraduate and especially graduate programs. Additionally, more detailed unit-based studies aimed at identifying and preventing professional bereavement among nurses should be conducted.

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Referee Evaluation Process

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Review

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The use of Artificial Intelligence in nursing education: opportunities, challenges and solutions

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ABSTRACT

Artificial Intelligence (AI) has the potential to transform nursing education by enhancing instructional quality and better preparing students for future healthcare demands. This traditional review examines opportunities, challenges, and strategies for AI integration into nursing education, drawing on full-text studies indexed in Web of Science, Scopus, and Google Scholar. AI supports professional competence and reduces educators' workload through virtual patient simulations, instant feedback, personalized learning, improved accessibility, time efficiency, and the promotion of analytical and critical thinking. However, unresolved ethical and legal issues, misinformation risks, academic misconduct, resistance to technology, financial constraints, and limited infrastructure hinder effective implementation. Conscious, ethical, and sustainable integration of AI can yield substantial benefits, yet adoption in developing countries remains insufficient. This review offers a practical roadmap for educators, policymakers, and researchers to leverage AI effectively in nursing education.

Keywords: Artificial Intelligence, nursing education, opportunities, challenges, solutions

INTRODUCTION

Artificial Intelligence (AI) technologies (e.g., big data and analytics, chatbots, robotics, and virtual and augmented reality), which are defined as the development of computer systems that can perform tasks that require human intelligence, have developed rapidly in recent years and have radically affected many fields, especially the health sector and nursing practices (Castonguay et al., 2023; Lifshits & Rosenberg, 2024). The potential of AI in healthcare to improve patient care and enhance clinical outcomes has accelerated its integration into nursing education and practice (Korkmaz, 2024). However, effective integration of AI into the nursing curriculum is a complex process that requires careful planning and implementation. Incorporating AI into educational settings brings significant opportunities and challenges and inflames debates in this field (De Gagne et al., 2024; Schneidereith & Thibault, 2023).

Nurse educators are working to ensure that nursing students can deliver safe, high-quality care in an increasingly complex and technology-integrated health system. At this point, it is essential to adapt to these new technologies that can support student learning and nursing education (Castonguay et al., 2023). Integrating AI, a relatively new technology, into nursing education provides many benefits. For example, algorithms used in simulation-based learning allow students to develop practical skills in clinical settings, while tools such as ChatGPT offer innovative educational methods to nursing students (Alderden et al., 2018; Shorey et al., 2020). The potential benefits of AI in nursing education include supporting students in developing medical knowledge and professional skills, creating safe clinical education environments, and increasing student success (Lifshits & Rosenberg, 2024). However, while using AI in nursing education provides many benefits, it also brings various challenges. Nursing educators' and students' low level of knowledge and competence about AI applications, ethical concerns, economic limitations, and confidentiality problems can be counted among the difficulties experienced (De Gagne et al., 2024; Sun & Hoelscher, 2023).

Although there has been a significant increase in studies on the use of AI in nursing as of 2017, there are significant gaps in the literature on how to use AI in nursing education (Korkmaz, 2024). Moreover, a standard and comprehensive roadmap for integrating AI into the nursing education curriculum and effectively using these technologies has not been established (Castonguay et al., 2023). It is stated that it is necessary for educators to fully understand the potential benefits, limitations, and ethical dimensions of AI in order to fill the existing gap and ensure the successful integration of AI into nursing education (Schneidereith & Thibault, 2023; Sun & Hoelscher, 2023). Accordingly, this review study aims to provide a road map for nursing educators with the

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opportunities offered by using AI in nursing education, the difficulties that may be encountered in this process, and solutions for the effective use of AI in nursing education. This study will provide a fundamental reference point for the effective integration of AI into nursing education and guide future research.

OPPORTUNITIES OFFERED BY THE USE OF AI IN NURSING EDUCATION

AI is a powerful tool that enriches learning experiences in nursing education, reduces the workload of educators, and makes education more efficient, practical, and accessible. With various applications ranging from simulations to individualized learning experiences, AI has great potential for transformation in nursing education (Korkmaz, 2024; Sun & Hoelscher, 2023). The opportunities offered by using AI in nursing education are explained below.

Simulations and Virtual Patients

AI-supported simulations and virtual patients enable students to improve their clinical decision-making, patient assessment, and communication skills. By providing realistic and immersive learning environments, these technologies equip nursing students with practical knowledge and critical thinking skills and increase their motivation to learn (Gonzalez, 2024; Kouka et al., 2025; Lifshits & Rosenberg, 2024; Son et al., 2023; Topaz et al., 2025). Moreover, the capacity of AI to generate various simulation cases, such as patient interviews or job interviews, saves educators time and enhances students' interactive learning experiences (Couper, 2025; De Gagne, 2023).

Individualized and Interactive Learning

By providing interactive education platforms, AI tracks students' performance and provides content to strengthen their weaknesses. AI algorithms create personalized education plans by analyzing each student's learning speed and deficiencies. This technology increases efficiency in education by providing personalized and interactive learning experiences in nurse education and areas such as remote patient monitoring. One study observed that students' knowledge, attention levels, and autonomous learning skills increased significantly after using an AI-based teaching methodology (Archibald & Clark, 2023; Rodriguez-Abad et al., 2023).

Creating Lesson Materials

AI can be used to create lesson plans and course materials. This can help educators facilitate lesson preparation and improve students' oral presentation skills, comprehension, and organizational abilities (Castonguay et al., 2023).

Analytical/Critical Thinking

Analytical and critical thinking is an important challenge at all stages of nursing studies. The main goal of clinical instructors is to enable nursing students to integrate theoretical knowledge into clinical practice effectively. Nursing students need to develop a structured thinking process to achieve this goal. This process starts with assessing the patient's condition, identifying key problems, and considering all possible interventions. AI can significantly contribute to this thinking process by providing advanced tools that help students select appropriate nursing interventions (Choi et al., 2023; Lifshits & Rosenberg, 2024).

Instant Feedback

AI accelerates learning by showing students their mistakes in real-time. This feedback lets students quickly correct their misconceptions by identifying errors and suggesting correct approaches (Castonguay et al., 2023). It also supports students to improve their weaknesses with individualized suggestions (Lifshits & Rosenberg, 2024).

Research Support

AI provides excellent convenience for nursing educators and researchers in task organization, summarization, and simplification tasks. It also supports research processes by accelerating data analysis and interpretation. For example, AI tools can analyze large data sets, highlight important findings, and provide recommendations, thus saving researchers time (Castonguay et al., 2023).

Access in Education

AI reduces language and cultural barriers by providing translation and language support and offers globally accessible educational materials. Digital education tools can increase access to quality education for students in geographically disadvantaged areas. By offering course materials in different languages, AI-enabled platforms provide students with equal opportunities and can customize the learning experience (Castonguay et al., 2023; Couper, 2025). Thus, even peripheral students can access educational resources on a global level (Lifshits & Rosenberg, 2024).

Grading and Documentation

AI automates routine tasks such as grading and documentation, allowing instructors to focus more on teaching and guidance (Rony et al., 2024). It also supports nursing educators in preparing exam questions and guidelines (Castonguay et al., 2023). These tools improve teaching quality while alleviating educators' workload (Lifshits & Rosenberg, 2024).

Time-Saving

AI provides students quick answers on various topics, making information quickly accessible. Thanks to its big data processing capacity, students can get immediate answers to their questions and be directed to relevant resources. This feature allows students to work more efficiently and accelerates learning (De Gagne, 2023). On the other hand, AI saves instructors considerable time by automating routine tasks such as grading, attendance tracking, and student progress monitoring. In this way, instructors can focus on complex teaching tasks and guidance so that AI can improve student and instructor experience (Castonguay et al., 2023).

CHALLENGES OF USING AI IN NURSING EDUCATION

While integrating AI into nursing education offers significant opportunities, such as improved learning outcomes and increased efficiency, it also brings privacy and security concerns, ethical issues, and resistance to adoption (De Gagne, 2023). The New York Department of Education's ban on access to some AI-based programs due to concerns about academic integrity violations has brought the negative impacts of these technologies on education back to the agenda (Korn & Kelly, 2023). However, reports of increased cheating cases in exams and academic studies have intensified the debate on the possible adverse effects of tools such as ChatGPT on the education system (Sun & Hoelscher, 2023). The challenges of using AI in nursing education, which are at the center of the debates, are discussed comprehensively in this section.

Ethical and Legal Issues

Integrating AI into nursing education brings fundamental ethical challenges, such as student and patient confidentiality. Since AI systems require access to personal data, ensuring data privacy and security is very important (Abdulai & Hung, 2023; Katznelson & Gerke, 2021). Moreover, the inherent complexity of some AI models can lead to various ethical and legal issues (Couper, 2025; O'Connor et al., 2023; Topaz et al., 2025). In addition, algorithmic biases can cause serious fairness issues in AI systems. This can lead to unfair decisions by reflecting the biases in the data sets used in the results (De Gagne et al., 2024; Rony et al., 2024).

The rapid spread of AI technologies also reveals the lack of legal and regulatory frameworks for using these technologies. The insufficient development of national and international regulations on the use of AI in education creates uncertainties about responsibility and limits of use. The lack of legal regulations and uncertainties about who is responsible and the limits of use can lead to various legal problems for educational institutions and students (Vincent-Lancrin & Vlies, 2020). In particular, the lack of data privacy and ethical use of AI-based systems can increase the risk of misuse of students' data. Moreover, the lack of international standards creates significant differences in implementing AI in education in different countries, leading to global inequality (De Gagne, 2023; Zhang & Aslan, 2021).

Access to Misinformation

Although AI applications can produce compelling and user-friendly content, they have significant limitations in accuracy and reliability. AI-generated information can often be false or completely fabricated (Chen et al., 2024). AI's tendency to generate and disseminate false information can undermine users' trust in information and lead to erroneous decisions. This becomes a concern in environments where academic integrity and credibility are important (Thorne, 2024; Topaz et al., 2025). Furthermore, if AI-generated texts are rephrased or altered, the systems may not even recognize the information they generate (Topaz et al., 2025).

AI models are limited in providing, summarizing, and synthesizing up-to-date information depending on the frequency with which knowledge bases are updated. In rapidly evolving fields such as nursing and health care, AI responses may not incorporate the latest developments, resulting in the dissemination of incomplete or outdated information. Although language models are constantly updated and improved, they depend on educational data and cannot fully meet human cognition's knowledge, skill performance, and assessment requirements. As such, AI cannot generate original ideas, such as new theoretical models (Castonguay et al., 2023).

Errors in Research

AI's ability to generate content can, in some cases, produce incomplete, inaccurate or misleading information. Misinformation can lead to erroneous conclusions in academic research and applied sciences, leading to larger-scale problems (Archibald & Clark, 2023; Chen et al., 2024). Especially in academic research, the limitations of AI in generating references pose a significant problem. In some cases, references are misrepresented or not based on actual sources. This poses significant risks to academic integrity. Leading scientific journals have expressed opposition to using AI tools as an "author" for various ethical and methodological reasons (Thorne, 2024).

Threat to Examination Security and Critical Thinking

The development of AI technologies in recent years has led to significant concerns in examinations for measuring critical thinking and diagnostic reasoning skills in nursing education (Abujaber et al., 2023; Archibald & Clark, 2023). The high success of AI-based tools such as ChatGPT in undergraduate exams increases the debate on integrating these technologies into educational processes (Huang, 2023). Especially in distance education programs, students easy access to such tools threatens the effectiveness of existing exam security systems (Abujaber et al., 2023).

Academic Misconduct

While AI is gaining attention as a valuable learning tool in education, the potential for students to use this technology in unethical ways raises concerns. In particular, the ability of tools such as ChatGPT to generate summaries or content raises the issue of academic misconduct, which can result in students using the generated summaries, presenting them as their own, and ignoring the actual labor involved in the process (Abujaber et al., 2023).

Technological Barriers

The lack of necessary technical infrastructure (internet access, hardware) poses a serious problem when using AI technologies, especially in developing and remote regions. Technological requirements such as a strong internet connection, modern hardware, and computers with high processing capacity are often not accessible in these regions. Using online AI tools is almost impossible, especially in regions with limited internet access (Chisom et al., 2024). Advanced AI applications' high software and hardware costs can make accessing these technologies complex for many educational institutions (Lifshits & Rosenberg, 2024). Building and deploying AI infrastructure, acquiring AI software, and integrating it into existing health systems require significant financial investment. This can be particularly challenging for universities operating on tight budgets (Rony et al., 2024).

The Need for Continuous Updating

Since AI is rapidly developing, the systems used must be updated regularly and keep up with innovations. This necessity increases the challenges teaching staff and educational institutions may face in digital transformation processes. Moreover, due to the rapid advancement of AI, old technologies may quickly become obsolete, further complicating the cost and adaptation processes. Educational institutions may not always be able to quickly change their curricula with these technologies (Alkhaqani, 2023; Hwang et al., 2022).

Limited Human Characteristics

Since nursing education is a human-oriented profession, excessive use of AI technologies may make developing human skills (communication, empathy) challenging. AI-supported simulations and virtual patient applications may not fully provide the experience students gain from real patient interaction in practice (Buchanan et al., 2021).

Resistance

Educators and students may face cultural and educational barriers to using AI in education (Chen & Lee, 2024). In order to be able to use AI tools effectively, educators must first be informed and trained. However, this process requires significant time and cost, and some educators may be concerned that AI will increase their workload or threaten their role (De Gagne, 2023). Furthermore, resistance to adopting AI is a challenge for educators and students that needs to be addressed. Nurses nursing students and educators may be apprehensive about integrating AI into their workflow and fear that it may change or diminish the value of their role. Resistance to technologies can make the adoption of AI in education difficult and hinder the effective use of the innovations AI offers (Rony et al., 2024).

SUGGESTIONS FOR EFFECTIVE USE OF AI IN NURSING EDUCATION

In the last part of this review, various solution suggestions are given to cope with the difficulties brought by the use of AI in nursing education and maximize the benefit of technology. AI-related developments require a review of assessment methods in nursing education and a reconsideration within an ethical framework. Educators should take more careful and strategic steps to balance the opportunities and threats that AI technologies will create in educational processes (Gonzalez, 2024; Sun & Hoelscher, 2023).

Ethical and Legal Steps

Using AI technologies in nursing education necessitates setting ethical standards and making these standards applicable. In particular, the adoption of advanced security technologies such as encryption and anonymization is necessary to ensure the security of student and patient data. Such practices aim to reduce AI's potential risks to data privacy (Dunlap & Michalowski, 2024). Furthermore, algorithms that make the decision-making processes of AI transparent and explainable should be developed. However, at this point, data bias and the risk of reinforcing existing inequalities through AI systems is another critical issue that needs to be carefully addressed (Seibert et al., 2020). Ethical concerns during the integration of AI into nursing education require solutions not only at the individual but also at the systemic level (Abdulai & Hung, 2023).

Educators and students should be trained to understand AI's limitations, possible inaccuracies, and biases. In this context, appropriate policies and guidelines should be established. This can ensure a balanced approach that enriches the learning experience and preserves academic integrity (Alkhaqani, 2023; De Gagne, 2023). Robust privacy and security measures ensure that the full potential of AI in education is realized while maintaining ethical values. While AI can be a handy tool, students and lecturers must recognize its limitations and cautiously approach its use (De Gagne, 2023). A combination of ethical guidance, comprehensive educational programs, and strong safety protocols are imperative for the effective use of AI in nursing education. National and international laws regulating the integration of AI into education should be established and developed. Licensing and approval mechanisms should be established to ensure that AI tools used in education are reliable and effective.

Strengthening Technology and Infrastructure

Infrastructure investments can be provided through state-supported funds or private-sector partnerships to enable educational institutions to procure the necessary hardware and software. Developing low-cost AI tools and open-source systems in developing countries can support this process. Integrating AI-based tools into nursing curricula involves significant costs due to elements such as software, hardware, and staff training and requires investments in technology and infrastructure (Ahmad & Jenkins, 2022; Couper, 2025). However, these concerns can be effectively addressed by engaging instructional design experts and nurse educators in developing technology-enhanced curricula with appropriate training and technical support (Abujaber et al., 2023; Cary et al., 2024). One way to do this is by reallocating resources from existing budgets, seeking grant support, or collaborating with sector partners. To address these challenges, governments and educational institutions should create long-term strategic plans prioritizing technological investments (Abujaber et al., 2023).

Training and Awareness Studies

Training programs that include pedagogical aspects, applications, and use of AI technologies and train-the-trainer training should be planned to increase the knowledge and skills of trainers. To convey the potential and limitations of AI to students, it should be integrated into the curriculum, and seminars, workshops, and courses should be organized regularly (Topaz et al., 2025). Higher education institutions should recognize the need for professional development of faculty members to learn and understand AI technologies such as ChatGPT so that it can be used as a meaningful learning tool. Academic administrators should prioritize time and funding to support faculty members in developing their competence in using and understanding AI functionality and capabilities (Castonguay et al., 2023). It is also necessary to increase awareness by including an educational framework that includes the effects and use of AI in the nursing education curriculum (Abdulai & Hung, 2023; Archibald & Clark, 2023; Castonguay et al., 2023).

Steps Towards Skill Development

It is of great importance for educators to use AI-based tools and techniques in a way that supports human interaction, critical thinking, and creativity. Nurse educators can contribute to developing skilled and professional nurses through their critical role in developing these essential skills. Collaboration between AI researchers and nurse educators can promote a holistic approach to nursing education that takes advantage of technology while maintaining the value of human interaction (Jung, 2023).

Furthermore, nurse educators should play an important role in designing AI-enabled tools in alignment with the goals of nursing education and the profession's core values, ensuring that these tools support clinical judgment and patient-centered care. This requires educators to continue to explore, innovate, and adapt their teaching methods to provide the best possible education to nursing students (De Gagne, 2023; Jung, 2023; Reid, 2024; Schneidereith & Thibault, 2023).

In order to develop students' critical thinking, problem-solving, creativity, and self-directed learning skills, it is recommended to use a variety of teaching methods, such as written assignments, as well as oral presentations and exams that keep multiple-choice formats to a minimum and focus on skills such as visual interpretation, open-ended responses to patient scenarios or problem-solving. However, assignments that support oral expression skills, synchronous presentations, live discussions, or debates will further reduce students' reliance on AI (Castonguay et al., 2023; O'Connor et al., 2023; Reid, 2024; Sun & Hoelscher, 2023). Such assignments have the potential to limit student dependency due to AI's inability to process non-textual inputs (Topaz et al., 2025).

Dealing with Resistance

Instructors and students should be actively involved in AI training and processes to reduce or overcome possible resistance to new technologies. It is important to emphasize that AI technology supports and enhances the teaching and learning process when used correctly to reduce resistance. Creating an ethical framework that aligns with nursing values is an essential preparation step for students to understand and adopt AI. Students are encouraged to evaluate AI's potential benefits and ethical responsibilities through value clarification exercises (De Gagne, 2023). In order to reduce resistance to AI, AI applications should be integrated with methods that develop students' human skills, such as empathy, communication, and ethical decision-making. AI-based learning systems should be balanced with face-to-face education and actual clinical experiences using Blended Learning Models (Topaz et al., 2025). Studies on the explainability of AI can help students and educators find technology more reliable. It is recommended that educators provide clear and understandable explanations to increase students' confidence in technology (Weitz, 2021).

Continuous Updates and Standardization

For AI systems to adapt to rapidly developing technology, updates should be created continuously and regularly. National and international standards for using AI in nursing education should be developed to ensure consistency between institutions. In addition, an international guide, directive, or policy should be created to use AI tools (Abdulai & Hung, 2023; Castonguay et al., 2023; Sun and Hoelscher, 2023). It should be determined and transparent about the consequences of plagiarism or other academic integrity violations. As AI tools and technologies rapidly evolve, the quality and effectiveness of AI-supported educational resources may change. Establishing standards and best practices for AI integration in nursing education is crucial to ensuring consistency and quality. This includes developing guidelines for using AI in educational environments, evaluating the effectiveness of AI tools, and sharing best practices across institutions (Couper, 2025).

Interdisciplinary Collaboration

Effective use of AI in education can be achieved through teamwork by collaborating with experts from disciplines such as nursing, informatics, ethics, and law. In particular, academic and industry collaboration can contribute to developing innovative approaches for integrating AI into education, research, and development (De Gagne, 2023; Weitz, 2021).

Ensuring Access and Equality

For everyone to benefit from the advantages of AI, these technologies need to be made accessible and affordable. In this context, strategies are suggested to support language and cultural diversity by adapting AI tools to different languages and cultures (Son et al., 2023). For example, the CILS (Cross-Cultural Intelligent Language Learning System) system offers personalized learning experiences that can be adapted to individuals' linguistic and cultural needs using artificial intelligence technologies. This approach facilitates global interactions by increasing language and cultural understanding levels (Xia et al., 2024). Similarly, studies on how AI can support diversity, equity, and inclusion in education emphasize that technologies should be designed and evaluated relatively. It has been stated that such systems should be developed from a social and technical perspective, especially considering the needs of historically disadvantaged groups (Viberg et al., 2024). In addition, studies on language education with AI have discussed how these technologies can provide a solution to overcome language and cultural barriers along with their pedagogical benefits. Studies show that AI tools can be practical in different geographies by encouraging the continuous participation of learners (Xu & Li, 2024).

CONCLUSION

AI stands out as a significant technological advancement with the potential to revolutionize nursing education. Its advantages, such as providing interactive learning experiences, rapid access to information, and enhancing student learning, make this technology a valuable tool in education. However, the potential risks of AI on academic integrity, ethical violations, data privacy, and independent thinking necessitate a careful and informed approach to its use. In particular, integrating AI chatbots, such as ChatGPT, into nursing education has great potential to improve students' learning experiences and prepare them for a rapidly changing healthcare environment. However, incorrect or excessive use of these tools can decrease students' original thinking and critical reasoning skills. Therefore, nursing educators must establish clear guidelines for ethical use, provide students with the ability to critically evaluate AI resources, and develop methods that encourage independent learning. Although the application of AI in nursing is still in its early stages, it is expected to provide important scientific insights in the future. In this process, ongoing research is important to explore best practices of AI in education and understand its impact on student learning while addressing ethical and legal concerns. As Nobel Peace Prize winner Christian Lous Lange said, "Technology is a useful servant but a dangerous master." Accordingly, AI's responsible and conscious use can help avoid potential pitfalls in nursing education and maximize its benefits. AI opens the door to an innovative transformation in nursing education. Nursing educators who adopt an ethical, responsible, and critical approach can effectively integrate this technology into education, prepare their students for the requirements of the rapidly changing technological environment in health care, and contribute to the advancement of the profession. Strengthening the technological infrastructure, ensuring equality, establishing interdisciplinary collaboration, and establishing a standard model in education can be listed among the basic recommendations for the effective use of AI in nursing education. As a result, integrating AI into nursing education can provide an innovative restructuring of education by moving technology beyond being a mere tool. Using AI tools to complement human interactions can help students develop essential skills such as complex problem-solving, critical thinking, and collaboration. However, it should be noted that AI technologies cannot replace professional nursing skills but can support them.

ETHICAL DECLARATIONS

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

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

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