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RESEARCH ARTICLE
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Evaluating The Anger and Self-Care Ability Levels of Surgical Patients Experiencing Organ Loss

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ABSTRACT

Objective: This study was conducted to assess the levels of anger and self-care ability among surgical patients following organ loss.
Material and Methods: The data of this descriptive study were collected from 60 patients who underwent mastectomy, gastrectomy, cholecystectomy, and thyroidectomy at the University Hospital, General Surgery Clinic of a state university between December 2016 and April 2017. A personal information form, the trait anger and anger expression scales, and the exercise of self-care agency scale were used to collect data. The scales used in the study were applied to the patients twice (before the operation and during the discharge period). The researcher collected the data by using the face-to-face interview technique.
Results: The mean age of the patients (n=60) was 54.6±13.2, 68% (n=41) were female, 90% (n=54) were married, and 65% (n=39) were literate. The results of the study showed that the level of trait anger was higher before the operation in patients undergoing thyroidectomy and after the operation in those undergoing gastrectomy ($p<0.01$). Anger levels increased in those undergoing gastrectomy and mastectomy and decreased in those undergoing thyroidectomy and cholecystectomy after the operation ($p<0.01$). In addition, the postoperative self-care agency of the patients undergoing cholecystectomy was high ($p<0.05$).
Conclusion: Organ loss increases the anger level of patients and decreases their self-care agency. Recommendations for the planning and implementation of nursing care practices to reduce the anger of surgical patients who experience organ loss and to increase their self-care agency must be put in place.
Keywords: Anger, nursing, self-care, surgery, surgical nursing

INTRODUCTION

Organ loss is the process of surgically removing an organ from the human body when it loses its function, becomes irreparably damaged, or poses a life-threatening situation for the patient (1,2). These surgical interventions, which are applied for various reasons such as cancer, trauma, and deformity, enhance the quality of life of individuals and prolong their life expectancy (1). The most common surgical procedures that result in organ loss are thyroidectomy, mastectomy, cholecystectomy, and gastrectomy. According to the latest statistics in Turkiye, 117,811 cholecystectomies, 21,928 thyroidectomies, 6,849 mastectomies, and 2,036 gastrectomy operations were performed in 2017 (3).

Surgical interventions that cause organ loss affect patients both physically and psychologically. For example, physical complications after mastectomy include pain, scarring, lymphedema, limitation in shoulder range of motion, muscle weakness, spinal deformation because of unilateral mastectomy, or change in body posture. Some of the psychological complications are negative thoughts about the image of women, problems arising from anxiety, depression, and depressive disorders, and negative body image. Organ loss is a trauma to which patients can react differently (4,5).

Kübler Ross describes patients' reactions to trauma, loss, and mourning in 5 phases, including denial, anger, bargaining, depression, and acceptance. The first phase is denial. This is

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the stage in which the patients fail to face their grief and to realize the circumstances. They avoid confronting loss and its effects. Patients ask such questions as, "Is this true?" or "This didn't happen to me, did it?" (6,7). After denial, the second phase is anger. In that phase, patients' psychological adaptation has not yet occurred. Patients describe feelings of rebellion against their loss as anger. The most frequently asked question is "Why me?" If the feeling of anger is not removed, it can turn into depression in the long term. Patients who seem to accept organ loss and repress their anger might end up delaying the onslaught of emotions typically felt at this stage. After the bargaining phase, patients face their loss (6-8). In this phase, symptoms and signs of depression might be observed in patients. The final stage is the acceptance phase which is completed when patients acknowledge their loss and its conditions and return to the normal flow of life. The typical psychological adaptation of patients who accept their loss is actualized. If the patients can express their feelings, they typically pass the acceptance stage (9).

One of the feelings or reactions experienced by patients undergoing organ loss is anger, which arises from physiological conditions such as aches, pain, and fatigue. Anger is a human reaction that stems from undesirable outcomes, including disappointment, frustration, and feelings of incompetence (10). In addition, patients may express their feelings, such as uncertainty and fear about the operation or the post-operative process, through anger. In cases where anger is not relieved, patients may become depressed (11,12). Patients' perspectives on the operation and their psychological readiness for it affect the post-operative treatment and recovery process. In patients who have psychological or adaptation problems in the preoperative period, issues such as the development of complications after the operation, the application of more anesthesia, or an increase in the need for analgesics may be encountered (13,14). Patients undergo a challenging period, both physiologically and psychologically, which can hinder the healing process. During this time, the patients' self-care practices and nursing care can accelerate healing. Self-care agency is the individual's ability and willingness to maintain self-care (15). The self-care agency of patients is influenced by various factors, including education, socio-economic status, culture, age, health status, and anxiety (16,17).

Therefore, in nursing care applications for patients undergoing surgery, it is crucial to provide patient-specific care and evaluation with a holistic approach to address the physiological and psychological issues experienced during the healing process. Surgical nurses should actively consider patients' attitudes and concerns about organ loss and work towards enhancing their level of self-care (16,18).

The healing process will have a positive impact if surgical nurses consider the physiological and psychological reactions of their patients and if treatment is arranged according to their needs. This current research aims to assess the levels of anger and self-care among surgical patients experiencing organ loss.

METHOD

Aim and design of the study

This study was conducted with a descriptive design to assess anger and self-care ability levels in surgical patients who experienced organ loss.

Research questions

Does organ loss affect patients' anger levels?

Does organ loss have an impact on patients ' self-care agency levels?

Is there an association between patients' organ loss, anger levels, and self-care agency?

Population and sample

The study group comprised patients who were hospitalized for planned gastrectomy, mastectomy, cholecystectomy, or thyroidectomy operations in the general surgery clinic of a university hospital. According to a study titled *The Relationship Between General Health State with Trait Anger Level and Anger Expression Style of Nurses* the standard deviation of trait anger was 3.05, and a sample of 56 was calculated for each group consisting of 14 people, with a 95% confidence range and 5% tolerance value (19). Since the most common resections in Turkey are gastrectomy, mastectomy, cholecystectomy, and thyroidectomy, these patients were included in the sample. Having agreed to participate, 60 patients consisting of 15 in each group were included in the study. The patients who volunteered to participate and who were included in the study were those undergoing gastrectomy, cholecystectomy, mastectomy, or thyroidectomy surgery, were 18 years of age or older, had normal levels of perception and comprehension, spoke Turkish, had total resection planned, and had elective surgery.

Data collection tools

Three data collection tools were used in the research. These are the personal information form, Trait Anger and Anger Expression Scales, and The Exercise of Self Care Agency Scale.

Personal Information Form: The personal information form used in the research is a data collection tool consisting of 9 questions. It was developed by the researcher to include information about the socio-demographic properties of patients (age, gender, marital status, education, work status, income status) and their health history (planned surgical operations, past surgical operations, and information about the person accompanying them at discharge).

Trait Anger and Anger Expression Scales: "Trait Anger and Anger Expression Scales" were used to assess patients' anger levels in the preoperative and postoperative periods. The scale developed by Spielberger et al. in 1983 consists of two main scales: T-anger and anger expression style. On the T-anger

scale, one is asked "how he feels in general", while on the anger expression scale, one is asked "how often he behaves as mentioned." The scale consists of a total of 34 items, which measure not the absence of anger but its existence. In the scale ranges, the scoring method is "none (1)", "slightly (2)", "fairly (3)", and "completely (4)". The first ten questions of the scale include items that measure the trait level of anger. The other 24 items are concerned with anger style. Eight items are related to the suppression of anger, eight are about expressing anger, and eight are regarding anger control. The lowest and highest scores in the trait anger subscale are 10 and 40, respectively. In each anger style subscale, the lowest score (anger-in, anger-out, anger control) is 8, and the highest is 32. In the trait anger subscale, the high scores indicate a high level of anger. The validity and reliability study of the scale was conducted by Ozer (20) in Turkey. Ozer obtained the alpha values of the trait anger scale as between 0.67-0.92, anger control 0.80-0.90, anger-out 0.69-0.91, and anger-in 0.58-0.76.

The Exercise of the Self-Care Agency Scale: This was used to evaluate the self-care agencies of patients in the postoperative period. It was developed by Kearney and Fleischer in 1979 and was adapted to Turkish society by Nahcıvan (21) with a study of validity and reliability in 1993. The scale determines the self-care agency of individuals. The scale adjusted to Turkish society is a 5-point Likert-type with 35 items. Each statement consists of 5 options such as "It does not define me at all," "It does not define me very much," "I have no idea," "It describes me a little," and "It describes me very much." On the Turkish scale, whereas items 3, 6, 9, 13, 19, 22, 26, and 31 are evaluated negatively, the remaining items are assessed positively. On the scale, positive statements are rated as 0, 1, 2, 3, and 4, and the negative statements as 4, 3, 2, 1, and 0, respectively. Whereas the lowest score is 35, the highest score is 140. The top score corresponds to the highest of the self-care agency. The test-retest reliability is 0.80, and internal consistency is 0.89 because of the validity and reliability of the scale study in chronic diseases (21).

Data collection

With the comfort of the patients in mind, the study data were collected in patients' rooms at The University Hospital General Surgery Clinic. During data collection, a quiet environment was provided to eliminate external factors distracting patients' attention. The purpose and method of the study were explained to patients by the researcher before the data were collected. Fifteen patients from different patient groups (mastectomy, gastrectomy, cholecystectomy, thyroidectomy) were selected, and a total of 60 patients were included in the study. The researcher collected the data in two steps with a face-to-face interview technique.

First step (1. Evaluation): After admission to the general surgery clinic, and while still in the preoperative period, the patients spent approximately 30 minutes filling out a personal information form in their rooms using a face-to-face interview technique At the same time, the first evaluation of the anger levels was carried out by using Trait Anger and Anger Expression Style Scales.

Second step (2. Evaluation): The patients were re-visited during the postoperative discharge. For approximately 40 minutes, using the face-to-face interview technique in their rooms, the patients re-applied their Trait Anger and Anger Expression Scales, and the second assessment of their anger levels was carried out. Following this, the Self-Care Agency Scale was applied. During the data collection period, each patient was interviewed face-to-face for 70 minutes.

Data analysis

The data obtained from the study were analyzed using SPSS (Statistical Package for Social Sciences) for the Windows 17.0 package program. The number, percentage, mean, and standard deviation were utilized as descriptive statistical methods to evaluate the data. The significance of the difference in terms of intergroup variables was examined by independent sample t-test, ANOVA, and Paired Samples tests. For the results, $p < 0.05$ was considered as statistically significant.

Ethical approval

Ethics committee permission was obtained from the relevant Trakya University School of Medicine Scientific Research Ethics Board (TÜTF-BAEK 2016/233: date: 02.11.2016 and decision number 17/10). Additionally, written permission was obtained from the Health Research and Application Centre's Central Directorate. Before participating in the study, the patients were informed regarding the nature of the study, and verbal consent from all participants was obtained.

Limitations

The fact that the study could not be widened to include patients experiencing all types of organ loss (due to its being conducted in a hospital) is an indication of its limitation. Future studies could be enhanced by increasing the samples of groups and patients who experience organ loss.

RESULTS

An examination of the individual statistics of the 60 patients included in the study shows that the mean age of the patients was 54.6 ± 13.2, and the age range varied between 23 and 83. 68% (n=41) of the patients were female, 90% (n=54) were married, and 65% (n=39) were literate (Table 1).

Trait anger levels increased ($t=9.068$, $p<0.001$ and $t=8.035$, $p<0.001$, respectively) in patients who underwent gastrectomy and mastectomy and decreased ($t=7.296$, $p<0.001$ and $t=6.223$, $p<0.001$, respectively) in patients who experienced thyroidectomy and cholecystectomy (Table 2).

Cholecystectomy patients had a high self-care agency compared to patients undergoing other types of organ loss ($F=70.34$, $p<0.001$) (Table 3).

Table 1. Individual characteristics of patients

Individual characteristics	Mean±SD	Range
Age	54.6±13.2	23-83
	n	**%**
Gender		
Female	41	68.3
Male	19	31.7
Marital status		
Single	6	10.0
Married	54	90.0
Education status		
Reader-writer	39	65.0
Primary **Education**	7	11.7
High school	10	16.7
University	4	6.7

n=Number, %=Percent. SD: Standard Deviation

A negative correlation (r=-0.744, p<0.001) between post-operative anger and self-care agency was obtained. In contrast, a positive correlation between the anger-control and self-care agency (r=0.795, p<0.001) was noticed. A negative interaction between anger-out and self-care agency and anger-in and self-care agency (respectively, r=-0.684 p<0.001, r=0.486 p<0.001) was observed (Table 4).

DISCUSSION

The study demonstrates that in the postoperative period, the anger level of patients increased in gastrectomy and mastectomy and decreased in thyroidectomy and cholecystectomy (Table 2). It is an acceptable situation for patients to experience anxiety and anger during the preoperative period. Due to the adverse impacts of operations, postoperative anxiety and depression may be manifested in patients. As a consequence of this, anger may be triggered (11-13).

In their study, Kheyran-Alnesa et al. (22) observed that patients who would undergo heart surgery had high preoperative anger levels, and there was a slight decrease in the control group after surgery. Pettersson et al. (23) reported that patients with colorectal cancer described their feelings, such as anger and fear, in interviews held before the operation. Macik (24) stated that after a mastectomy, patients' inner anger was high and they felt anxious because the disease had occurred. Miller-Matero (25) determined that some patients felt anger after gastrectomy surgery. Tutuş and Saz (26) stated that thyroid gland diseases may cause angry outbursts in patients because they affect hormones. Rogers et al. (27) stated that patients with thyroid cancer experience some symptoms, and anger is one of them. The studies also revealed that patients having undergone surgical intervention are not only affected physically and but also have higher anger rates. In addition, surgeries such as gastrectomy and mastectomy are primarily performed due to cancer (28,29). This explains why patients express their anxiety about the postoperative process through anger. It is known that there are mood changes in people when the thyroid gland is suppressed (26). It is also thought that the reason for anger in patients undergoing cholecystectomy and thyroidectomy is related to the fear of surgery. The fact that the physiological and psychological effects on the human body of thyroidectomy and cholecystectomy are less severe when compared with mastectomy and gastrectomy may be associated with a decrease in postoperative anger levels.

The study shows that patients undergoing a cholecystectomy have higher self-care powers (Table 3). The low impact of surgery on the human body enables patients to maintain their self-care and cope with existing problems. Shahbaz et al. (18) determined that patients who underwent varicotomy had low levels of self-care agency. Candan Donmez et al. (30) determined that patients with lumbar disc hernias had a moderate self-care agency level. Fırat and Öztunç (31) found that the postoperative self-care abilities of total laryngectomy patients in the control group were moderate. In their study, Güner and Kaymakçı (32) determined that the self-care agency level of patients who experienced a mastectomy was higher than those who experienced a gastrectomy. The follow-up process continues after gastrectomy and mastectomy surgeries. In addition, the discharge time is longer compared to cholecystectomy and thyroidectomy surgeries (33,34). The physical effects of gastrectomy and mastectomy on patients are higher. Based on all this, it can be seen that patients' self-care is lower after the operations, requiring more care and exercise (lymphedema exercises) or care tools (varicose socks, corset). A smooth and fast recovery process positively affects the patients' self-care agency. However, gastrectomy and mastectomy, which have high effects on the human body, have

Table 2. Effect of organ loss type on anger level

Trait Anger Scale	Preoperative (n:60)	Postoperative (n:60)		
Surgical Procedure	**Mean±SD**	**Mean±SD**	**t**	**p**
Gastrectomy	19.2±4.43	27.6±5.83	9.068	<0.001*
Mastectomy	20.7±5.16	26.4±6.44	8.035	<0.001*
Thyroidectomy	25.0±5.98	18.6±4.12	7.296	<0.001*
Cholecystectomy	24.0±5.42	18.1±3.34	6.223	<0.001*

*p<0.01; Independent Sample t-Test

Table 3. Effect of organ loss type on self-care agency

	Self-Care Agency		
Surgical Procedure	**Mean±SD**	**F**	**p**
Gastrectomy	68.5±16.1	70.34	<0.001*
Mastectomy	78.5±17.2		
Thyroidectomy	125±10.5		
Cholecystectomy	126±11.0		

*:p<0.05; ANOVA (Variance) Analysis

Table 4. Relationship between organ loss, anger and self-care agency in postoperative period

Trait Anger Scale and Self-Care Agency	Self-Care Agency	
	r	**p**
Trait Anger	-0.744**	<0.001
Anger Style		
Anger-Control	0.795**	<0.001
Anger-Out	-0.684**	<0.001
Anger-In	-0.486**	<0.001

*:p<0.05;**:p<0.01;Pearson Korelasyon

low self-care agency. The results suggest that their condition affects self-care agency in patients experiencing organ loss.

This study concluded that patients experiencing organ loss had decreased self-care agency as trait anger, anger-out, and anger-in levels increased, and the level of self-care agency increased as anger control increased (Table 4). Almonacid et al. (35) decided that anxiety and self-care were associated in patients with a laryngectomy; 97.5% of patients' self-care was low until the seventh postoperative day and they required care and help. Matero et al. (25) found that patients with feelings of anger, frustration, and depression after gastrectomy missed the 1-year follow-up appointments recommended by the hospital. Raharjo et al. (36) found that patients' stress levels increased after mastectomy and they became dependent on the support of caregivers when their self-care was evaluated. Having surgery affects patients both psychologically and physically. Patients who cannot manage the surgery process well get angry and express their feelings, sometimes through anger. Therefore, it is essential to evaluate patients holistically. The results of the study showed that the self-care level of the patients who are psychologically affected by the surgical intervention is lower. As patients express their feelings about the surgery in anger or suppress this anger, their self-care levels become lower. It can be seen that the self-care level of patients who manage their anger is higher. Recovery processes can also be faster by caring for patients who manage their anger.

CONCLUSION

The anger levels of patients who experience organ loss are apparent both in the preoperative period and in the postoperative period. In this study, both preoperative and postoperative anger levels of the patients were found affected. In addition, it has been found that patients' self-care ability decreases in surgeries such as gastrectomy and mastectomy, which negatively affect body image and have a high risk of complications. During the healing process, increasing anger levels of patients also adversely affect self-care practices.

As a result of this study, it is understood that patients can express their emotions as anger in the preoperative or postoperative period. Anger negatively affects self-care in patients who experience organ loss. Therefore, surgical nurses should analyze patients carefully before organ loss, detect anger behaviors, and then plan and implement nursing care strategies to minimize their anger to improve the self-care ability of patients with organ loss. When necessary, help should be sought from a consultation-liaison psychiatry nurse. No previous studies evaluating the relationship between anger and self-care agency of patients experiencing organ loss were found. Further research is required to adopt and apply a holistic approach and contribute to patient recovery processes, focusing on the relationship between anger and self-care agency in patients who experience organ loss.

Ethics Committee Approval: This study was approved by the Trakya University School of Medicine Scientific Research Ethics Board (TÜTF-BAEK 2016/233: date: 02.11.2016 and decision number 17/10).

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RESEARCH ARTICLE
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Students' Perceptions Regarding Clinical Practice: A Quasi-Experimental Metaphor Study

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ABSTRACT

Objective: This study aims to use metaphors to reveal students' perceptions of clinical practice and the change in their perceptions after starting practice.
Methods: The study's population consists of 98 students in the midwifery department of a health sciences faculty in Istanbul, and the sample consists of 86 students (87.75% of the population). The data of the study were obtained using the a student information form and the Clinical Practice Perception Form (CPPF) created by the authors. The CPPF asks the students to fill in the blanks for such phrases as "Clinical practice is like … because …", "Lecturer/research assistant/mentor in the clinic is like … because ...", "Healthcare team members in the clinic are like … because ...", "Patients are like … because ..." before and after going into clinical practice. The study uses the descriptive analysis technique to analyze the completed metaphor statements.
Results: The students were observed to compare the clinic to the "school" the most before and after the clinical practice. The clinic's lecturer/research assistant/mentor was most likened to a "mother" before going into practice; after entering practice, they were determined to mostly compared it to "light." Before and after clinical practice, healthcare team members were most likened to "friends," and patients were most likened to a "flower."
Conclusion: The midwifery students were observed to have positive perceptions about clinical practice before and after their first clinical practice. The study allowed students' perceptions of clinical practice to be determined, as these constitute an important part of midwifery education . In this way, the study is thought to shed light on how to identify the deficiencies in clinical practice and how to arrange future training needs.
Keywords: Clinical practice, education, teacher, metaphor, midwifery student

INTRODUCTION

Perception is the way individuals perceive events or situations and can affect life positively or negatively (1). During midwifery education, students gain a professional identity by developing perceptions about values and ethical behaviors. By having a positive perception of the profession, students are able to adapt to their profession more, and this is reflected in the quality of their midwifery care (2). For students, clinical practice is the starting place for recognizing, adapting to, and internalizing the profession. During clinical practice, students sometimes fail to show the knowledge, attitudes, and behaviors that are targeted. The reasons for this situation should be analyzed by the student, the teacher For this reason, students need to express their perceptions about clinical practice, and one of the ways to detect perceptions is to conduct a metaphor study (3).

Metaphor studies are a type of research frequently used to determine the perceptions that occur in people during a process of change and to reveal an existing situation (4). The Oxford Learner's Dictionaries define metaphor as "a word or phrase used to describe somebody/something else, in a way that is different from its normal use, to show that the two things have the same qualities and to make the description more powerful" (5). In this context, metaphors can redefine and conceptualize situations and events as they are perceived. Metaphors can be used to explain things that are unknown or uncertain through things that are known and obvious (6-8).

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Midwifery education by its nature mainly includes practical training. Practical training is often carried out through simulation and clinical practices. Practical training environments accompanied by simulations are close to ideal environments and allow for many factors to be controlled. However, uncertainties occur more in clinical practice, and the perceptions, thoughts and experiences of midwife candidates who are just at the beginning of their education are critical. Students' perceptions of clinical practice will also affect their perspectives on the profession. No metaphor analysis in the literature is found to have examined midwifery students' perceptions toward clinical practice or how these perceptions change over time. The study aims to use metaphors to reveal midwifery students' perceptions toward clinical practice and the changes in their perceptions after starting practice. In line with this aim, the study will identify the issues related to clinical practice and develop suggestions for solutions. In this respect, the study is original in the field of midwifery.

MATERIALS AND METHODS

Purpose and Type of Research

This research has been conducted using the phenomenological design, a qualitative research method, to reveal the perceptions of first-year midwifery students regarding clinical practice through metaphors.

Population and Sampling

The sample consists of students who agreed to participate in the study and who met the inclusion criteria. The inclusion criteria are: being a first-year student with no clinical experience (not having worked in a hospital before, not participating in the simulation study) and completing 13 weeks of the Basic Practices Simulation Training course for 4 hours per week. Due to the nature of qualitative research, the study was continued until data saturation was reached. In line with this, the study was completed with 86 students (82.7% of the population).

Data Collection Tools

The study obtained its data using a student information form (SIF) and the Clinical Practice Perception Form (CPPF) the researchers had created in line with the literature. The SIF was also developed in line with the literature (9,10) and consists of a total of five questions about the participants' demographic and learning characteristics. The CPPF consists of questions for evaluating perceptions toward clinical practice using the metaphor method (6,7). This form has the participants fill in the blanks to such statements as "Clinical practice is like … because …", "Lecturer/research assistant/mentor in the clinic is like … because ...", "Healthcare team members in the clinic are like … because ...", and "Patients are like … because ..." before and after clinical practice.

Research Process

The students entered clinical practice for the first time on February 28, 2023. Beforehand, the students had received 52 hours of theoretical and 52 hours of simulation-supported practical training. Clinical practice was carried out once a week for 13 weeks, 8 hours a week. Due to the earthquake in Türkiye on February 6, 2023, the theoretical course was held using distance learning (synchronized online), simulation-supported practical training also took place, and their clinical practice occurred in person. This course aims to provide students with general skills regarding health and disease. Within the scope of their clinical practice, each teacher (n = 6) was responsible for the clinical teaching of approximately 16 students. In addition, midwives and nurses in the clinic served as mentors to the students. At the beginning of the study, one researcher informed the students who had successfully passed the 52-hour Basic Practices Simulation Training course about the study. Both verbal and written consent were obtained from the students who met the inclusion criteria and volunteered to participate in the study. Before going into clinical practice, students who met the inclusion criteria were given the SIF and CPPF at the beginning of February and were asked to fill out the forms. The study analyzed the forms of 86 students. After obtaining consent from the students, they were divided into groups, and appointments were made. Each group had a maximum of 10 students. The researchers ensured that the group members sat at different points in the designated classrooms in order to prevent them from being affected by each other. Group interviews were conducted, and the students were asked to fill in the blanks of the specified statements using metaphors. The students were asked to raise their hands regarding anything they did not understand during the interviews. Each group interview was completed in at most 120 minutes. At the end of each interview, analyses were made, and the interviews continued until data saturation was reached.

Ethical Aspect of the Research

To conduct the study, ethics committee approval (Approval No. 2023/85 dated February 7, 2023) was obtained from the Istanbul University-Cerrahpaşa, Social and Human Sciences Research Ethics Committee. The participants were additionally informed that their identities would be kept confidential and that the data would only be used for this study. The study was conducted per the Principles of the Declaration of Helsinki.

Data Analysis and Evaluation

The students' sociodemographic data were analyzed using the program IBM SPSS version 25. Continuous variables are expressed as arithmetic mean, standard deviation (*SD*), minimum, and maximum values and categorical variables as frequencies and percentages.

Metaphor Analysis

The metaphorical statements were analyzed through the content analysis approach, as used in similar studies in the literature (7,10,11,12).

RESULTS

Table 1 presents the sociodemographic characteristics of the students participating in the research. Their average age is 19 ± 1.01 years. Of the participants, 79.3% (n = 69) were determined to be Anatolian High School graduates. While the mothers of 54% (n = 47) are primary school graduates, the fathers of 50.6% (n = 44) are secondary school graduates (Table 1).

Table 1. Socio-demographic Characteristics of Students

Variables		
Age Mean±SD (Min-Max.)	**19.00±1.01 (18-45)**	
Graduated High School	**n**	**%**
Anatolian high school	69	79.3
Normal highschool	2	2.3
Science high school	10	11.5
Health vocational high school	5	5.7
Mother's Education Level		
Cannot Read or Write	4	4.6
Primary education	47	54.0
Secondary education	33	37.9
High education	2	2.3
Father's Education Level		
Primary education	30	34.5
Secondary education	44	50.6
High education	12	13.8

The study first examined the questionnaires collected from the participants for usability. Table 2 (Clinical Practice), Table 3 (Teacher in the Clinic), Table 4 (Health Team Members in the Clinic), and Table 5 (Patient Provided with Clinical Care) show the metaphors in which the students participating in the research expressed their perceptions about their clinic, as well as the themes and sub-codes prepared based on the metaphors. In addition, the examinations regarding the questions asked before and after the clinical practice are given below.

Metaphors Regarding Clinical Practice (Internship)

Of the 86 students in the study, 28 were excluded due to missing data prior to starting clinical practice. Data collection was completed once saturation was reached regarding the statements of the remaining 53 students. Of the 86 students in the study, 36 students were excluded due to having incomplete data after the clinical application. Because the statements of the remaining 45 students were saturated, data collection was considered complete. The students determined to have produced 44 different metaphors related to clinical practice before starting their clinical practice, and these metaphors are grouped under five main themes (Table 2). Below are some of the student statements regarding clinical practice before starting practice.

It is like a key to a door that opens to the future because it is the first step of our profession that we will do throughout our lives. (Student 28)

Clinical internship is kind of scary because I don't know what to do, I'm afraid of doing something wrong. (Student 3)

After the clinical practice, the students produced 36 different metaphors related to clinical practice, and when examining the contents of these metaphors, five main themes were determined (Table 2). Below is one student's statement.

Table 2. Students' Metaphors and Metaphor Themes Regarding Clinical Practice (Internship)

AFTER CLINICAL PRACTICE (N=45)							
Themes	**Metaphors**	**MF* (f)**	**MNα (n)**	**Themes**	**Metaphors**	**MF* (f)**	**MNα (n)**
Wide variety / Exciting	Repair kit, Mall, Carnival, Single Seat, Bullet train, Game	6	6	Exciting / Complexity	Surprise box, Maze, Beehive	3	3
Scary	Scary, Closed Room, Iceberg, Waitress	4	4	Work/Centre of Work	Life (2), Spirit of life, Sun (2), Chain (team) (2), Family, Garden	9	6
Teaching / Guiding	Book (3), School (5), Education, Kindergarten, Primary School, Teacher, Informative, Success, Turtle, Flower that has not yet bloomed, Diary, White pen, Moon (2), Tourist guide, Shoes	22	15	Teaching / Guiding	Experience, Tree, School (5), Test book, Book (2), Education, Navigation, Guide, Moon, Lantern, Growth-development, Path, Car, Pyramid, Turtle	20	15
Continously Make an Effort	Factory, Machine, Discipline, Level-up in game, Worker bee, Tree, Seed (2), Cross-stitch, Bond (between caregiver and patient)	10	9	Practice / Observation	Training area, Laboratory, Kitchen, Art workshop	4	4
A new beginning / Entering the profession / Basic of life	Baby's first steps, Baby learning to walk, A blank page, Key to the door to the future, Key, Preparation, Water, Life (2), Sun, Universe	11	10	Preview of the Profession / Beginning of the Career Path / Firsts	Trailer (a long road), Rehearsal (2), Travel, Home, Primary school, Kindergarten, Diary, Key	9	8
TOTAL		53	44			45	36

*Metaphor Frequency , [α] Number of Metaphors

It's like a surprise box because we start every day with new excitement and don't know what awaits us. (Student 26)

Metaphors Regarding Teachers in the Clinic

Among the statements of the students in the study about the teacher in the clinic, 12 were excluded from the analysis before the clinical practice and 24 after the clinical practice due to missing statements (the metaphor part [is like…] was written down but not the reason [because …]). Thus, the analyses were completed with 69 participants pre-practice and 57 after starting practice. The students were observed to have produced 44 different metaphors about the teacher in the clinic pre-clinical practice, with three main themes emerging in line with this (Table 3). Below are some of the students' statements.

In the clinic, the teacher is like a compass because we do not have enough information in the first place, and our teachers help us find our way. (Student 5)

The teacher is like a mother because the baby first learns everything from the mother and their environment. (Student 19)

After starting clinical practice, the students produced 31 different metaphors about the teacher in the clinic, with four main themes being determined for these metaphors (Table 3). Some of the students' statements are as follow.

The teacher is like a light because they show us the right path because they correct our mistakes and show us the right ones; they tell us what to do and illuminate our path like a shining light in the dark. (Student 29)

The teacher is like an inspector because the teacher comes and checks you out all of a sudden. (Student 78)

The teacher is like a sudden quiz because they appear suddenly. (Student 79)

Metaphors Regarding Health Care Team Members in the Clinic

Among the students' statements in the study about the healthcare team members in the clinic, 30 were excluded from the analysis pre-clinical practice due to having incomplete information (the metaphor was written but not the reason). Therefore, data saturation was reached with 51 students. They were observed to have produced 38 different metaphors about the healthcare team members in the clinic pre-clinical practice, with three main themes emerging in line with these metaphors (Table 4). Some of the students' statements are as follow.

The medical team is like pearls on a necklace because they have to work in harmony and stay in constant communication, otherwise the pearls on the necklace will separate and the harmony will be broken. (Student 36)

They are like groups of worker bees because working as a team rather than alone always progresses faster. (Student 51)

After starting clinical practice, 36 of the students' statements about the medical team members were excluded from the analysis due to containing incomplete information (i.e., the metaphor was written, but not the reason). Therefore, the second step of this part of the study analyses was completed with 45 participants. The participants were seen to produce 37 different metaphors, with three main themes being derived from these (Table 4). Below is one student statement.

Table 3. Students' Metaphors and Metaphor Themes Regarding Educator in the Clinic

AFTER CLINICAL PRACTICE (N=57)

Themes	Metaphors	MF* (f)	MNα (n)	Themes	Metaphors	MF* (f)	MNα (n)
Sheds Light / Guidance / Educative / Experienced / Knowledgeable / Formative / Productive	Lighthouse, Flashlight (2), Light (5), Lamp, Sun, Map, Compass (8), Guide (3), Navigation, Book writer, Book (4), Pen ink, Parent, Brother/sister, Sewing machine, Master, Pomegranate, Scientist, Owl, Telephone, Baker, Carpenter, Fertile land, Key	41	24	Guidance / Educative /	Guide (3), Guiding (5), Commander, Director, Road sign, Sign, Compass (4), Map, Light (9), Lantern (2), Sun (2), Parent, Grandparent, Mother-father (3), Master, Lesson, Book (4), Gardener	42	18
Person who leads / Integrative	Leader, Commander, Scout leader, Brain, Captain, Toothpaste	6	6	Leader / Follower	Supervisor, Radar, Trainer, Luck, Human brain	4	4
Kind / Supportive / Helpful / The person who makes you feel comfortable and confident / The Basis of Life / Indispensable / Beginning of Life	Mother (9), Family, Hero without cape, Walking stick, Supporter, Wall, Safe zone, Sister, Seat cushion, Home, Water, Water of life, Patience, Parents	22	14	Kind / Supportive	Mother (3), Helper, Support, Colleague, Home, Eraser, Family member	8	6
-	-	-	-	Inspector	Overseer, Quick exam, Chili pepper	3	3
TOTAL		69	44			57	31

*Metaphor Frequency , ᵅ Number of Metaphors

Table 4. Students' Metaphors and Metaphor Themes Regarding Health Team Members in the Clinic

AFTER CLINICAL PRACTICE (N=45)							
Themes	**Metaphors**	**MF* (f)**	**MNα (n)**	**Themes**	**Metaphors**	**MF* (f)**	**MNα (n)**
Instructive / Guiding / Exemplary	Signboard (2), Traffic sign, Light, Candle, Map, Model, Book, Calculator	9	8	Instructive / Guiding	Master (3), Book, Visual book, Television, Navigation, Pole star, Compass, Sign, Key	11	9
Parts that Make up the Whole / Acting Together / Team / Unity / Harmonious / Hardworking / Disciplined	Chain (2), Handcuffs, Pearls of necklace, Puzzle Pieces (2), Pieces of robot, Children holding hands, Color palette, Human body, Comrade (2), Team Player (2), Friend (4), Fellow, Beehive, Tree (2), Tree branches, Table chairs, Sun and moon, Street lamp, Ant (3), Soldier	30	20	Part of the Whole / Complementary / Orderly / Seriousness / Hardworking	Parts of the food processor, Branches of the tree, Stars, Pearls of the necklace, Overgrown trees, Fingers of the hand, Chain, Solar system, Sun and moon, Vitamin, Half an apple, Soldier army, Traffic, Bee (2), Handcuffs, Store owner (importance of cooperation)	17	16
Helpful / Healing / Sincere / Support / Enjoyable	Caregiver, Sister, Sibling, Superhero, Medicine, Fairy/ magic wand, Family (3), Family members, Sofa edge, Slides	12	10	Someone in the Family / Indispensable for life	Family (4), Brother and sister, Sister, Mother and father, Mother, Parent, Friend (3), Comrade, Fellow, Support center, Oxygen, Heart	17	12
TOTAL		51	38			45	37

*Metaphor Frequency , ᵅ Number of Metaphors

Table 5. Students' Metaphors and Metaphor Themes Regarding the Patient Provided with Clinical Care

AFTER CLINICAL PRACTICE (N=60)							
Themes	**Metaphors**	**MF* (f)**	**MNα (n)**	**Themes**	**Metaphors**	**MF* (f)**	**MNα (n)**
The Reward for the Effort / The Task that Needs to be Done / Seeing the Reward for What You Do	Tree, Fruit, Food, Field, Responsibilities, Mirror	6	6	Work / Labour	Responsibility (2), Tree (2), Field, Seed (2), Plant, Destination	9	6
Person in Need of Attention and Care / Requiring a Solution	Flower (12), Plant, Orchid, Seed, Baby (10), Newborn, Child (2), Poor, Person sitting on sofa, Exam question, Knitting ball	32	11	In Need of Care / In Need of Support	Flower (15), Baby (9), Innocent baby, Child (3), Son, Pet, Student, Oil painting	32	8
Precious and Blessed Person	Diamond, Pearl, Cat (precious), Book (precious), Family member, Special, Relative (3), Top priority, Son, Precious, Family, Eye, The trust (important)	15	13	Valued	The most precious, Unique, The most loved toy, The valued object, The trust, Family (2)	7	6
Learning Tool / Requiring Attention	Subject, Exam paper, Exam	3	3	Learning Tool / Real / Practice	Exam (2), Paper-pencil, Model, Subject (3), Practice book, Life, Mirror (2), Puzzle	12	8
TOTAL		56	33			60	28

*Metaphor Frequency , ᵅ Number of Metaphors

Members of the healthcare team in the clinic are like hearts because they are indispensable; the clinic is very difficult without them. (Student 11)

Metaphors Regarding the Patients Being Provided with Clinical Care

Among the statements about the patients receiving care in the clinic, 25 students in the study pre-clinical practice and 21 students after starting clinical practice were excluded from the analysis because their statements had incomplete information (the metaphor was written, but not the reason). Therefore, the study analyses were completed with 56 pre-clinic participants and 60 participants after starting clinical practice. Because data saturation was reached with the statements, the study data were considered complete at this stage. While 33 different metaphors were found with four main themes related to patients pre-clinical practice, 28 different metaphors with four main themes were found after starting clinical practice (Table 5). Accordingly, some of the student statements pre-clinical practice about patients receiving care are found below.

The individuals to whom I provide care in the clinic are like diamonds because they should always be valued. (Student 22)

After starting clinical practice, some of the students' statements regarding the patients receiving care are as follows.

They're like a puzzle because I'm designing a program to find existing and potential problems with them. (Student 62)

They are like a model because we apply what we've learned on them. (Student 20)

DISCUSSION

Midwifery students begin to gain a professional identity during their education and aim to provide good health care throughout their professional lives. Clinical practice is an applied discipline and has an essential place in midwifery education. Midwifery teachers (lecturers) should give importance to their students' clinical practice experiences and should receive frequent feedback on this subject. Metaphors are used to express a concept with another concept with similar characteristics and have great power for understanding complex and abstract ideas. Metaphor studies try to reveal meanings using language, and these studies obtain metaphors related to the researched subject by asking the participants one or more open-ended questions (7). The present metaphor study has used metaphors to collect and analyze its research data. As a result of the analyses, the study has described the students' perceptions toward clinical practice, with the findings discussed below within the scope of the literature.

Metaphors Regarding Clinical Practice (Internship)

In line with the students' statements pre-practice, one negative main theme (i.e., scary) was determined. No negative expressions were found for the responses after starting their clinical practice. The students were determined to have defined clinical practice as work after starting clinical practice. Thus, a new main theme was obtained (i.e., work/work center). According to La Sala et al., nursing students positively perceive how clinical practice is taught (13). Another study conducted qualitative interviews with nursing students and reported the students to have experienced stress that had negative affected their clinical practice (14). From this point of view, students' perspectives on clinical practice provide an essential basis for students' learning processes and preferences for their future work environments. Clinical practice is considered necessary for determining an effective curriculum's success and students' academic achievement.

Metaphors Regarding Teachers in the Clinic

The instructors who guided the students in their practice conducted chairside visits. Students were asked to obtain information about their patients (e.g., gathering evidence from patient files, receiving verbal information from patients) and to make presentations at the bedside. In addition, students were accompanied while caring for the patients and during invasive procedures. Accordingly, the main themes in Table 3 show the students pre-clinical practice to have defined the teaching staff with values such as kind, supportive, and helpful. However, kindness/supportiveness was seen to have been left out after starting clinical practice, with the students then having been determined to see the teaching staff mainly as guiding, instructive, and knowledgeable supporters. In one study where nursing students practiced according to two different teaching models, the students found the teaching model that included intensive mentoring more satisfactory (15). Learning methods and individual motivations are the most critical indicators of effective teaching. In addition, students' interactions with their instructors are thought to affect their academic success (16). Nursing students accept the supervisory power of the instructor in the clinical setting and consider it to be necessary for patient safety (17). In addition, the formation of the central theme of the inspector after starting clinical practice is believed to be caused by some students feeling hesitant about making a bedside presentation and answering the instructor's verbal questions.

Metaphors Regarding Health Care Team Members in the Clinic

Pre-practice, the students in the clinic were determined to mostly focus on the concept of team. After starting clinical practice, the students stated the healthcare team members in the clinic to have educational roles. This situation is thought to be beneficial in practice.

According to Aydin Er et al. (18), first-year nursing students were seen to give more importance to values such as smiling, patience, and calmness with regard to the nursing profession. In contrast, fourth-year nursing students were seen to emphasize responsibility and scientific curiosity. Another study conducted with nursing students observed experienced specialists to contribute to developing positive attitudes toward nursing skills and knowledge (19). A study that qualitatively investigated medical students' professional perceptions found the students to state themselves to have been insufficient at acquiring professional values. According to that study's results, the reasons for this inadequacy were faculty members' inability to be role models, insufficient clinical experience, and limited interactions with healthcare team members (20). Another study stated the cooperation among the teacher, students, and healthcare team members in the clinic to provides nursing students with a positive experience of clinical learning (21). Also in line with the literature, an effective healthcare team member relationship has been found to support overcoming failures and learning experiences (22).

Metaphors Regarding the Patients Receiving Clinical Care

In the pre-clinical practice statements about the patients receiving care in the clinic, values are mentioned such as frequently valuing those needing care. At the same time, an increase is found regarding the concept of learning tools in the statements made after starting clinical practice, as well as for statements touching on work. One study stated that nurses who care for chronic patients experience difficulties due to unpredictable, problematic, and strenuous processes in their

care experience and that these nurses have difficulty meeting patients' needs (23). While adequate theoretical knowledge is expected from newly graduated nurses, nurses expect to gain the ability to apply this knowledge to their patients (24). When looking at the current study's results, the students are seen after starting their clinical practice to have given importance to specialization regarding patient care and to teaching on this subject.

CONCLUSIONS AND RECOMMENDATIONS

The students have been concluded to compare the clinic to school the most, both before and after their clinical practice, and to perceive it as a teaching/guiding phenomenon. While pre-clinical practice statements used kindness-themed metaphors more when describing the teacher, this use is seen to have decreased after starting their clinical practice, and the use of knowledgeable person-themed metaphors is seen to have increased. Metaphors describing health team members as a team were seen to have had more weight before the clinical practice. After starting clinical practice, namely once the students started interacting with the healthcare team members, they used metaphorical expressions describing them as similar to themselves and wise. Pre-clinical practice, the students viewed patients more as individuals in need of care. After starting clinical practice, although they continued to see patients as individuals in need of care, the students also saw patients as learning tools and people who require responsibility.

This study has used metaphors to reveal midwifery students' thoughts about their experiences before and after starting their first clinical practice. The study has enabled determination of students' perceptions of clinical practice, which constitutes an important part of midwifery education. In this way, the study is thought to be able to shed light on how to identify the deficiencies in clinical practice and how to arrange future training needs.

Strengths

This pioneering study has revealed in depth the perceptions midwifery students who are just entering clinical practice have about clinical practice and shown them to generally express positive statements. This study is thought to be able to contribute to how the course can be managed in the coming years by understanding students' expectations and feelings regarding clinical practice. Monitoring the changes in the students' perceptions as expressed in this study over their 4-year university education will allow their perceptions to be more deeply understood in their professional lives. New studies using long follow-ups will also be able to reveal midwifery students' perceptions and can also be used as a tool for making the changes that are necessary regarding the education system.

Limitations

The February 6, 2023 earthquake caused massive destruction and was felt in 11 provinces of Türkiye. As a result, the theoretical part of the course had to be done with distance education, while the practical part was done in person. The fact that the theoretical part of the course had been conducted online is thought to have possibly affected the study's results.

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Lower Limb Amputation Experience in Individuals with Peripheral Vascular Diseases - Systematic Review Protocol of Qualitative Data Amputation Experience in Individuals with Peripheral Vascular Diseases

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ABSTRACT

Objective: To synthesise evidence on the experiences of individuals with vascular pathology undergoing major lower limb amputation.
Materials and Methods: A systematic literature review (SLR) of qualitatively focussed evidence. Qualitative, descriptive, exploratory case studies and surveys in English, Spanish, or Portuguese from 1983 to 2022 were included, reporting experiences.
Results: Utilising Joanna Briggs Institute instruments and assumptions, 10 articles, 213 findings, 15 categories, and five synthesised discoveries resulted in an awareness of the need for amputation, change and difference, the meaning of mobility, facilitating conditions, and the level of preparation and knowledge of professionals.
Conclusion: The disease narrative prepares individuals for amputation. The decision emerges as a last resort in the experience of pain and suffering. A complex event of constant interactions between chronic illness, anticipation of amputation, changes, strategies, and relationships beyond the fear of complications, giving rise to conflicting feelings and doubts about the future.
Keywords: Peripheral arterial disease, systematic review, surgical amputation

INTRODUCTION

In a constantly changing world, human beings experience transition periods, which may lead to the development of capacities to manage or confront these changes (1). The increasing number of individuals with Peripheral Arterial Disease (PAD) subject to amputation is a concerning reality in Vascular Surgery Services. In 2015, 4539 amputations were performed in Portugal, of which 2213 were major amputations of the lower limb, and 1991 were associated with circulatory system diseases (2). Varino et al. (3) stated that PAD is the most common lower limb amputation (LLA) aetiology. It´s a potentially serious condition, associated with a high risk of cardiovascular morbidity and mortality and physical disability, being the leading cause of death in the Western world (4). According to the same document, it has a prevalence of 10%–25% in the population over 55 years old, and approximately 70%–80% of people are asymptomatic, which hinders early diagnosis and initiation of treatment in an early stage (4).

When there is a disruption in blood flow, PAD arises, with atherosclerotic disease being the main aetiology, gradually narrowing or obstructing vessels, impairing the normal flow of peripheral arteries, resulting in reduced transport of nutrients and oxygen to cellular tissues, leading to ineffective elimination of metabolic waste products. Normahani et al. (5) clarified that conditions leading to LLA in individuals with PAD include uncontrollable pain, tissue destruction due to infection, irreversible ischaemia, the existence of joint flexes, and situations of bedridden individuals unable to regain gait after revascularization.

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Amputation consists of separating a limb or segment of it from the body. It is classified as minor if performed below the ankle joint and major if performed above the ankle. It is a last-resort treatment in various health conditions, determining various factors conditioning individual responses to amputation: aetiology, age, type and level of amputation, time after amputation, social support, and coping strategies (6). It is a procedure that transforms a person's identity in all its dimensions, and the social implications and effects on work capacity, quality of life, and self-image are devastating (7).

Working in a service where the number of amputations is significant, the challenge arises in supporting the transition of the individual and their family to this new condition of life. This fact triggered the need to explore how amputation of vascular aetiology is experienced. With the aim of synthesising the best available evidence on the experiences of individuals with vascular pathology undergoing major amputation, no specific context was defined in the research question (8): How does an individual with vascular pathology experience major amputation of the lower limb?

MATERIALS AND METHODS

This study represents a systematic review of qualitative studies and follows the guiding protocol of JBI (8):

Inclusion and Exclusion Criteria

The inclusion criteria presented below are defined on the basis of the above-mentioned review question:

Search Strategy and Study Identification

"The search strategy identifies published and unpublished studies through a three-phase process" (8). An initial limited search was conducted in the Google search engine, followed by an analysis of the words contained in the title and abstract and the indexing terms used to describe the article. Subsequently, a second search was conducted using all identified keywords and indexing terms in all included databases. Third, the reference lists of identified reports and articles were consulted for additional studies.

The first phase of identifying scientific evidence involved defining the search terms (Table 1). To do this, the Medical Subject Headings (MeSH) Browser® and the CINAHL Subject Headings were consulted.

The first stage of study identification was conducted in January 2022 through CINAHL, MEDLINE, MedicLatina, Nursing & Allied Health Collection, Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews, Cochrane Methodology Register, Library, Information Science & Technology Abstracts, and Cochrane Clinical Answers, via EBSCO HOST through the Order of Nurses, JBI Evidence Synthesis, PubMed, cielo, and RNCAAP.

No time frame was defined, considering that potentially relevant, seminal, and early studies in the field could be missed (8). After identifying relevant articles for the review question, the time frame was defined as January 1, 1983, to January 31, 2022. The following table describes the search strategy of databases with identified articles.

All titles and abstracts of the identified articles were read by one researcher, who applied the inclusion/exclusion criteria. Two researchers independently evaluated the references and included abstracts, following the same guidance, by thoroughly reading the articles.

Assessment of Methodological Quality (MQ)

The studies selected for inclusion in the systematic review were subjected to rigorous MQ assessment by the researchers using the JBI (8) critical appraisal checklist for qualitative studies (Table 3).

Table 1. Inclusion Criteria

PARTICIPANTS	Qualitative studies involving adult individuals who have undergone major lower limb amputation of vascular etiology. An adult is defined as any person aged 18 years or older.
PHENOMENON OF INTEREST	Studies that report experiences of major lower limb amputation. By experience, it is understood as the "(...) process of organizing the person's relationship with their daily life, with certain life situations (...)," related to "(...) changes, significant events, that cause disagreement between consciousness and existence and that put the person in the face of the need to choose. The person who experiences is, above all, a person who makes choices (9). Studies were sought that described how the amputated person responded to their new health condition.
STUDIES	Qualitative studies (phenomenological, ethnographic, grounded theory, ethnography, and action research). Simple descriptive studies; Case studies and surveys describing experiences of amputation may also be considered; Studies with an exploratory design.

Table 2. Exclusion Criteria

PHENOMENON OF INTEREST	Studies that do not investigate experiences of major lower limb amputation of vascular etiology. Traumatic amputations are excluded.
STUDIES	Opinion articles, comments, and publications related to reader letters are excluded.

Table 3. Descriptors used in the search

	Population		Phenomenon of Interest	
Key Words	Amputated Lower limb loss	Dysvascular Peripheral arterial disease	Vivência Adaptação Experience	Perceção Coping
CINAHL Headings	Amputee Amputation	Peripheral vascular diseases	Life Experience Life purpose Coping	Adaptation and psychological perception
Mesh Terms	Amputee Amputation	Peripheral arterial disease Peripheral vascular disease	Life change events Adaptation and psychological perception	

Data Extraction

Two researchers collected a set of information about each included study, following a systematic process to ensure scientific rigour and avoid biases. In qualitative reviews, "data consist of statements and texts of interest to the researcher, as published in the primary studies" (8). Data extraction followed the JBI (8) model for extracting qualitative evidence. It included details regarding methodology, method, phenomenon of interest, geographical and cultural context, participants, data analysis, authors' conclusions, and reviewers' comments.

Table 4. Databases and search strategy

Database	Boolean Formula and Limiters
CINHAL Complete	("lower limb loss" OR (MM "Amputees ") OR (MM "Amputation ") OR "amputated") AND ("experience" OR (MM "Life Experiences") OR (MH "Life Purpose") OR (MM "Adaptation, Psychological") OR (MM "Perception") OR (MM "Coping") OR "life change events") AND ("dysvascular" OR (MH "Peripheral Vascular Diseases ") OR "peripheral arterial disease")
MedLine	(MH "Peripheral Arterial Disease") OR (MH "Peripheral Vascular Diseases") OR "dysvascular") AND ((MH "Amputees") OR (MH "Amputation") OR "amputated" OR "lower limb loss") AND ((MH "Life Change Events") OR (MH "Adaptation, Physiological") OR (MH "Perception") OR "coping" OR "life purpose" OR (MH "Value of Life") OR "life experiencie")
RCAAP	Amputação E Reabilitação E Doença Crónica
SCIELO	((Amputação) AND (Vivência OR Experiência OR adaptação)) AND (Doença arterial)
PUBMED	((Peripheral arterial disease OR Peripheral vascular disease OR Dysvascular) AND (Amputation OR Amputee OR Amputated)) AND (Coping OR Experience OR Life change events)

Table 5: Checklist for critical appraisal of a qualitative study by the JBI

Reviewer:				
Study Reference:				
Title: **Authors:**		**Yes**	**No**	**Not Clear Not applicable**
1	Is there congruence between the declared philosophical perspective and the research methodology?			
2	Is there congruence between the methodology and the research question or objectives?			
3	Is there congruence between the research methodology and the methods of data collection?			
4	Is there congruence between the research methodology and the representation and analysis of the data?			
5	Is there congruence between the research methodology and the interpretation of the results?			
6	Is there a statement that locates the investigator culturally or theoretically?			
7	Was the influence of the investigator on the research and vice versa addressed?			
8	Are the participants and their voices adequately represented?			
9	Is the research ethical according to current criteria, or is there evidence of ethical approval from a specific body?			
10	Do the conclusions resulting from the research derive from the analysis or interpretation of the data?			
Included Excluded Seek more information				
Comments: (including reasons for exclusion)				

Table 6. Operational definitions of meta-aggregatio

Finding	Textual excerpt of the author's analytical interpretation of the results or data.
Illustration	Direct quotation of a participant's voice, field observation, or other supporting data.
Category	Brief description of a key concept that emerges from the aggregation of two or more similar findings.
Synthesis of the Findings	Comprehensive description of a group of categorised findings: This refers to a detailed and inclusive explanation of a cluster of categorised discoveries. It is an explanatory statement that conveys the complete and comprehensive meaning of a group of related categories.

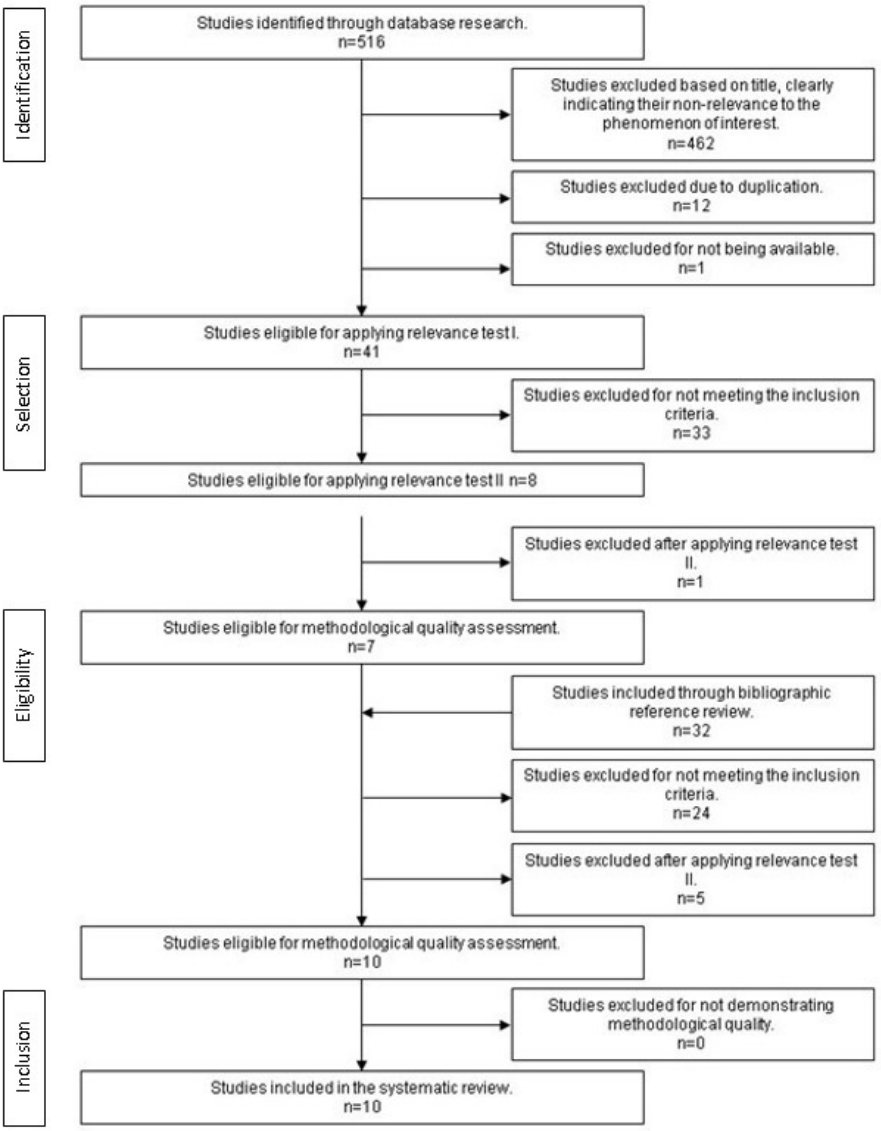

Figure 1: Flowchart of the sample selection process

Data Synthesis

Meta-synthesis is the process of combining the results of individual qualitative studies to create summary statements. It is an interpretive process that requires transparency and expertise to identify and extract results from the included studies, categorise them, and aggregate the categories into a final synthesis, constituting a statement for practise (8).

The units of analysis in qualitative studies are findings presented as themes, metaphors, or concepts identified by researchers. Operational definitions characterising meta-aggregation (Table

Table 7. Assessment of the methodological quality

Study reference	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
C1	S	S	S	S	S	NC	N	S	S	S
C2	NC	S	S	S	S	NC	S	S	S	S
C4	S	S	S	S	S	N	S	S	S	S
M2	S	S	S	S	S	S	S	S	S	S
P1	NC	S	S	S	S	N	NC	S	S	S
P2	NC	S	S	S	S	N	NC	S	S	S
R1	S	S	S	S	S	S	NC	S	S	S
RB1	NC	S	S	S	S	S	N	S	S	S
RB6	NC	S	S	S	S	N	NC	S	S	S
RB7	NC	S	S	S	S	N	NC	S	S	S
%	36%	100%	100%	100%	100%	27%	27%	100%	100%	100%

S: Yes, N: No, NC: Not clear, NA: Not applicable

4) describe the data to be synthesised and explain each stage.

For each finding, a level of credibility is established (8): "Unequivocal (I): The evidence is beyond any reasonable doubt and includes findings that are factual, directly reported/observed, and not subject to challenge; Credible (C): The evidence, although interpretive, is plausible in light of the data and theoretical framework. Conclusions can be logically inferred from the data, but since the results are essentially interpretive, these conclusions are open to challenge; and Not

Table 8. Studies included in the Systematic Review

Author	Participants	The cultural and geographical contexts	Phenomenon of interest
C1 Washington et al. (10)	Six participants: 4 men with a mean age of 64.2 years and 2 women with a mean age of 69 years; 3 amputated above the knee and 3 amputated below the knee.	United Kingdom, Manchester.	Experience of amputation and its impact on psychological well-being.
C2 *Columbo* et al., (11)	Twenty participants with a mean age of 65 years (ranging from 45 to 88 years). Amputated between 2011 and 2015. Seventeen men and three women, 17 amputated below the knee and three above the knee.	EUA, New Hampshire	Perception of the adaptation and rehabilitation process of the amputated person.
C4 Torbjörnsson et al. (12)	Thirteen participants with major lower limb amputation, 9 men and 4 women with a mean age of 75 years, 11 amputated below the knee, and 2 above the knee.	Stockholm Suécia	Experience of amputation due to PAD.
M2 Madsen Et al. (13)	Eleven participants, eight men and three women, 3 days after unilateral lower limb amputation. Age range between 45 and 84 years. Six participants were amputated below the knee, one was amputated through the knee, and four above.	Rural areas of Denmark	Behaviour of individuals after losing a lower limb due to vascular disease.
P1 MacKay et al. (14)	Thirty-five participants, 23 men and 12 women, had amputated due to vascular disease. Age ranged from 32 to 86 years. There were 23 below-knee amputees, 5 above-knee amputees, and 7 bilateral amputees.	Toronto, Canadá	Perceptions and experiences of individuals with lower limb amputations due to vascular disease.
P2 Couture et al. (15)	Sixteen participants amputated above and below the knee. Most participants returned home after amputation, and 2 were institutionalised. Twelve participants received a prosthesis, and 10 could walk more than 30 steps with the prosthesis.	Québec, Canada	Adaptation to lower limb amputation due to vascular disease.
R1 Pereira and Gomes (16)	Ten participants with major lower limb amputation, all male, aged between 39 and 77 years. Half of the individuals were retired, two were unemployed, and three were working at the time of this illness episode.	Urban area of Portugal	Transition process of the amputated patient: intervention of the rehabilitation nurse.
RB 1 Couture et al. (17)	Sixteen participants had their knees amputated; 12 below the knee and 4 above the knee, 9 men and 7 women; the average age was 65.6 years.	Québec, Canada	Coping strategies and adaptation after an amputation.
RB 6 Suckow et al. (18)	Twenty-six participants were amputated with an average age of 64 years (ranging from 39 to 87 years), 19 men and 7 women. All patients had at least one major amputation, above or below the knee, and eight were bilateral amputees.	EUA, Utah, Salt Lake City, Dartmouth-Hitchcock, and Emory	Quality of life in individuals amputated due to vascular disease.
RB 7 Pedlow et al. (19)	Sixteen participants had lower limb amputations, five women and 11 men, aged between 29 and 82 years (average 64 years), nine above-the-knee amputations, and seven below-the-knee.	Toronto, Canada.	Information needs of individuals amputated due to vascular disease.

Table 9. Results of the meta-aggregation

Finding Example	Illustration Example	Categories	Synthesis of the Findings
They felt that amputation was effectively a choice of life over death.	*"… as it is, you live …" (C1, p.3)*	Amputate to be able to live	**Awareness of the need for amputation**
Acceptance of amputation came with the realisation that they had no choice but to get on with life.	*"… put that part of my life behind me. Just go on from there." (C1, p.4)*	Accepting the consequences of the disease	
When asked, 85% of the patients felt that intolerable ischaemic rest pain was the most appropriate threshold for having their limb amputated.	*''If I could, I would have taken an axe and chopped off my leg sooner just to remove the pain" (RB6, p.726)*	Amputating to relieve pain	
Having a leg amputated was perceived as a life-changing event to which participants had to adjust.	*"My life has changed dramatically with this operation".* (M2, p.6)	Perception of change	**Change and difference**
O facto de se verem com a imagem corporal alterada leva-os a sentirem-se diferentes das outras pessoas e a vivenciarem o estigma da deficiência	*"Ser different dos outrows. Só vejo uma pessoa normal e eu já não sou." (R1, p.77);*	Mirror reflection	
Once at home (T3), people apparently preferred to keep their feelings hidden from others and refused to think about the amputation.	*"I'd rather not think about the amputation. (...) It makes me angry. I'm ready to blow up at any time."; (RB1, p.5)*	The whirlwind of feelings and emotions	
(…) three additional coping strategies associated with the amputation experience were identified in the qualitative data analysis: noticing progress, learning new things, and using humour.	*"From one day to the next, I notice I can do a lot more and that helps me a lot.";* *"I try to find the funny side of the situation instead of always being disappointed." (RB1, p4)*	Coping strategies	
However, a number noted that undergoing an amputation affected friendships.	*"… You determine who your real friends are … since I was in the hospital, I have hardly heard from him at all" C1, (p.5).*	Changes in relationships with others	**Facilitating conditions**
Limited finances were identified as a key challenge for some participants. These participants indicated that a lack of financial resources impacted their social opportunities and required them to make difficult choices.	"it does leave me as an amputee without a job and of course, since I wasn't really planning on going that path, it meant that there was no build-up of cash reserve, so we now live well below the poverty line".(P1, p.5)	Good economic conditions facilitate	
Social and emotional support from family members and friends was uniformly described as "helpful."	*"My wife of 37 years, having somebody to support you help. [She was] always there to support me. If somebodys going to have an amputation, God, I hope they have somebody like my wife";(C2, 266)*	The support network supports overcoming.	
They described how the accessibility of their homes could enable their activities of daily living or act as a barrier to their mobility and independence.	*"Because of the way the bathroom is set up, I can't take a shower anymore. So it's a sponge bath every morning." (P1, p.5)*	Accessibility and access to technical aids facilitate	**Meaning of mobility**
To be able to learn to use a prosthesis meant a lot to the patients. It was not just a tool for learning to walk again; it was a symbol of normality.	*"I became almost normal, I am the person I am. I had never been in a wheelchair before, and now I can suddenly stand up again."* (C4, p.61).	Wearing a prosthesis returns to normalcy	
First, most participants (…) felt that mobility, or the lack thereof, had the greatest impact on their Quality of life.	*''It is always a problem. stairs, doorways, getting around.'';* *''You can't stop or start like you used to. People cut you off, bump into, crowd you"; (RB6, 727)*	Mobility is independence	
Participants indicated that providing this information would have prepared them for what they would be facing and helped them with the coping process.	*"What lies ahead or what you may be going through at that point from a hospital perspective before you go into rehab. If you must stay half of your amputation through the three weeks inside St. Michael's, you should be well-prepared for what to expect after the amputation. Not just go into rehab and expect someone to tell you when you've been dealing with the situation for almost a month now (RB7, p.92).*	Lack of preparation of professionals to prepare	**Level of preparation and knowledge of professionals**
Ao enfermeiro cabe a difícil tarefa de percecionar não só os significados, mas todas as condições pessoais da pessoa de forma a poder orientá-la no sentido favorável da transição, sem qualquer juízo de valor	*"… este internamento tem sido de forte recuperação do meu relacionamento com a minha mulher e a confirmação de que esta casa tem profissionais de todo o tamanho, … parecem que foram feitos para isto … o meu sentimento mais forte é ter força para que o esforço que vocês profissionais têm feito resulte naquilo que vocês querem." (R1, p.96)*	The professionals	

Supported (NS): the findings are not supported by the data and none of the other level descriptors apply."

All data related to the research question, including author observations, were considered findings in the 10 articles. Findings were identified through repeated readings of the texts.

RESULTS

The flowchart presented below (Figure 1) explains the entire process leading to the final number of articles included in the systematic literature review.

The results of the MQ assessment (Table 5) indicate that the congruence between philosophical perspective and research methodology is not clear in most studies. Only three studies provide a statement that culturally and theoretically situates the researcher. The authors, for the most part, do not address their potential influence on the research. These findings are consistent with those found in other qualitative systematic reviews conducted by the investigator.

The 10 studies all met the other inclusion criteria, and the reviewers considered them to have moderate methodological quality and agreed on their inclusion in the systematic review (Table 6).

The reviewer created category descriptions after extracting 213 findings and illustrations from the ten articles, which were discussed with the second reviewer, categorising the findings based on the similarity of meaning. These categories were subjected to synthesis, to produce a single comprehensive set of synthesised findings (Table 7), which can be used as a basis for evidence-based practise (8).

Awareness of the need for amputation: Intense pain in individuals with vascular disease predicts the possibility of amputation, being considered the decisive factor for accepting the procedure, considering its repercussions on mobility and consequently on daily activities. The decision to amputate arises as a consequence of the individual's behaviours and the progression of their disease, presenting itself as the only solution to relieve pain and suffering, but mainly to save their life, facilitating the acceptance of amputation.

Change and difference: Major lower limb amputation is a disruptive event that involves a change in the person's way of being and existing in all dimensions. The feeling of sadness is pervasive in the discourse of the amputated individual throughout the process, contrasting with the feeling of satisfaction from pain and suffering relief. The improvement or lack thereof in health condition is crucial in stimulating positive feelings. Perception of the new body image is the first sign of identity change after amputation. The stigma of disability is manifested as something that hinders them from living life in the same way, leading the amputated individual to feel different and to feel that others see them differently. Maintaining productive work and maintaining pre-amputation status is structuring for the reconstruction of identity.

Facilitating conditions: Social support, especially emotional support from family and friends are recognised by amputated individuals as essential for overcoming difficulties. Lack of technical aids and accessibility at home and in the community are barriers to the mobility and independence of the amputated person, often resulting in the abandonment of activities and/or social interactions. Lack of economic resources is one of the difficulties in coping with the additional costs associated with their new condition (travel, adaptation of physical space, equipment, assistance for activities beyond their reach). Whether facilitator or inhibitor, it is the knowledge that the individual has and how they optimise community resources and services.

Meaning of mobility: The use of a prosthesis is not just a means to walk again, but rather a symbol of normality. Mobility and functionality are intrinsically linked to the quality of life of the amputated patient.

Level of preparation and knowledge of professionals: Studies show that amputees would like to have structured information about the entire process to better prepare them for what they would face. The nurse should seek to understand personal conditions (meanings, beliefs, attitudes, socioeconomic status, level of preparation) to guide them towards a healthy transition. Some studies indicate that the message from healthcare professionals is not always well perceived and/or their availability is not as desired. They point out that throughout the learning process, there is often not enough time for individuals to express their concerns. Thus, professional interaction focuses on practical aspects, and professional assistance is directed towards self-care in its instrumental aspect.

In the context of this systematic review, a narrative summary of the synthesis of findings was chosen (Figure 2). This narrative synthesis depends on the researcher's response to the research question and epistemological position, aiming to lead to a synthesis grounded in the philosophy of the qualitative paradigm.

DISCUSSION

Transition is a personal process involving definitions and redefinitions of the self and the situation. For a person to truly be in transition, it is essential that they are aware of the changes occurring. Otherwise, it is necessary to help them perceive these changes before facilitating the transition process (1).

Most individuals had a fearful reaction upon receiving the news of limb amputation, thinking they would lose the integrity of their body and their former self. The same authors explain that individuals who have the possibility to decide on amputation, such as those with vascular pathology, begin their grieving process upon making the decision (20).

Response patterns emerge from observable and unobservable behaviours during the transition process, which, despite appearing disrupted or dysfunctional, are not random events. These behaviours encompass patterns that reflect both

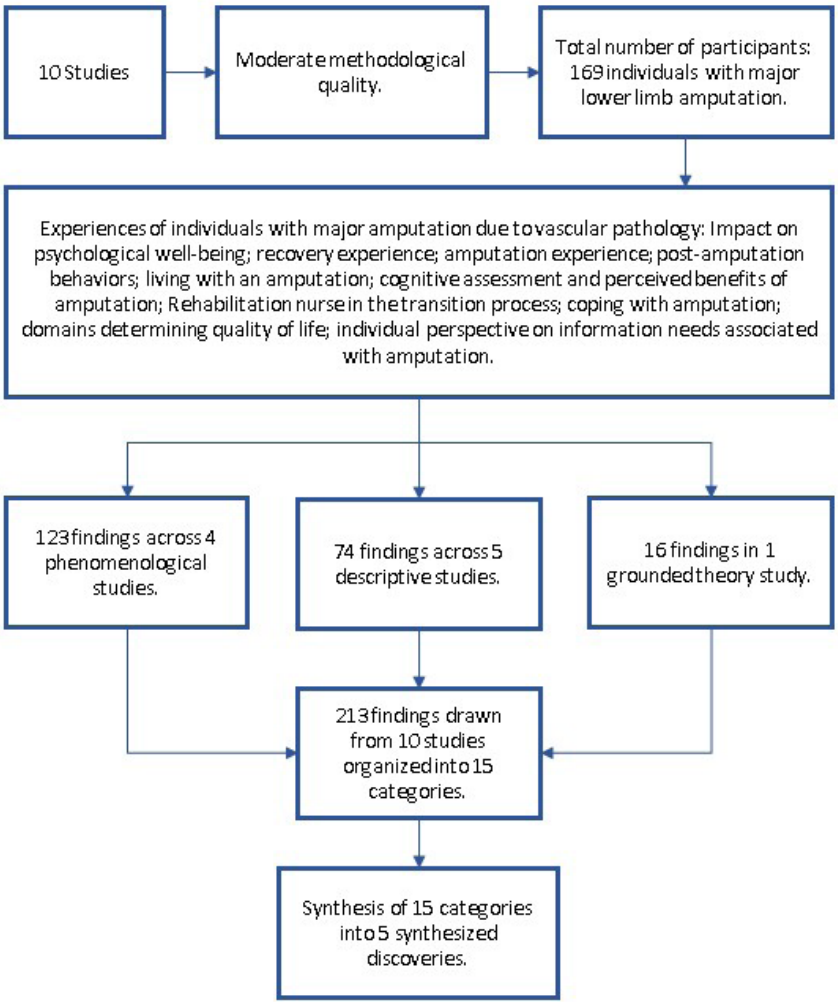

Figure 2: Meta-aggregation of the qualitative study adapted from JBI

intrapsychic structures and processes and changes in the sociocultural context. Examples include disorientation, distress, and possibly euphoria and happiness (1).

After amputation, individuals feel satisfaction and happiness because of the improvement in their quality of life, enabling them to overlook physical difficulties. Negative feelings are associated with social factors, physical changes, and persistent pain after amputation (21). Amputees may even experience feelings of abandonment, disappointment, and loneliness related to how they perceive themselves and how others perceive them (22).

Perhaps the most widespread characteristic of transition is the disconnection associated with the rupture of bonds on which a person's feelings of security depend (1). Lindheim and Syme (23), in their study of factors influencing health, identify "the importance (...) of being connected (...)" as a common element. These connexions are not passive but require active engagement among people and the environment.

In response to the loss of independence, individuals develop coping strategies to adjust to their new condition, emphasising positive thinking, humour, and nurturing hope for brighter days. Belon and Vigoda (20) advocated that amputees learn coping strategies primarily from cognitive-behavioural therapies and mindfulness to effectively manage the psychological changes associated with amputation.

Amoah et al. (21) stated that social support is also crucial for supporting the transition of the amputee, particularly from family, providing emotional and financial support and aiding in adaptation and performance of daily life activities. In addition, Reichmann and Bartman (24) stated that it is comforting for the individual initiating this process of amputation to have someone in the same condition accompany and advise them.

Transitions can be influenced by personal factors such as cultural beliefs, attitudes, socioeconomic status, preparation, and knowledge, as well as by community and social conditions. Understanding these factors is crucial for professional

intervention to facilitate a healthy transition (1). Ligthelm and Wright (25) emphasise the role of the healthcare team in physical and functional recovery, but note that professional support may not fully address the emotional and existential needs of amputees.

The experiences of transition can carry positive, neutral, or negative meanings. Whether desired or not and stemming from personal choice, understanding a transition's significance for the individual is crucial for grasping their experience and its health implications (1). Dunne et al. (26) highlighted that the ability to use prosthetics holds significant personal meaning for amputees, fostering dedication, motivation, and engagement in the pursuit of independence and the semblance of normalcy. Foster & Lauver (27), Virani et al. (28), and Amoah et al. (21) mention that lack of mobility hinders the performance of daily life activities, including household and professional tasks, potentially leading them to quit their jobs.

Meleis (1) underscores the significance of nurses comprehending the transition process from the individual's perspective, integrating the meanings ascribed by the individuals themselves, while also highlighting that uncertainty is closely intertwined with the necessity for acquiring new knowledge and fostering new skills to address the demands brought about by the new health condition.

Rassin et al. (29) stated that some individuals had doubts about the amputation process due to a lack of information from the healthcare team. According to Meleis (1), preparation or education is the nursing therapy of choice to create conditions for confronting a transition. Sufficient time is needed to assume new responsibilities and develop new skills for it to be effective.

Limitations

The need for multiple English terms to translate the concept of "experience" may have constrained this research.The studies' inclusion criteria eliminated some potentially relevant articles, but they were not clear on the level and aetiology of amputation.

CONCLUSIONS

This review illustrates the vulnerability of individuals with vascular pathology, an already fragile condition whose disease narrative leads to limb amputation. This decision arises as a last resort in an experience marked by intense pain and suffering.

Thus, concerning the synthesis of findings, we recommend: Understanding personal conditions (meanings, beliefs, attitudes, socioeconomic status, level of preparedness), as well as whether the individual perceives the severity of the disease and the need for amputation; promoting contact with family and amputees; preparing the individual for surgery, allowing time to express their concerns, including information about: surgery; post-surgery; recovery; discharge planning; family involvement in the care process; and safety and well-being precautions; assisting in restoring body image and promoting self-esteem; and redefining negative meanings attributed by the individual to their condition; promoting the development of coping strategies; and assisting in the transition from hospital to home.

Greater knowledge is needed regarding the developmental, functional, and structural reorganisation of the family of an individual with vascular disease who undergoes major amputation. Similarly, more primary studies describing the transition process of individuals with vascular pathology undergoing major amputation, from awareness to mastery, will be necessary.

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RESEARCH ARTICLE
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Determining the Effect of Mobile Learning for Nursing Students' Related to Time Management

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ABSTRACT

Objective: This study was conducted to determine the effect mobile learning has on time management for nursing students.
Materials and Methods: This descriptive and correlational study was conducted with 140 nursing students of a nursing college in Istanbul between October and November 2021. Data were collected using the Student Information Form, Attitude Scale Towards Mobile Learning, and Time Management Questionnaire. Data analysis was performed using the Mann- Whitney U test, Kruskal-Wallis H test, Spearman correlation, and Bonferroni Post Hoc Test.
Results: The mean age of the students was 20.94±2.30 years. The mean total scores of the Attitude Scale Towards Mobile Learning and Time Management Questionnaire were 160.24±37.58 and 89.04±12.24, respectively. A significant difference was found between the mean scores of the Attitude Scale Towards Mobile Learning and Time Management Questionnaire according to age groups, study class, internet access method, and the device they frequently used ($p<0.05$).
Conclusion: Nursing students' possessed a positive attitude toward mobile learning and time management. In addition, the students' characteristics effectively ensured their attitudes toward mobile learning and time management.
Keywords: Mobile learning, attitude, time management, nursing students

INTRODUCTION

Mobile learning involves learning in different locations using internet technologies, with learners accessing content with the help of portable digital technologies (1-3). At the same time, mobile learning is a method that improves students' achievement, motivation, and problem-solving skills. Because of this, it has attracted the attention of many students (4-6).

With the global impact of the COVID-19 pandemic, mobile learning has subsequently enabled students to organize the educational process according to their needs and learning styles (3, 4, 7). Studies on the use of mobile devices in education emphasize that they are helpful in student education and assist in the permanent acquisition of information (8, 9).

In nursing education, where theory and skill education are used together, it is especially important for the students to possess sufficient knowledge and skills to provide quality care (4, 10). In today's nursing education all over the world, it has become mandatory to include technological approaches in the curriculum to provide students with competence in clinical practice (3, 4, 11, 12). In addition, the COVID-19 pandemic has profoundly affected nursing education, in the same way it has affected all education and training methods, by hastening the process. Under the current systems, mobile learning can be quickly realized, independent of place, time, and space. Mobile learning, recently introduced into clinical education, is a new form of learning that uses wireless network technology and communication equipment to acquire educational information, resources, and services (1, 13).

Realizing educational methods through mobile learning platforms makes obtaining information and learning more accessible. However, the widespread and easy accessibility of mobile learning, which has such positive effects as mentioned above, also introduces problems related to time management (14, 15). Because mobile learning facilitates long-distance learning and prolongs the time the students spend in front

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Table 1. Characteristics of nursing students (n=140)

Variables		n	%
Average age x̄±S.D=20.94±2.30 year			
Age groups	≤19	36	25.7
	20-21	60	42.9
	≥22	44	31.4
Gender	Woman	105	75.0
	Men	35	25.0
	1st grade	42	30.0
Class	2nd grade	27	19.3
	3rd grade	36	83.6
	4th grade	35	25.0
Average CGPA x̄±S.D=3.16±0.41			
CGPA	2.00 - 2.99	23	16.4
	3.00 - 4.00	117	83.6
Marital status	Single	135	96.4
	Married	5	3.6
Device often used in learning	Smartphone	61	43.6
	Laptop	59	42.1
	Computer	16	11.4
	Tablet	4	2.9
Intended use of smartphone	Education	9	6.4
	Communication	109	77.9
	Listening to music	19	13.6
	Game play	3	2.1
Daily smartphone use	1 hour	2	1.4
	2 hours	13	9.3
	3 hours	47	33.6
	4 hours or more	78	55.7
Mobile learning time	10 min.	4	2.9
	20 min.	11	7.9
	30 min.	27	19.2
	40 min. and over	98	70.0
Internet access method	Own mobile Wi-Fi	33	23.6
	Own Wi-Fi	50	35.7
	Dormitory/home Wi-Fi	57	40.7

S.D.: Standard Deviation, CGPA: Cumulative Grade Point Average

of screens, it may negatively affect the manner in which students spend time in their daily lives. Mather et al. (2016) stated in their study that mobile learning facilitates effective time management (16). Accordingly, nursing students' use of mobile learning in university directly relates to effective time management (17). When examining nursing education, students may have difficulty managing their time because the course curriculum is intensive and because nursing is an applied field

Table 2. Attitude Scale Towards Mobile Learning and Time Management Questionnaire scores of nursing students (n=140)

Scales	Mean	S.D.	Median	Min.	Max.	Cronbach- α coefficient
Attitude Scale Towards Mobile Learning	160.24	37.58	164.0	45.0	225.0	0.978
Satisfaction	72.16	19.92	74.0	20.0	100.0	0.980
Effect to Learning	43.39	10.67	44.0	11.0	55.0	0.971
Motivation	24.71	7.19	25.0	7.0	35.0	0.966
Usability	19.98	7.47	20.0	7.0	35.0	0.926
Time Management Questionnaire	89.04	12.24	90.0	55.0	117.0	0.806
Time Planning	51.49	11.09	51.0	20.0	76.0	0.900
Time Attitudes	23.76	3.52	24.0	15.0	35.0	0.819
Time Wasters	13.78	3.68	14.0	4.0	20.0	0.712

S.D.: Standard Deviation, Min.: Minimum, Max.: Maximum

(18, 19). In addition, because nursing students who study under such programs are prone to changing their location frequently, they may encounter issues when using time effectively (20). Therefore, nursing students must learn to manage time to work efficiently after completing their education (18, 19). The main goal of time management is to enable individuals to plan their lives and tasks (21) adequately. Proper time management is also crucial in allowing the students to reach their personal and career goals by providing such opportunities as increasing productivity, reducing stress, and seizing opportunities through mobile learning platforms (22). At the same time, nursing students, who will become critical team members of the future healthcare system, will have to manage their time while fulfilling their roles and responsibilities to protect and improve the health of the individual, family, and society, offering cures in the event of illness (3). Education is one of the most influential factors in terms of shaping individuals and causing them to set goals throughout the course of their lives (11). Appropriate use of time management in lessons and extracurricular activities in educational life requires skills. Realizing these skills and integrating mobile learning will enable nursing students to properly express themselves and find success (4). This study aims to determine the effect of nursing students' attitudes on time management regarding mobile learning. The research questions were the following:

1. What are the students' attitudes towards mobile learning and time management?

2. Is there a difference between mobile learning and time management levels according to the individual characteristics of students?

3. Is there a relationship between students' attitudes towards mobile learning and time management?

MATERIALS AND METHODS

Research Type

This study was conducted along the descriptive and correlational type.

Participation in the Study

The study population consisted of nursing students (N=366) studying at a nursing college in Istanbul between November 8 and November 22, 2021. The goal was for the sample to reach at least 132 students with a 5% margin of error and 95% confidence interval, taking into account the average duration of smartphone use as reported in the literature (23). However, considering possible lapses in data, approximately 10% more than the required sample number was used, bringing the number to 140 nursing students. The criteria for inclusion in the sample included: the individuals were nursing students, they were actively continuing their education and training, they playing computer/video games, and they do not have any communication problems.

Data Collection Tools

The study data were collected through the Student Information Form, Attitude Scale Towards Mobile Learning, and Time Management Questionnaire (TMQ).

The Student Information Form

The form, developed by the relevant literature (1, 6, 7, 19), consisted of 10 questions about the student's age, gender, grade, Cumulative Grade Point Average (CGPA), marital status, device frequently used for education, purpose of smartphone use, daily smartphone usage time, mobile learning time, and internet access method.

Attitude Scale Towards Mobile Learning

The Attitude Scale Towards Mobile Learning, developed by Demir and Akpınar in 2016 (24), is a 45-item scale that evaluates undergraduate students' attitudes towards mobile learning. The scale has four sub-dimensions: Satisfaction, Effect on Learning, Motivation, and Usability. Satisfaction evaluates students' Satisfaction towards mobile learning, while Effect on Learning evaluates the effect using mobile devices to study has on learning, Motivation evaluates students' motivation towards mobile learning, and Usability evaluates the usefulness of mobile devices. The lowest score that can be obtained from the 5-point Likert-type scale is 45, while the highest score is 225. It can be understood that the higher the score obtained from the scale, the higher the students' attitudes towards mobile learning. The Cronbach alpha reliability coefficient of the final version of the scale was calculated as 0.95 (24). In this study, Cronbach's alpha reliability coefficient was 0.978.

Time Management Questionnaire (TMQ)

The Time Management Questionnaire (TMQ) developed by Britton and Tesser in 1991 (25) was adapted into Turkish by Alay and Koçak in 2002 (26). The inventory comprises three sub-dimensions: Time Planning, Time Attitudes, and Time Wasters. The inventory, which is a 5-point Likert type, consists of 27 items in total. The 16th item in the Time Planning sub-dimension, the 2nd, 6th, and 7th items in the Time Attitudes sub-dimension, and all items in the Time Wasters sub-dimension are reverse scored. The sum of these three sub-dimensions provides the total score of the Time Management Questionnaire. The lowest possible score on the scale is 27, while the highest is 135 (26). Cronbach's alpha reliability coefficient was 0.80 in the Turkish adaptation of the scale and 0.806 in this study.

Procedures of the Study

The data were collected through the Student Introduction Form, Attitude Scale Towards Mobile Learning, and Time Management Questionnaire, using Google Forms to collect the data with first, second, third, and fourth-year nursing students. Students were informed about the study on the first page of the data collection forms. Before beginning the study, students were asked to whether they were willing to participate by

Table 3: Comparison of Attitude Scale Towards Mobile Learning and Time Management Questionnaire Scores according to characteristics (n=140)

Variables	n	Attitude Scale Towards Mobile Learning		Time Management Questionnaire	
		x̄±S.D	Median	x̄±S.D	Median
Age class					
≤19 (1)	36	149.64±38.06	152.5	85.42±14.42	84.5
20-21 (2)	60	164.07±31.70	167.5	89.40±10.27	90.0
≥22 (3)	44	163.70±43.35	170.0	91.50±12.36	91.5
Statistical analysis*		χ^2 =7.849		F=2.548 p=0.082	
Probability, Difference		**p=0.020 [1-2.3]**			
Gender					
Woman	105	162.06±34.00	164.0	89.56±12.66	92.0
Male	35	154.80±46.85	163.0	87.45±10.89	88.0
Statistical analysis, Probability		Z=-0.510 p=0.610		Z=-1.183 p=0.237	
Classroom					
1. (1)	42	140.21±41.89	151.5	86.64±13.94	86.0
2 (2)	27	165.37±27.13	164.0	87.44±11.56	89.0
3. (3)	36	176.36±29.01	180.0	88.56±11.22	91.5
4. (4)	35	173.74±37.71	174.0	93.63±10.73	92.0
Statistical analysis		χ^2 =23.391		F=2.421 p=0.069	
Probability, Difference		**p<0.001 [1-3.4]**			
CGPA					
2.00 - 2.99	23	151.52±49.04	166.0	92.09±15.16	94.0
3.00 - 4.00	117	161.96±34.89	164.0	88.44±11.56	89.0
Statistical analysis, Probability		Z=-0.636 p=0.525		t=1.311 p=0.192	
The deviceoften used in learning					
Smartphone (1)	61	156.36±39.43	163.0	85.49±11.53	85.0
Laptop (2)	59	160.92±38.99	168.0	92.39±12.56	94.0
Desktop computer (3)	16	166.94±22.57	167.0	87.38±9.98	88.5
Statistical analysis*		F=0.564		F=5.208	
Probability, Difference		p=0.570		**p=0.007 [1-2]**	
Intended use of smartphone					
Education	9	157.22±32.16	160.0	89.33±10.81	93.0
Establishing communication	109	159.82±38.76	166.0	89.57±12.65	91.0
Listening to music	19	161.05±36.38	160.0	85.84±10.87	85.0
Statistical analysis, Probability		χ^2 =0.685 p=0.710		χ^2 =2.132 p=0.344	
Everyday smartphone					
1-2 hours	15	167.67±43.29	168.0	94.73±8.61	94.0
3 hours	47	157.38±34.41	161.0	90.21±11.57	90.0
4 hours or more	78	160.53±38.53	164.5	87.23±12.90	88.5
Statistical analysis, Probability		χ^2 =1.216 p=0.545		**F=2.759 p=0.067**	
Mobile learning					
10-20 minutes	15	167.67±43.29	168.0	83.13±7.49	83.0
30 minutes	47	157.38±34.41	161.0	88.59±12.72	89.0
40 minutes and over	78	160.53±38.53	164.5	90.06±12.51	91.0
Statistical analysis, Probability		χ2 =1.216 p=0.545		**χ2 =2.132 p=0.344**	
Internet access					
Own mobile (1)	33	146.42±46.28	149.0	84.61±12.18	85.0
Own Wi-Fi (2)	50	169.38±34.51	175.5	88.58±12.21	89.0
Dormitory/home Wi-Fi (3)	57	160.23±32.43	160.0	92.00±11.65	93.0
Statistical analysis, Probability		χ^2 =1.216 p=0.545		**χ2 =2.132 p=0.344**	
Difference		**p=0.015 [1-2]**		**p=0.020 [1-3]**	

**For normally distributed data, the "Independent Sample-t" test (t-table value) was used to compare the measurement values of two independent groups; the "ANOVA" test (F-table value) statistics were used to compare three or more independent groups. For non-normally distributed data, "The Mann-Whitney U" test (Z-table value) was used to compare the measurement values of two independent groups; "Kruskall-Wallis H" test (χ2-table value) statistics were used to compare three or more independent grou*

Table 4. Correlation evaluation of Attitude Scale Towards Mobile Learning and Time Management Questionnaire scores of nursing students (n=140)

Correlation*		Time Management Questionnaire	Time Planning	Time Attitudes	Time Wasters
Attitude Scale Towards Mobile Learning	*r*	0.145	**0.253**	0.057	**-0.223**
	p	0.088	**0.003**	0.503	**0.008**
Satisfaction	*r*	0.105	**0.201**	0.040	**-0.174**
	p	0.215	**0.017**	0.637	**0.040**
Effect to Learning	*r*	**0.185**	**0.218**	0.069	-0.035
	p	**0.029**	**0.010**	0.421	0.679
Motivation	*r*	0.062	0.164	-0.006	**-0.211**
	p	0.469	0.053	0.945	**0.013**
Usability	*r*	0.086	0.159	0.018	**-0.177**
	p	0.312	0.061	0.831	**0.037**

**Spearman's correlation coefficient was used to examine the relationship between two quantitative variables that do not have a normal distribution.*

selecting the "I approve" option on the shared forms. Students answered the data collection questions in about 20 minutes.

Ethical Consideration

To conduct the study, permission from the institution and ethics committee was obtained from Maltepe University Ethics Commitee (Date and Number: 05.11.2021- 2021/30-07). For the Attitude Scale Towards Mobile Learning and Time Management Questionnaire used in the study, the necessary permissions were obtained from the relevant authors via e-mail. The data from the students who agreed to participate in the study were collected online by the researchers outside of the student's class hours and at times that would not affect their education. This study adhered to the Helsinki Declaration of Human Rights.

Statistical Analysis

Statistical analyses were performed using the SPSS (IBM SPSS Statistics 27) package program. Descriptive statistics were used to interpret the findings. Parametric tests were used for normally distributed data, while nonparametric tests were used for non-normally distributed data. In this context, the Independent Sample-t test (t-table value), the ANOVA test (F-table value), the Mann-Whitney U test (Z-table value), the Kruskal-Wallis H tests ($\chi 2$ -table value), and Spearman correlation analysis were used.

RESULTS

It was found that 42.96% of the nursing students were in the 20-21 age group with a mean age of 20.94±2.30 years. Additionally, 75% were female, 30% were in the first grade, 83.6% had a GPA between 3.00-4.00 points, and 96.4% were single. It was found that 43.6% of the students frequently used smartphones during their education, 77.9% used smartphones for communication purposes, 55.7% used smartphones for 4 hours or more per day, 70% had a mobile learning time of 40 minutes or more per day, and 40.7% accessed the internet via dormitory/home Wi-Fi (Table 1).

Nursing students' attitudes towards mobile learning and time management levels

The findings regarding the students' responses to the Attitude Scale Towards Mobile Learning and Time Management Questionnaire are presented in Table 2. The mean total score of this questionnaire was 160.24±37.58, with its sub-dimensions being 72.16±19.92 for Satisfaction, 43.39±10.67 for Effect to Learning, 24.71±7.19 for Motivation, and 16.98±7.47 for Usability. The mean total score of the Time Management Questionnaire was 89.04±12.24, with sub-dimensions of 51.49±11.09 in Time Planning, 23.76±3.76 in Time Attitudes, and 13.78±3.68 in Time Wasters (Table 2).

Comparison of nursing students' attitudes towards mobile learning and time management levels according to characteristics

After obtaining the results, the students' characteristics and mean scores on the Attitude Scale Towards Mobile Learning and Time Management Questionnaire were analyzed. According to age, it was found that the mean scores of the Attitude Scale Towards Mobile Learning of the students in the 20-21 and 22 age groups were statistically significantly higher than those who were 19 years of age. The mean scores of the students in the 3rd and 4th grades were statistically significantly higher than those in the 1st grade ($p<0.05$). It was found that the mean total score of the Time Management Questionnaire of students using laptops was statistically significantly higher than those using smartphones ($p<0.05$). The mean Attitude Scale Towards Mobile Learning score of the students who used their own Wi-Fi was statistically significantly higher than those with mobile data ($p<0.05$). The mean total score of the Time Management Questionnaire was statistically significantly higher in students who used dormitory/home Wi-Fi than in those who used their own Wi-Fi ($p<0.05$) (Table 3).

The relationship between nursing students' attitudes towards mobile learning and time management levels

There was a statistically significant positive correlation between the Attitude Scale Towards Mobile Learning, Effect to Learning sub-dimension mean scores, and Time

Management Questionnaire total (r=0.185; p=0.029) mean scores. A statistically significant positive correlation was also found between the Attitude Scale Towards Mobile Learning total (r=0.253; p=0.003), Satisfaction (r=0.201; p=0.017), and Effect to Learning (r=0.218; p=0.010) sub-dimension mean scores and Time Management Questionnaire Time Planning sub-dimension ($p<0.05$). A statistically significant negative correlation was found between the Attitude Scale Towards Mobile Learning total score and sub-dimension mean scores and the Time Management Questionnaire Time Wasters sub-dimension mean score ($p<0.05$) (Table 4).

DISCUSSION

After the COVID-19 pandemic, changes in the education and training system have also caused changes in attitudes towards mobile learning, which is significant regarding time management. In light of this, the present study was conducted to determine the effect of nursing students' attitudes towards mobile learning as it relates to time management.

The nursing students have stated that their attitudes towards mobile learning are high, based on the results of the Attitude Scale Towards Mobile Learning. Similarly, Demir and Akpınar (2016) found that students in the department of computer education and instructional technologies had high attitudes towards mobile learning (24). This finding is expected because digital systems are an integral part of daily life, as aside from the advantages that mobile learning provides. In addition, the study observed that the sub-dimension of Satisfaction was higher for the nursing students than the other sub-dimensions. Similarly, a study conducted by Hacıhasanoğlu et al. (2010) determined that the Satisfaction sub-dimension was higher than the other sub-dimensions for undergraduate students (27). Because of today's technology, it can be stated that education has become innovative and accessible regardless of time and place, especially due to mobile devices. Such devices also increase the satisfaction of nursing students as it relates to mobile learning. On the other hand, it was determined that the Usability sub-dimension was lower than the other sub-dimensions for the students who participated in the study. Similarly, the study of Karakaş and Saka (2021) also found that the Usability sub-dimension was lower than the other factors (28). The low Usability sub-dimension may be associated with the continuous development of technology and the time it takes for nursing students to adapt to each new development.

The total score obtained from the Time Management Questionnaire indicates that the students' time management levels are high; in other words, they manage their time well. This is similar to the studies conducted by Kaya et al. (2012) and Bıçkıcı and Torun (2021) (18, 29). Nursing students must realize the importance of time and acquire time management skills during their student life (30). In addition, the study's findings indicated that the Time Planning sub-dimension of the Time Management Questionnaire was higher than the other dimensions. Time Planning is defined as determining the activities necessary to achieve specific goals and planning how much time, with which tools, and when these activities will be carried out. This sub-dimension focuses on time management's short- and long-term planning (31). Similarly, a study conducted by Yılmaz and Temiz (2023) found that the Time Planning sub-dimension was higher than the other sub-dimensions for their participants (32). This finding indicates that nursing students possess excellent time planning skills. On the other hand, it was determined that the Time Wasters sub-dimension was lower than the other sub-dimensions. Time Wasters are habits that cause loss of time and prevent effective use of time. The Time Wasters sub-dimension includes items related to activities that negatively take up time (31). These would include everything that distracts nursing students from their university/faculty goals. For this reason, it is essential to teach students about potential time wasters, and to support the students in removing such hazards from their lives.

The findings also determined that the attitude of nursing students towards mobile learning changes according to individual characteristics. Students in the 20-21 and 22 age groups were shown to possess higher attitudes towards mobile learning. Thus, the study found that as the students got older, their attitudes towards mobile learning also increased. It can be thus stated that maturation is a prerequisite for learning (33).

The age groups in question correspond to students in the 3rd and 4th grades. This finding emphasizes that attitudes towards mobile learning differ according to grade level, and as nursing students' begin new grade levels, their attitudes towards mobile learning also increase. This notion also supports the finding that attitudes towards mobile learning increase with age.

Students who used laptops were found to manage their time better. Time management consists of analyzing time use, defining time problems, self-definition, setting objectives and priorities, transferring program goals to implementation plans, preparing daily plans and schedules, developing time management techniques, and analyzing and re-monitoring the process (18, 19). Laptops, much like other technological tools, can be useful in bettering people's lives if they understand how to use beneficial tools (15, 32, 34). This shows that nursing students who spend most of their time in front of the computer develop time management skills.

It was also determined that students who used their own Wi-Fi had better attitudes towards mobile learning. Students' attitudes towards mobile learning increased when they were able to attend classes from anywhere and at any time via Wi-Fi. A high student attitude is critical to promoting lasting learning (15, 35). This finding corroborates those of relevant studies in the literature (18, 19). Those who used dormitory/home Wi-Fi were found to have higher time management levels. This finding reveals that nursing students who have continuous and easy internet access are more aware of how to manage their time.

A significant positive relationship was found between the Attitude Scale Towards Mobile Learning, its Effect on Learning

sub-dimension, and the Time Management Questionnaire total score. This finding emphasizes that as mobile learning increases in students, time management also increases. When the items belonging to the Effect to Learning sub-dimension are examined, it can be seen that individuals believe that they can perform comfortable and efficient learning through mobile technologies in many aspects (access from anywhere, social interaction, ease of content follow-up, etc.) (24, 33). The Time Management Questionnaire was used to determine the time management skills of nursing students who participated in this study. This finding can be considered promising for the future training of competent nurses. Along with increases in the Attitude Scale Towards Mobile Learning total, Satisfaction, and Effect to Learning sub-dimension, there are also increases in the Time Planning sub-dimension of the Time Management Questionnaire. The 20 items under the Satisfaction sub-dimension represent student satisfaction with mobile learning. There are 11 items that examine the effect of mobile learning on learning in the Effect to Learning sub-dimension (24).

The Time Planning subscale of the Time Management Questionnaire represents long-term and short-term (one-day or weekly) planning and emphasizes that students use their time better (36). This study found that the mobile technologies which have become a staple of our time, have had a positive impact on the effect, attitude, and satisfaction of nursing students toward learning.

The Time Wasters sub-dimension scores were found to decrease as the Attitude Scale Towards Mobile Learning total, Satisfaction, Motivation, and Usability sub-dimension scores increase. A study by Alay and Koçak (2003) revealed that university students who manage their time better and avoid time-wasting activities can succeed more academically (31). Considering these findings, it was suggested that students with high mobile learning attitudes manage time better and avoid time wasters, and, in this context, they may be more successful in academic life.

CONCLUSION

This study determined that nursing students possessed positive attitudes towards mobile learning and maintained high time management levels. It also revealed that individual characteristics influenced students' attitudes toward mobile learning and time management. Increasing students' awareness of mobile learning methods is thus necessary to maintain such positive results. Planning the sections that direct the individual to use time effectively in mobile learning activities will allow students to increase their sensitivity to this issue. At the same time, considering the adverse effects of time wasters on people's psychosocial health, it may be recommended to conduct future studies that reveal the relationship between time management and mental problems.

Ethics Committee Approval: This study was approved by Maltepe University Ethics Committee (Date and Number: 05.11.2021- 2021/30-07).

Informed Consent: Written consent was obtained from the participants.

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Validity and Reliability of the Turkish Version of the NutriSTEP Questionnaire

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ABSTRACT

Objective: This study aims to evaluate the validity and reliability of the Nutrition Screening Tool for Every Preschooler (NutriSTEP) questionnaire in Turkish, a measurement tool originating from Canada that is designed to assess the nutrition risk of preschool children.
Materials and Methods: An online cross-cultural validation study was conducted with 196 parents of children aged 3-5 years in Istanbul, Türkiye. The NutriSTEP questionnaire is comprised of 17 items covering four categories and underwent translation into Turkish and subsequent evaluation for language, content, and face validity. Data collection occurred online, with statistical analyses being performed to gauge the reliability and validity of the tool.
Results: A total of 196 parents participated in the study who yielded a mean NutriSTEP score of 27.30 ± 6.64, indicating a notable prevalence of medium to high nutrition risk among preschoolers. The content validity index was assessed at 0.99, underscoring the robustness of the tool's content validity. The item-scale correlation analysis revealed a significant and consistent correlation between each item and the total score, affirming the coherence of the items within the NutriSTEP scale. Further scrutiny through item analysis unveiled predominantly positive correlations between most items and the total score, further bolstering the tool's efficacy at gauging nutrition risk. A criterion-related validity analysis highlighted significant associations between NutriSTEP scores and various factors, illuminating the tool's predictive capacity concerning nutrition risk. Moreover, the test-retest analysis demonstrated a robust correlation between the initial and repeated administrations of NutriSTEP ($p < 0.01$), reaffirming its reliability over time.
Conclusion: In conclusion, the Turkish adaptation of NutriSTEP demonstrates strong validity and reliability for assessing nutrition risk among preschool children, making it a suitable tool for use in Türkiye. Its user-friendly nature that allows parents to complete the assessment swiftly in approximately 10 minutes provides valuable insights into various aspects of children's nutritional status.
Keywords: Children, preschoolers, nutrition screening, nutrition risk, parent

INTRODUCTION

Nutrition plays a crucial role in supporting optimal growth and development. When mismanaged, nutrition can result in both short-term and long-term health issues, including chronic diseases such as diabetes and heart conditions, as well as such problems as obesity, wasting, stunting, and iron deficiency in growing children (1). Identifying children at risk of malnutrition early on is essential for preventing childhood malnutrition. Nutrition risk encompasses a spectrum of conditions, ranging from malnutrition to overnutrition (2). Nutritional risk screening aims to identify the characteristics that may contribute to a decline in nutritional status at an early stage before it gets exacerbated (3). The objective is to pinpoint individuals at risk of symptomatic or asymptomatic feeding issues (4). Given that eating habits established in childhood shape nutritional behaviors in adulthood, instilling healthy eating habits from an early age is imperative (5,6). Nutrition screening serves to raise awareness about potential nutritional issues. However, the literature has yet to identify a straightforward tool for screening nutrition risk that parents can readily utilize and apply to all stages of early childhood in Türkiye. Implementing effective screening systems during early childhood can effectively prevent significant nutritional issues

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by identifying children at risk of undernutrition early on. Early detection of existing nutritional issues reduces the burden and associated costs, facilitating timely interventions.

The Nutrition Screening Tool for Every Preschooler (NutriSTEP) questionnaire is a 17-item measurement tool developed in Canada for assessing nutrition risk and is completed by parents (4). While several pediatric nutrition risk screening scales have been developed for preschoolers, most are suitable for employment in acute/hospital settings. NutriSTEP, however, is suitable for use in preschools, routine healthy child check-ups, and hospital settings. Its primary advantages include its simplicity and user-friendliness, allowing parents and caregivers to complete it quickly in around 10 minutes (7). NutriSTEP facilitates early identification of potential nutrition problems, can be administered online and in various settings, and is practical (1,8). Providing nutrition education to families whose children's nutritional status is assessed using a reliable tool is believed to be able to affect the child's nutritional status and risk factors.

Research Question

Is the translated Turkish version of NutriSTEP a valid and reliable tool?

MATERIALS AND METHODS

Aim

This study aims to evaluate the validity and reliability of the Turkish version of NutriSTEP, which was originally developed in English in Canada.

Participants

The study enrolled parents of children aged 3-5 years with access to the Internet and a smartphone, tablet, or computer between March 2021-July 2021. It was conducted in 10 voluntarily participating preschools in Istanbul, Türkiye. The preschools were selected based on their geographical location to ensure equitable access to the Internet and food, as per the Ministry of Industry and Technology study (9). These districts were categorized into six levels based on various socioeconomic development indicators: demography, employment, social security, education, health, finance, competitiveness, innovation, and quality of life.

Sample

The sample size comprises the parents who met the inclusion criteria and agreed to participate. To ensure the adequacy of the factor analysis, which suggests a sample size of 5-10 times the number of items on a scale, a minimum of 170 parents (ten times the number of items on the 17-item scale) were planned for inclusion (10). Accordingly, a total of 196 parents were included. The inclusion criteria require the parents to have a child aged 3-5 years; proficiency in the Turkish language; access to an Internet connection and a smartphone, tablet, or computer; and no chronic diseases or disabilities affecting their child's nutrition. Teachers indiscriminately provided eligible parents information about the study.

Instruments

The researchers developed an information form comprised of 16 questions to gather sociodemographic data about the children and their families.

The NutriSTEP questionnaire is a concise tool developed by Simpson et al. (4) in Canada that screens eating habits, identifies nutritional problems, and assesses nutrition risk in children. Originally developed in English and French, it has been translated into six other languages commonly spoken in Canada (Traditional Chinese, Simplified Chinese, Punjabi, Spanish, Tamil, and Vietnamese). Parents are able to complete NutriSTEP online by answering questions about their children's nutrition, physical characteristics, and activities. NutriSTEP consists of 17 questions categorized under four sections: food and fluid intake (Items 1-6, 9-10, 13), physical growth and development (Items 8, 16-17), physical activity and sedentary behavior (Items 14-15), and factors influencing food intake and nutritional behavior (e.g., food insecurity, nutritional environment; Items 7, 11-12). Each question offers 2-5 response options and is scored from 0 (no risk) to 4 (high risk). The total score is obtained by adding up the points from each question, with higher scores indicating greater nutrition risk. Possible scores range from 0-68, and based on NutriSTEP's cut-off points, scores of 20 or lower are considered low risk, between 21-25 as medium risk, and 26 or higher as high risk.

Procedure

Language validity

While translating NutriSTEP into Turkish, considerations were made to ensure appropriate sentence structures and cultural adaptation of nutritional behaviors. The researcher and two native Turkish translators each translated NutriSTEP into Turkish, with the most appropriate expressions being selected from among the three translations to create the Turkish version. The Turkish version was then back-translated into English by an English expert who is a native Turkish speaker with no access to the original English form. The back-translated version was compared to the original form, and necessary corrections were made to finalize the Turkish version. The final Turkish NutriSTEP version was sent to the original author for approval.

Content validity

Content validity was assessed to evaluate the conceptual clarity and cultural suitability of the translated NutriSTEP items. The Turkish version was reviewed by experts in pediatric nursing (12 associate professors & 11 professors) and dietetics (1 associate professor, 1 Master's degree, 2 bachelor's degrees) who are proficient in English. Experts evaluated each item conceptually and provided ratings on a scale of 1-4. Based on their opinions, the content validity index for the 17 items was found to be 0.99. The final version of NutriSTEP was developed by considering the experts' recommendations.

Face validity

As an initial evaluation, the items' intelligibility and the tool's usability were assessed by 10 parents in a pilot study. Any items that were not understood or that lacked clarity were identified and modified accordingly. Because no negative feedback was received, the data collected during the pilot study were not included in the final analysis.

Data Collection

After making the necessary corrections, the researchers selected 10 different private preschools in Istanbul from which to collect data and contacted the educators working in these institutions. In this communication phase, the educators were informed about the objectives of the study and instructed on how to use the NutriSTEP tool. Parents who were identified as potential participants were provided with an online questionnaire to complete the NutriSTEP assessment designed to measure their child's nutrition risk. Parental consent was obtained online. Parents then completed both the information form and the NutriSTEP tool online.

Test-retest analyses are typically conducted over a period of 2-6 weeks (average 4 weeks) to allow for short-term memory effects to fade, as well as for subject variability between tests. The present study waited four weeks before retesting (10–12), at which time the same cohort of participants was recontacted to assess the reliability of the data through a retest process. This time, the participants were contacted via the phone numbers they had provided and asked to complete the NutriSTEP assessment online for the retest phase (Figure 1).

Data Analysis

Data were analyzed using SPSS for Windows (Version 23.0). Descriptive statistics such as mean, standard deviation (*SD*), and frequency were used to summarize the data. NutriSTEP validation was assessed through language validity, content validity index, and criterion-related validity (predictive validity) analyses. Reliability testing used standard errors, item-total correlations, sub-dimension score correlations, scale response biases, and test-retest reliabilities. Because NutriSTEP is not a Likert-type or consistently ordered measurement tool, Cronbach's alpha was not calculated, not did the original study calculate any Cronbach's alpha.

Ethical Statement

The study received approval from the Ethics Committee of İstanbul University-Cerrahpaşa in Türkiye (IRB number 16.03.2021/53211), with additional permission being obtained from the preschools. Teachers informed parents about the study and obtained their consent online.

RESULTS

This study has found the children's mean age to be 3.94±0.85 years, with 66.8% being male and 53.6% having a normal body mass index (BMI). The mean ages of the mothers and fathers is 32.94 ± 5.14 years and 35.69 ± 5.12 years, respectively. The mean number of individuals living in the immediate family is 3.60 ± 0.87. Among the families, 54.6% have only one child, and 59.7% of the mothers and 54.6% of the fathers have bachelor's degrees. Additionally, 50.5% of the families have income equal to their expenses, while half of the mothers and 99% of the fathers are employed. Furthermore, 89.3% of the families have a nuclear family structure, with 51% having three individuals living in the family (Table 1).

The NutriSTEP scores and their descriptive statistics are presented in Table 2. The mean NutriSTEP score is 27.30 ±

Table 1. Distribution of descriptive characteristics of children (n=196)

Features	Mean	SD
Age of children (min-max: 3.00-5.50)	3.94	0.85
Age of mothers (min-max: 23.00-54.00)	32.94	5.14
Age of fathers (min-max: 27.00-55.00)	35.69	5.12
Features	**n**	**%**
Cinsiyet		
Female	65	33.2
Male	131	66.8
Body Mass Index (BMI)		
Weak (<5 percentile)	19	9.7
Normal weight (5-75 percentile)	105	53.6
Overweight (85-95 percentile)	45	23.0
Obesity (>95 percentile)	27	13.8
Number of children in families		
1	107	54.6
2 or more	89	45.4
Mothers' education		
Primary school	7	3.6
Middle School	14	7.1
High school	35	17.9
Bachelor	117	59.7
Postgraduate	23	11.7
Fathers' education		
Primary school	8	4.1
Middle School	7	3.6
High school	54	27.6
Bachelor	107	54.6
Postgraduate	20	10.2
Income Status		
Income less than expenses	34	17.3
Income equals expenses	99	50.5
Income more than expenses	63	32.1
Mothers' work status		
Yes	98	50.0
No	98	50.0
Fathers' work status		
Yes	194	99.0
No	2	1.0
Family type		
Nuclear family	175	89.3
Extended family	15	7.7
Single-parent family	6	3.1
Number of individuals living in the family		
*3.60±0.87 (min-max: 1.00-8.00)	100	51.0
3	96	49.0
4 or more		

*Arithmetic mean standard deviation.

6.64. The mean scores for the subdimensions are as follows: food and fluid intake is 18.21 ± 3.38, physical growth and development is 2.63 ± 2.93, physical activity and sedentary behavior is 2.79 ± 2.42, and factors influencing food intake and nutritional behavior is 3.65 ± 1.58. The mean scores for the NutriSTEP items range from 0.15-3.28 (Table 2).

Several tests were performed to determine the reliability of the Turkish version of NutriSTEP, including standard error, item-total and sub-dimension score correlation, test-retest, and scale response bias tests. The study also has evaluated the mean, standard error, and standard deviation values of the parents' answers to the 17 items on NutriSTEP (Table 2).

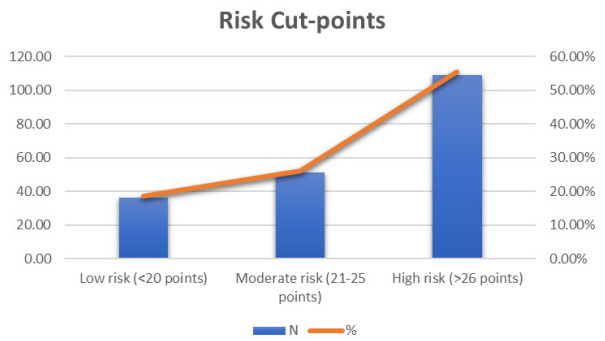
When considering the NutriSTEP risk assessment, 55.6% of the children have high nutrition risk, 26% have medium risk, and 18.4% have low risk (Figure 1).

Criterion-Related Validity (Predictive Validity)

To assess the predictive validity of NutriSTEP, BMI, income status, mother's employment status, and family type criteria were considered. A significant difference was found between the total NutriSTEP score and BMI. As the BMI increases or decreases, the average NutriSTEP score increases (χ^2 = 102.726, p < 0.001). A significant difference is also found between the total NutriSTEP score and income status. As income status increases, the mean NutriSTEP score decreases, indicating a lower nutritional risk status (F = 6.172, p = 0.005). Similarly, a significant difference was found between the total NutriSTEP score and mother's employment status, with working mothers having higher NutriSTEP scores compared to non-working mothers (t = 17.566, p < 0.001). In terms of family type, extended families have higher NutriSTEP mean scores compared to nuclear families (χ^2 = 14.579, p = 0.001; Table 3). However, no significant difference was found regarding NutriSTEP scores based on the parents' education levels.

Table 2. Distribution of mean scores of responses to NutriSTEP items (n=196)

NutriSTEP Items	Mean	SD
Item 1	3.28	0.97
Item 2	2.46	0.99
Item 3	2.57	0.57
Item 4	3.01	0.73
Item 5	1.99	0.85
Item 6	0.69	0.99
Item 7	0.16	0.37
Item 8	0.15	0.37
Item 9	1.05	0.86
Item 10	1.49	0.89
Item 11	1.30	0.96
Item 12	2.18	1.16
Item 13	1.64	1.37
Item 14	1.63	1.97
Item 15	1.16	1.07
Item 16	1.24	1.85
Item 17	1.22	1.82
Food and fluid intake (Items 1,2,3,4,5,6,9,10,13)	18.21	3.38
Physical growth and development (Items 8,16,17)	2.63	2.93
Physical activity and sedentary behavior (Items 14,15)	2.79	2.42
Factors affecting food intake and eating behavior (Items 7,11,12)	3.65	1.58
NutriSTEP Total	27.30	6.64



Graph 1. Distribution of NutriSTEP risk status (n=196)

Item Total and Sub-Dimension Score Correlation

Table 3. Comparison of NutriSTEP score with some descriptive characteristics of children and families (n=196)

Features	n	NutriSTEP Total	Test p
Body Mass Index (BMI)			
Weak (<5 percentile) (a)			
Normal (5-85 percentile) (b)	19	34.63±4.99	
Overweight (85-95 percentile) (c)	105	23.22±4.90	**x2:** 102.726
Obesity (>95 percentile) (d)	45	29.26±4.08	**p<** 0.001*
	27	34.74±4.35	a=d>c>b**
Income Status			
Income less than expenses (a)			
Income equals expenses (b)	34	30.41±6.75	**F:** 6.172
Income more than expenses (c)	99	27.34±6.69	**p=** 0.005*
	63	25.57±5.95	b=c<a***
Mother's working status			
Yes	98	32.50±4.70	**t:** 17.566
No	98	22.12±3.47	**p<** 0.001*
Family type			
Nuclear family (a)	175	26.66±6.48	**x2:** 14.579
Extended family (b)	15	32.13±4.54	**p=** 0.001*
Single-parent family (c)	6	33.83±8.13	a<b****

*p<0.05, x^2: Kruskal Wallis test, F: One-Way ANOVA, t: Student t-test, ** Bonferroni-adjusted p-value p<0.008, ***Post hoc Tukey's-b test result, **** Bonferroni-adjusted p-value p<0.0167.

An item analysis has been performed to determine the internal consistency of NutriSTEP. The item sub-dimension score correlations range from 0.32-0.59 in the food and fluid intake sub-dimension, 0.29-0.77 in the physical growth and development sub-dimension, 0.60-0.90 in the physical activity and sedentary behavior sub-dimension, and 0.24-0.75 in the

Table 4. NutriSTEP item total and sub-dimension score correlations (n=196)

Sub-dimension	Items	Item Sub-Dimensional Score Correlations	P	Item Total Score Correlations	p
Food and fluid intake	Item 1	00.35	0.000*	0.13	0.053
	Item 2	00.46	0.000*	0.31	0.000*
	Item 3	00.32	0.000*	0.24	0.000*
	Item 4	00.40	0.000*	0.34	0.000*
	Item 5	00.38	0.000*	0.21	0.003*
	Item 6	0.38	0.000*	0.28	0.000*
	Item 9	0.36	0.000*	0.40	0.000*
	Item 10	0.59	0.000*	0.50	0.000*
	Item 13	0.39	0.000*	0.23	0.001*
Physical growth and development	Item 8	0.29	0.000*	0.26	0.000*
	Item 16	0.76	0.000*	0.53	0.000*
	Item 17	0.77	0.000*	0.53	0.000*
Physical activity and sedentary behavior	Item 14	0.90	0.000*	0.51	0.000*
	Item 15	0.60	0.000*	0.45	0.000*
Factors influencing food intake and nutritional behavior	Item 7	0.24	0.001*	0.12	0.080
	Item 11	0.63	0.000*	0.20	0.005*
	Item 12	0.75	0.000*	0.37	0.000*

*p<0.01

factors influencing food intake and nutritional behavior sub-dimension ($p < 0.001$). The item-total score correlations range from 0.12-0.53, with all items except Items 1 and 7 being significantly correlated with the total score ($p < 0.001$; Table 4).

Test-Retest

A Pearson correlation analysis was conducted to examine the relationship between the test and retest mean scores from the NutriSTEP, which was readministered after a four-week interval. A strong correlation exists between the NutriSTEP total score and sub-dimensions obtained from the first test and the retest (Table 5).

Table 5. Correlations of NutriSTEP Test-Retest Mean Scores (n=82)

NutriSTEP alt boyutları	Test-retest reliability	
	r	p
Food and fluid intake	0.97	0.000*
Physical growth and development	0.99	0.000*
Physical activity and sedentary behavior	0.99	0.000*
Factors influencing food intake and nutritional behavior	0.95	0.000*
TOTAL	0.99	0.000*

*p<0.001, r: Pearson Correlation Analysis

Response Bias

This study observed no response bias in the participants' responses to NutriSTEP. Hotelling's T-squared test was found to be significant ($T^2 = 443.756$, $p < 0.001$).

DISCUSSION

This study has substantiated the validity and reliability of the Turkish version of NutriSTEP, a questionnaire administered online to parents for evaluating nutrition risk in Turkish preschool children. NutriSTEP was originally developed in Canada (4) and subsequently translated into multiple languages. It has undergone adaptation and validation in various countries, including New Zealand (3) and Iranian (2).

Nutrition risk in preschoolers encompasses a spectrum of factors influencing their nutritional status, ranging from undernutrition to overnutrition. Socioeconomic status has been recognized as a determinant of this risk (4). The domestic environment, particularly parental influence, plays a pivotal role in shaping children's dietary habits toward either healthful or unhealthful choices (13). Maternal emphasis on balanced nutrition can serve as a positive model for children's dietary decisions (5,14). Encouragingly, fostering healthy dietary practices at home can ameliorate children's eating habits (15). Parents have been well-documented as having a profound influence have on their children's feeding behaviors and nutritional status (16). Consequently, employing a parent-centric nutritional risk assessment tool such as NutriSTEP can actively engage parents in strategizing for healthier outcomes.

In accordance with the NutriSTEP developers' risk assessment thresholds, the current study found the percentages of children classified as having low, moderate, and high nutrition risk (low risk ≤ 20; 21< moderate risk < 25; high risk ≥ 26) as 18.4%, 26.0%, and 55.6%, respectively. When considering that the preschools had been selected from districts with the highest level of socioeconomic development (9), the children evidently have high risk levels. Notably, these elevated risk levels surpass the anticipated risk levels NutriSTEP developers had established in Canada as derived from their data encompassing approximately 4,000 preschoolers and toddlers (17). Similarly, the NutriSTEP adaptation study conducted in New Zealand

reported a higher prevalence of high-risk children (31.6%) compared to the original study (3). Parents' dietary habits, food accessibility at home, family dietary patterns, and sociocultural characteristics have major influence on children's dietary behaviors (18).

Many interventions targeting early childhood obesity in the literature have predominantly concentrated on modifying children's nutritional and physical activity behaviors, which yielded limited long-term efficacy, underscoring the need for getting parents involved in interventions (19). Various socioeconomic and sociodemographic factors (e.g., family structure, parental education, income) impact children's and adolescents' access to nutritious foods (20,21). A mother's nutritional knowledge positively influences children's dietary habits, whereas a lower maternal education detrimentally affects nutritional status (22). One study revealed lower parental education and income levels to be associated with unfavorable developmental outcomes in children, with heightened rates of unhealthy eating habits correlating with lower parental education levels (23). Moreover, a family's socioeconomic standing has been linked to their children's dietary habits (24,25), with unhealthy dietary patterns being more prevalent among children from economically disadvantaged families (26). Despite most parents in the current study possessing bachelor's degrees (59.7%), the NutriSTEP scores were seen to be high. Furthermore, NutriSTEP average scores escalated as income level decreased, signifying heightened nutrition risk for children from economically disadvantaged families. In alignment with prior research, the present study has also observed employed mothers to exhibit higher NutriSTEP mean scores compared to non-working mothers.

During the preschool phase, children's dietary preferences and habits predominantly develop in response to familial dietary patterns, with these behaviors often persisting into adulthood without some intervention. Children commonly emulate their parents' dietary choices (13,27). Extended family structures can significantly influence the mother-child dynamic, nutrition attitudes, and practices (28). Notably, the present study has unearthed a significant disparity between NutriSTEP total scores and family structure, with preschoolers residing in extended families demonstrating higher NutriSTEP mean scores than those in nuclear families.

When assessing a scale, item sub-dimensions and their correlations to the total score offer insights into scale-item reliability and should ideally surpass 0.20 (29). In the Turkish NutriSTEP item-total score correlation analysis, two items (Items 1 and 7) failed to correlate with the total score but exhibited correlations with the sub-dimensions. However, no items were excluded from the Turkish NutriSTEP version, as item removal was deemed inappropriate in adaptation studies without the consent of the original scale owner. The scale's validity and reliability testing were not sample-specific (30). Notably,Item 1 in the NutriSTEP tool, which assesses children's grain consumption, exhibited a correlation value of 0.13 with the total score while correlating with the sub-dimension at a value of 0.35. Despite the significance of grain consumption, in Turkish culture, particularly bread, this item may have yielded disparate results due to the association between grain consumption and obesity and further spurred by inadequate nutritional education. Concerns regarding bread and other grain products have escalated due to burgeoning obesity and chronic disease risks, as well as negative messaging from various sources (31). The average daily grain consumption in Türkiye stands at 60.77 g for preschool boys and 58.94 g for girls. In urban locales, the average daily grain consumption for boys and girls is 61.85 g and 62.02 g, respectively, while this dwindles to 58.12 g and 52.35 g respectively in rural regions (32).

NutriSTEP's Item 7 probes whether parents encounter difficulty purchasing food for their children due to cost constraints and boasted a correlation value of 0.12 with the total score, while its correlation with the sub-dimension was 0.24. Responses to this item may vary in developing nations (2). Additionally, one study indicated Item 7 in the NutriSTEP questionnaire to furnish a satisfactory gauge of food security and nutritional risk (33). The remaining items exhibited correlations with the total score in this study, which are indicative of congruence with the scale. Items 16 and 17 garnered higher correlations with their sub-dimensions (0.76 and 0.77, respectively) compared to the total score (r = 0.53). These items respectively encapsulate parental perspectives toward the child's weight and growth trajectory. Item 16 gauges parental comfort with the child's growth, while Item 17 evaluates parental perception of the child's weight in terms of the desired weight. Analogously, the Iranian version of NutriSTEP also reported robust correlations for Items 16 and 17 (2).

This study was conducted online in response to the COVID-19 pandemic. A prior study had attested to the validity and reliability of the online application of NutriSTEP (8). Notably, Hotelling's T-squared test, which gauges equivalence in people's responses to scale items, yielded significance in the present study, suggesting the absence of any response bias on the scale. This outcome implies the parents to have evaluated their children without external influence and to have responded to the scale based on their children's current characteristics. The online iteration of NutriSTEP offers advantages such as broader parental outreach, unbiased outcomes, reduced paper expenditure, instantaneous transmission upon completion, and potential integration into online health records upon request (8). This tool is poised for integration into primary healthcare services and facilitates a swift identification of nutritional risk as well as prompt intervention in the nascent stages.

Conclusions

In conclusion, the Turkish version of NutriSTEP has been authenticated and validated for assessing nutritional risk in preschool children. Given the cultural diversity prevailing across Türkiye's various provinces, deploying this nutritional assessment tool across diverse sociocultural cohorts nationwide holds immense promise. Leveraging the online platform for tool administration extends its reach to a broader parental demographic.

Limitations

Although Cronbach's alpha stands as a well-established and extensively used metric for assessing reliability, its applicability in this study for NutriSTEP was precluded due to non-uniform frequency and selection weights among the test items. Consequently, test-retest analysis was employed to appraise reliability. Another study limitation pertains to the exclusion of illiterate parents, as the tool was administered online.

Ethics Committee Approval: This study was approved by the ethics committee of İstanbul University-Cerrahpasa (IRB number 16.03.2021/53211).

Informed Consent: Written consent was obtained from the parents.

Peer Review: Externally peer-reviewed.

Author Contributions: Conception/Design of Study- M.A., D.G.; Data Acquisition- M.A.; Data Analysis/Interpretation- M.A., D.G.; Drafting Manuscript- M.A., D.G.; Critical Revision of Manuscript- D.G.; Final Approval and Accountability- M.A., D.G.

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REVIEW ARTICLE
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The Effect of Aerobic Exercise Accompanied by Music on Pain, Quality of Life, and Well-Being in Patients with Fibromyalgia Syndrome

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ABSTRACT

Fibromyalgia is a medical issue characterised by increased sensitivity to all stimuli. This sensitivity often manifests as joint stiffness, chronic pain at multiple tender points, and systemic symptoms such as cognitive dysfunction, sleep disorders, anxiety, fatigue, and depressive episodes. Fibromyalgia occurs without any identifiable underlying organic disease. Listening to music while exercising has been found to have many advantages in various of physical activities. It may enhance good emotions, enhance physical performance, decrease the perception of effort, and improve physiological efficiency. Furthermore, music has beneficial impact on patients neurological and endocrine systems, evoking significant emotional and cognitive reactions. It also regulates the mental and physiological functions of humans and provides a balance between oxygen and blood in the brain, and wordless music is effective for training pain. In this article, the effects of physical activity accompanied by music on the body in patients with fibromyalgia syndrome, the results of studies on music and exercise, and possible results obtained when music and exercise are used together are discussed. Bacause of the literature review, physical activity with music was found to have a positive effect on reducing fibromyalgia symptoms.
Keywords: Fibromyalgia, physical exercise, music, pain, quality of life, psychological well-being

INTRODUCTION

Fibromyalgia is a medical condition characterised by persistent and extensive pain in the muscles and skeleton, which is sometimes accompanied by symptoms such as exhaustion, digestive disruptions, and changes in sleep patterns and mood (1). The most common symptoms are widespread musculoskeletal pain, impaired sleep quality, anxiety, depression and decreased quality of life (2). In addition, muscle cramping, headaches, gastrointestinal disorders, waking up without feeling refreshed, cognitive dysfunction, generalised sensitivity, difficulty performing daily activities, and psychosomatic symptoms associated with such conditions can occur (3). Patients with severe depressive disorder and FMS (fibromyalgia syndrome) also frequently have functional somatic symptom, although they are distinct medical disorders (4). The influence of symptoms on pain, physical functionality, and quality of life is long-lasting (5). This condition disrupts patients daily routines and reduces their well-being.

Fibromyalgia

Fibromyalgia was first described in the 19th century, and in the 1970s, it was discovered that its aetiology was related to the central nervous system (6). It is a syndrome with an ICD code M79.7 that has no underlying organic disease. Fibromyalgia is the third most common diagnosis in rheumatology clinics (7). The age range in which it generally occurs is 30-35 years (1). It is estimated that 2%-8% of the global population will affected by fibromyalgia (8). Family history and female sex are among the risk factors. In a study conducted in Turkey, its prevalence in women was 3.6% (9). The prevalence of this condition is greater in women than in men, and it is mostly attributed to elevated levels of anxiety and depression, modified pain response

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behaviour, changed central nervous system (CNS) input, and hormonal influences associated with the menstrual cycle (10).

The diagnosis of FMS is currently based on clinical evaluation. No definitive laboratory test, radiographic examination, or biological marker has been identified. It is thought that abnormal central and/or peripheral pain mechanisms play a role in the development of widespread and chronic pain reported by patients with fibromyalgia, together with genetic factors (11). People with genetic predisposition develop fibromyalgia as a result of exposure to environment-related, physiological, and psychological stresses (12). The pathophysiology of fibromyalgia is influenced by several factors, including autonomic and neuroendocrine system dysfunction hereditary factors, and exposure to environmental stressors (13). Fifty percent of patients with FMS also state that their symptoms started suddenly after a febrile illness; for example, 50% of FMS patients state that their symptoms begin after a febrile illness (14).

There is no definitive cure for fibromyalgia. Treatment is primarily focused on managing symptoms and improving quality of life. To this end, ensuring patient well -being, reducing or eliminating pain, and thus improving quality of life are highly important for both the treatment course and patient. This treatment method necessitates a thorough multidisciplinary strategy that includes the use of medications, lifestyle modification , and the incorporation of various complementary therapies. Pharmacologic therapy is highly recommended as a means of treatment. However, it has a low level of efficacy and some side effects (15). The treatment process requires a multidimensional approach to fibromyalgia management, including pain management, nonpharmacological methods, behavioural therapy, patient education, and exercise (16). Research on alternative therapies that have fewer or no side effects on patients has increased in recent years with physical therapy-oriented nonpharmacologic treatments (17). Unfortunately, conventional medical treatments offer limited benefits. According to statistics, 90% of patients with FMS use complementary medicine to treat their symptoms (1). Alternative treatments for fibromyalgia include physical exercise, aerobic exercise, low to moderate level to acupuncture to improve pain and stiffness, thermal therapies such as body heating and cryotherapy, hyperbaric oxygen therapy (HBOT), exercise, and massage, probiotics, plant extracts, and natural products that reduce the burden of fibromyalgia on quality of life and improve pain and other symptoms. Exercise, which is a nonpharmacological treatment method aimed at increasing the physical functions of patients and improving their general health status, and training and cognitive behavioural therapy programmes that can be applied in different contexts have been found to be effective in the treatment of FMS. Treatment methods using a single modality cannot provide complete efficacy in patients with FMS, and the most effective methods in clinical practise are treatment approaches that combine pharmacological and nonpharmacological treatment methods (18).

One of the most promising and cost-effective nonpharmacological approaches for trating FMS is physical exercise (19). Moderate, low-impact aerobic exercise at 60-70% of the maximum heart rate two to three times a week is one of the therapeutic measures with proven efficacy in improving pain, depression, and stress (20). Although physical activity and exercise are not standard treatments for fibromyalgia regular participation in physical activities has a positive effect on psychological functioning in individuals with FMS (21). According to a meta-analysis, patients with FMS engaged in aerobic, resistance, or mixed exercise showed substantial improvements in physical function. As a result, it was thought that combining exercise with other therapies could help individuals with FMS live better lives, experience less muscle discomfort, and perform better physically (5).

Music Therapy

Managing music requires evolutionary skills that inculude social integrity, collaboration, group coordination, and communication. Simultaneously, this task is multifaceted and stimulates several cognitive functions, including perception, emotion, learning, teaching, and memory, in the brain (22). Empirical evidence supports this finding. Music therapy can cause many physiological changes, such as changes in respiration, heart rate, skin conductance, motor patterns, neuroendocrine response, and immunological function(23). Similarl, comparable physiological responses have been observed during physical exertion (24).

A harmonious mind, body, and soul are produced through music. Sound and music have a beneficial effect on pain and anxiety. Music therapy is a successful approach for decreasing pain and anxiety severity intensive care. Music has psychological and physiological effects on people, and although it is quite difficult to analyse these effects, two theories are mentioned. The first theory posits the psychological effects of music due to its physiological effects. The second theory is the effect of music on first degree emotions (25). Music has beneficial effects on patients' neurological and endocrine systems, facilitating the emergence of significant emotional and cognitive responses. Music has a positive effect on hormones such as serotonin, dopamine, testosterone, and adrenaline, which play a role in the development of mental diseases and control human emotions. Furthermore, music maintains the proper balance of oxygen and blood flow in the brain while also regulating physiological processes such as blood pressure and respiration (26). According to recent findings, the endogenous opioid system (EOS) may be activated when there is active sensorimotor synchronisation, , including endorphin release, with music (27, 28). Additionally, according to recent evolutionary theories, the ability of humans to coordinate their movements with the beat of music in a group—such as when they sing, clap, drum, or dance—is an evolutionary adaptation because it fosters social cohesion (27, 29). The person feels better as a result.

Use of music during physical activity

The prevalence of fitness routines involving music has increased over the past 20 years. Research has revealed that incorporating music into exercise has ergogenic effects, meaning that it enhances exercise performance. Additionally, exercise provides psychological benefits, such as improved mood, and psychophysical benefits, such as reduced perception of effort during exercise (24). It has been proven that music has a soothing and relaxing effect. In addition to these qualifications, it has cognitive stimulant properties (30). Music therapy is thought to bypass or compensate for impaired neurological processes, such as pain management, and affect regulation in a multiplex manner. (31). Music has also been recommended as a strategy for improving adherence to physical exercise because of its propensity to elevate emotional states during physical activity (32,33). A meta-analysis revealed that including music in exercise routines yields many advantages in terms of physical activity. These benefits include promoting a more pleasant emotional state, improving physical performance (known as the ergogenic effect), reducing the perception of exertion, and increasing physiological efficiency (34). The results of a study using VIVIFRAIL exercise with musicdemonstrated that participants felt physically fit, were invigorated, and had positive emotions (35). Another meta-analysis revealed that music has a significant effect on pain treatment with high heterogeneity and that music without lyrics is effective for pain treatment (36). Moreover, music is known to positively affect human mood (37). Accordingly athletes who listened to music while exercising experienced an increase in positive psychological impacts, including self-worth, attention, confidence, and the desire to exercise more. İn addition, listening to fast-paced music was found to increase general exercise tolerance and neuromuscular fatigue thresholds. The electromyographic fatigue threshold (EMG FT) was defined functionally as the highest exercise intensity that can be sustained indefinitely without increasing the EMG activity of the working muscle. Listening to fast-rıhytim music increases overall exercise tolerance and neuromuscular fatigue thresholds (38). Music can be used to increase motivation during bodily activity or to distract oneself from feelings of wear (39). It may relive pain, anxiety, and psychophysiological stress. Numerous studies have demonstrated that music can reduce pain and anxiety while also enhancing quality of life for both healthy people and patients. A study conducted in a palliative care unit observed that classical Turkish music therapy increased comfort and functional capacity while also reducing pain and anxiety. (40). Music theraphy several beneficial effects, including lowering blood pressure, heart rate, body temperature, and breathing rate; it also promotes relaxation, alters the patient's perception of pain, diverts attention, and lessens nausea caused by chemotherapy; and, most importantly, it enhances the quality of life, particularly for patients approaching the end of their life. Relaxing with music apps reduces anxiety, depression, and stress levels (41). It also alleviate insomnia (42, 43).

Although it is commonly recognised that listening to music can reduce pain, its effects are marginal, and its therapeutic relevance is questionable. Recent theoretical developments, however, indicate that synchronising with music—whether by tapping, clapping, or dancing—has major evolutionary social implications linked to endogenous opioid system activation, which fosters social bonding and analgesia. Thus, compared with merely listening to music, active sensory-motor synchronization with music may provide greater analgesic benefits (44). In selecting the music to be used during exercise, various musical tendencies should be preferred among the types of music that are relevant to the activities. Fast, loud music can be played to promote optimal exercise, in which loudness and tempo interact (45).

(45). The correct metronome (BPM) count could be applied during exercise (46). The sound of the music should be heard equally by all parts of the exercise environment. Music and exercise should be selected simultaneously. Regardless of the metronome number of the music, the rhythm of the exercise should be at the appropriate synchronization. The use of music in sports is recommended because studies have shown that music has a positive effect on adjusting the breathing rhythm and increasing performance when exercising. In the realization of the design, it is possible to benefit from the fact that the musical form is effective for imagery. Research has shown that listening to fast-paced, energetic music while exercising influences an athlete's heart rate, and that there are parallels between human movement and musical rhythm (37). There are many randomized controlled studies on the effectiveness of music and exercise in patients with fibromyalgia.

CONCLUSIONS AND RECOMMENDATIONS

Studies have shown that exercise has positive effects on pain perception, quality of life, and physical condition in FMS patients. The positive effects of music on a person's mood are well known. Additionally, a pilot study examining the effect of low-impact aerobic exercise combined with music therapy on patients with fibromyalgia revealed that therapeutic aerobic exercise was effective in improving depression and general discomfort in individuals with FMS. Aerobic exercise is more effective when combined with music therapy. This increased. Based on these data, it is necessary to investigate the effects of exercise combined with music threapy on FMS symptoms and increase the number of studies on this subject. If the applications yield positive results after research, will provide ease of application if the patient can apply them on their own and without being dependent on a healthcare institution. In addition, it is advantageous in many respects because it is a safe, cost-effective intervention. In addition to pharmacological treatments, it can be recommended for patients with fibromyalgia to reduce their symptoms or as a nonpharmacological treatment method. Because of the literature review, physical activity with music was found to have a positive effect on reducing fibromyalgia symptoms in patients.

Table 1. Studies on exercise and music therapy among patients with fibromyalgia

Work Performed	Method	Description of the Study	Data Collection Tools	Implementation	Result
Gavi et al. (47)	RandomisedControlled Study	The groups were divided into 2 groups as strengthening exercises (STRE) or flexibility (FLEX) exercises. STRE had different exercises.	Visual Analogue Scale (VAS), Heart Rate Variability (HRV), Treadmill test, Sit and lie test (Wells and Dillon's Bench), Maximal repetition test, and hand grip dynamometry; Quality of life with Fibromyalgia Impact Questionnaire (FIQ); Beck and Idate Special Situation Inventory (IDATE); Short-form health survey (SF-36)	Exercise was performed in both groups twice a week for 45 min for 16 weeks in accordance with the recommendations of the American Sports Medicine Association.	Strengthening activities enhance strength and discomfort more quickly and significantly than flexibility exercises. Both groups experienced improvements in fitness, pain, anxiety, sadness, and quality of life, but there was no change in autonomic modulation.
Assumpcao et al. (48)	This was a three-arm randomised controlled study.	For 12 weeks, individuals with FM underwent stretching and weight training for two days a week.	The Fibromyalgia Impact Questionnaire (FIQ) was used to measure FM symptoms, the SF-36 quality of life scale was used for the Medical Outcome Study, and a visual analogue was used to quantify pain.	In addition to medical treatment, two different exercise programmes were applied to the stretching and resistance groups twice a week for 12 weeks.	Resistance exercise was most beneficial in lowering depression and stretching exercise was most successful in increasing quality of life, particularly in terms of pain and physical functioning.
Busch et al. (49)	Systematic review	Several high-quality RCTs published between 2007 and 2011 were reviewed, including aerobic, strength, flexibility, and mixed-format aquatic and land-based exercise regimens.			Aerobic physical fitness and quality of life are improwed while lowering pain, weariness, and depression.
Izquierdo-Alventosa et al. (50)	Randomised controlled study	For a total of 16 sessions, conducted twice a week for 8 weeks, 32 women with fibromyalgia participated in low-intensity physical exercise that included aerobic and low-load resistance exercises with the goal of improving endurance and coordination.	Visual Analogue Scale and Borg Perceived Exertion Scale scores	The first phase (sessions 1 to 4) consisted of 15 min of relaxed walking, 25 min of a 10-exercise circuit, and 20 minutes of cooling down. The exercises were performed using 1-kg dumbbells and weights at a speed determined by a metronome set at 60 beats per minute. The second phase is cooldown	Physical exercise improves pain in women with fibromyalgia. It also improves perceived pain, quality of life, and physical fitness.
López-Roig et al. (51)	A cross-sectional prospective study	The exercise study included 211 female patients with fibromyalgia.	Self-efficacy scale for physical activity, Chronic Pain Self-efficacy Beliefs, International Physical Activity Questionnaire Short Form Perception of pain intensity, Perceived impact of fibromyalgia and disability, Commitment to be physically active and exercise Catastrophizing pain scale, and Tampa Kinesiophobia scale scores	The 30 and 60 min sessions are designed for fast walking, performing Daily physical activities, and moderate exercise.	The tool can be a helpful tool for assessing patients' feelings about their abbilities and tailoring the goals and methods of physical activity and walking exercise interventions.

Table 1 continued. Studies on exercise and music therapy among patients with fibromyalgia

Work Performed	Method	Description of the Study	Data Collection Tools	Implementation	Result
Polat et al. (52)	Randomised controlled, experimental study	Exercise as a virtual reality and traditional training group were randomly assigned to 34 patients with fibromyalgia.	Fibromyalgia impact questionnaire, Visual analogue scale (vas), Hospital anxiety and depression scale, Fatigue severity scale, Symptom severity scale, euroqol-five dimension index scale/VAS, and six-minute walk test	For four weeks, the conventional training group performed conventional exercise (three days a week, 15 min a day) and aerobic exercise (three days a week, 20 minutes a day). For four weeks, the virtual reality group mixed bicycle exercise with virtual reality exercise three days a week for 15 minutes each. Both groups engaged in the identical 4-week at-home workout regimen after the exercise.	Combining virtual reality activities with aerobics exercise improves quality of life, patient satisfaction, and cardiopulmonary capacity in patients with fibromyalgia syndrome. İn addition, it could improve patient adherence to exercise.
Medeiros et al. (53)	Randomised single blinded study	Forty-two female patients with fibromyalgia were randomised into two groups, and an exercise programme was applied.	Pain was measured using the Visual Anolouge Scale (VAS), function using the Fibromyalgia Impact Questionnaire, sleep using the Pittsburgh Sleep Quality Index, quality of life using the SF-36, fear avoidance using the Fear Avoidance Beliefs Questionnaire, and pain catastrophizing using the Pain Related Destructive Thoughts Scale.	The participants performed Mat Pilates and water aerobic exercise twice a week for 12 weeks. Both baseline and 12-week assessments were completed.	In terms of function and discomfort, both groups showed improvement. There was no discernible variation in any assessed factors between the groups.
Espí-López et al. (19)	Single -blind, randomised controlled pilot study	For 8 weeks, 35 patient with fibromyalgia were divided into three groups: (G1) therapeutic aerobic exercise combined with music therapy (n = 13); (G2) therapeutic aerobic exercise in any rhythm (n = 13); (G2) therapeutic aerobic exercise in any rhythm (n = 13); and (CG) control (n = 9).	Before and after the intervention, measures were taken for depression, quality of life, general discomfort, and balance.		Patients with fibromyalgia who engage in therapeutic aerobic exercise reported reduced overall pain and depression. The efficacy of this treatment is enhanced when combined with music therapy, thereby enhancing balance and quality of life.
Lepping et al. (54)	Double-blind Randomised Controlled Type	9 participants with fibromyalgia were randomly selected to listen to instrumental Western Classical music (5 people) or nature sound (4 people) control.	Pain tolerance and threshold were objectively measured using quantitative sensory tests; first, the Quantitative sensory test (QST) was used to differentiate the central pain phenotype in fibromyalgia. Autonomic nervous system (ANS) reactivity was measured an electrocardiogram.	Patients were first isolated from the sound, and then music was played for 25 min. Meanwhile, QST (quantitative sensory test) and ECG (electrocardiogram) tests were performed. This procedure was repeated at 1-week intervals.	Although the results are cautious, this study provides evidence that some people may benefit more from music and sound stimulation as a treatment than others. Further studies are require.

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Rapidly Increasing Brain Drainage in Türkiye: Causes, Effects, and Solutions

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ABSTRACT

Recently, increasing economic, social, and political imbalances in the country have caused important health problems. In addition, due to the COVID-19 pandemic, it is seen that the human power deficit in health and the problems of health inequality have increased. Health workers cannot obtain economic and social motivation resources despite difficulties they experience. These losses of qualified manpower. Migration depends on many factors, such as the conditions and policies of the source and destination countries and the characteristics of the migrating individuals. Brain drain is the migration of well-educated, expert, and qualified people to developed countries to improve living conditions. It is usually carried out by people seeking better opportunities, living standards and working conditions. Nurses, who are essential to healthcare delivery, are particularly affected by this phenomenon. The movement of nurses from developing countries to more developed countries creates challenges for both the source and destination countries. In Türkiye, it is seen that the rate has increased with a serious acceleration in the last period. Addressing this problem requires a comprehensive approach that includes improving economic conditions, work environments, professional development opportunities, and social recognition. By implementing these strategies, countries can better protect their health workforce and provide more stable and effective health systems for their populations. This review aims to highlight the rapidly increasing brain drain among healthcare workers in Türkiye and the causes thereof.
Keywords: Health workers, nurse, international migration, brain drain, reasons for migration

INTRODUCTION

Globalisation, defined as the transfer of economic, social, political, and cultural values across borders, has both drawbacks and benefits (1). Due to the acceleration of globalisation, technological developments, and increasing living standards, many developed countries, especially the United States of America (USA), offer opportunities and provide qualified employment in many fields, such as science, art, education, and sports. It accepts qualified workers from developing or underdeveloped countries to work in its own countries. (2). The negative attitudes experienced in our country recently have caused human resources to migrate internationally at an ever-increasing pace. It can also cause serious losses in the health sector, which provides services with qualified labour (1-3). The international migration of healthcare workers has recently been considered an important issue on the international health policy agenda. Regarding health manpower, international migration refers to the mobility of qualified healthcare workers across borders (4).

The greatest capital of the 21st century is brainpower equipped with education and also brain power is the most serious investment for countries' production and development. Loss of brain power is roughly expressed as brain drain and constitutes the migration category, the share of which has increased the most in international migration movements in recent years (5). Today, the fact that knowledge and knowledge-based production technologies have become the engine power of globalisation reveals a clear selectivity based on quality in the migration policies of developed countries, which are the main immigration recipients. In this sense, receiving countries are seen to compete to attract brain drain through migration policies (6).

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Concept of International Migration

Migration has existed since the beginning of humankind. It has played a crucial role in societies' growth and development. Additionally, migration is closely linked to the characteristics of the geographies in which people live (5).

Migration may occur for economic, social, political, or environmental reasons and require people to adapt to the geographical features of new settlement areas. The phenomenon of migration has strong effects on both migrating individuals and migrated regions, and it has also been a catalyst for cultural exchange and social change (2,6).

International migration refers to population movements from one country to another to stay, work, or settle (7). International migration generally follows a hierarchy from developing countries to more developed countries and from developed countries to countries with better conditions (4). In this context, the reasons for migration, which are frequently encountered in the international migration literature, are evaluated under four headings. This topic is discussed under various names, such as different demographic characteristics between countries, cyclical crises of capitalism, income differences between regions, and economies forced to restructure globally (8). Labour shortages in developed countries constitute one of the biggest reasons for international migration. Meeting these labour shortages with relatively cheap labour, obtained without spending any effort or training, provides a great advantage to developed countries (9). International migration is a complex phenomenon that occurs for different reasons and in different ways. The types of international migration can be classified in terms of quality, content, and scope. Here, distinctions can be made as forced migration, voluntary migration, refugee migration, labour migration, temporary migration, permanent migration, brain drain, regular migration, and irregular migration (10). Each type of migration creates opportunities and challenges for immigrants and host countries. In addition to positive effects such as economic growth, cultural diversity, and social dynamism, negative effects such as integration problems, resource sharing, and political tensions may also arise. Managing international migration requires developing effective policies to balance these impacts and improve the well-being of both migrants and host societies (6,11-13).

Our country's recent economic and social problems have led to the loss of qualified workforce. In this context, the international brain drain has increased significantly and continued rapidly.

Concept of the brain drain

The concept of brain drain refers to the international transfer of resources in the form of human capital and refers to the migration of highly educated and qualified individuals from developing to developed countries (2). The greatest capital of the 21st century, the "information age," is brainpower equipped with education (5). Today, the fact that knowledge and knowledge-based production technologies have become the engine power of globalisation reveals a clear selectivity based on quality in the migration policies of developed countries, which are the main immigration recipients (6). We will examine the positive and negative aspects of brain drain

1. Negative Effects on the Source Country: Brain drain can cause talent loss in source countries. This can have a huge impact, especially in industries that require expertise in specific areas, such as healthcare. Insufficient healthcare personnel can reduce the quality of healthcare in source countries.

2. Positive Effects on the Target Country: Brain drain can positively affect the labour market in the target countries. Highly qualified and educated individuals can contribute to the economy and stimulate innovation.

3. Brain Drain Cycle: In some cases, a brain drain cycle occurs. Some migrants may return to their source countries over time from countries where they find better opportunities. In this case, experience and knowledge transfer can occur.

4. Cultural Interaction: Brain drain can increase the interaction between different cultures. People from other countries can bring different perspectives and experiences, thus increasing their cultural diversity (11).

Organisation for Economic Co-Operation and Development (OECD) countries have a mechanism that facilitates the entry of highly-skilled workforces, and they are almost competing in this regard. Exchange of professional employees is a critical issue for high-income countries, and brain drain from developing countries to developed countries is increasing (12). It is pointed out that the increase in migration will continue in the future with an increasing mismatch between supply and demand. It is emphasised that there is an escape route for those migrating throughout the country to be well-educated and important human resources for their development (11).

The brain drain concept is divided into several classes. Examples include brain export and virtual and hidden brain drain (2).

Brain export; It means exporting qualified brains to another country. Today, brain export enables individuals to gain financial gains from migration and contributes to the development of the sending countries.

In addition to the knowledge, skills, and experiences that migrating individuals acquire abroad, the remittances they send can significantly contribute to their development when they return to their home countries. Foreign exchange inflows, technology transfers, and innovative ideas can support economic growth. Therefore, sending countries can strengthen their development strategies by tapping into the potential of their diasporas (14-20).

Virtual brain drain; It is the use of qualified individuals living in an underdeveloped/developing country to serve a developed country without moving geographically. These companies achieve maximum efficiency/profit by making minimum investments in the internet and computers; thus, they do not spend social security on their employees.

Table 1. (IOM) 2022, Key migration data at a glance

Females[a]	**135 million international female migrants** worldwide in 2020, representing 3.5% of the world's female population	Up from **130 million** (or 3.4%) in 2019
Males[a]	**146 million international male migrants** worldwide in 2020, representing 3.7% of the world's male population	Up from **141 million** (or 3.6%) in 2019
Labour migrants[b]	**169 million migrant workers** in 2019	Up from **164 million** globally in 2017
Missing migrants[c]	Around **3900 died and missing** globally in 2020	Down from approximately **5,400** in 2019

Sources: (a) UN DESA, 2021; (b) ILO, 2021; (c) IOM, n.d.a

Hidden brain drain; It is used to describe a situation where qualified human resources work for the benefit of a foreign company without physically migrating to a developed country, that is, within the borders of their country (2).

The main difference between hidden and virtual brain drain is that virtual brain drain does not require physical mobility, whereas hidden brain drain generally refers to permanent overseas settlements that are not fully reflected in statistics (9).

International migration offers some benefits. One of the important benefits expected from international migration is that skilled workers who migrate return to their home country with the experience they have gained and accelerate the development process. Another benefit is its contribution to education. It helps develop international academic and scientific collaborations (12). When the literature is examined, in the research conducted by Yılmaz in 2014 and the World Bank report in 2013, It is stated that the remittances of overseas workers sent to "developing" countries in 2012 increased by 5.3% compared with the previous year, reaching a total of 401 billion US dollars, and this figure is estimated to reach 515 billion US dollars in 2015 (9).

When the effects of international migration on the receiving country's economy are considered, economic growth undoubtedly comes first. There are strong findings that innovation positively affects economic growth in terms of capital accumulation, human capital, foreign trade, and domestic demand. Migrant countries demonstrate that immigrants contribute to economic growth in the long term as long as they make good use of their talents, skills, and capital (10).

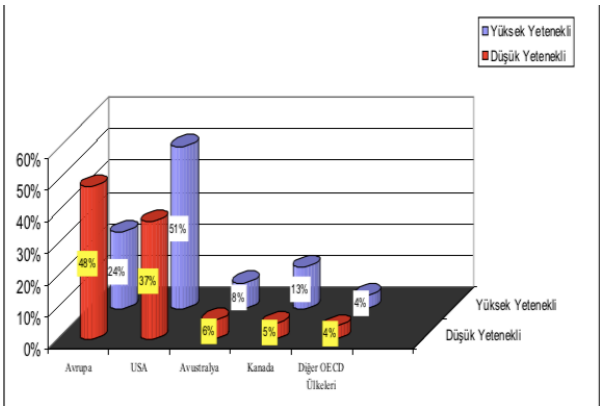

Figure 1: ***Share of immigrants received by OECD Countries according to skill level among the total number of immigrants coming to OECD Countries*** **(%) 2000 (12)**

Brain drain causes a country's scarce resources, such as human capital, to leave. The migration of human capital, which is the source of economic growth, negatively affects the country's adaptation to innovation and modern technology, as well as its economic performance and growth (10,22). The flight of human capital from developing countries to developed countries, on the one hand, increases international inequalities and, on the other hand, makes it more costly for developed countries and developing countries to become richer (12). When the literature is examined, Docquier and Marfouk (2006), in their study of qualified workforces between 1990 and 2000, found that the migration movement according to education level was concentrated in a few countries among the OECD countries. As a result of this analysis, 51% of qualified immigrants reside in the United States. If Canada and Australia are added to this rate, it increases to 70%, and if the other three largest

Table 2. Key facts and figures from World Migration Reports 2000 and 2022

	2000	2022
Estimated number of international migrants	173 million	281 million
Estimated number of world migrants	2.8%	3.6%
Estimated number of female international migrants	49.4%	48.0%
Estimated number of children international migrants	16.0%	14.6%
The region with the highest proportion of international migrants	Oceania	Oceania
The country with the highest proportion of international migrants	United Arab Emirates	United Arab Emirates
Number of migrant workers	-	169 million
Global international remittances (USD)	128 billion	702 billion
Number of refugees	14 million	26.4 million
Number of internally displaced persons	21 million	55 million

countries—Europe, England, Germany, and France—are added, it rises to 85% (21-23).

Turkey According to the United Nations Organisation for Migration (IOM), the 2022 World Migration Report builds on the previous two reports (2018 and 2020) by providing updated migration statistics at global and regional levels and a descriptive analysis of complex migration issues (13,21).

According to the World Migration Report, 272 million people, corresponding to approximately 3.5% of the world population, migrated in 2019, whereas this rate reached 281 million, with a migration rate of 3.6% in 2020.

When the World Migration Report 2022 is examined, it can be seen that the contribution of the Report 2000 to migration policy and migration studies has been successful. Since 2000, 11 world migration reports have been published by the IOM. These reports present for researchers and society in an evidence-based manner the direction in which the understanding of migration has evolved from the past to the present. The table below lists important results from the 2000 and 2022 World Migration Reports (13,21).

This updated report summarises the key statistics of the obtained data. While some data remain fairly constant, the proportion of female international migrants and the overall proportion of the world population that is migrants have changed dramatically. For example, international remittances increased from an estimated US$128 billion to US$702 billion, highlighting the importance of international migration as a driver of development (13-14).

Brain Drainage in Healthcare Workers: An Urgent Global Challenge

Brain drain, the migration of skilled and educated professionals to other countries, poses a significant global challenge for the healthcare sector (10). This is a complex issue with far-reaching implications for developing countries. Addressing root causes requires a multifaceted approach that includes improving economic conditions, work environments, political stability, and professional opportunities (6).

In Turkey, especially in recent years, there has been a significant increase in the number of healthcare professionals migrating abroad. For example, according to data from the Turkish Medical Association, 2685 doctors requested a “Certificate of Good Conduct” to work overseas in 2022. This number has increased by 91% from 2021, and the trend continues into the first three months of 2023. Factors such as economic uncertainties and inadequacies, burnout syndrome, and difficult working conditions are the main reasons for migration (2,17,22)

Causes of Brain Drain in Healthcare

By taking comprehensive measures to retain healthcare professionals, countries can ensure better healthcare outcomes and sustainable development for their populations (4-7).

The effects of brain drain on healthcare are complex and depend on many factors. These factors include the state of the health systems of the source and target countries, economic conditions, motivations, and skills of migrating individuals. (4-8)

1. **Economic Factors:** One of the primary drivers of brain drain in the healthcare sector is the disparity in wages and benefits between developing and developed countries. Healthcare professionals often seek better compensation packages abroad because their skills are highly valued and well-rewarded (15).

2. **Work conditions: Working** conditions in many developing countries are often challenging, with healthcare workers having long hours, high patient loads, and inadequate resources. These stressful conditions contribute to job dissatisfaction and prompt many to seek better working environments.

3. **Political Instability**: Political turmoil and instability can create an uncertain and unsafe environment for healthcare professionals. In countries where healthcare policies are inconsistent or lack of support for the health sector, professionals may feel compelled to leave.

4. **Professional Development Opportunities**: Developed countries often offer more advanced opportunities for professional growth, including access to cutting-edge technology, research facilities, and continuing education. The desire for professional development can drive healthcare workers to migrate.

5. **Quality of Life**: Beyond professional factors, overall quality of life, including education, safety, and general living conditions, plays a significant role in migrating. Healthcare professionals often move to countries that offer better living standards for themselves and their families (4-8).

Effective Factors in the Brain Drain of Healthcare Professionals

The brain drain of healthcare workers, especially nurses, is a critical problem that affects healthcare systems globally. Nurses are the backbone of medical care, providing essential services and support at all levels of healthcare. However, several factors push nurses to migrate from developing countries to more developed countries in search of better opportunities and conditions (5). Although such migration benefits the receiving countries, it can have serious consequences for countries left behind. The following reasons come to the fore when examining how nurses are affected by brain drain. (1).

1. Economic Disparities

Wage Differences: Nurses often earn significantly higher salaries in developed countries than in home countries. This financial incentive is a strong motivator for migration.

Benefits: Developed countries typically offer comprehensive benefits packages, including health insurance, retirement plans, and other financial incentives, which are often lacking in developing countries.

2. Working Conditions

Infrastructure and Resources: Nurses in developing countries often work in under-resourced facilities with inadequate medical supplies and outdated equipment, making their work more challenging and stressful.

Workload and Hours: High patient-to-nurse ratios, long working hours, and insufficient support staff lead to burnout and job dissatisfaction among nurses.

Safety: In some regions, nurses face risks due to political instability, violence, and poor working conditions, which make their jobs unsafe and undesirable (1-5).

3. Professional Development

Education and Training: Opportunities for advanced training, continuing education, and specialisation are more readily available in developed countries, thereby attracting nurses seeking to further their careers.

Research and Innovation: Access to cutting-edge research and participation in innovative healthcare practises are significant pull factors for nurses (3).

4. Quality of Life

Living Conditions: Better overall living conditions, including safer environments, quality housing, and better education systems for children, are compelling reasons for nurses to migrate.

Work-Life Balance: Developed countries often provide better work-life balance, including more reasonable working hours and adequate vacation time (4).

5. Career Advancement

Promotion Prospects: Career advancement and professional growth opportunities are more abundant in developed countries, where healthcare systems are larger and more diverse.

Recognition and Respect: In many developed countries, nurses receive higher social recognition and respect, which can be a significant motivating factor.

Effects of Brain Drain on Healthcare Workers

1. Healthcare Service Delivery

Quality of Care: The loss of experienced and skilled nurses leads to a decline in the quality of care. The remaining nurses face increased workloads, which can compromise patient care and safety.

Access to Care: In regions already struggling with healthcare access, the emigration of nurses intensifies healthcare shortage, leaving vulnerable populations without adequate care (11).

2. Economic Impact

Training Costs: Developing countries invest substantial resources to train nurses. When these professionals migrate, this investment is lost, and the country must bear the cost of training new nurses.

Increased Burden: The financial burden on healthcare systems increases as they struggle to fill the gaps left by migrating nurses, often requiring the hiring of temporary or less experienced staff (8)

3. Educational Impact

Mentorship and Training: The departure of experienced nurses affects the education and training of new nurses. Fewer mentors and educators mean that the quality of nursing education may decline.

4. Healthcare Inequities

Rural and Underserved Areas: Brain drain disproportionately affects rural and underserved areas where healthcare professionals are already in short supply. These areas often suffer the most from the emigration of nurses.

Potential Solutions to the Brain Drain Problem in Healthcare Workers

Enhancing Work Conditions

Investing in healthcare infrastructure, providing adequate supplies and equipment, and ensuring safe and supportive working environments.

1. Professional Development

Create opportunities for continuing education, specialisation, and career advancement within the home country.

2. Political and Economics Stability

Ensuring stable governance and robust healthcare policies that support and protect healthcare workers.

3. International Collaboration

Form partnerships with developed countries for exchange programmes, joint training initiatives, and research collaborations that provide professional growth without permanent migration.

4. Recognition and Respect

Elevating nurses' social status and recognition through public acknowledgement, awards, and professional respect can make the profession more attractive (16).

Conclusion and Recommendations

Health migration creates various challenges and opportunities for migrating individuals and targeted societies. Brain drain

results may vary depending on many factors, such as the reasons for migration, the conditions of the source and target countries, and the profile of migrating individuals. Ensuring that healthcare professionals have the resources, support, and opportunities they need to thrive in their home countries is crucial for building robust and resilient healthcare systems.

The brain drain of healthcare professionals is an important problem that deepens inequalities in global healthcare and negatively affects the healthcare systems of source countries. The migration of qualified healthcare personnel to developed countries may reduce the accessibility and quality of healthcare services in the source countries. To solve this situation, international cooperation and improved working conditions of healthcare workers in the source countries are required.

The brain drain of nurses is a multifaceted issue with far-reaching implications for healthcare systems in developing countries. Addressing this problem requires a comprehensive approach that includes improving economic conditions, work environments, and opportunities for professional growth. By implementing these strategies, countries can better retain their nursing workforce, thereby ensuring more stable and effective healthcare systems for their populations. These steps can contribute to a more balanced and sustainable distribution of healthcare services globally.

Although brain drain poses significant challenges for developing countries, it is not an inevitable outcome of skilled migration. By implementing effective policies and fostering international collaboration, the negative impacts of immigration can be mitigated, and the potential benefits of brain gain can be realised, leading to a more balanced and beneficial migration landscape.

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Only those manuscripts approved by its every individual author and that were not published before in or sent to another journal, are accepted for evaluation.

Submitted manuscripts that pass preliminary control are scanned for plagiarism using iThenticate software. After plagiarism check, the eligible ones are evaluated by editor-in-chief for their originality, methodology, the importance of the subject covered and compliance with the journal scope.

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- Grant information and detailed information on the other sources of support,
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Abstract: An English abstract should be submitted with all submissions except for Letters to the Editor. The abstract of Research Articles should be structured with subheadings (Objective, Materials and Methods, Results, and Conclusion). Abstracts of Case Reports and Reviews should be unstructured. Please check Table 1 below for word count specifications.

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- Confirming that the references cited in the text and listed in the references section are in line with NLM.
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- Confirming that the statistical design of the research article is reviewed.
- Confirming that journal policies detailed on web page of the journal have been reviewed.
- Acknowledgement of the study "in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration in materials and methods section.
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- References
- All tables
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Manuscript Types

Research Articles: This is the most important type of article since it provides new information based on original research. The main text of original articles should be structured with Introduction, Material and Method, Results, Discussion, and Conclusion subheadings. Please check Table 1 for the limitations for Original Articles.

Statistical analysis to support conclusions is usually necessary. Statistical analyses must be conducted in accordance with international statistical reporting standards (Altman DG, Gore SM, Gardner MJ, Pocock SJ. Statistical guidelines for contributors to medical journals. Br Med J 1983: 7; 1489-93). Information on statistical analyses should be provided with a separate subheading under the Materials and Methods section and the statistical software that was used during the process must be specified.

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Table 1. Limitations for each manuscript type

Type of manuscript	Word limit	Abstract word limit	Reference limit	Table limit	Figure limit
Research Article	4000	250 (Structured)	35	6	5 or total of 10 images
Review	5000	250	50	6	10 or total of 15 images
Case Report	1000	200	15	No tables	4 or total of 8 images
Letter to the Editor	400	No abstract	5	No tables	No media

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Tables should be included in the main document, presented after the reference list, and they should be numbered consecutively in the order they are referred to within the main text. A descriptive title must be placed above the tables. Abbreviations used in the tables should be defined below the tables by footnotes (even if they are defined within the main text). Tables should be created using the "insert table" command of the word processing software and they should be arranged clearly to provide easy reading. Data presented in the tables should not be a repetition of the data presented within the main text but should be supporting the main text.

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When a drug, product, hardware, or software program is mentioned within the main text, product information, including the name of the product, the producer of the product, and city and the country of the company (including the state if in USA), should be provided in parentheses in the following format: "Discovery St PET/CT scanner (General Electric, Milwaukee, WI, USA)"

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References

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Journal Article: Blasco V, Colavolpe JC, Antonini F, Zieleskiewicz L, Nafati C, Albanèse J, et al. Long-termoutcome in kidneyrecipientsfromdonorstreatedwithhydroxyethylstarch 130/0.4 andhydroxyethylstarch 200/0.6. Br J Anaesth 2015;115(5):797-8.

Book Section: Suh KN, Keystone JS. Malaria and babesiosis. Gorbach SL, Barlett JG, Blacklow NR, editors. Infectious Diseases. Philadelphia: Lippincott Williams; 2004.p.2290-308.

Books with a Single Author: Sweetman SC. Martindale the Complete Drug Reference. 34th ed. London: Pharmaceutical Press; 2005.

Editor(s) as Author: Huizing EH, de Groot JAM, editors. Functional reconstructive nasal surgery. Stuttgart-New York: Thieme; 2003.

Conference Proceedings: Bengisson S. Sothemin BG. Enforcement of data protection, privacy and security in medical informatics. In: Lun KC, Degoulet P, Piemme TE, Rienhoff O, editors. MEDINFO 92. Proceedings of the 7th World Congress on Medical Informatics; 1992 Sept 6-10; Geneva, Switzerland. Amsterdam: North-Holland; 1992. pp.1561-5.

Scientific or Technical Report: Cusick M, Chew EY, Hoogwerf B, Agrón E, Wu L, Lindley A, et al. Early Treatment Diabetic Retinopathy Study Research Group. Risk factors for renal replacement therapy in the Early Treatment Diabetic Retinopathy Study (ETDRS), Early Treatment Diabetic Retinopathy Study KidneyInt: 2004. Report No: 26.

Thesis: Yılmaz B. Ankara Üniversitesindeki Öğrencilerin Beslenme Durumları, Fiziksel Aktivitelerive Beden Kitle İndeksleri Kan Lipidleri Arasındaki Ilişkiler. H.Ü. SağlıkBilimleriEnstitüsü, DoktoraTezi. 2007.

Manuscripts Accepted for Publication, Not Published Yet: Slots J. The microflora of black stain on human primary teeth. Scand J Dent Res. 1974.

Epub Ahead of Print Articles: Cai L, Yeh BM, Westphalen AC, Roberts JP, Wang ZJ. Adult living donor liver imaging. DiagnIntervRadiol. 2016 Feb 24. doi: 10.5152/dir.2016.15323. [Epub ahead of print].

Manuscripts Published in Electronic Format: Morse SS. Factors in the emergence of infectious diseases. Emerg Infect Dis (serial online) 1995 Jan-Mar (cited 1996 June 5): 1(1): (24 screens). Available from: URL: http://www.cdc.gov/ncidodlElD/cid.htm.

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