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Research Article

Turkish Version of Kolcaba's Immobilization Comfort Questionnaire: A Validity and Reliability Study

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SUMMARY

Purpose: The purpose of this study was to determine the validity and reliability of the Turkish version of the Immobilization Comfort Questionnaire (ICQ).
Methods: The sample used in this methodological study consisted of 121 patients undergoing lower extremity arthroscopy in a training and research hospital. The validity study of the questionnaire assessed language validity, structural validity and criterion validity. Structural validity was evaluated via exploratory factor analysis. Criterion validity was evaluated by assessing the correlation between the visual analog scale (VAS) scores (i.e., the comfort and pain VAS scores) and the ICQ scores using Spearman's correlation test. The Kaiser-Meyer-Olkin coefficient and Bartlett's test of sphericity were used to determine the suitability of the data for factor analysis. Internal consistency was evaluated to determine reliability. The data were analyzed with SPSS version 15.00 for Windows. Descriptive statistics were presented as frequencies, percentages, means and standard deviations. A p value $\leq .05$ was considered statistically significant.
Results: A moderate positive correlation was found between the ICQ scores and the VAS comfort scores; a moderate negative correlation was found between the ICQ and the VAS pain measures in the criterion validity analysis. Cronbach α values of .75 and .82 were found for the first and second measurements, respectively.
Conclusions: The findings of this study reveal that the ICQ is a valid and reliable tool for assessing the comfort of patients in Turkey who are immobilized because of lower extremity orthopedic problems.
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Introduction

The main goal of nursing as a professional discipline is to provide patient care, and one of the pillars of nursing practice and research is assessing the comfort status of patients and providing comfort interventions [1]. Comfort is an important element of quality of life, and many interventions performed by health care professionals, especially nurses, focus on promoting comfort [2]. Comfort theory guides nurses in this process [3,4].

Comfort theory is based on the concept of comforting [5]. It was developed by Kolcaba, and has the potential to affect the perspectives and practices of other health care providers in health care settings [6,7]. Kolcaba developed the taxonomy of the concept of comfort, which included three types of comfort (relief, ease, and transcendence) and four contexts [8]. In 1994, she published the comfort theory [9,10], which was updated in 2007 [7]. Each of the three types of comfort is a theoretically unique component and has a positive impact on the patient's recovery [6].

Contexts of comfort

According to Kolcaba, the four contexts of comfort are physical comfort, psychospiritual comfort, environmental comfort and sociocultural comfort [6]. Physical comfort is related to bodily perceptions. It encompasses physiological factors such as rest and

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relaxation, responses to disease, nutrition and homeostasis, and bowel function continuity that affect an individual's physical condition. Pain is one of the main factors that compromise physical comfort [5].

Psychospiritual comfort has mental and spiritual components. It encompasses emotions that are associated with concepts that give the individual's life meaning, such as self-esteem, self-concept and self-awareness. In patients undergoing surgery, the most important factor that reduces psychospiritual comfort is anxiety [6].

Environmental comfort includes external factors and circumstances and their effects on the individual. It encompasses factors related to the individual's external environment, including light, noise, color, temperature, the safety of the environment and the landscape visible through the window [11].

Sociocultural comfort refers to the individual's social and cultural environment. Components of sociocultural care include consulting and sharing knowledge; providing care that is sensitive to the individual's family traditions, habits, and religious beliefs; offering financial support services; ensuring interpersonal communication; planning discharge and offering discharge training; and sustaining care at home [5,6].

Nursing care should be planned holistically and should embrace the four dimensions of comfort. By means of such comprehensively planned care, patients can experience relief, ease and transcendence. To realize this goal, nurses should be guided by and equipped with an instrument that properly assesses the level of patient comfort [12]. Such instruments may have benefits that are manifested by nursing documentation, such as assessing the quality and expected outcomes of patient care [11,13].

Lower extremity arthroscopy, comfort and nursing

With advances in minimally invasive surgical techniques, arthroscopic surgery has become the most common orthopedic surgical procedure worldwide [13]. In arthroscopic surgery, the surgical field is viewed with a fiber-optic endoscope via a small incision, and the pathological field is resected or debrided with special surgical instruments via another small incision [14,15]. Lower extremity arthroscopy allows the direct visualization, identification and treatment of many lesions in the knee and ankle joints [15]. Knee arthroscopy is the most common surgical procedure performed on the knee. Pain after lower extremity arthroscopy appears to be the most important problem related to surgery [16]. Moreover, casts, dressings, splints or immobilizers used to immobilize the extremities after surgery may cause discomfort in orthopedic patients. Discomfort may also occur as a result of pressure, swelling and skin breakdown and of the reduced independence in daily activities such as self-care requirements, nutrition and elimination that many patients experience as a consequence of immobilization [17,18].

According to the National Association of Orthopedic Nurses, orthopedic nurses view their patients as whole people with physical, psychological, cultural, social, emotional, and spiritual needs. Also, they should aim for the highest standards of nursing practice to provide optimum patient care [19]. The patients' perception of care, which is influenced by their comfort during hospitalization, has been an important consideration in health care delivery; this perception is related to the nurse's ability to meet the patient's immediate physical and clinical needs in a timely manner and to provide a comforting physical presence [20].

Pulmonary, cardiovascular, gastrointestinal, metabolic, neuroendocrine and psychological changes occur as a physiological response to surgical trauma and stress [21]. Therefore, after arthroscopic surgery, for which the patient is hospitalized for a short time, reducing pain in the first 24 hours [16] and providing comfortable postoperative care are important. The patient's experiences of great pain will result in decreased comfort and satisfaction [21].

Assessment of comfort in literature

According to Pearson [2], most of the studies about comfort found in the literature assess comfort using tools that lack reliability and validity. Many researchers have used only pain scales to measure comfort or have developed questionnaires based on the literature to assess the patient's discomfort [22,23]. However, comfort cannot be limited to the absence of pain [2]. Comfort is a multidimensional concept that includes physical, psychospiritual, environmental and sociocultural comfort [6]. Furthermore, many factors, such as positioning, temperature, pressure, health, and the environment, plus physiological and psychological factors, affect comfort [2]. The visial analog scale (VAS), which is used in some studies to measure comfort, does not focus on the dimensions of comfort and only requires selecting a point between two end points [24-26]. Furthermore, the VAS was found to have lower sensitivity than Anatomical Illustration Rating Scale for some body areas and subgroups [26]. However, valid and reliable assessment tools are required to evaluate the effectiveness of patient care interventions [2]. Although comfort is frequently measured in practice, it is a slowly emerging and immature concept in the literature [4].

National studies of comfort and the standards for measuring comfort are limited [9,13,27]. A validity and reliability study of the Turkish version of the General Comfort Questionnaire (GCQ) was conducted by Kuğuoğlu and Karabacak in 2008 [28]. Versions of the GCQ have appeared for specific domains, such as the Postpartum Comfort Questionnaire [9], the Urinary Incontinence and Frequency Comfort Questionnaire [27], the Perianesthesia Comfort Questionnaire [13]. They have also been adapted for use in Turkey. However, there are no studies that focus on the comfort of orthopedic patients confined to bed rest. Assessing the comfort level of these patients and measuring the effects of comfort-augmenting interventions in the care context are crucial to allow nurses and other health care providers to demonstrate evidence-based patient outcomes. Nursing care guided by comfort theory could contribute to an increased quality of care and patient satisfaction by ensuring an optimal level of comfort. The purpose of this study, which is based on comfort theory and takes a holistic approach to individual assessment, was to adapt the Immobilization Comfort Questionnaire (ICQ) to Turkish and to test the validity and reliability of the adapted questionnaire on patients undergoing lower extremity arthroscopy.

Methods

Study design

This study used a methodological study design.

Setting and sample

This study was conducted between December 2012 and March 2013 in the orthopedics and traumatology department of a training and research hospital in Ankara. One hundred twenty-one patients undergoing lower extremity (hip, knee and ankle) arthroscopic surgery were included in the study. All of the participants were literate in Turkish, aged 18 years or older, and hospitalized with postoperative bed rest for 1 day.

The sample size was determined with reference to the number of items and Likert scales. A wide range of recommendations about

sample size in factor analysis has been made. Gorusch [29] and Hatcher [30] recommend a minimum subject-to-item ratio of at least 5:1 in exploratory factor analysis; furthermore, they provide stringent guidelines regarding when this ratio is acceptable and note that higher ratios are generally better. The scale to be tested for validity and reliability contained 20 items with 6-point Likert-type answers for each of the items. The sample size was 120, equal to 20 items with 6 Likert preferences, to ensure that there was at least one participant for each possible option [29,30].

Ethical consideration

Permission to use and test the validity and reliability of the ICQ in the Turkish population was obtained by email from Associate Professor (Emeritus) Kathy Kolcaba who developed the original questionnaire. The original questionnaire was obtained from website of Kathy Kolcaba [31].

Ethical approval for the study protocol, which adhered to the principles of the Declaration of Helsinki [32], was obtained from the ethical council of the university prior to the study (approval no. 1491-226-12/1648.4-5519). The patients completed a written informed consent for participation before volunteering to be part of the study.

Measurements/instruments

In this study, a descriptive patient characteristics form, the VAS and the ICQ were used as tools for data collection.

Descriptive patient characteristics form

The descriptive patient characteristics form was the first part of the data collection form. It contained questions about the patient's age, sex, occupation, education, marital status, height, weight, and body mass index; the presence of chronic diseases; the hospitalization date; and the duration of the operation.

VAS

In the second part of the inquiry, VAS was used to evaluate comfort and pain. There is no gold standard for measuring comfort; however, the founder of comfort theory, Kathy Kolcaba, used the VAS to assess comfort in comparison with ICQ because of its ease of administration and its minimal use of written language [6].

The VAS, first developed in 1921 by Hayes and Patterson, is commonly used to measure clinical phenomena, including pain and comfort [2,25]. The VAS is a tool for converting certain qualitative measures to quantitative measures [33]. It is easy to use and requires very little written language. There is a large body of literature on the use of the VAS in medicine, and clinically significant measurements of the VAS have been established for pain, comfort, fatigue, and sleep quality [2,25]. The VAS presents the extremes of a parameter on opposite ends of a 10cm (100 mm) line, and the patient is asked to indicate his or her current status along that line. For instance, on a VAS to measure pain, one end of the line is labeled “no pain”, the other end is labeled “severe pain”, and the patient indicates his or her current level of pain along the scale [34]. The distance from “no pain” to the patient's mark quantitatively represents the patient's pain level. In our case, the second measure was comfort, so the measurement item was “I feel as comfortable as possible right now” with “definitely uncomfortable” at one end of the line and “completely comfortable” at the other end [6].

The validity of the VAS is demonstrated by quantitatively appropriate incremental changes in scores that move in parallel with corresponding qualitative, verbal descriptions of the changes in pain over time. For instance, the mean and median VAS pain scores should increase in a linear and graduated fashion as the description of the change in pain escalates from “much less pain” to “much more pain” [34]. The fact that there are minimal translation difficulties related to the VAS has led to a great number of cross-cultural adaptations of this tool [35]. The VAS has been used in Turkish studies [21,22,36].

ICQ

The development of the ICQ was influenced by Kolcaba's GCQ. The ICQ is a 20-question measure with Likert-type response scales. Each statement on the questionnaire has a Likert-type response, with values ranging from 1 to 6 indicating responses from *strongly disagree* to *strongly agree*. The pattern of positive and negative responses on the questionnaire was designed to be mixed. Accordingly, for the positive items, the highest score (6 points) indicates the highest degree of comfort, and the lowest score (1 point) indicates the lowest degree of comfort. For negative items, the lowest score represents the highest degree of comfort, and the highest score represents the lowest degree of comfort. To calculate the total score for the questionnaire, the negative item scores are reverse-coded and added to the positive item scores. The minimum and maximum total scores on the questionnaire are 20 points and 120 points, respectively. The mean item score ranges from 1 to 6 and is determined by dividing the total score by the number of items on the questionnaire. For the mean item score, 1 point represents low comfort and 6 points represent high comfort [6]. No subscales or cut-off points were designated in the original scale. The validity and reliability study of the ICQ was conducted by Hogan-Miller, Rustad, Sendelbach, and Goldenberg [37], with contribution from Kolcaba, and included patients undergoing coronary angiography who were immobilized. Cronbach α was .74 for the first assessment and .67 for the second assessment [37]. No other studies using the ICQ were found during the literature search.

Language validity of ICQ

To ensure the language validity of the questionnaire and in accordance with the methodology of translation, the questionnaire was adapted by translating it into the target language (Turkish) and back-translating it into the original language (English) [38]. Each item in the questionnaire was translated into Turkish by three different English linguistics experts and evaluated; the most appropriate translation of each item was used for the Turkish version. The completed Turkish version of the questionnaire was then back-translated into the original language by three different English linguistics experts. The final Turkish and English versions of the questionnaire were compared to the original English version and determined to be compatible by three academic faculty members who specialize in nursing and are literate in both Turkish and English. The finalized and approved Turkish version of the questionnaire was tested on 10 patients who were hospitalized in the orthopedics and traumatology department and was determined to be understandable. The questionnaire items were short, clear and understandable, so there was no need to add or remove any words during the language equivalence phase of the study.

Data collection/procedure

The patients' descriptive characteristics, pain and comfort levels (measured with the VAS) and comfort (measured with the ICQ) were assessed during each patient's third hour in the postoperative care unit, which is a level 1 intermediate intensive care unit. The next morning, a second assessment of comfort and pain using both

the VAS and ICQ was conducted prior to the patient's mobilization and transfer to the clinic. The first and second assessments were conducted by the same researcher to maintain reliability between assessments. The second assessment was not for retest analysis but to monitor the change in patients' comfort and pain, as described in Hogan-Miller et al's study and in Kolcaba's book [6,37].

Surgery and perioperative clinical pain protocol

During the data collection phase of the study, various orthopedic surgeons performed the lower extremity (hip, knee and ankle) arthroscopy; however, the anesthesia team, scrub and circulating nurses, and postoperative care unit nurses were the same for all patients. All patients undergoing lower extremity arthroscopy were admitted to the orthopedic surgery unit 1 night before the surgery and were administered 1 g of cefazolin sodium intravenously as a prophylactic antibiotic during the preoperative period per physician's order. After approximately 1 hour in the postoperative recovery unit, the patients were transferred to the orthopedic surgery postoperative care unit for the first 24 hours after surgery. Unless an allergy was reported, the patients were administered diclofenac sodium (75 mg) intramuscularly every 6–8 hours for pain control. Ice packs were applied for 20 minutes every 2 hours for the first 12 hours to reduce pain and bleeding. As an intravenous fluid replacement, dextrose 5.0% and normal saline (0.9%) were administered intravenously at 100–125 mL/hour from the induction of the spinal anesthesia or femoral nerve block to the end of the postoperative 12th hour. The next morning, the patients were mobilized and transferred to the clinic, and they were discharged from the hospital after they received discharge education.

Data analysis

The validity study of the questionnaire addressed language validity, structural validity and criterion validity. Structural validity was evaluated using exploratory factor analysis. Criterion validity was evaluated by assessing the correlation between the VAS scores (for comfort and pain) and the ICQ scores (for comfort) using Spearman's correlation test. The suitability of the data for factor analysis was assessed with the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity. Internal consistency was used to determine reliability. The data were analyzed with assistance from an expert in biostatistics using SPSS for Windows 15.0 (SPSS Inc., Chicago, IL, USA). The descriptive statistics were presented as frequencies, percentages, means and standard deviations. A p level $\leq$ .05 was considered statistically significant.

Results

Descriptive patient characteristics

The mean age of the participants was 33.22 ± 11.95 years; 75.2% were male; 31.4% were primary school graduates; 63.6% were married; 62.0% had not had any prior surgery (Table 1).

The participants' mean ICQ score was 75.37 ± 12.39; the mean VAS comfort score was 5.40 ± 1.62; the mean VAS pain score was 3.65 ± 2.22 for the first postoperative assessment after arthroscopy (performed during the third hour of immobilization). The next day, after arthroscopy and prior to mobilization, the second postoperative assessment yielded a mean ICQ score of 68.85 ± 12.57, a mean VAS comfort score of 4.42 ± 1.61, and a mean VAS pain score of 5.01 ± 2.07 (Table 2).

Table 1 *Descriptive Characteristics of Patients (N = 121).*

Characteristics	Value *M* (range) or *n* (%)
Age (yr)	33.2 (18–66)
Gender	
Male	91 (75.2)
Female	30 (24.8)
Marital status	
Single	44 (36.4)
Married	77 (63.6)
Education level	
Primary school	38 (31.4)
High school	37 (30.6)
≥ University	46 (38.0)
Prior surgery	
Yes	46 (38.0)
No	75 (62.0)

Validity of ICQ

To test the criterion validity of the ICQ, the relationships between the ICQ scores and the VAS pain and VAS comfort scores were examined. We determined a moderate positive correlation between the ICQ scores and the VAS comfort scores (r = .67 and r = .67, respectively; p < .001). Moreover, a moderate negative correlation was found between the ICQ scores and the VAS pain scores (r = −.59, r = −.44, respectively; p < .001; Table 3).

Factor analysis was conducted within the scope of questioning, reasoning and evaluating dimensions. Prior to the factor analysis, the KMO test and Bartlett's test of sphericity were performed to determine the suitability of the data for factor analysis. The KMO value was .66, and the Bartlett's test of sphericity value was 914.36 (p < .001). This statistically significant value indicated that factor analysis could be conducted with this sample size. To reveal the structural characteristics of the variables, the factor and component number and the factor loadings of the variables were assessed using exploratory factor analysis (Table 4). Seven subfactors explained 70.6% of the total variance in the factor analysis (Table 4).

Reliability of ICQ

Internal consistency was examined to assess the reliability of the ICQ. No items had a negative effect on reliability based on the Cronbach α coefficient calculation; therefore, none of the items were excluded. For the first assessment of comfort with the ICQ (performed during the third postoperative hour), the Cronbach α was .75, and for the second assessment (performed the next day, before mobilization), it was .82.

To determine the change in comfort during the immobilization period, the relationship between the first and the second comfort scores was examined. Because the data were sequential, Spearman's sequential correlation test was used. The correlation coefficient was .38 (p < .001), and the correlation between the two assessments was found to be moderately statistically significant.

Table 2 *Comfort and Pain Assessment Scores of Orthopedic Patients Immobilized Because of Lower Extremity Problems (N = 121).*

Comfort and pain assessment scales	First assessment		Second assessment	
	Range[a]	*M* ± *SD*	Range[a]	*M* ± *SD*
ICQ item score	1.5–5.3	3.76 ± 0.61	1.9–5.3	3.44 ± 0.62
ICQ total score	30–106	75.37 ± 12.39	38–106	68.85 ± 12.57
Comfort VAS score	1–10	5.40 ± 1.62	1–8	4.42 ± 1.61
Pain VAS score	0–10	3.65 ± 2.22	1–10	5.01 ± 2.07

Note. ICQ = Immobilization Comfort Questionnaire; VAS = visual analog scale.
[a] Range expressed from minimum to maximum.

Table 3 *Correlations Between ICQ Scores and VAS Scores of Orthopedic Patients Immobilized Because of Lower Extremity Problems (N = 121).*

Comfort and pain assessment scales	ICQ first assessment	ICQ second assessment	Comfort VAS score First assessment	Comfort VAS score Second assessment
Comfort VAS score First assessment	.67[a] $p < .001$			
Comfort VAS score Second assessment		.67[a] $p < .001$		
Pain VAS score First assessment	−.44[a] $p < .001$		−.60[a] $p < .001$	
Pain VAS score Second assessment		−.59[a] $p < .001$		−.62[a] $p < .001$

Note. ICQ = Immobilization Comfort Questionnaire; VAS = visual analog scale.
[a] Spearman's correlation coefficient.

Discussion

Most patients with orthopedic problems experience immobilization as a result of injury or treatment protocols. However, there is no standardized tool for assessing the degree of discomfort they feel during hospitalization. This methodological study was designed to apply the ICQ, which has been found to be valid and reliable for assessing patients undergoing coronary angiography [37], to the orthopedics and traumatology clinics and test its validity and reliability with a new population. Given that ICQ is not a commonly used tool, the literature review did not reveal any studies with which to cross-check our study results.

Validity of the ICQ

Criterion validity is assessed by comparing the results of a new tool with the results of another valid and reliable tool used at the same time [39]. In our study, patients who reported high levels of comfort on the ICQ were expected to show low pain intensity and high comfort on the simultaneously administered VAS [6]. The moderate positive correlation between the ICQ scores and the VAS comfort scores and the moderate negative correlation between the ICQ scores and the VAS pain scores are indicators of the validity of the ICQ.

One of the questions that researchers investigate when developing or adapting a measurement tool is whether there is a particular order to the participants' responses to each item on the tool [40,41]. The suitability of the sample size for factor analysis was examined using the KMO test and Bartlett's test of sphericity. The KMO values range from 0 to 1; a KMO value of .50 or more indicates that the sample size is suitable for factor analysis. In our study, the KMO value was .66, indicating that the sample size was adequate for factor analysis. Seven subfactors were identified which explained 70.6% of the total variance in the factor analysis. However, the items in these subfactors did not constitute a clinically significant group of factors. The items that assessed physical comfort, psychospiritual and sociocultural comfort were observed to be in the same dimension and did not form separate subscales. For instance, the items “I need to feel good again,” “My muscles ache from being in the same position,” and “I have a loved one(s) who makes me feel cared for” were observed to be in the same dimension. Consequently, we decided that the ICQ has 20 items, but it is a one-dimensional measurement tool (Table 4). This finding, similar to the findings of Hogan-Miller et al [37], showed that the ICQ was adapted from the GCQ. The outcomes of Kolcaba's studies suggest that it is more accurate to interpret the questionnaire as a whole and not in parts classified into types or contexts, as described in the comfort theory, because of the holistic nature of comfort. Furthermore, Kolcaba's studies indicate that the scale has state characteristics rather than trait characteristics [6,11].

Table 4 *Factorial Structure of ICQ in Orthopedic Patients Immobilized Because of Lower Extremity Problems (N = 121).*

Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
I feel healthy right now.	.81						
It is easy to eat in this position.	.73						
I feel peaceful.	.69						
My body is relaxed now.	.68						
The temperature in this room is fine.	.66						
I am comfortable in this position.	.63						
My pain is difficult to endure.		.70					
Pain in my back bothers me.		.58					
I feel depressed.		.50					
I have a loved one(s) who makes me feel cared for.			.82				
I have enough information about my test results.			.64				
I need to feel good again.			.61				
My muscles ache from being in the same position.			.46				
I am not hungry.				.86			
This bed is comfortable.				.63			
My leg feels numb.					.87		
The sounds keep me from resting.					.55		
My groin/leg feels tender.						.86	
I feel dependent on others.						.53	
I am constipated right now.							.86
Initial Eigenvalues	5.25	1.98	1.64	1.54	1.38	1.21	1.01
Total							

Note. ICQ = Immobilization Comfort Questionnaire.

Reliability of the ICQ

The Cronbach α was .75 for the first assessment of comfort using the ICQ and .82 for the second assessment. A Cronbach α of .70 or higher is accepted as an indicator of reliability [42]. A possible explanation for the higher Cronbach α in the second assessment was that at the second assessment, the patients had a better perception of the discomfort related to immobilization because they had been immobilized for longer. The internal consistency of the ICQ was found to be reliable in our study. Similarly, the Cronbach α of the ICQ was .74 at the first assessment and .67 at the second assessment in the study by Hogan-Miller et al [37], which was conducted with patients who were immobilized after undergoing coronary angiography.

Another method for determining the reliability coefficient is to examine a measure's performance over time, which is performed by administering the test again under the same conditions to the same individuals after a predetermined time interval [43,44]. However, examinations of consistency over time are not appropriate for every measurement tool. For instance, tools that assess a patient's perception of pain or distress related to symptoms of cancer are not appropriate for examinations of consistency over time, because the variables being assessed can change over time. This method can be used for tools that are developed to assess factors that do not change over time, such as personality and cognitive skills [38,43]. For the aforementioned reasons, the results of the second assessment in our study were not appropriate to determine retest reliability.

Physical comfort is associated with bodily perceptions and is affected by many physiological factors. These factors include, but are not limited to, sleep and rest, response to disease, nutrition and

hydration levels, and waste elimination [6]. Environmental comfort involves external factors and conditions and their effect on an individual. In this context, factors such as illumination, noise, color, temperature, smell, furnishings, and the landscape visible from the patient's window are external factors that affect human comfort [9]. According to Carpenito-Moyet [45], in patients experiencing discomfort, their responses to a dangerous or disturbing impulse cause a change in comfort. Therefore, an individual's physical and environmental comfort is a state that is unstable and may change instantly. Consistent with the literature referenced above, our study found a statistically significant difference and a moderate correlation between two postoperative repeat assessment results [6,37].

Limitations

Our study was designed to be a single-center study with a limited patient sample. To broaden the sample size, a multicenter study design targeting a larger population with distinct sociodemographic features would be useful. However, the fact that comfort is affected by treatment and care protocols, and environmental factors that cannot be standardized in a multicenter study led us to conduct a single-center study. Moreover, our institution is a military hospital. Because of the nature of our institution's target population, the majority of our sample comprised male soldiers, which led to a limitation regarding gender.

Conclusion

Comfort, which includes relief, ease and transcendence, is a subjective concept. One way to make a subjective concept as objective as possible is to make the outcome measureable. The findings of this methodological study reveal that the ICQ (a one-dimensional, 20-item questionnaire) is a valid and reliable tool for assessing the comfort of patients in Turkey who are immobilized because of lower extremity orthopedic problems. The ICQ is easy and practical to complete and has a structure that includes holistic care components. Thus, nurses can guide the care of immobilized patients with this tool, which is based on Kolcaba's comfort theory.

In future research, comparisons of the results of comfort-promoting interventions using ICQ measurements will be beneficial for developing evidence-based guidelines. These results may be a source of inspiration for nurses and other health care professionals in various health care settings. Additionally, our findings could contribute to the applicability of comfort theory. The adaptation of the original tool to different cultures, such as in the Turkish culture, may universally broaden the practice areas in which Kolcaba's theory is applied.

Conflicts of interest

The authors declare no conflicts of interest.

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