Applied Nursing Research 38 (2017) 169–174

Contents lists available at ScienceDirect

Applied Nursing Research

journal homepage: www.elsevier.com/locate/apnr

Original article

Development of post hip replacement comfort scale[☆,☆☆]

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A R T I C L E I N F O

Keywords:
Instrument development
Psychometric testing
Nursing assessment
Hip replacement surgery
Patient comfort

A B S T R A C T

Aim: To develop and psychometrically test the Post Hip Replacement Comfort Scale (PHRCS).
Background: Evaluation of the patient comfort after hip replacement surgery is highly important in order to increase the quality of patient care. The review of the relevant literature shows that a scale that specifically measures the patient comfort after hip replacement surgery is absent.
Design: Methodological design was used. This study included the development of the scale and tested the psychometric properties of the scale.
Method: 180 patients who had been hip replacement surgery recruited from three education and research hospitals' orthopedic and trauma departments from January 2014 to December 2015. The study was conducted in three phases. In phase 1, scale items were developed based on the literature review and other comfort scales. In phase 2, the trial was applied with data collection forms. Phase 3 was conducted to evaluate the reliability and validity of the finalized inventory using item analysis.
Results: The Cronbach's alpha coefficient value is 0.758. Test-retest results found positive and meaningful correlation between the scores of the scales, indicating the reliability of the scale. Scope, surface, criterion and construct validity analysis confirmed the validity of the scale. There were 26 items in the final scale. In our study, the average patient comfort score was 3.64 ± 0.43 (from 1 to 5).
Conclusion: The PHRCS is recommended for evaluating patients' comfort after hip replacement surgery and examining the effects of nursing interventions on patients' comfort.

1. Introduction

Maintaining patient comfort, which is an indicator of the results of patient care, is one of the main aims of nursing. Katharine Kolcaba (1991), who developed the comfort theory, stated that comfort of the individuals should be evaluated together with physical, sociocultural, psychospiritual and environmental dimensions (Kolcaba, 1991). Pain felt by the patient is the main determinant of physical comfort about bodily perceptions (Kolcaba, 2003). The impact of external factors such as temperature, light, bed, sound over the patients constitutes the environmental comfort (Kolcaba, 2003). Consultation, religious practices, interpersonal communication, and discharge planning and education are the factors that constitute the sociocultural comfort (Kolcaba, 2003). Psychospiritual comfort, which includes esteem, sexuality and self-identity, is negatively influenced by anxiety (Kolcaba, 2003). Given that the patients are influenced by various factors in a hospital, nurses should take patient comfort into consideration while evaluating the patients and preparing the plans for patient care.

Planning, implementation and evaluation of the post-operative care of the patients who undergo hip replacement surgery within the context of the comfort theory will increase patient care quality. Evaluation of the patient comfort will help the healthcare providers to determine the necessities of the patients so that the impact of medical interventions over patient comfort may be assessed. Therefore, as Kolcaba states, proper tools should be developed in order to evaluate the needs of patients and measure patient comfort (Kolcaba, 1991).

2. Background

In 2001, Kolcaba developed the General Comfort Questionnaire (GCQ) in order to evaluate comfort of all types of patients (Kolcaba, 2001). In order to evaluate comfort of patients with different health problems, the GCQ has been modified in line with the demands unique to these problems. Perianesthesia Comfort Scale of Wilson

☆ This research has been accepted as a doctoral thesis of Hulya SARAY KILIC at the Gulhane Military Medical Academy Health Sciences Institute.
☆☆ This research was an oral presentation at the First International Congress on Nursing (ICON-2017) between 16th – 18th March 2017 at Grand Park Lara Convention CenterAntalya/ TURKEY.

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http://dx.doi.org/10.1016/j.apnr.2017.10.004
Received 12 April 2017; Received in revised form 1 August 2017; Accepted 15 October 2017
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(Wilson & Kolcaba, 2004), Urinary Incontinence and Frequency Comfort Questionnaire of Dowd (Dowd, Kolcaba, & Steiner, 2000) and End of Life Comfort Questionnaire of Novak (Novak, Kolcaba, Steiner, & Dowd, 2001) are among the main questionnaires that have adapted the GCQ to specific health problems. GCQ (2008), Postpartum Comfort Questionnaire (2010), and Urinary Incontinence Comfort Scale (2012) are among the examples of the GCQ that have been adapted into Turkish (Karakaplan & Yildiz, 2010; Kuguoğlu, 2008; Zengin & Pinar, 2012).

Hip replacement surgery is the most frequently performed orthopedic surgery, thanks to the developments in technology and the increase in the number of elderly patients (Heybeli & Mumcu, 1999; Sayek, 2004). The number of annual hip replacement is 193.000 in the United States of America (Mauk, 2014) and about one million around the world (Knutsson & Engberg, 1999). When the revision surgeries are taken into consideration, Birrel et al. expects an important increase in the number of hip replacement surgery in the next 15 years (Birrell, Johnell, & Silman, 1999). Health care requirements in hip replacement surgery, which mainly stem from limited movement ability, start in the pre-operative period and continue during the post-operative period (Simsek Yaban, 2006). In addition to physiological problems, such as constipation, inappetency, orthostatic hypotension and pressure sore, which are mainly caused by limited movement ability, the patients that undergo hip replacement surgery may suffer from psychological problems, including anxiety, delirium and sleep disorders (Nazli, 2007). The patients are influenced in physical, physiological, social and spiritual terms following the hip replacement surgery. A study on the expectation of the patients after hip replacement surgery found that the patients primarily demanded to regain movement ability and relief of pain (Elibol, 2011). Maintaining and increasing comfort of the patients that suffer from limited movement ability are highly important in terms of nursing.

GCQ may not be sufficient for comprehensive evaluation of the comfort of the patients after hip replacement surgery. The review of the literature on comfort scales shows the lack of a valid and reliable questionnaire that specifically evaluates comfort of the patients, who undergo hip replacement surgery. This study develops the PHRCS in order to fill the gap in the literature. The scale that we develop evaluates the medical interventions before and after hip replacement surgery on comfort of the patients. By revealing the comfort levels of the patients, who undergo hip replacement surgery, we intend to provide contributions to the plans and practices for increasing patient comfort levels.

3. Methods

3.1. Aim

The purpose of the study was to develop and psychometrically test the PHRCS for measuring comfort after hip replacement surgery.

3.2. Methodology

An instrument development study was designed to assess the patient comfort after hip replacement surgery.

3.3. Sample/participants and setting

There are diverging suggestions on the calculation of sampling size of the reliability-validity studies. Some of the researchers suggest that the sample size should be at least 100 so that factor analysis may be conducted (Gorsuch, 1983; Kline, 1979; MacCallum, Widaman, Preacher, & Hong, 2001). On the other hand, Hatcher argues that at least 100 samples with five samples per each item are required (O'Rourke & Hatcher, 2013). Based on these suggestions we calculated the samples size as 180, five times the 36 items of our study.

This study was conducted between January and November 2015 with the participation of 180 voluntary patients that underwent hip replacement surgery at the orthopedics and traumatology clinics of three training and research hospitals. Voluntary patients at and above the age of 18, who could communicate in Turkish, had no mental problems and underwent total or partial hip replacement surgery, were included in the study.

3.4. Data collection

The questionnaire consisted of four parts. The first part included questions on the patients' sociodemographic characteristics; the second part included information on hip replacement surgery; the third part included PHRCS developed within the context of this research; and the final part included the GCQ that was used to evaluate criterion validity. GCQ was developed by Kolcaba in 1992 (Kolcaba, 1992). The GCQ was adapted into Turkish by Kuguogluand Karabacakin Turkish in 2008 (Kuguoğlu, 2008). The scale consists of 48 questions based on a 4-type Likert scale and the scores to be obtained ranged between 48 and 192. The overall score (ranged between 1 and 4) is calculated by the dividing the total score into the total number of items. The higher the overall score, the higher the patient comfort. The Cronbach's Alpha coefficient of the Turkish version of the scale was 0.85 (Kuguoğlu, 2008). The Cronbach's Alpha coefficient ofthe GCQ of this research was 0.83.

3.5. Ethical considerations

The study was approved by the university's institutional review board and an informed, written consent was obtained from all participants. All participants were aware that they had the right to stop answering any questions or participating in this study and would not incur any penalty. Written and verbal consent of the participants was obtained. Data collection form did not include any questions that may reveal the identities of the participants. We placed special attention to avoid directing the participants about the answers to the question on the scale. Data was collected by using face-to-face interviews.

3.6. Instrument development

The development process was conducted in three phases: Phase 1: item development; Phase 2: pilot study; Phase 3: psychometric analysis.

3.6.1. Phase 1: item development

We used the relevant literature on the questionnaires developed within the context of comfort theory in order to determine the items in the draft questionnaire (Karakaplan & Yildiz, 2010; Klemetti et al., 2015; Knutsson & Engberg, 1999; Kuguoğlu, 2008). The draft scale was submitted to expert opinions and the results were evaluated.

3.6.2. Phase 2: pilot study

Pilot study was the stage that the draft questionnaire was employed on the participants. Given that the discharge days of the patients differed in different hospitals, we selected the second day after the surgery for data collection.

3.6.3. Phase 3: psychometric analysis

Psychometric Analysis comprised of 3 stages: item analysis, reliability analysis, and validity analysis.

During the first stage of item analysis, we used the methods of the different of lower-upper group means based item analysis method and the correlation based item analysis (Tezbasaran, 1997). The participants at the upper hand of the total scale scores were considered as the 'upper group' and those at the lower hand of the total scale scores were considered as the 'lower group'. For the lower and the upper groups, we conducted independent sample *t*-test for each items, starting with the first item. Items that were statistically insignificant and that had

negative results according to the t-test were excluded from the questionnaire. During the correlation-based item analysis, we calculated the corrected item-total score correlation coefficients and the Cronbach's alpha if item deleted of the PHRCS. In order to exclude an item from the questionnaire, we employed two criteria: the corrected-item total score correlation coefficient was negative and lower than 0.20; and/or Cronbach's alpha of the questionnaire increased when the item was deleted.

In stage 2, internal consistency and test re-test analyses were used for evaluating reliability. In order to assess the internal validity of the PHRCS, we used Cronbach's alpha internal validity coefficient (Erkus, 2003; Sencan, 2005; Tezbasaran, 1997). In order to evaluate test-retest reliability and consistency, we calculated the correlation coefficient by comparing the correlation between the average test and retest scores of at least 20% of the sample (Sencan, 2005). Kolcaba suggested the researchers to employ retest 10 min after the test in order to construct comfort scales since the comfort levels of the participants may change in a short period (Kolcaba, 2014). Due to this, retest was conducted nearly 10 min after the first test.

In stage 3, scope, surface, criterion and construct validity analysis were used for evaluating validity. Surface and scope validity analysis conducted by researchers in phase 1. For criterion validity GCQ was used. Evaluation was made by comparing the correlation coefficients for the scores obtained from the original GCQ and the newly developed PHRCS.

For construct validity both exploratory factor analysis and confirmatory factor analysis were used. Before the factor analysis, Kaiser-Meyer-Olkin (KMO) test was employed in order to determine whether the sample size was sufficient for factor analysis. The KMO value above 0.60 indicates that the sample size is sufficient for factor analysis (Cam & Baysan-Arabaci, 2010; Sencan, 2005).

3.7. Data analysis

Data obtained was analyzed by using the SPSS (The Statistical Package for Social Sciences) 21.0 statistical program. As descriptive statistics, number and percentage were used for numerical data and mean and standard deviation were used for variables. Regarding the items of the scale, Pearson's correlation coefficient was used for the "correlation based item analysis", and *t*-test for independent groups was used on lower and upper groups for "difference of lower-upper group means based item analysis". Cronbach's alpha coefficient and Pearson's correlation coefficient for the test-retest total scores were calculated to analyze the reliability of the scale. Pearson's correlation coefficient between the GCQ and PHRCS total scores was calculated in order to analyze construct validity.

4. Results

4.1. Sample characteristics

The descriptive data related to the participants are shown in Table 1. The mean age of 180 patients was 59.63 ± 15.73 years. %68.3 of the participants were female and %69.4 were married. Average Body-Mass Index of the participants was 27.47 ± 5.11. %90.6 of the participants stated that they lived with the family members. The percentages of the patients that underwent hip replacement surgery due to primary Osteoarthritis and femur fracture were %43.9 and %23.3, respectively. Mobilization median for post-operative period was 6. Preoperative and post-operative pain score averages were 7.93 ± 1.98 and 3.57 ± 2.39, respectively.

4.2. Instrument development

4.2.1. Phase 1 – item development

87 items that were derived from the relevant works was decreased to 43 items while preparing the draft questionnaire. Surface validity was completed during the same stage.

Expert opinion was derived two times in order to evaluate content validity. The first expert group included two academicians from the department of orthopedics and traumatology, five academicians from the department of surgical diseases nursing, two academicians from the department of internal medicine nursing, five nurses working at orthopedics and traumatology clinic, three physical therapists, one academician from the department of biostatistics and epidemiology, one psychologist and one patient that underwent hip replacement surgery, total 20 experts. 5 of the 43 items were deleted based on the opinions of the experts in the first group. The second expert group included five experts and 2 of the remaining items were excluded from the questionnaire based on the opinions of the second expert group. After content analysis, the number of items in the questionnaire was 36. Furthermore, the opinions of an expert in Turkish literature were asked and the questionnaire included 22 positive and 14 negative statements.

4.2.2. Phase 2 – implementation of the questionnaire

The sample of participants consisted of 180 patients who had hip replacement surgery. For test-retest reliability analysis; the PHRCS was applied on 44 patients (24.4%) ten minutes after the first test.

4.2.3. Phase 3-item analysis

The difference of lower-upper group means based item analysis found no statistically meaningful relationship between the results for the lower and the upper groups ($p > 0.005$). Based on the analysis, 4th ($t = -1.349$; $p = 0.181$), 19th ($t = -1.267$; $p = 0.209$) and 26th ($t = -1.982$; $p = 0.050$) items were removed from the questionnaire.

Corrected item-total score correlation coefficient based item analysis results are shown in Table 2. The analysis of Table shows that corrected item-total score correlation coefficients of the 7th (0.156), 8th (0.175), 10th (0.145), 20th (0.119), 21st (0.190), 22nd (0.190) and 27th (0.086) are below 0.20. Cronbach's alpha coefficient increased when the 7th, 20th and 27th items were deleted from the scale; it did not change when the 8th item was deleted; and Cronbach's alpha coefficient decreased when the 10th, 21st and 22nd items of the questionnaire were deleted. Based on the item-total score correlation based item analysis, we decided to delete the 7th, 8th, 10th, 20th, 21st, 22nd and 27th items from the questionnaire.

Based on the difference of lower-upper group means based item analysis and the corrected item-total score correlation coefficient based item analysis, we excluded 10 items (4th, 7th, 8th, 10th, 19th, 20th, 21st, 22nd, 26th, and 27th items). Reliability and validity analysis was conducted for the remaining 26 items.

4.3. Reliability

Cronbach's alpha for the 36 items of the PHRCS was 0.756. the Cronbach's alpha calculated after 10 items were deleted was 0.758. Table 3 shows test-retest reliability results. Average results of the 44 participants that had test-retest were 3.58 ± 0.42 for the first test, and 3.68 ± 0.49 for re-test. Correlation analysis conducted to evaluate test-retest reliability shows a meaningful positive relationship between the scores obtained from the test and retest ($r = 0.817$; $p < 0.001$).

4.4. Validity

Content analysis of the questionnaire was evaluated in the first phase. Table 4 shows the criterion validity of the PHRCS. The results show positive and meaningful relationship between the average scores obtained from the PHRCS and the GCQ ($r = 0.701$; $p < 0.001$).

While evaluating the construct validity of the PHRCS, we conducted the KMO test, that analyses whether the sample size was sufficient for factor analysis and found the value of 0.681 ($p < 0.001$). Next, we conducted explanatory factor analysis in order to evaluate construct

Table 1
The Descriptive Data Related to the Participants.

	n	%
Age (Minimum = 18, maximum = 91, mean ± SD = 59.63 ± 15.73, 1st and 3rd quarters = 48–70)		
Gender		
Female	123	68.3
Male	57	31.7
Body Mass Index (Minimum = 17.78, maximum = 44.63, mean ± SD = 27.47 ± 5.11, 1st and 3rd quarters = 23.43–30.37)		
<24.9	59	32.8
25–29.9	74	41.1
30–34.9	32	17.8
> 35	15	8.3
Marital status		
Married	125	69.4
Single	55	30.6
Living alone status		
Yes	17	9.4
No	163	90.6
The reason to have surgery		
Femur fractures	42	23.3
Primary osteoarthritis	79	43.9
Secondary osteoarthritis	58	32.2
Tumor	1	0.6
The number of mobilization[a] (Minimum = 0, Maximum = 18, Median = 6, 1st and 3rd quarters = 4–8)		
Pain score[b]		
Preoperative pain score	Minimum = 0 Maximum = 10 Mean ± SD = 7.93 ± 1.98 1st and 3rd quarters = 7–9	
Postoperative pain score	Minimum = 0 Maximum = 10 Mean ± SD = 3.57 ± 2.39 1st and 3rd quarters = 2–5	

[a] Patients' each stand up was evaluated as one mobilization during the day.
[b] It was evaluated by visual analog scale from 0 to 10.

validity. The results suggest incongruence between the factors, the three dimensions of the comfort theory (relief, ease and transcendence) and four dimensions (physical, psychospiritual, environmental and sociocultural). Consequently, we analyzed the construct validity of the factor items by using corrective factor analysis of the SPSS Amos 21.0 software. The analysis found incongruence between the factors and the planned items. Consequently, we reached to the conclusion that construct analysis of the PHRCS with the sub factors was inappropriate.

4.5. Instrument

The aim of the PHRCS, whose reliability and validity was analyzed within the scope of this research, is to determine comfort levels of the patients that undergo hip replacement surgery. The patients were asked to score each item on a 5-point Likert scale (5 = strongly agree; 1 = strongly disagree). Average score was obtained by dividing the total score to the number of items. The scale was evaluated on a single factor. Higher scores obtained from the scale indicated higher patient comfort. We used the 36-item scale for reliability and validity analysis. The final form of the questionnaire included 26 items.

5. Discussion

Maintaining and increasing the comfort levels of the patients that undergo hip replacement surgery is important. This study analyzed the reliability and validity of the PHRCS that was developed to evaluate the impact of nursing care over patient comfort during the post-operative period.

5.1. Reliability

This study used internal reliability analysis and test-retest method in order to evaluate the reliability of the questionnaire. We used Cronbach's alpha coefficient to evaluate the internal consistency (homogeneity) of the items of the scale and adopted the coefficient of 0.70 as the criteria for internal consistency (Cortina, 1993). Cronbach's alpha coefficient for the 36 items before the item analysis was 0.756 and it was 0.758 for the 26 items after the item analysis. The Cronbach's alpha that was found above the 0.70 criteria indicated the reliability of the questionnaire.

Cronbach's alpha coefficients of the original and the Turkish adaptation of the GCQ were 0.88 (Kolcaba, 1992) and 0.85 (Kuguoğlu, 2008). On the other hand, Cronbach's alpha value of the Turkish Postpartum Comfort Questionnaire and the Turkish Urinary Incontinence Comfort Scale were 0.78 and 0.94, respectively (Karakaplan & Yildiz, 2010; Zengin & Pinar, 2012). In other words, Cronbach's alpha values of the scales developed to evaluate patient comfort ranged between 0.82 and 0.94 (Dowd et al., 2000; Dowd, Kolcaba, & Steiner, 2006; Kolcaba, Dowd, Steiner, & Mitzel, 2004). Cronbach's alpha coefficient of this study resembled to those of other comfort scales.

Test-retest method is based on employing the original scale over a share of the sample under the same conditions and after a period of time. Scholars suggest the employment of the retest in a period of 2-to-6 weeks after the first test (Baysan-Arabaci & Cam, 2011; Tavsancıl, 2002). However, this long period leads to a decrease in the reliability coefficient of the scale (Sencan, 2005). The period between the two tests should be long enough that the answers do not change but short enough that the participants continue to remember their answers. Since the comfort levels of the participants may change in a short period, we decided to employ a 10-min break between the test and the retest (Kolcaba, 2014).

Test-retest correlation coefficient of this study was 0.817. Values of correlation coefficient that are close to the value of 1.00 indicate higher

Table 2
The corrected item-total score correlations based on item analysis results of PHRCS.

	Item	Scale mean score if item is deleted	Scale variance if item is deleted	Corrected item-total correlation	Cronbach's alpha if item is deleted
N = 180	Item 1	114.70	164.680	0.263	0.755
	Item 2	115.32	160.586	0.266	0.753
Number of items = 33	Item 3	115.51	158.676	0.243	0.755
	Item 5	115.89	157.190	0.256	0.754
	Item 6	115.95	155.132	0.331	0.749
Cronbach's alfa = 0.759	Item 7	116.44	160.639	**0.156**	**0.761**
	Item 8	117.29	160.265	**0.175**	**0.759**
	Item 9	115.74	158.831	0.234	0.755
	Item 10	114.53	166.384	**0.145**	**0.758**
	Item 11	115.41	160.210	0.239	0.754
	Item 12	114.98	161.614	0.255	0.754
	Item 13	114.82	163.670	0.240	0.755
	Item 14	114.69	164.247	0.242	0.755
	Item 15	117.49	161.413	0.211	0.756
	Item 16	116.54	152.093	0.406	0.744
	Item 17	116.84	155.942	0.310	0.751
	Item 18	115.77	159.197	0.319	0.751
	Item 20	116.14	163.420	**0.119**	**0.761**
	Item 21	114.92	163.614	**0.190**	**0.757**
	Item 22	117.14	161.342	**0.190**	**0.757**
	Item 23	115.61	157.726	0.312	0.751
	Item 24	115.31	158.919	0.277	0.753
	Item 25	115.24	161.549	0.262	0.754
	Item 27	114.78	166.383	**0.090**	**0.760**
	Item 28	115.34	156.562	0.434	0.746
	Item 29	114.92	160.597	0.370	0.750
	Item 30	117.22	158.531	0.238	0.755
	Item 31	117.01	159.207	0.251	0.754
	Item 32	116.12	154.644	0.403	0.746
	Item 33	115.36	158.880	0.302	0.751
	Item 34	116.04	158.210	0.228	0.756
	Item 35	116.76	158.085	0.286	0.752
	Item 36	115.12	157.165	0.437	0.746

Table 3
Comparison of test-retest results.

	n	Mean ± SD	p	r[a]
Test	44	3.58 ± 0.42	$^{<}$0.001	0.817
Retest	44	3.68 ± 0.49		

[a] Pearson's correlation coefficient.

reliability. Test-retest correlation coefficient of the Turkish Urinary Incontinence Comfort Scale was 0.71. Given that the test-retest correlation of our questionnaire was relatively high, the PHRCS has yielded consistent outcomes and has ensured the test-retest reliability.

5.2. Validity

We used expert opinions of Law she technique in order to evaluate content validity. Five and two of the items were deleted from the scale based on the first and the second expert opinions, respectively. Consequently, content validity was analyzed on the scale that consisted of 36 items.

Face validity, which is also named as "logical validity", is firstly analyzed by the researcher (Sencan, 2005). We made necessary corrections based on the suggestions made by the experts. Consequently, we maintained face validity of the PHRCS.

There are different suggestions about the correlation analysis on criterion validity. Although some researchers suggest that higher correlation coefficients indicate higher congruence (Tavsancıl, 2002), other suggest that the value should not be lower than 0.30 (Sencan, 2005). In this study, we adopted the value of 0.30 as the criteria of correlation coefficient for criterion validity. The correlation analysis indicates a positive meaningful relationship between the PHRCS and theGCQ results ($r = 0.701$; $p^{<} 0.001$). Alpar (2012) states that a correlation between 0.70 and 0.79 indicates high relationship. In this sense, the criterion validity of our scale is consistent with the findings in the literature.

We conducted construct validity analysis in order to evaluate the qualities that the PHRCS measures (Alpar, 2012; Sencan, 2005). We employed factor analysis in order to realize this aim. The KMO test results show that the sample size is adequate for factor analysis. The descriptive and corrective factor analyses that were conducted in order to determine the constructs that constitute the scale found that the sub factors did not maintain the item correlations. Due to this, we found that the subfactors of the PHRCS did not have construct validity. Since the literature suggests that the concept of comfort should be considered as a whole (Kolcaba, Tilton, & Drouin, 2006), we reached to the conclusion that the results for scale evaluation should be evaluated as a whole.

5.3. Limitations

One of the limitations of this study is related with the fact that the PHRCS that was developed within the scope of this study was related with the post-operative conformity of the patients that underwent only total or partial hip replacement surgery. The other limitation is that the second post-operative day was taken as the reference point for the development of this questionnaire. Consequently, no comfort evaluation was conducted in other days.

6. Conclusion

The PHRCS, which was developed to evaluate comfort of the patients, especially by the nurses, during the post-hip replacement surgery period, was a reliable and valid scale. Consequently, our scale may be used to evaluate comfort levels of the patients that undergo hip replacement surgery. Higher scores obtained from the scale that consisted of 26 items indicated higher patient comfort. Further research in other languages that evaluates the validity and reliability of the PHRCS may be conducted. Furthermore, similar studies may be conducted on different samples in other days of the post-operative period in order to enhance the reliability and validity of this scale. We suggest that further research that takes the developments in technology and social and cultural change should be conducted in order to confirm the validity and reliability of our scale.

Table 4
Compliance analysis results between the mean scores of GCQ and PHRCS (N = 180).

	The average score of general comfort questionnaire (0–4) (2.97 ± 0.30)
The average score of post hip replacement comfort scale (0–5) (3.64 ± 0.43)	N = 180 r = 0.701[a] $p^{<} 0.001$

[a] Pearson's correlation coefficient.

6.1. Relevance to clinical practice

Evaluation of patient comfort after hip replacement surgery is highly important in order to plan post-surgery patient care. There is no standard objective measurement tool in order to evaluate patient comfort after hip replacement surgery. The scale developed by these researchers may meet the demand for evaluating the quality of patient care and the patient comfort after hip replacement surgery.

The developed PHRCS is a valid and reliable instrument. The PHRCS can be used to evaluate comfort after hip replacement surgery. The instrument is useful for examining the effects of nursing interventions on patients' comfort. The instrument should be further tested in populations with different cultural backgrounds.

Acknowledgements

The authors thank the personnel and patients for helping.

Declaration of conflicting interests

The authors declare that there is no conflict of interest.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Contributions

HSK, ST contributed to study design. HSK, as the primary investigator contributed to data collection. HSK performed the data analysis. Manuscript was written by the HSK and ST and edited by the ST.

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