Original Article

Validity and Reliability Testing of the Turkish Version of the "Scale of Perception of Nursing Activities That Contribute to Nursing Care Quality (EPAECQC)"

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Abstract

Background: Measuring nurses' awareness of healthcare quality is another approach that has come to the fore in recent years. A survey of literature does not provide any research that focuses on the assessment of healthcare services from the perspective of nurses in Turkey.
Aim: The aim of this study is to test the validity and reliability of the Turkish version of the "(EPAECQC)", developed by Martins et al., in Portugal in 2006.
Method: The sample of this study consisted of 211 nurses employed in the Education and Research Hospital, Faculty of Medicine, Eskisehir Osmangazi University. The English version of the "Scale of Perception of Nursing Activities That Contribute to Nursing Care Quality (EPAECQC)" was translated into Turkish and then back translated. Confirmatory factor analysis was conducted on LISREL to test validity. Internal consistency based on Cronbach's α and item-total correlations was used to test reliability. The scale comprises 25 items and
seven sub-dimensions. Item scores are based on a four-point Likert-type scale.
Results: The study was conducted with 211 nurses working in Hospital of Eskisehir Osmangazi University. The nurses' average age was 28.31 ± 6.12. In the sample, 167 nurses (79.1%) were female, and 113 nurses (53.6%) held an undergraduate degree. Item-total correlations were higher than 0.30, and alpha reliability coefficients of sub-factors varied from 0.716 to 0.894. This study also calculated fit indices of the 25-item model developed to measure nursing care quality. The results are as follows: $x_2/sd=334.35/209=1.59$; $p<0.01$, root mean square error of approximation (RMSEA)=0.053; standardized root mean square (S-RMR)=0.05; comparative fit index (CFI)=0.98.
Conclusion: As a result, the Turkish version of the EPAECQC is of acceptable psychometric quality. The Turkish version of the scale is a valid and reliable instrument that can be used to measure the perceptions of Nurses

Key Words: Nursing Care, Quality, Validity, Reliability, Healthcare

Introduction

Quality is a subjective concept whose definition differs from one person to another and over time, based on sociocultural differences, beliefs, attitudes and behaviors (Donmez & Ozbayir, 2011). The International Organization for Standardization (ISO) defines quality as the "degree to which a set of inherent characteristics fulfils requirements". The Joint Commission on Accreditation of Healthcare Organizations in the United States defines quality as the degree to which desirable outcomes are increased and undesirable outcomes are reduced through healthcare (ISO Quality Assurance Systems, 2014; Sandlin, 2000).

Delivery of high-quality healthcare is ensuring the sustainability of care services by protecting health with the cooperation of a multidisciplinary team, ensuring early diagnosis and treatment to the extent possible, adhering to scientific principles and taking advantage of appropriate modern technologies and resources. That is why nursing care alone cannot be an indicator of quality (Donmez & Ozbayir, 2011; Martins et al., 2016; Freitas et al.,2014). The American Nurses Association (ANA) interprets quality as the sum of activities involved in the best practice of nursing care for patients (Erefe, 2005).

Nursing care, as a part of complex institutions, has to overcome certain challenges regarding quality assurance in healthcare in order to meet effectively the needs of service users within and out of the institution.

Today, raising awareness for the delivery of high-quality healthcare services is no more considered an isolated attempt, but a technical and social obligation due to the increase in the demand for healthcare services. The costs of healthcare services have also been on the rise. Furthermore, limited resources and users' demands related to rights are increasing. Healthcare professionals must demand environments where they can take effective and ethical responsibilities and offer solutions to problems in the most appropriate way (Yuri & Tronchin, 2010).

Professional associations in the healthcare sector play a critical role in defining quality standards for each field characterized by social requirements of the profession. Such standards represent the global performance required in nursing care services. The standards may be concrete or abstract, general or specific, but are always outcome-oriented. They provide parameters for the assessment of service quality, as a point of reference for the evaluation of nurses' performance (Martins et al., 2016).

The National Quality Forum (NQF) and the ANA specified the criteria with regard to care quality. These criteria are related to, for example, pressure ulcers, falls, urinary catheter for patients in special units, smoking cessation for patients with pneumonia and acute myocardial infarction, nosocomial infections, prevention of negligence, pain management, psychosocial interaction, patient satisfaction, consistent communication, prevention of cardiovascular diseases, and nursing care hours for each day and each patient (Erefe,2005; Mantolva,2007). Previous studies present two different approaches to the assessment of nursing care services. One of them is the determination of care standards, and assessment and control of practices, and the other one is patient satisfaction with nursing care (Donmez & Ozbayir, 2011; Karaca,2015). Measuring nurses' awareness of quality nursing care is another approach that has come to the fore in recent years.

Healthcare professionals play a primary and crucial role in the quality of healthcare services. There are two aspects of quality in healthcare institutions, i.e. the technical (scientific) aspect and the art of practice. Healthcare services delivered by professionals without scientific knowledge and competence are unlikely to lead to progress in patients' health. On the other hand, healthcare professionals' attitudes and behaviors, as indicators of quality, are significant factors that affect patient satisfaction (Donmez & Ozbayir, 2011). A survey of literature suggests that the number of studies that assess the quality of nursing care from the perspective of nurses is limited. The limited number of studies revealed that the data collected to find out nurses' perception of healthcare services are of particular importance (Yuri & Tronchin, 2010; Martins et al., 2016). Programs and procedures implemented to promote quality necessitate changes in services. This requires dedication and determination from nurses. This study intends to evaluate how

nurses perceive, interpret, and make sense of the quality of nursing services they deliver.

Aim of the Study

Hogston (1995) links quality nursing care to the level of experience, and the knowledge, skills and competence required for flawless patient care. Leino-Kilpi (1996) defines quality nursing care as the degree of excellence in meeting psychological, mental, social, physical and environmental needs of patients. Williams (1998) holds that quality nursing care is a type of care with therapeutic effects, comprising of physical and psychological factors (Adams,2014; Burhans,2010). Kunaviktikul et al. (2015) defines quality nursing care based on parameters such as meeting physical, emotional, social and psychological needs of patients. In another study, quality care is defined in terms of empathetic response to healthcare delivery and patient needs to support their healing process (Adams & Iseler, 2014; Burhans & Alligood, 2010).

Nursing care is a service that each and every individual has already needed or is likely to need in a further stage of life. Care provision, a part of general healthcare services, is mainly incumbent upon nurses. That is why, in order to provide quality nursing care, nurses are required to be equipped with necessary knowledge and skills, develop awareness of humanistic and moral aspects of healthcare, be willing to improve their professional competence continuously, and comply with professional ethics in the delivery of healthcare (Dinc, 2010).

This study intends to analyze and test the reliability, validity and practicability of the Turkish version of the "Scale of Perception of Nursing Activities That Contribute to Nursing Care Quality (EPAECQC)", developed by Martins et al. in Portugal in 2014 and 2016 in order to measure nurses' perception of activities that contribute to the quality of care services.

Methodological Approach

This is a cross-sectional, descriptive and methodological research that aims to test the reliability and validity of the Turkish version of the "Scale of Perception of Nursing Activities That Contribute to Nursing Care Quality (EPAECQC)". The study was conducted in the Faculty of Medicine Hospital of Eskisehir Osmangazi University, Turkey, in August-September 2017.

The population of the study comprises nurses working in a university hospital in Eskisehir (n=550). The initial aim of the study was to reach all members of the population without selecting a sample. The research data were collected from nurses that participated in the study on a voluntary basis (n=211).

Data-Collecting Instruments: For the purpose of this study, the "Scale of Perception of Nursing Activities That Contribute to Nursing Care Quality (EPAECQC)", developed by Martins et al.[4] in 2014 and 2016 in order to determine the quality of healthcare services delivered by nurses, was used. The scale consisting of 25 questions is divided into seven dimensions: "patient satisfaction", "health promotion", "prevention of complications", "well-being and self-care", "functional readaptation", "nursing care organization", and "responsibility and rigor". The items were scored from 1 (never) to 4 (always), based on the four-point Likert-type scale. In this study, the scale was adapted into Turkish, and tested for validity and reliability. The researchers contacted the scale developers to get permission for adaptation, and to request analysis notes with regard to evaluation of the scale.

Personal Information Form: The form consists of six questions that seek socio-demographic and employment information about the participants, i.e. age, gender, marital status, level of education, length of experience, and the unit in which they are employed.

Cultural adaptation of the scale, and validity and reliability: After the cultural adaptation was completed and the scale took its final form in the Turkish language, data-collecting process started. Data were collected from nurses in face-to-face interviews. In the case that nurses demanded to complete the form on their own, they were informed about the form thoroughly and asked to fill out the form completely. The efforts related to cultural adaptation of the scale focused on achieving the closest meaning in the original version. Cultural adaptation is not limited to translation. It also includes finding the cultural equivalent, in the target language, of what concepts represent in the source language.

The four-stage process introduced by Hui and Triandis has been known to be the most acceptable model for ensuring the intercultural equivalence of scales (Guillemin et al.,1993). In

this model, each stage is a prerequisite for the succeeding one.

1-Conceptual/functional equivalence is a must in adaptation. Semantic equivalence does not guarantee cultural appropriateness given that sentences literally translated may not refer to same concepts in the source and the target culture. 2-Equivalence in construct operationalization 3-Question/item equivalence 4-Metric (scalar) equivalence.

In general terms, cultural adaptation consists of two stages: translation, and assessment of the scale with the use of psychometric tests. The condition on which all researchers engaged in cultural adaptation agree is ensuring the conceptual equivalence (Bullinger & Ravens-Sieberer, 1995).

Techniques used in data analysis and evaluation: For cultural adaptation and validity and reliability testing of the "Scale of Perception of Nursing Activities That Contribute to Nursing Care Quality (EPAECQC)", the steps defined in internationally acknowledged methods were followed (Norman et.al,2010; Ryan et.al,2010; Guillemin et al.,1993; Beaton et al.,2002). The adaptation into Turkish consisted of the following stages:

1- After receiving permission from Matins et al., who developed the original scale, the researchers got approval from the Ethics Board for Noninvasive Research, ESOGU Faculty of Medicine Hospital.

2- The English text was translated into Turkish by two people independently.

3- Two translations into Turkish were discussed and merged into a single instrument by a committee under the supervision of a physician who has a good command of English.

4- A bilingual translator (a translator who is able to use English and Turkish languages equally well) was asked to back translate the instrument into English, i.e. the source language of the scale.

5- A specialized working group compared the back translation with the English original, and conducted a cognitive-conceptual inquiry on the Turkish version of the scale.

6- A pilot study was conducted on a group of nurses with the Turkish version of the scale. As a result of this, conceptual equivalence was reconsidered, each recommendation regarding item construction was taken into account, and revisions were made on Turkish wording to give the scale its final form.

7- The scale was administered to the sample consisting of nurses.

8- The data collected were analyzed.

9- Validity and reliability were tested with the use of appropriate statistical methods.

SPSS (Statistical Package for Social Sciences) (SPSS 20.0, SPSS, Chicago, IL) and Sigma SAT 3.5 were used for the statistical data analyses. P-values less than 0.05 (two-way) were reported as statistically significant. Kruskal-Wallis Analysis of Variance was conducted to find out whether the data showed normal distribution in the comparison of more than two groups.

LISREL software model was used to carry out confirmatory factor analyses to test structural equivalence model, which indirectly provides evidence for the reliability of items and the scale. LISREL 8.72 was used to conduct confirmatory factor analyses and to construct the models (Crowley & Fan , 1997; Norman et.al, 2010).

Confirmatory factor analysis is generally shown in path diagrams where hypothetical constructs are defined as latent variables (factors). It consists of two components: measurement model and structural equation model. The measurement model defines which hypothetical constructs or factors are measured by observed variables, and plus the validity and reliability of these measurements. The structural equation model defines direct and indirect relationships between hypothetical constructs, and shows the amount of explained and unexplained variance.

One of the significant advantages of confirmatory factor analysis is that it suggests different types of fit indices for evaluating to which extent a theoretically defined model fits the data. In the present study, confirmatory factor analysis was used, and structural equation models were constructed.

Research Ethics

Ethical considerations This study was approved by the clinical research ethics committee (9 August 2017 No:80558721/G-235).

Informed consent was obtained from the participating nurses before data collection. The

study participants were given written information explaining the aims, procedures, and benefits of the study.

Results

Socio-demographic Data Related to the Participants

The socio-demographic data related to the participants of this study are presented in Table 1. In the sample, 41.7% of the nurses were aged between 26 and 32 (n: 88), 79.1% were female (n: 167), 61.6% were married (n: 130), and 53.6% were undergraduate degree holders (n: 113). The data further suggest that 54% of the nurses had 1 to 5 years of experience (n: 114), and 62.1% were working in internal medicine departments (n: 131).

Validity of the "Scale of Perception of Nursing Activities That Contribute to Nursing Care Quality"

The validity of the scale was based on language, content and construct validity.After the items were translated into Turkish, the scale was presented to five experts to be evaluated for **content validity**. The experts were asked to evaluate the comprehensibility and relevance of items. The wording in some items was amended according to their recommendations, but no items were excluded from the scale.

Confirmatory factor analysis was conducted to test the **construct validity** of the "Scale of Perception of Nursing Activities That Contribute to Nursing Care Quality - (EPAECQC)", consisting of seven dimensions. The confirmatory factor analysis of the 25-item scale yielded the following values of factor loading (*Lambda)*, multiple correlation (R^2, referring to the strength of the relationship between each item and latent variables), and *t* (referring to the significance of the relationship) (See Table 2).

Validity and Reliability Testing by Confirmatory Factor Analysis

Confirmatory factor analysis was conducted to confirm the factors in the original form of the scale with regard to content validity. As a result of this, no items were removed from the scale, and the original form of the scale was maintained (see Figure 1).

In the confirmatory factor analysis, t values of 25 items were statistically significant ($p<0.05$). (see Table 2)

This study also calculates the fit indices of the 25-item scale developed to measure the quality of nursing care. The results are as follows: chi-square statistics $x^2/sd=334.35/209=1.59$; $p<0.01$, root mean square error of approximation (RMSEA)=0.053; standardized root mean square (S-RMR)=0.05; comparative fit index (CFI)=0.98.

The fit index and values suggest that the present form of the scale fits the data. The other values that refer to goodness of fit indices for the factor construct of items were as follows: x^2/sd: 334.35/209=1.59; GFI: 0.83; NFI: 0.96; NNFI: 0.97; RFI: 0.96; RMSEA: 0.053. In the confirmatory factor analysis, the path diagram shows that the model fit was ensured. The factor loading related to the model and the path graphics of items were within the desirable range (See Figure 1).

Reliability and Item Analyses of the "Scale of Perception of Nursing Activities That Contribute to Nursing Care Quality"

The total correlations of items and the Cronbach's alpha internal consistency coefficients of factors were calculated in order to test the reliability of dimensions confirmed in the confirmatory factor analysis. The testing included the evaluation of mean scores of items, total and mean scores of factors, and standard deviation.

The Cronbach's alpha internal consistency coefficient of the scale, as a whole, was 0.956, which is interpreted as an indicator of high reliability. The alpha coefficients of each dimension as well as item-total correlations are presented in Table 3.

Item-total correlations were higher than 0.30, and alpha reliability coefficients of sub-factors varied from 0.716 to 0.894. Reliability coefficients of sub-factors were also high. The analyses reveal that item-total correlations of the scale as a whole and sub-dimensions were high, and that there was no need to exclude any items from the scale. The mean scores of sub-dimensions in the "Scale of Perception of Nursing Activities That Contribute to Nursing Care Quality" are close to each other. The minimum value that a sub-dimension could take is 1, and the maximum is 4. High mean scores suggest that nurses have developed high awareness of the quality of care services. (See Table-4)

Table-1: ***Distribution of Mean Scores in The "Scale of Perception of Nursing Activities That Contribute to Nursing Care Quality" by Nurses' Socio-Demographic Data (N=211)***

Variables	Nurses (*N* = 211)	
	n	%
Gender		
Women	167	79.1
Men	44	20.9
Age		
19-25	23	9.1
26-32	10	4.0
33-39	34	13.5
40 and over	35	13.9
Age(years; *M±SD*)	28.31±6.12	
Length of experience (years; *M±SD*)	6.5 ± 4.8	
Length of experience		
1-5 years	114	54.0
6-10 years	61	29.9
11-15 years	28	13.3
Over 16 years	8	3.8
Marital Status		
Married	81	38.4
Single	130	61.6
Level of Education		
Vocational High School of Health	63	10.5
Associate Degree	19	25.1
Undergraduate Degree	113	61.9
Graduate Degree	16	7.6
Workplace		
Internal Medicine	131	62.1
Surgical Medicine	54	25.6
Intensive Care Unit	26	12.3

Table 2: ***Factor Loading (Lambda), Multiple Correlation (R^2) and T Values of Items in The "Scale of Perception of Nursing Activities That Contribute to Nursing Care Quality"***

Dimensions	No	Estimated value (lambda)	*t*	R^2
Patient satisfaction	Q1	0.90	19.24	0.82
	Q2	0.92	19.81	0.85
	Q3	0.78	14.26	0.61
Health promotion	Q4	0.74	14.17	0.54
	Q5	0.79	13.77	0.63
	Q6	0.79	13.76	0.62
Prevention of complications	Q7	0.79	14.1	0.62
	Q8	0.81	14.42	0.65
	Q9	0.78	13.81	0.60
Well-being and self-care	Q14	0.77	14.37	0.59
	Q15	0.65	10.72	0.42
	Q16	0.61	11.89	0.37
	Q18	0.76	13.11	0.58
Functional readaptation	Q20	0.82	14.75	0.68
	Q21	0.82	15.04	0.67
	Q22	0.82	15.3	0.67
Nursing care organization	Q23	0.76	11.82	0.57
	Q24	0.82	13.13	0.66
	Q25	0.77	14.1	0.59
Responsibility and rigor	Q10	0.67	10.92	0.45
	Q17	0.67	11.25	0.45
	Q11	0.72	12.59	0.52
	Q12	0.75	14.01	0.56

Figure 1. Path diagram of the "Scale of Perception of Nursing Activities That Contribute to Nursing Care Quality"

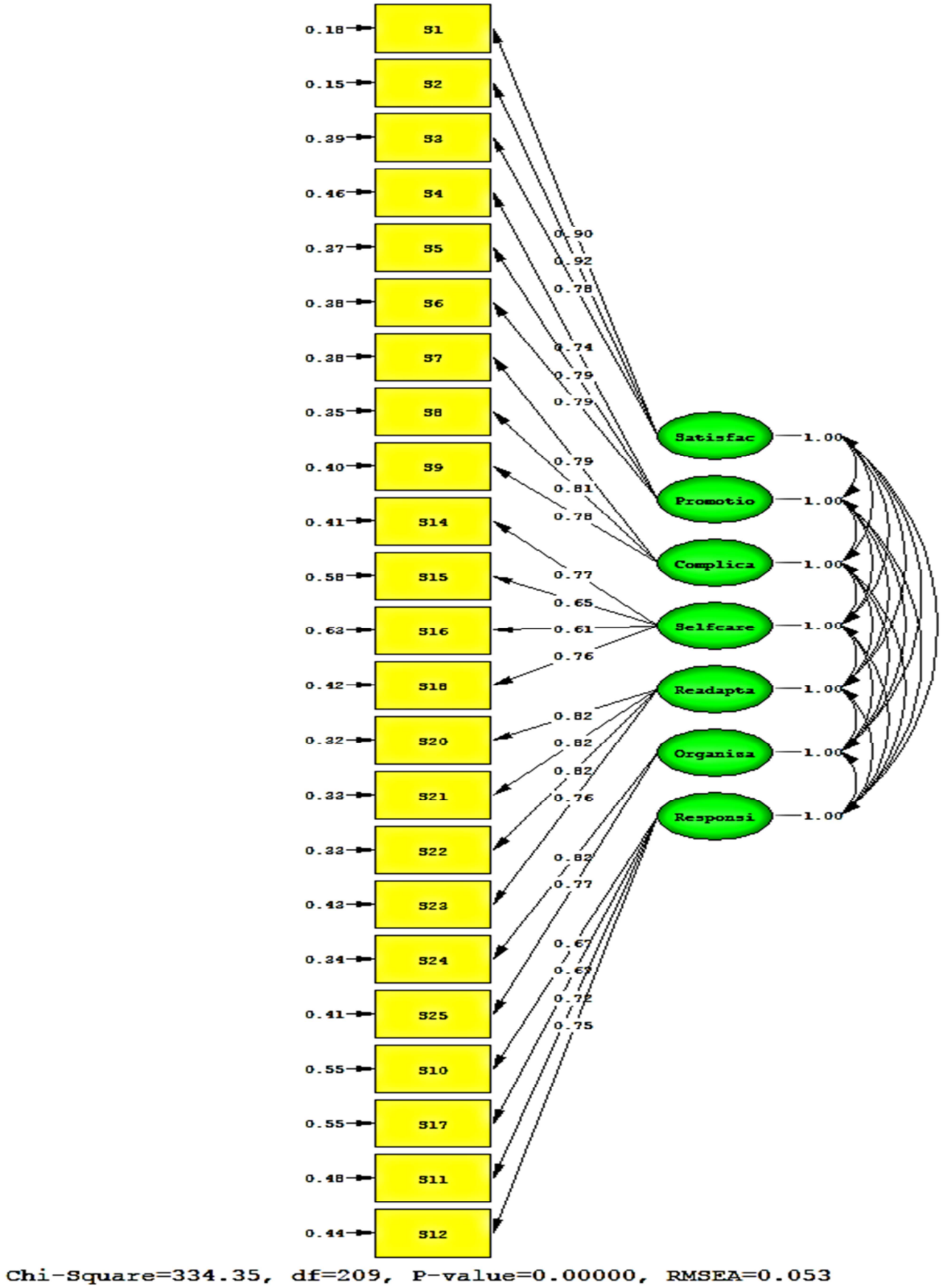

Table 3: ***Alpha Coefficients of Dimensions and Item-Total Correlations***

Dimensions		Item-Total Correlation	Cronbach's Alpha Coefficient (Adaptation)	Cronbach's Alpha Coefficient (Original Scale)
Patient satisfaction	Q1	.817	0.894	0.744
	Q2	.845		
	Q3	.728		
Health promotion	Q4	.662	0.818	0.740
	Q5	.723		
	Q6	.636		
Prevention of complications	Q7	.643	0.828	0.779
	Q8	.738		
	Q9	.681		
Well-being and self-care	Q14	.750	0.892	0.862
	Q15	.767		
	Q16	.786		
	Q18	.688		
Functional readaptation	Q20	.543	0.781	0.830
	Q21	.533		
	Q 2	.645		
Nursing care organization	Q23	.631	0.716	0.684
	Q24	.567		
	Q25	.567		
Responsibility and rigor	Q10	.619	0.774	0.855
	Q11	.601		
	Q12	.499		
	Q17	.595		
Total			0.956	0.940

Table 4 ***Mean Scores and Standard Deviations of the Scale and Dimensions***

Dimensions	Total Group (N= 211)
Patient satisfaction	3.29(.491)
Health promotion	3.29(.661)
Prevention of complications	3.33(.588)
Well-being and self-care	3.32(.593)
Functional readaptation	3.30(.545)
Nursing care organization	3.33(.629)
Responsibility and rigor	3.29(.551)
Total	3.29(.491)

Study Limitations

The most significant limitation in this validity and reliability testing is that the study was carried out in only one healthcare institution. The data were collected in summer. The rate of participation was 41.29% as the staff were on leave for summer break.

Discussion

Definitions of quality vary by nurses' point of view. Previous research has shown that nurses' perception of quality is related to environmental and cultural effects, and generally depends on the institutional context. It is essential to develop a correct and institution-specific definition of quality (Ryan et.al, 2016). The findings suggest that, in their practices, nurses generally adopt the definition of quality used in the institution in which they work.

Scholars have adopted different approaches to the adaptation of scales developed in a different culture. Some adopt a positive approach to adaptation while others are more critical of adapted scales. It is also emphasized in the literature that scales developed in different cultures can measure a number of international concepts as well as allow intercultural comparison and discussion (Guillemin, 1993).

The researchers followed the stages included in internationally acknowledged methods for the adaptation and reliability and validity testing of the scale in this study (Guillemin et al.,1993; Beaton et al.,2002; Acquadro et al.,2008; Bentzen et al.,1998; Ware et al.,1997).

The literature presents limited studies on nursing care where scales that measure nurses' perceptions are used. These limited number of studies present the following reliability results: the Cronbach's alpha coefficient was 0.71 in "Quality of Nursing Care Questionnaire–Head Nurse"(Mryyan et al.,2006), developed by Mryyan et al. in Jordan in 2006; 0.84 in "Perception of Quality Nursing Care Scale" (Zhoa et al., 2008), developed by Zhoa et al. in China in 2008; 0.73 in "Unmet Nursing Care Needs" (Lucero et al.,2009) conducted by Lucero et al. in the US in 2009; 0.90 in the scale developed by Starc & Erjavec in Slovenia in 2017 ; and 0.92-0.94 in "Nurses' Perception Quality Of Nursing Care" (Nantsupawat et al.,2011), developed by Nantsupawat et al. in Thailand in 2011. The original version of the "Scale of Perception of Nursing Activities That Contribute to Nursing Care Quality" had a high internal consistency with Cronbach's alpha coefficient of 0.94.(Martins et al.,2016) The Cronbach's alpha coefficient is calculated to be 0.95 in the Turkish version of the scale. It is suggested in the literature that the Cronbach's alpha is over 0.70 in order for a measurement tool to be internally consistent (Norman et al.,2010; Nantsupawat et al.,2011; Hinkin et al.,1997). In the present study, the Cronbach's alpha of all sub-dimensions were over this value, assuring that the scale is a valid and reliable tool. The study proved to be compatible with similar studies (Martin et al.,2016).

The mean scores in the scale suggest that the majority of nurses carry out healthcare activities in line with quality standards. Their expectations from nursing care also point to high standards. The results indicate that the "prevention of complications" and "healthcare organization" dimensions are slightly more important than other dimensions from the perspective of nurses. It would be interesting to refer to a study published in 2017, using this scale, in a sample of 3451 Portuguese nurses, where the dimensions "prevention of complications" and "responsibility and rigor" were the most important (Ribeiro et al.,2017). The application of the original scale showed that the majority of nurses in Portugal were female (83.5%), and their average age was 38.5. In the present study, 79.1% of the nurses were female, and the average age was 28.31±6.16. Compared to the age profile of nurses in similar studies related to nursing care, the sample of this study consisted of a younger group of nurses (Martins et al.,2016; Yuri & Tronchin, 2010).

Conclusion

The administration of the Turkish version of "Scale of Perception of Nursing Activities That Contribute to Nursing Care Quality - (EPAECQC)" proved that the scale is a valid and reliable measurement tool. The findings indicating a high value of internal consistency show that the Turkish version of the scale fulfills the criteria of psychometric validity. The Turkish version of the EPAECQC is a promising tool to measure nurses' perception of nursing activities that contribute to nursing care quality. It may be used in other context related to nursing practices.

It is essential to conduct further studies with different samples. Further studies in which this

scale is used will contribute to strengthening its measuring capacity.

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