Validity and Reliability of the Turkish Version of the Instrument of the Quality of Nursing Doctoral Education

Hemşirelikte Doktora Eğitiminin Kalitesi Ölçeği'nin Türkçe Formunun Geçerlik, Güvenilirliğinin İncelenmesi

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ABSTRACT

The aim of this study is to determine the validity and reliability of the Turkish version of the Quality of Doctoral Education in Nursing (QNDE) scale. The lack of a measurement tool examining the quality of doctoral education in nursing in a national context is the reason for this study. Data were collected from 55 teaching staff and 225 doctorate students. Explanatory and confirmatory factor analyzes were used for test validity. Cronbach's α coefficient of reliability, independent-sample t test, and test-retest analysis were calculated to test Reliability. The factor loads ranged between 0.51-0.91.The construct validity was good ($\chi2/df$ =3.02; RMSEA = 0.085; CFI = 0.87; NFI = 0.90; GFI = 0.79; TLI = 0.90; IFI =0.91; p < 0.001). The Cronbach alpha value of the scale was 0.94. The results of this study show that the Turkish version of the Quality of Nursing Doctoral Education instrument is a valid and reliable tool.

Keywords: Validation, Reliability, Nurses, Nursing doctoral education, Quality

ÖZ

Bu çalışmanın amacı Hemşirelikte Doktora Eğitiminin Kalitesi (QNDE) ölçeğinin Türkçe formunun geçerlilik ve güvenilirliğini belirlemektir. Ulusal bağlamda hemşirelikte doktora eğitiminin kalitesini inceleyen bir ölçüm aracının olmaması bu çalışmanın gerekçesidir. Veriler 55 öğretim üyesi ve 225 doktora öğrencisinden toplanmıştır. Geçerlilik analizleri için açıklayıcı ve doğrulayıcı faktör analizleri kullanılmıştır. Güvenilirliği test etmek için Cronbach's α güvenilirlik katsayısı, bağımsız-örnek t testi ve test-tekrar test analizi yapılmıştır. Ölçeğin faktör yükleri 0.51-0.91 arasında değişmektedir. Uyum indeksleri değerleri kapsam geçerliliği için uygun kriterler arasında bulunmuştur ($\chi2/df$ =3.02; RMSEA = 0.085; CFI = 0.87; NFI = 0.90; GFI = 0.79; TLI = 0.90; IFI =0.91; p < 0.001). Cronbach alfa katsayısı 0.94'tür. Bu sonuçlar, Hemşirelik Doktora Eğitiminin Kalitesi ölçeğinin Türkçe formunun geçerli ve güvenilir bir araç olduğunu göstermektedir.

Anahtar Sözcükler: Geçerlilik, Güvenilirlik, Hemşire, Hemşirelik doktora eğitimi, Kalite

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INTRODUCTION

Postgraduate education forms the basis for creating new scientists and determining scientific policies,and is a stage in the production and dissemination of knowledge (Karadag & Ozdemir, 2017; Karaman & Bakırcı, 2010). In Turkey as in the rest of the world, postgraduate and doctorate education are becoming more widespread. According to a report of the Organization for Economic Cooperation and Development (OECD), the number of people graduating from doctorate programs in OECD countries in 2019 was 276 800, with 71 000 in the United States. According to this report, Turkey came 27th among countries granting doctorates (OECD, 2019). The number of students registered in doctorate programs in Turkey is currently 96 199 (Council of Higher Education, 2020).

The mission of doctorate education in nursing is to train researchers with the capacity for criticism and reflection to develop scientific knowledge relating to nursing (Bullin, 2018). Doctorate education develops in the student not only the knowledge of how to conduct good-quality research, but also the skills to carry out institutional, clinical, managerial, educational and social services (Sibanzade & Scafide, 2018). At the same time, doctorate programs have functions such as the identification of social and economic needs, developing health-related policies, using new technologies in patient care, and implementing innovative ideas (Kim, McKenna & Ketefian, 2006). Another aim of doctorate education is to train nurses to take up positions as educators in nursing schools, and leadership positions in implementation and management (Beeber, Palmer, Waldrop, Lynn & Jones, 2019). In order to achieve these objectives and to be able to present good quality education, doctorate programs must be adequate in quantity and quality of sources, advisers and students with regard to having clear policies on education, defining the aims and expectations of the program, and accommodating what is expected from the program to the activities that take place during the course of the program (Bahar & Aydogdu, 2019; Karadag & Ozdemir, 2017).

One of the topics which has gained importance as a result of factors such as globalization and the Bologna Process is quality in doctorate education programs (Bao, Kehm & Ma, 2018; Kim et al., 2015). At an international level, work on the quality of doctorate education in nursing is conducted by the International Network for Doctoral Education in Nursing (INDEN). Under the work conducted by INDEN, a guide has been developed for Quality of Doctoral Education in Nursing. In the guide, the main criteria for quality of doctoral education are stated as "quality of mission, teaching staff, students, curriculum, program management and sources" (Kim et al., 2006). In Turkey, attention has recently started to be paid to quality studies and evaluation. Thus, internal and external quality evaluation is being carried out in universities by the Higher Education Quality Council (Turkish Higher Education Quality Council, 2020). However, quality measurement and accreditation work has not yet been implemented for the quality evaluation of masters and doctorate programs in institutions of higher education.

Good quality postgraduate education is of vital importance, especially for underdeveloped and developing countries. For this reason, postgraduate education must be accorded the importance it needs and problems in this area must be solved (Lim, 2018). Quality measurement and accreditation must be carried out in institutions giving postgraduate education, infrastructure must be improved, there should be an adequate number of well-equipped staff, and the quality of postgraduate education should be raised (Karaman & Bakırcı, 2010; Lim, 2018). The needs of the student within the educational process, their expectations and their views directs their success. Therefore, evaluation from the point of view of the students is just as important as from that of those preparing and running the program (Kapucu & Bulut, 2018; Kim et al., 2015).

Examining studies conducted on the effectiveness of postgraduate education programs in the literature, it is seen that there is uncertainty in the aims of postgraduate education, there are problems of communication between students and counsellors, the necessary qualities for teaching staff acting as thesis supervisors in the doctorate process and for students about to begin doctorate studies have not been clearly stated, lesson programs are very heavy and there have been difficulties with conducting them alongside working life, and the measurement evaluation process has not been conducted in a sound fashion (Arimoto, Gregg, Nagata, Miki & Murashima, 2012; Bao et al., 2018; Bullin, 2018). Also, it is known that inadequacy of university sources and staff lower the quality of doctorate education (Arimoto et al., 2012; Kim et al., 2010). Recently particularly, although the number of doctorate students has risen, the inadequate numbers of teaching staff may have prevented teaching staff from mentoring students and devoting time to them (Miki, 2012). Kapucu & Bulut (2018) examined the views of government university students on the quality of doctorate education in nursing. The students stated that they experienced time pressure because of the amount of work, and various difficulties because of the negative attitudes of their advisors. At the same time, they stated that they thought while doctorate education was helping them to gain professional skills such as planning and conducting research and thinking critically, it made no contribution to their intellectual development.

There is quantitative data in studies which have been conducted concerning the quality of doctorate programs, but there is no evidence of systematic evaluation of doctorate programs in nursing with regard to students, graduates, program content, teaching staff, and sources. In addition, an examination of the literature on the topic in Turkey shows no valid and reliable measurement instrument developed to determine doctorate education quality.

Aim

This study was conducted with the aim of examining the validity and reliability of the Turkish form of the Quality of Doctoral Education in Nursing Scale.

METHODS

Participants

This study used a methodological research design. The research was conducted at four universities in the provinces of western region of Turkey between February and June 2019 with teaching staff who were nurses and teaching in the nursing doctorate program and acting as thesis advisors, and with nursing students who were currently receiving doctorate education. It is recommended that in methodological studies, the sample size in testing the validity and reliability of measurement instruments should be at least between five and ten times the number of variables (items) (Tavsancıl, 2019). The Quality of Doctoral Education in Nursing Scale consists of 43 items. The present study was conducted with 55 teaching staff and 225 doctorate students. Thus, a sample of 280 for analysis was determined to have adequate power to detect effects. The purposive sampling method was used in determining participants, and the following criteria were considered in including participants in the study.

For teaching staff: Conducting classes at the doctorate level in the field of nursing; having previously acted as a doctoral thesis advisor or acting as doctoral thesis advisor for at least one student.

For doctorate students: Currently pursuing doctoral education in a postgraduate education program in the field of nursing and having attended classes for at least three semesters; being at the stage of doctoral thesis or having graduated from a doctorate program in the previous three years, 2016-2019.

Research Instruments

***Information Form*:** Two separate forms were prepared for teaching staff and students. The form for the teaching staff had six questions, concerning age, gender, academic title, the field of knowledge of their doctorate, and the field of knowledge in which they were currently working. The form for the students also had six questions, on age, gender, field of doctorate, work situation and place of work, at what stage of education they were as doctorate students, or if they had graduated, their year of graduation.

Quality of Nursing Doctoral Education Instrument (QNDE): This was developed by Kim et al. with the aim of determining the quality of doctoral education in nursing. The Likert-type scale consists of four sub-dimensions and 43 items. The first 17 items on the scale are in the sub-dimension of Program/Curriculum Assessment, 12 items are in the sub-dimension of Teaching Staff Assessment, nine are in the sub-dimension of Assessment of Sources, and five are in the sub-dimension of General Assessment. The scale items are scored 1: I totally disagree, 2: I disagree, 3: I agree, and 4: I totally agree. The minimum score on the scale is 43, and the maximum is 172. The minimum and maximum scores on the sub-dimensions are as follows: Program Assessment min. 17, max. 68, Teaching Staff Assessment min. 12, max. 48, Assessment of Sources min. 9, max. 36, and General Assessment min. 5, max. 20. The instrument took approximately 20 minutes to complete. A higher score indicated a positive perception of the quality of the doctoral education, or in other words higher quality of education (Kim et al., 2006). A cutoff point of 0.70 is recommended for the scale (Kim et al., 2015).

Data Analysis

The statistics packages Statistical Package for the Social Sciences (SPSS) 20.0 and Analysis of Moment Structures (Amos) 21.0 were used in the analysis of the data. Data concerning the descriptive characteristics of the individuals who participated in the research were examined using numerical values and percentage distribution. In the validity and reliability analysis, the significance level was taken as $p \leq 0.001$.

Validity

Language validity was tested using the translation-retranslation method. After language validation, the scale was presented for content validation to ten teaching staff in the field of Nursing, and their expert views were sought. The experts were asked to score the items for suitability as follows: 1: not suitable, 2: the item needs serious revision, 3: the item needs slight revision, and 4: suitable. In assessing the content validity of the scale, the Content Validity Ratio (CVR) and the Content Validity Index (CVI) were used. The content validity of the scale was tested by calculating Kendall's Coefficient of Concordance according to the experts' views (Büyüköztürk, 2017).

The structural validity of the research was assessed by exploratory factor analysis and confirmatory factor analysis. In e exploratory factor analysis, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO), Bartlett's Test of Sphericity analysis and basic component analysis were used, and in confirmatory factor analysis, the goodness of fit index was used.

Reliability

In assessing the reliability of the scale, the internal consistency, test–retest reliability, intraclass correlation coefficient and paired-sample *t*-tests were examined. Internal consistency was further evaluated with item-total correlations and interitem correlations. To determine item discriminating power test–retest was conducted. In addition, the item discrimination powers were investigated by examining the *t*-values, taking into account the difference between the highest 27% and the lowest 27% groups. For unchangeability, test-retest were investigated and intraclass correlation coefficient and paired sample *t*-tests were used.

Ethical Considerations

In order to use the scale, Mi Ja Kim was informed and the necessary permission was obtained by email. Institutional permission to commence the research was obtained from the the Ege University Scientific Research and Publication Ethics Committee. Permission to collect data was obtained from the universities where the research was conducted. The aims of the research were explained to the teaching staff and students who voluntarily accepted to participate in the study, and their oral and written approval was obtained.

RESULTS

Descriptive Data

The mean age of the teaching staff participating in the research was 48.67±7.41 years, and all were female. The mean age of the students was 32.56±4.72 years, and 93.3% was female. Table 1 shows findings relating to the individuals' descriptive characteristics.

Validity Analysis Findings

Content validity

According to the expert views, CVR values varied between 0.73 and 1.00, and CVI was determined to be 0.93. In Kendall fit coefficient analysis, it was found that the expert views were statistically in accord with each other (*Kendall's W* = 0.367, *p* = 0.000).

Structural Validity

According to the results Kaiser-Meyer-Olkin Measure of Sam-

pling Adequacy (KMO) and Bartlett's Test of Sphericity of Analysis, the KMO value was 0.915, and the χ^2 value was 12248.03 (*p*<0.001), which was adequate for factor analysis of the sample.

According to the result of basic components analysis, four factors had eigenvalues greater than 1. These were: Factor 1= 14.68, Factor 2=6.95, Factor 3=4.25, Factor 4=3.54. These factors explained 59.7% of total variance. Factor 1 explained 26.5% of total variance, Factor 2 14.7%, Factor 3 10.6%, and Factor 4 7.9%. Also, it was determined in the result of the Varimax rotation technique that the factor load values relating to the 43 items of the scale varied between 0.51 and 0.91. According to the results of factor analysis, items 1-17 were in Factor 1, items 18-29 in Factor 2, items 30-38 in Factor 3, and items 39-43 in Factor 4 (Table 2).

The fit indices resulting from CFA performed to test the structural validity of the four-factor 43-item scale obtained as a result of EFA were obtained as x^2/df = 3.02; *RMSEA* = 0.085; *CFI*

Table 1: Individuals' Descriptive Characteristics

Descriptive Characteristics of Teaching Staff	n	%
Age Mean±SD 48.67±7.41 (Min-Max: 38-66)		
Gender		
Female	55	100
Male	0	0
Doctorate Department		
Fundamentals of Nursing	3	5.5
Internal Medicine Nursing	8	14.5
Surgical Nursing	3	5.5
Pediatrics Nursing	7	12.7
Gynecology Nursing	11	20.0
Psychiatric Nursing	9	16.4
Public Health Nursing	14	25.5
Date of receiving doctorate		
2010 or before	50	90.91
2011 or after	5	9.09
Academic title		
Professor	25	45.5
Assistant professor	17	30.9
Doctoral lecturer	13	23.6
Department where employed		
Fundamentals of Nursing	3	5.5
Internal Medicine Nursing	8	14.5
Surgical Nursing	2	3.6
Pediatric Nursing	7	12.7
Gynecological Nursing	11	20.0
Psychiatric Nursing	9	16.4
Public Health Nursing	14	25.5
Nursing Management	1	1.8
TOTAL	**55**	**100**

Descriptive Characteristics of Students	n	%
Age Mean±SD. 32.56±4.72 (Min-Max: 25-49)		
Gender		
Female	210	93.3
Male	15	6.7
Doctorate Department		
Fundamentals of Nursing	27	12.0
Internal Medicine Nursing	35	15.6
Surgical Nursing	40	17.8
Pediatrics Nursing	19	8.4
Gynecology Nursing	48	21.3
Psychiatric Nursing	18	8.0
Public Health Nursing	38	16.9
Stage in doctoral education		
Graduate	50	22.2
Taking classes	76	33.8
Qualification stage	16	7.1
Thesis	83	36.9
Graduates' Graduation Year*		
2016-2017	23	46
2018-2019	27	54
Profession		
Academic	80	35.6
Nurse	143	63.6
Part-time nurse	2	0.8
TOTAL	**225**	**100**

*Date taken from graduated students; therefore the number n is different.

= 0.87; *NFI* = 0.90; *GFI* = 0.79; *TLI* = 0.90; *IFI* = 0.91; *p*<0.001. Figure 1 shows the four-factor model formed in relation to the 43-item form of the scale.

Reliability Analysis

Item Analysis

Item analysis showed the item-total correlation coefficients of the items to be between 0.52 and 0.68. It was found as a result of t test for item discriminative power that each item had the power at a statistically significant level to distinguish the group in the upper 27% of the sample and the group in the lower 27% from the total score (*p*<0.001). Table 3 shows findings relating to item analysis of the scale.

Internal Consistency and Temporal Invariance

The Cronbach alpha was found 0.94, and that of the sub-dimensions varied between 0.93 and 0.97. The results of Pearson product-moment correlation analysis to determine the temporal invariance of the scale showed *r*=0.930 between the scale total mean score obtained by the students at the first measurement and that obtained when the scale was re-applied two weeks later (*p*<0.001). Table 4 shows the Cronbach Alpha values of the scale and the results of the test-retest analysis.

DISCUSSION

The content validity index was within recommended reference values (*CVI* = 0.93), and this showed that the scale items adequately represented the characteristics which it was intended to measure, and that the scale had a high content validity index (Alpar, 2018). Also, testing with Kendall's coefficient of concordance (W) indicated that interrater agreement was moderate

(Miller, 2009). The KMO Test and Bartlett's Test of Sphericity were performed prior to the EFA and it was determined that the sample was sufficient to test construct validity (Gungor, 2016; Kline, 2013).

In this study, it was found that four factors had an eigenvalue of more than 1 according to Varimax rotation. According to the four-factor structure, the total explained variance is 59.7%. In multi-factorial designs, an explained variance of 40-60% is accepted as adequate (O'Rourke et al., 2013; Buyukozturk, 2017). A total explained variance of over 40% is in accordance with the rate specified in the literature.

The model obtained as a result of EFA was examined with CFA. Of the goodness of fit indices showed that fit was good (Brown, 2006; Cote et al., 2001; Hooper, Coughlan & Mullen, 2008; Mair, 2018). The model described in Turkish can measure the structure intended for measurement in a valid way with four dimensions.

An item analysis was calculated to test the reliability of the measure, and it was found that total correlations were over 0.40 and discrimination power was statistically significant. These findings show that the items on the scale have a high level of the qualities which it is wished to measure, and distinguish well the measured characteristics of individuals (Buyukozturk, 2017; Tavsancıl, 2019). The Cronbach alpha coefficients of the scale and its sub-dimensions were found to be above 0.90. These results show that the items are internally consistent and that the internal consistency of the scale is good (Mukaka, 2012). According to the test-retest analysis, the total score correlations obtained from the first and second measure were statistically significant, indicating a strong correlation

Table 2: Factor Loads of the Survey of the Quality of Nursing Doctoral Education

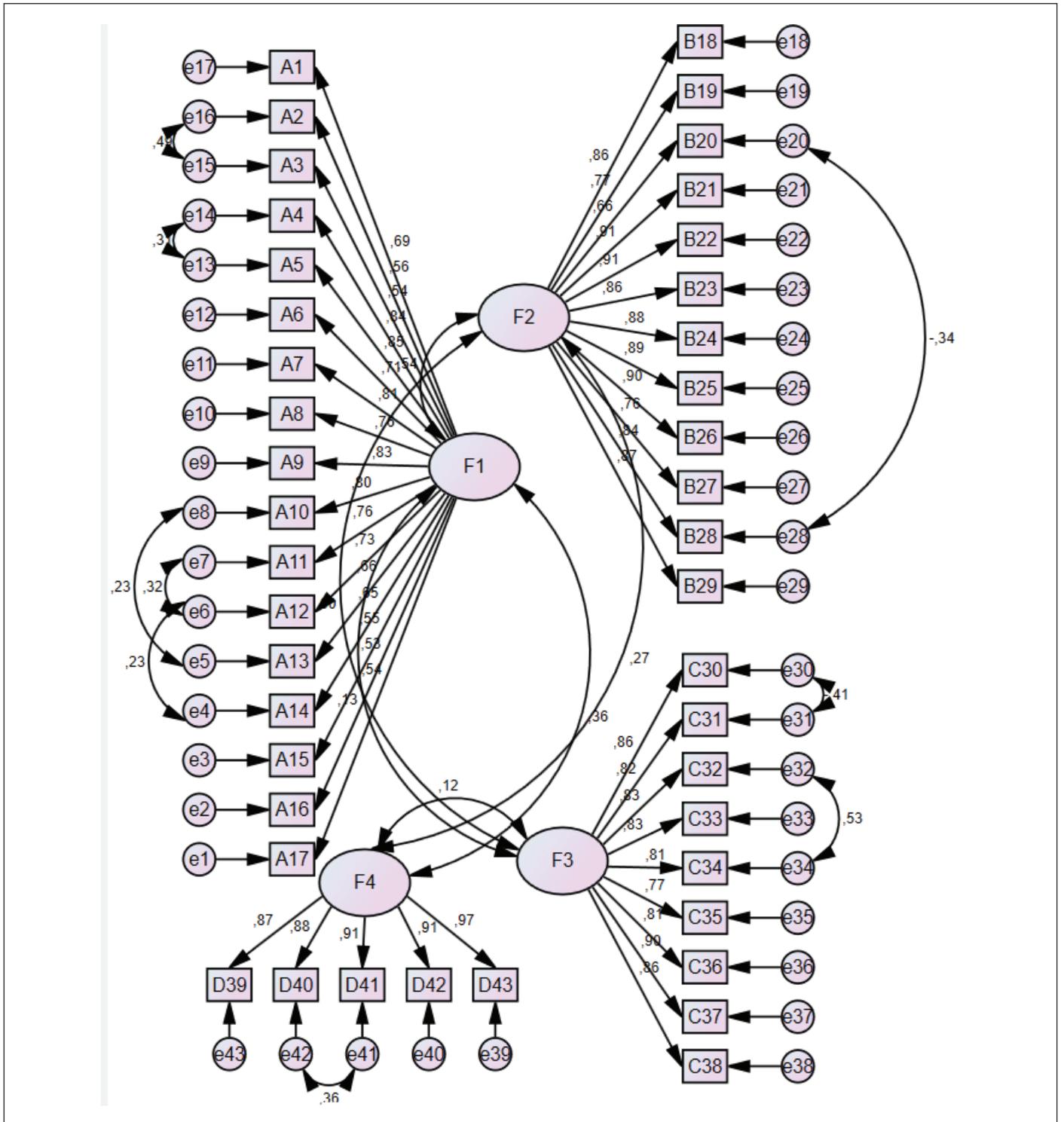| F1		F2		F3		F4	
Item	Factor Load	Item	Factor Load	Item	Factor Load	Item	Factor Load
Q1	0.84	Q18	0.88	Q30	0.91	Q39	0.93
Q2	0.81	Q19	0.87	Q31	0.88	Q40	0.90
Q3	0.81	Q20	0.86	Q32	0.87	Q41	0.89
Q4	0.78	Q21	0.86	Q33	0.86	Q42	0.88
Q5	0.77	Q22	0.87	Q34	0.84	Q43	0.87
Q6	0.75	Q23	0.86	Q35	0.83		
Q7	0.74	Q24	0.83	Q36	0.82		
Q8	0.72	Q25	0.80	Q37	0.80		
Q9	0.69	Q26	0.79	Q38	0.79		
Q10	0.67	Q27	0.78				
Q11	0.64	Q28	0.73				
Q12	0.63	Q29	0.64				
Q13	0.59						
Q14	0.58						
Q15	0.56						
Q16	0.55						
Q17	0.51						

Figure 1: Structural equivalence model of the quality of nursing doctoral education scale.

(Ozdamar, 2018). These results indicate that the temporal stability of the scale is at a high level, and that even when time has passed, it measures the same thing. It was found as a result of reliability analyses that the scale was a reliable measurement instrument.

CONCLUSIONS

The study findings show that the Quality of Doctoral Education in Nursing Scale is a valid and reliable measurement instrument for Turkish society. Using the scale, institutions conducting postgraduate doctoral programs in nursing can assess

Table 3: Item Analysis of the Quality of Nursing Doctoral Education Scale

Item	Item-Scale Total Correlation	Item Discriminative Power		Item	Item-Scale Total Correlation	Item Discriminative Power	
	r	t	p		r	t	p
Q1	0.600	13.067	0.000	Q23	0.684	11.164	0.000
Q2	0.580	10.599	0.000	Q24	0.574	7.118	0.000
Q3	0.488	6.855	0.000	Q25	0.606	8.109	0.000
Q4	0.654	11.631	0.000	Q26	0.655	10.512	0.000
Q5	0.697	13.463	0.000	Q27	0.514	7.546	0.000
Q6	0.522	8.020	0.000	Q28	0.561	7.610	0.000
Q7	0.568	8.542	0.000	Q29	0.570	7.884	0.000
Q8	0.539	9.211	0.000	Q30	0.380	4.836	0.000
Q9	0.627	11.990	0.000	Q31	0.318	5.242	0.000
Q10	0.607	9.760	0.000	Q32	0.317	7.283	0.000
Q11	0.633	10.569	0.000	Q33	0.362	5.846	0.000
Q12	0.646	11.134	0.000	Q34	0.357	8.418	0.000
Q13	0.486	7.038	0.000	Q35	0.332	3.445	0.000
Q14	0.577	9.778	0.000	Q36	0.322	5.002	0.000
Q15	0.415	5.509	0.000	Q37	0.396	6.227	
Q16	0.374	4.464	0.000	Q38	0.357	4.047	
Q17	0.453	6.689	0.000	Q39	0.365	6.248	
Q18	0.699	11.672	0.000	Q40	0.379	8.924	
Q19	0.641	9.822	0.000	Q41	0.449	10.814	
Q20	0.519	7.590	0.000	Q42	0.374	7.584	
Q21	0.663	9.622	0.000	Q43	0.361	7.996	
Q22	0.684	9.636	0.000				

Table 4: Internal Consistency and Temporal Invariance Analysis Results of the Quality of Nursing Doctoral Education Scale

Sub-dimension	Number of Items	Internal Consistency Coefficient	Test-Retest Reliability	
		Cronbach Alpha	r	p
Program/Curriculum Assessment	17	0.95	0.978	0.000
Assessment of Teaching Staff	12	0.97	0.934	0.000
Assessment of Sources	9	0.96	0.946	0.000
General Assessment	5	0.93	0.925	0.000
Total Scale	43	0.94	0.930	0.000

the quality of doctoral education in nursing by taking the views of two significant participants, the teaching staff and the students. They can make adjustments to the education programs in the light of these views. The quality of doctoral programs in nursing in universities can be evaluated in country-wide samples using this scale. It is thought that this study will show the way for quality in postgraduate education programs in different disciplines in Turkey. The fact that the sample of the study consisted of universities in the western region of Turkey limits the representativeness and generalizability of the results. It is recommended to increase the generalizability of the scale with studies to be carried out with large sample groups.

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