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Turkish Adaptation of Patient Nurse Trust Scale: A Validity and Reliability Study

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ABSTRACT

Objective: This study aims to adapt the Patient-Nurse Trust Scale to Turkish and perform validity and reliability analyses.

Methods: This study has been conducted as methodological. It was conducted between February 2021 and June 2021 in a training and research hospital in Istanbul, Turkey. The study was completed with 311 participants. Introductory Information Form, Patient-Nurse Trust Scale, and Trust in Nurses Scale were used for data collection. In addition to descriptive statistics, language validity, content validity, construct validity, criterion-related validity, discrimination, internal consistency reliability, two-half test reliability, and item analysis methods were used to determine the scale's psychometric properties.

Results: As a result of factor analysis, it was determined that the scale showed a single factor structure, and explained 66.63% of the total variance. Item factor load values were found to vary between .74 and .88. The ratio of the chi-square value to the degrees of freedom (397.496/112) was found to be 3.549. It was found that RMSEA= .09, GFI= .86, IFI= .93, NFI= .91, CFI= .93, and RFI= .87. It was found that the correlations of all items varied between .71 and .87. The Chronbach's alpha value for the whole scale was calculated as .97. As a result of parallel test analysis, it was determined that there was a significant positive correlation between both scales (r= .301; p= .000).

Conclusion: The exploratory factor analysis and confirmatory factor analysis results of the Turkish version of the scale are acceptable, and their reliability indexes are high.

Keywords: Trust, communication, patient-nurse relationship, validity, reliability.

1. INTRODUCTION

Nurses are expected to care for patients who have difficulties in meeting their self-care needs. Virginia Henderson emphasized that nurses performed uniquely in helping individuals recover and prepare for a peaceful death. This unique performance includes the development of a special care relationship between the patient and the nurse (1-3). Nurses are the health care providers closest to patients. Individuals have no choice but to rely on nurses, especially when they are critically ill. Therefore, "trust" is necessary to establish and maintain a professional caring relationship (1,3,4).

There are many definitions of trust. It is generally defined as the feeling of belief and attachment without fear, hesitation, and doubt, confidence It is emphasized that everything important for people happens in an environment of trust, and in this direction, "trust" is a basic requirement for humanity (1). Trust has the potential to give meaning to life by instilling faith and hope in people (5,6). Trusting another means opening up to an action and expecting the other to act according to their own wishes, interests, or will. The concept of trust in nursing research is widely discussed in patient-nurse relationships (3).

Effective patient-nurse communication has a great role in providing effective and successful nursing care. This communication is based on trust is very important in starting and maintaining a healthy patient-nurse relationship (5-7). Lack of communication can result in a lack of trust in the patient–nurse relationship (8,9). On the other hand, the patient-nurse relationship, which is established without developing a sense of trust, may affect communication negatively. This situation may prevent nurses from providing high-quality and patient-centered care to their patients (6,10,11). Carter argued that trust is even more fundamental than the duties of benevolence, righteousness, and harmlessness and that without trust, no one would have a

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reason to undertake these duties (2). On the other hand, it was emphasized that trust is a moral imperative to establish a professional care relationship and achieve desired patient outcomes (1,3).

Studies have demonstrated the importance of the concept of trust in providing positive patient outcomes in the patient-nurse relationship (12). It was stated that when the patient trusts the nurse, he feels physically and emotionally safe and sees himself as an active member of the care team (13,14). In the study of Kim et al. (2012), it was revealed that a high trust relationship reduces depression in individuals with chronic diseases (15).

In order to develop trust in the patient-nurse relationship, the nurse should understand the patient's needs well and provide humane care in line with their needs. In addition, allocating enough time for care, meeting the need for information, and creating a safe environment for the patient while giving care contribute to the development of trust in the patient-nurse relationship. Another important behavior that fosters this feeling is that nurses take on the role of patient advocate when necessary (1,2).

A measurement tool that will measure the trust between the patient and the nurse will guide the strategies that can improve this sense of trust. However, It was found in the Turkish literature only the Trust in Nurses Scale that was developed by Radwin and Cabral (2010) and adapted into Turkish (16,17). This scale was developed and tested only for cancer patients (16). It is thought to be necessary to develop a valid and reliable measurement tool that can accurately measure the patient-nurse trust relationship that can be applied in all patient groups. Accordingly, this study aims to adapt the Patient-Nurse Trust Scale into Turkish and perform validity and reliability analyses.

2. METHODS

2.1. Ethical Considerations

Ethics committee approval was obtained from Marmara University Faculty of Medicine Ethics Committee (date: 05.02.2021; no: 09.2021.204). Institutional permission was obtained from the İstanbul Health Directorate. Consent of the participants to participate in the study was obtained. Permission was obtained from Zha to adapt the Patient-Nurse Confidence Scale. Permission was obtained from Yücel to use the Trust in Nurses Scale.

2.2. Study design and setting

This study has been conducted as methodological. It was conducted between February 2021 and June 2021 in a training and research hospital in Istanbul, Turkey.

2.3. Sample size and participants

The study population consisted of patients who were hospitalized in inpatient clinics, excluding intensive care units, in a Training and Research Hospital. The sample has consisted of patients who met the inclusion criteria.

In the validity and reliability phase of scale development studies, in order to apply factor analysis to a data set, the amount of data should be at least five times the number of questions, and as this ratio increases, the analysis quality also increases. In addition, Comrey defines the sample size as 50 very poor, 100 poor, 200 moderate, 300 good, 500 very good, and 1000 excellent (18-20). Accordingly, the number of samples was determined as 380, 20 times as much as the original scale consisted of 19 items. The study was completed with 311 participants in line with the inclusion criteria (being between the ages of 18-85, being literate) and exclusion criteria (having a mental illness, hearing, and visual impairment).

2.4. Data Collection Tools

Introductory Information Form, Patient-Nurse Trust Scale, and Trust in Nurses Scale were used for data collection.

2.4.1. Information Form

This form prepared by the researchers was composed of five questions including socio-demographic variables.

2.4.2. Patient-Nurse Trust Scale (PNTS)

The scale was developed by Zha et al. (2020). The scale, scored in a four-point Likert format (1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree), consists of 19 items. The score that can be obtained from the scale is between 19 and 76, and a higher score represents more trust between the patient and the nurse. The Cronbach's alpha value of the single factor scale is .95 (6).

2.4.3. Trust in Nurses Scale (TNS):

For the parallel test method, the TNS developed by Radwin and Cabral (2010) and adapted to Turkish by Ay and Yücel (2013) was used (16,17). The scale is unidimensional and contains five items and is scored as never (1), rarely (2), sometimes (3), often (4), usually (5), always (6) on a 6-point Likert scale. The highest score that can be obtained from the scale is 30, the lowest score is 5. A high score on the scale indicates a high level of trust in nurses. In Radwin and Cabral's (2010) study, the Cronbach alpha value of the scale was found to be .81 (16). The Cronbach alpha value of the Turkish version of the scale is .95 (17). In this study, the Cronbach alpha value of the scale was found to be .80.

2.5. Data Analysis

Study data were analyzed using SPSS (Statistical Package for Social Sciences) for Windows 25.0 and Amos 22.0 program. Kolmogorov-Smirnov test was used to test whether the data set exhibits a normal distribution and it was seen that the

data set did not exhibit a normal distribution. In addition to descriptive statistics, language validity, content validity, construct validity, criterion-related validity, discrimination, internal consistency reliability, two-half test reliability (equivalent halves) and item analysis methods were used to determine the psychometric properties of the scale. Construct validity was tested with Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). While evaluating the CFA fit indices, CFI (Comparative Fit Index), GFI (Goodness of Fit Index), IFI (Incremental Fit Index), NFI (Normed Fit Index), RFI (Relative Fit Index, RMSEA, Root Mean Square Error of Approximation) values were used.

3. RESULTS

The mean age of the participants was 49.01 (Sd=13.46), 44.4% were female, 55.6% were male, and the majority (55.9%) were primary school graduates. 83.9% of the participants who were hospitalized for an average of 6.53 (Sd=5.51) days stated that they had been hospitalized before. It was determined that the previous hospitalizations were 3.31 (Sd=2.50) times on average. When the participants were asked to rate their satisfaction with the care they received during their hospitalization on a scale ranging from 1 to 10, it was seen that their satisfaction with the care was 8.62 (Sd=1.81) on average. When the participants were asked to rate their trust in the nurses/nurses they care for on a scale ranging from 1 to 10, it was determined that the mean value was 8.54 (Sd=1.88) (Table 1).

Table 1. *Socio-demographic data of the participants (n=311)*

Results	Min-Max	Ort (Sd)	N	%
Age	18-65	49.01 (13.46)		
Gender				
Female			138	44.4
Male			173	55.6
Education				
Primary education			174	55.9
High school			55	17.7
University and above			82	26.4
Length of hospital stay (days)	1-43	6.53 (5.51)		
Prior hospitalization				
Yes			261	83.9
No			50	16.1
How many hospitalizations have you had before*	1-20	3.31 (2.50)		
How long is your hospital stay (days)	1-43	6.53 (5.51)		
Nursing care satisfaction	1-10	8.62 (1.81)		
Their trust in the nurses/ nurses they care for	1-10	8.54 (1.88)		

**Evaluation was made on those who answered "yes" to the previous question.*

3.1. Validity Analysis

3.1.1. Language Validity

For the language validity of the scale, the original scale was first translated into Turkish by five people who were fluent in both English and Turkish languages. Then, the best expressions were selected among all the translations by the researchers. It was translated into English again by three experts who are fluent in both languages and different from the first translation group. English translations were compared with the original scale. After the necessary arrangements, the Turkish form was created.

3.1.2. Content Validity

To assess the content validity, the opinions obtained from 15 experts were analyzed with the Davis technique (20). In this technique, experts assess the scale items with a four-point rating system. The content validity rate (CVR) is calculated for each item and is obtained by dividing the number of the items with 3 or 4 points on the expert forms by the total number of experts. The content validity index (CVI) is obtained by calculating the mean CVRs. It is recommended that the CVI be above 0.80 and the items with a CVR below .80 be eliminated (21). In the analysis results, the items' CVRs were found to range from .73 to 1, and the CVI was observed to be .91.

3.1.3. Face Validity

The face validity of the scale was evaluated with data obtained from 20 patients. During this pilot study, the researchers interviewed the participants face-to-face to assess whether any item was understood at the first reading, and how long it took to respond. For face validity, it was seen that the participants found the scale to be good in general and stated that the items were understandable. It was also stated that approximately 15-20 minutes were needed to complete the scale.

3.1.4. Construct Validity

The factor analysis of the scale was carried out with exploratory and confirmatory factor analyses. The factor analysis was deemed interpretable after the analysis of KMO and Bartlett's test results. The KMO and Bartlett's test values were found to be 0.94 and .000, respectively. As a result of EFA, it was determined that the scale showed a single factor structure, and the single factor structure explained 66.63% of the total variance (Table 2). The scree pilot plot also confirmed the single-factor structure of the scale (Figure 1). Item factor load values were found to vary between .74 and .88 (Table 2). According to the CFA, it was determined that the Structural Equation Modeling Results of the scale were significant at the p=.000 level and that the 19 items and one dimension forming the scale were related to the scale structure. The model has been improved. While making the improvement,

the variables that reduced the fit were determined, and new covariances were created for those with high covariance among the residual values. It is shown in Table 3 that the values accepted for the fit indices are provided in the later renewed fit index calculations. The ratio of the chi-square value to the degrees of freedom (397.496/112) was found to be 3.549. When the other fit indices were examined, it was found that RMSEA = .09, NFI = .91, RFI= .87, GFI =. 86, and CFI = .93. The model with standardized parameter estimates or the factors and items of the scale is presented in Figure 2.

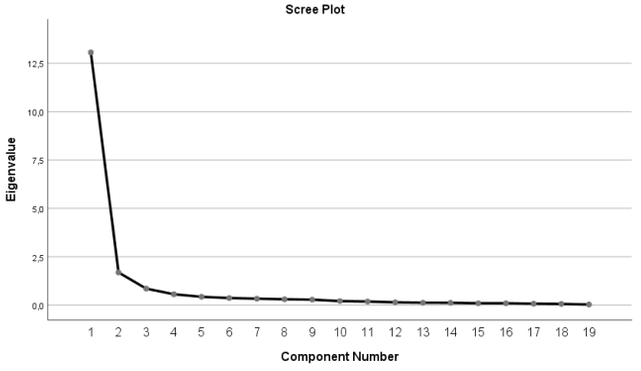

Figure 1. *Scree pilot graph*

Table 2. *Factor analysis results of the Patient-Nurse Trust Scale (n=311)*

Items	Item loads	Item-total correlation	Lower %27* – Upper%27*	
			t	p**
Item 11	.88	.87	-15.672	.000
Item 12	.87	.86	-15.093	.000
Item 17	.85	.82	-13.251	.000
Item 7	.84	.82	-13.937	.000
Item 5	.85	.82	-16.813	.000
Item 3	.84	.81	-14.638	.000
Item 13	.83	.81	-14.136	.000
Item 15	.83	.81	-13.010	.000
Item 18	.83	.81	-13.416	.000
Item 10	.82	.80	-15.006	.000
Item 19	.82	.80	-13.675	.000
Item 2	.81	.79	-11.755	.000
Item 8	.81	.78	-11.258	.000
Item 1	.80	.77	-11.053	.000
Item 6	.79	.76	-15.087	.000
Item 16	.79	.76	-12.821	.000
Item 9	.78	.75	-11.755	.000
Item 4	.74	.72	-14.001	.000
Item 14	.74	.71	-13.948	.000
Total variance explained		%66.63		
Cronbach's Alpha		.97		
Spearman-Brown		.94		
Guttman		.94		

*N=311;*n1=n2=84; **p<.001*

3.2. Reliability Analysis

In the item total item residual analysis performed for the reliability analysis of the scale, it was found that the correlations of all items varried between .71 and .87 (Table 2).

To determine the distinctiveness of the items in the scale, the raw scores obtained from the scale were ranked from largest to smallest, and the mean scores of the groups in the lower 27% and upper 27% were compared with the independent group t-test. As a result of the comparison, it was observed that there was a statistically significant difference between the averages of the lower and upper group item scores (p= .000).

Cronbach's alpha coefficient was calculated for the whole scale and sub-dimensions for internal consistency. The Chronbach's alpha value for the whole scale was calculated as .97. The spearman-Brown coefficient was .94 due to the two-half reliability analysis; The Guttman coefficient was found to be .94 (Table 2). When the item score averages of the lower 27% and upper 27% slices were compared, it was observed that there was a significant difference (p= .000) (Table 2).

To determine the consistency coefficients in the context of the analysis of the reliability of the scale, the parallel test method was applied. As seen in Table 4, as a result of Spearmen's correlation analysis, it was determined that there was a significant positive correlation between both scales (r= .301; p= .000).

Table 3. *Fit indexes as a result of confirmatory factor analysis (n=311)*

	Fit Indexes	Acceptable Fit Indexes	Good Fit Indexes
χ2/df	3.549	3≤χ2/df≤5	0≤χ2/df≤3
RMSEA	.09	0.06≤RMSEA≤1.0	.0≤RMSEA≤.05
GFI	.86	≥.90	≥.80
IFI	.93	≥.95	≥.85
CFI	.93	≥.95	≥.85
NFI	.91	≥.95	≥.80
RFI	.87	≥.95	≥.85
χ2 = 397.496, df=112, p=.000*			

*CFI, Comparative Fit Index; GFI, Goodness of Fit Index; IFI, Incremental Fit Inde; NFI, Normed Fit Index; RFI, Relative Fit Index; RMSEA, Root Mean Square Error of Approximation. *p<.05*

Table 4. *Reliability analysis results of the Patient-Nurse Trust Scale (n=311)*

	Parallel testing	
	r	p
Patient-Nurse Trust Scale	.372	.000
Scale of Trust to Nurses		
Spearmen correlation test was used; p<.001		

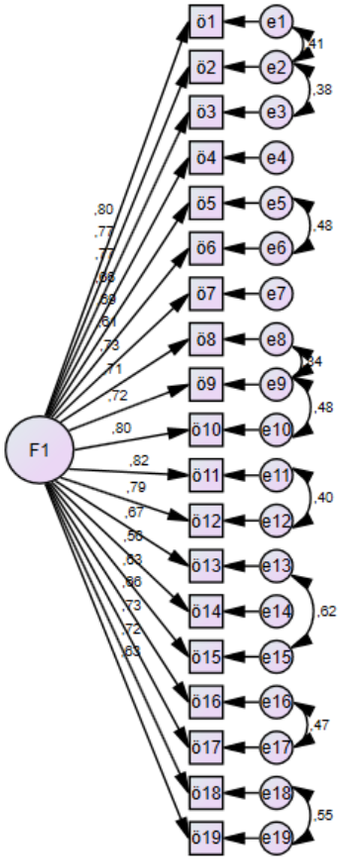

Figure 2. *Patient-Nurse Trust Scale CFA results*

4. DISCUSSION

In order to evaluate the content validity of the PNTS, the opinions of 15 experts were analyzed with the Devis technique. It is recommended that the CVI be above .80 (20,21). As a result of the analysis, the CVI was found to be .91. This finding showed that the content validity of the scale was good. In order to apply factor analysis to a data group, the data must be suitable for factor analysis and the sample must be sufficient (22).

When the results of Bartlet Sphericity Test and Kaiser-Meyer Olkin (KMO) Test conducted for this purpose are examined; It was determined that the Bartlet Test of Sphericity value was significant (p= .000) and the KMO sample fit coefficient was .94. KMO value between .80 and .90 and a significant Bartlet Test of Sphericity indicate that the sample is suitable for EFA (18). Accordingly, it has been seen that the data set is sufficient and suitable for EFA. The construct validity of the PNTS was tested using exploratory factor analysis. EFA is a method for determining the number of factors under which the items in a measurement instrument can be gathered and/or what kind of relationship there is among the factors. In other words, exploratory factor analysis shows how many sub-dimensions the scale consists of and which items these sub-dimensions consist of (20,22).

The EFA showed that one-factor structure explained 66.6% of the total variance. It was stated that the single-factor structure in the original scale explained 53.2% of the total variance. It was seen that the total variance explained in the Turkish version of the scale was higher. The total variance explained in the single factor scales should be over 30% (18,21). Hence, with all things considered, it may be stated that the percentage of the variance explained by the scale was very high and sufficient.

The scree plot graph also confirmed that the scale exhibited a single factor structure. Considering that the interval between two points in the plot is considered to be one factor, and the distances between the points after the first factor were negligible and very similar (20), it was determined that a single-factor structure was suitable for the scale. It is noteworthy that a single-factor structure may provide advantages for users in terms of implementation and assessment using this scale. In multi-factor scales, analyzes (reliability indexes, comparison tests, etc.) are performed separately for each sub-factor. On the other hand, in single factor scales, these analyzes are carried out for the whole of the scale at once. These advantages provide convenience to researchers.

The load value in factor analysis is the critical value used to determine whether an item should be included in the dimension where it is defined. An item is usually expected to have a load value of .45 or higher (18,20). The minimum required value for the item-total test correlation to be sufficient is specified as 0.30 (20,21). The item-total test correlation values of the remaining items vary between .74 and .88. This finding is an important finding in terms of the construct validity of the scale and shows that the items that make up the scale accurately measure the concept that is intended to be measured. It was observed that the item factor load values of the original scale ranged from .64 to .84. In most of the scale adaptation studies, it is seen that the intelligibility of the items is affected by cultural and linguistic differences, and therefore, factor loadings are lower than the original values. However, in this study, it was observed that most item loads in the Turkish version of the scale were higher than the original scale. This finding is important for the validity of the scale.

CFA results were analyzed to determine whether the original scale was validated in Turkish patients. It is stated that GFI and IFI indices above .85 and NFI and CFI indices above .80 reflect good fit (22). The findings show that the Turkish version of the scale has good fit values for the GFI, CFI, NFI and IFI indices. RMSEA value below .06 reflects good fit, while a value below .10 indicates an acceptable level of fit (22,23). It was seen that the RMSEA index for this scale was .09 and it had acceptable fit criteria. A ratio of chi-square value to degrees of freedom below three indicates a good fit; it is stated that a score below five reflects acceptable fit (21-23). When the CFA results were examined, the ratio of the chi-square value to the degrees of freedom was found to be 3.08 (p= .000). This value below five reflects an acceptable

level of compliance (22). After reviewing the goodness-of-fit indices obtained from confirmatory factor analysis, the model is considered suitable.

Internal consistency and reliability coefficients were found to over .97. Cronbach's alpha reliability coefficient is an ideal method for determining internal consistency in Likert-type scales, and it shows the agreement of the items in the scale with each other (18). Split-half tests determine reliability by dividing the test into two equal parts where the relationship between the two parts is calculated using the Spearman-Brown correlation coefficient. It is expected that this relationship will be significant and high. In scale development and adaptation processes, reliability coefficients of .70 and higher are considered to have sufficient reliability (18,20,22). In this study, Spearman-Brown and Guttman reliability coefficients were found to be .94 for the Turkish version of the scale. Accordingly, because the Cronbach's alpha, Spearman-Brown, and Guttman values were all .70 or higher for the entirety and sub-dimensions, this scale has sufficient internal consistency and satisfies the split-half reliability criteria.

In determining the parallel form reliability, the correlation between the points obtained from two-scale tools is looked at by implementing a different scale tool that has the same qualities to the same individuals at the same time. The Trust in Nurses scale, whose validity and reliability have been proven in the Turkish language, was referred for the parallel form reliability. A correlation value between .70 and 1.00 reflects a high-level correlation, while a value between .30 and .70 demonstrates a mid-level correlation (22). A positive significant correlation was found between the The Trust in Nurses scale and the Patient-Nurse Trust Scale (r= .372; p= .000). This result is important in terms of the reliability of the scale.

5. CONCLUSION

The results obtained from the study have shown that the exploratory factor analysis and confirmatory factor analysis results of the Turkish version of the Patient-Nurse Trust Scale are acceptable, and its reliability indexes are high. In this respect, it can be said that the Single-factor and 19-item Patient-Nurse Trust Scale is a valid and reliable measurement tool that can accurately measure the level of trust patients have in their caregivers.

Trust is an important part of the patient-nurse relationship. A trusting relationship must be established and maintained to achieve positive patient outcomes. All clinician nurses, can use the Patient-Nurse Trust Scale to determine the confidence level of their patients. The scale will also guide nurses, nurse managers, and nurse educators in the development of strategies that can improve trust between patient-nurses. On the other hand, it can be suggested that the Patient-Nurse Trust Scale be used in large samples containing different patient groups. and the nurse.

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Author Contribution:

Research idea: GKO

Design of the study: GKO, DCP

Acquisition of data for the study: GKO, DCP, FA

Analysis of data for the study: GKO, DCP

Interpretation of data for the study: GKO, DCP, FA

Drafting the manuscript: GKO, DCP, FA

Revising it critically for important intellectual content: GKO, DCP, FA

Final approval of the version to be published: GKO, DCP, FA

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