

Original Article

The Validity and Reliability of the Turkish Form of the Nurses' Role and Competencies Scale

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Abstract

Background: The nursing roles to be developed and defined well are able to deliver patients more effective care and fill some gaps in the healthcare systems.

Objective or Aims: The research was conducted in a methodological way to test the validity and reliability of the "Nurses' Role and Competencies Scale (NRCS)" to adopt to Turkish which was developed by Lin et al (2016) to determine the roles and competencies of the nurses.

Methodology: Nurses working in different services of a university hospital in Izmir were included to the research. A simple random sampling method was used and the sample consisted of 257 nurses who were five times more than the number of items (51 in total) of NRCS whose validity and reliability were examined in the study. While evaluating the validity of the research data, internal consistency and test retest analysis were used in evaluating language equivalence, content and structure validity and reliability.

Results: NRCS was translated into Turkish and then translated back into English for its language validity. Confirmatory factor analysis was used to prove the construct validity. Findings of the analysis made were as follows; $\chi^2 = 5744.89$, $X^2 / sd = 4.72$, $RMSEA = 0.078$, $CFI = 0.91$, $IFI = 0.90$, $NNFI = 0.90$ and $NFI = 0.89$. It is determined that Cronbach α value of the scale in proving reliability is .97; dimension of professionalism is .93, direct care dimension is .91, clinical research dimension is .91, implementation guidance dimension is .91, medical support dimension is .86 and leadership and innovation dimension is .84.

Conclusions: NRCS scale is a valid and reliable measurement tool that can be used in nursing studies in our country. Confirmatory factor analysis results showed that the scale had a good consistence with the original scale and confirmed six factor structure.

Keywords: nurse, nursing roles, nursing competencies, scale

Introduction

Nursing is a community service that has emerged with existence of human to keep individuals healthy, provide patient care and comfort, and develop confidence in patients (Erdemir 1998), and a health care discipline that has recently become a profession and includes theoretical and

scientific information-based practical skills (Taylan, Alan, Kadioglu 2012). According to another definition, the nursing is a profession that works in cooperation with other members of healthcare team for patients, has specific tasks within the team, require specific education and competency, and include a number of roles and

functions that are legally defined (Taylan 2009). The roles and functions of nursing have always been defined in parallel to, and affected by, health care requirements of community within, because the roles of nursing are affected by communities within and formed by community's requirements (Lin, Lee, Ueng, Tang 2015). The Boykin and Schoenhofer's theory of nursing as caring emphasizes that modernization of nursing roles would provide increase in independent activities and professional autonomy of nurses (Parker 2015). The nursing roles to be developed and defined well are able to deliver patients more effective care and fill some gaps in the healthcare systems (Burton 2000). It is necessary for nursing to provide quality and adequate health care service. Some healthcare systems therefore strive to define and improve existing roles of nurses (Chang, Shyu, Tsay, Tang 2012).

It is considered that some of the gaps in the health care systems may also be resolved by the influence of enhanced and improved roles of nurses (Scott 2016, Kooienga, Wilkinson 2016). Professional approach of nurses adopted for these occupational roles determines statute of nursing and society's perception for health. This is because the nurses are one of the most effective factors within the health and illness cycle (Henly, Wyman, Findorff 2011). It is therefore very important that nurses are aware of their roles and available competency, and to measure level of their knowledge. Nurses fulfill their numerous and various roles while providing individuals and families with care and therapy during the period when an individual is in the mother's womb and finally passes away, even after they die. It is a fact that nurse and nursing profession that are involved in care and therapy phases of such broad process at all times are not fully and completely visible to the society. However, another question mark is that how much of nursing is visible to the nurses. For these reasons, it is very important is to well define the roles that will be and are expected to be performed by nurses, and that definition of roles is recognized by nursing students and nurses with bachelor's degree and master's degree, and they are aware of their competence. Accurate description of roles and competence contributes to performance of nurses, and to professional development and adaptation of nursing students (Doran, Sidani, Keatings, Doidge 2002, Objectives, Outline 2013, Sharif, Masoumi 2012.). In the literature,

the roles of nursing include instructive, counselling, directive, caring, investigative, collaborative-cooperative, changing agent, patient advocate, undertaker, rehabilitating, decision-maker, communicator, coordinating, therapeutic, career developing, autonomic, and responsible roles (Lim, Honey 2014, Objectives, Outline 2013, Taylan, Alan, Kadioglu 2012,14,15). In Turkey, although nursing roles are taught during undergraduate study, they are not clearly described within the legal scope; therefore nurses have not yet gained their autonomy-independence, and they are not rendered competent and adequate enough to perform all of the roles. One of the major factors that allows nurses to plan adequate and effective care is their knowledge about their roles and responsibilities as well as their attitude and belief for these roles. The attitude and belief for roles affect the level of awareness of roles by nurses and drawing the line at their competence (Kalisch, Landstrom, Hinshaw 2009). It is therefore very important to identify the level of awareness of roles and competence by nurses and the attitude and behaviors affecting them. In the light of this information, the objective of this study was to adapt the Nurses' Roles and Competencies Scale developed by Lin et al. (2016) to Turkish.

Methodology

This is a methodologic and cross-sectional study that would adapt the Nurses' Roles and Competencies Scale (NRCS) to Turkish. The "Description Form for Nurses" and "Nurses' Roles and Competencies Scale" were used to collect data. The Description Form for Nurses includes 17 questions about sociodemographic characteristics and professional qualifications with 15 being multiple-choice questions and 2 being open-ended questions. The "Nurses' Roles and Competencies Scale" was developed by Lin et al in English to assess nurses' roles and area of competencies (Lin, Lee, Ueng 2015). This is a 5-point Likert scale that contains 51 items and six sub-dimensions to reveal nurses' roles and competencies. The sub-dimensions include professionalism (20 items), direct care (12 items), practical guidance (4 items), medical assistance (7 items), and leadership and reform (3 items).

The initial phase of the study investigated the validity of language, structure and content in the studies on validity and reliability of the "Nurses'

Roles and Competencies Scale". First, required permissions were obtained from the author that developed the scale in order to validate the language of the "Nurses' Roles and Competencies Scale". Then the English version of the scale was translated into Turkish by 3 certified translators that had a good mastery of both languages (Turkish-English). The most appropriate words and phrases were selected from Turkish translations to obtain a final version of the scale, which was then translated back into English by another certified translator who fluently speak and understand both of the languages. The items in the retranslated scale were reviewed and compared to the items in the original scale by the certified translator. Then, necessary editing was made by the investigators to put the scale into final form which was submitted to experts' opinion to test the language, equivalency of cultures, and content. The opinion of 12 experts in the field was obtained to assess the validity of content. The Davis technique was used to obtain written opinion of experts for each item in the scale. (Davis 1992). The experts were asked to grade each item of the scale: 1-Not appropriate; 2-Needs reviewing to be appropriate; 3: Appropriate, but needs minor change; 4: Very appropriate, and to provide their suggestion, if any, in the recommendations field under each item.

A confirmatory factor analysis was performed for structural validity of the scale. The test-retest technique was used to identify the criterion for invariance to time for reliability of the scale. The scale was re-administrated to 30 nurses two weeks after initial measurements. The test-retest technique was assessed by Pearson's product-moment correlation coefficient. The Cronbach α coefficient and correlation coefficient were calculated for the scale. After completion of the steps described above, the process of collecting data, i.e., phase 2 of the study, was initiated by a pilot scheme. The scale was first administrated to 10 nurses to assess whether the "Nurses' Roles and Competencies Scale" is understandable and appropriate. The nurses that took pilot scheme were not included in analyses. This research was conducted at a university hospital located to the west of Turkey between May 2016 and September 2016. The nurses were included in the research, who were minimum high-school graduate and willing to participate in the study,

and were not off duty or on the sick leave during the period of study. The number of items (51 items) in the "Nurses' Roles and Competencies Scale" was considered to find a proper sample number for the study. The literature recommends to use 7-10 persons per item to identify the sample number, therefore a total of 255 nurses was found appropriate to form the sample group and start the study (Tezbasaran 1997) and the study was completed with 257 nurses. The face-to-face interview method was used to collect data, and each interview took approximately 15 minutes. For reliability of test-retest, the "Nurses' Roles and Competencies Scale" was re-administrated to 10 nurses two weeks after the first administration. The data obtained from research was analyzed with Statistical Package for Social Science 22.0 (SPSS). In the analysis of data, the Cronbach alpha reliability coefficients were calculated to determine the number, percentage, mean, Confirmatory Factor Analysis (CFA), Pearson's product-moment correlation coefficient and reliability.

A written permission was obtained from the Ethics Committee of the university and the units of hospitals where the research was conducted. The objective of the research, method of administration, and the results intended to obtain were explained to the nurses participated in the research to obtain their written consent.

Results

Of the nurses participated in the research, 84.8% were female, 54.5% were between the ages of 26 and 35, 87.5% had a bachelor's degree, and 12.5% had a master's degree. 40.9% of the nurses worked for internal units, 42% worked as service nurse, and 93.3% worked as clinic nurse. 53.3% of the nurses have worked for 1 to 5 years.

The Confirmatory Factor Analysis (CFA) was performed to find structural validity of the Nurses' Roles and Competencies Scale, and the Cronbach alpha reliability coefficients were calculated to determine reliability. Opinions of experts were received to validate the content of the scale. The content validity rate (CVR) was calculated for each item to evaluate opinions delivered by a total of 12 experts. Then, the calculated CVR was averaged to find the content validity index (CVI). This index is used to determine whether experts deem that item necessary. This value was calculated to have appropriateness level of items. Since there were

12 experts, the items with CVR greater than 0.56 are deemed valid for content (Yurdugul 2005). Based on the calculation of CVR, the experts considered all the items appropriate. The scale includes 51 items and 6 sub-dimensions. The values are averaged to calculate the CVI, which is 1.00. In addition, the experts suggested that Item 1, Item 7, Item 20 and Item 21 to be corrected to make them more understandable and clearer. In line with such suggestions, the content of the scale was validated, then a CFA (Confirmatory Factor Analysis) was performed for the content. The first level and second level confirmatory factor analyses (CFA) were carried out to see whether the structure of the scale designed with 6 factors and 51 items was verified. The aim for performing the second level factor analysis was to see whether the upper structure was verified. In other words, we investigated whether it was likely to have a full score from the scale. The objective of confirmatory factor analysis (CFA) is to assess whether, or how much, the data fit the compliance degree of a factorial model containing factors (latent variables) consisted of many observable variables. The model to be examined may define a construct created using the data of an empirical study or setup based on a specific theory (Sumer 2000). A large number of fit indices are used to assess validity of a model in CFA. Among them, the most commonly used ones (Cole 1987, Sumer 2000) are the Chi-Square Goodness (χ^2), Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Non-Normed Fit Index (NNFI), Normed Fit Index (NFI), and Goodness of Fit Index (GFI). If the values for the scale model are $X^2/d < 3$; $0 < RMSEA < 0.05$; $0.97 \leq NNFI \leq 1$; $0.97 \leq CFI \leq 1$; $0.95 \leq GFI \leq 1$ and $0.95 \leq NFI \leq 1$, then this indicates perfect fit, if the values are $4 < X^2/d < 5$; $0.05 < RMSEA < 0.08$; $0.95 \leq NNFI \leq 0.97$; $0.95 \leq CFI \leq 0.97$; $0.90 \leq GFI \leq 0.95$ and $0.90 \leq NFI \leq 0.95$, then this indicates acceptable fit (Kline 2005, Sumer 2000).

The CFA was carried out to assess whether the construct of the scale with 6 factors and 51 items was verified. The first CFA performed analyzed the items with t value that is not statistically significant. Figure 1 shows the Structural Equation Model and Standard Values for the Nurses' Roles and Competencies Scale. As a result of the analysis, no insignificant t values

were found, therefore all the factors and items remained in the scale. The fit indices were $\chi^2=5744.89$, $X^2/sd= 4.72$, $RMSEA=0.078$, $CFI=0.91$, $IFI=0.90$, $NNFI=0.90$ and $NFI=0.89$. When we examine the coefficients that indicate the relationship between the observable variables of the model representing factorial structure of this scale and the factors, all the coefficients appear to be adequate. Considering the fit statistics calculated by CFA, the predetermined structure of the scale appears to fit the data collected. As seen in the Table 1, the regression coefficients and t values are significant ($t > 1.92$), so the model is verified.

The Cronbach alpha, the coefficient of internal consistency, was calculated to determine reliability of the scale. The alpha value for the professionalism dimension is .93; the alpha value for the direct care dimension is .90, the alpha value for the clinical research dimension is .91, the alpha value for the practical guidance is .91, the alpha value for the medical assistance dimension is .86, and the alpha value for the leadership and reform is .84. The alpha value for the entire scale is .97. The inter class correlation coefficient was examined to assess the stability of the scale over time in test retest analysis carried out at four weeks later ($r 0.908$, $p=0.0001$).

Discussion

The research was conducted to assess nurses' roles and competencies and to adapt the Nurses' Roles and Competencies Scale developed by Lin et al. (2016) to Turkish.

To adapt the scale to Turkish, the reliability and validity studies, which are psychometric studies, were performed. It is not appropriate to use an assessment instrument that is unable to carry out an accurate and reliable measurement, or carries out an accurate measurement but does not serve to the intended use. This requires to address reliability and validity of assessment instruments together. For an assessment instrument to be valid, an assessment instrument that is reliable but not valid does not have importance in practice despite being dependent on the reliability. First, the items of the scale were translated into Turkish, the validity of language and content was analyzed; then the psychometric properties of Turkish scale were assessed by internal consistency, test-retest, reliability of items, and validity of structure methods.

Table 1. Regression and T values for the scale

Items	Regression values	t values	Items	Regression values	t values
M1	0.42	4.56	M27	0.61	10.79
M2	0.43	4.83	M28	0.47	9.60
M3	0.46	6.16	M29	0.60	10.96
M4	0.52	6.20	M30	0.48	9.40
M5	0.57	6.19	M31	0.40	9.32
M6	0.37	5.40	M32	0.50	13.77
M7	0.45	6.17	M33	0.42	11.62
M8	0.41	6.07	M34	0.51	12.64
M9	0.42	5.48	M35	0.49	9.51
M10	0.44	6.01	M36	0.62	11.63
M11	0.51	6.07	M37	0.60	12.50
M12	0.53	9.78	M38	0.60	13.09
M13	0.39	6.05	M39	0.59	14.47
M14	0.64	13.10	M40	0.55	13.51
M15	0.48	12.75	M41	0.53	15.57
M16	0.54	10.12	M42	0.41	7.93
M17	0.43	9.13	M43	0.44	7.67
M18	0.38	5.87	M44	0.48	7.98
M19	0.52	11.56	M45	0.79	8.12
M20	0.51	11.00	M46	0.87	8.28
M21	0.43	10.20	M47	0.50	8.73
M22	0.56	8.78	M48	0.45	8.01
M23	0.35	7.97	M49	0.58	11.82
M24	0.65	10.56	M50	0.62	12.00
M25	0.43	9.53	M51	0.40	8.72
M26	0.45	10.05			

The content validity rate that assessed concordance of experts' opinion (Ayhan, Kocaman, Bektas 2015) indicates that there is a high concordance across the experts, that the scale represent the area that is required to be assessed, and that criteria for content validity are met. For the validity of scale structure, the CFA was carried out to see whether the structure of the scale with six factors would be verified in the sample of Turkish nurses. The structure of the scale in the original form was verified in accordance with values considered good fit criteria as a result of CFA. Thus, the scale appears to have acceptable fit values in Turkish sample. So, it would be appropriate to say that scale has an understandable language and content.

The reliability is the basic feature that each assessment instrument must have and ability of an assessment instrument to measure free of errors. This is what indicates that data for the instrument has been collected correctly and is reproducible. The assessment criteria for the scale is itself, therefore, it is very important that scale has internal consistency. The alpha coefficients of a scale consisted of items that highly correlate with each other are also high. The Cronbach alpha coefficient is a criterion for internal consistency and uniformity of items in the scale. If the Cronbach alpha coefficient is higher, then it is assumed that consistency of items in the scale is that high, and the scale is considered to have items that examine the elements of the same property. When identifying reliability level of the scale, it is recommended to calculate (Likert type) Cronbach alpha coefficient in cases where item scores are continuous in the "item analysis" (Korhan, Yont, Ak, Erdemir, F 2013). In this research, the Cronbach alpha coefficient was assessed to calculate coefficient of internal consistency of the Nurses' Roles and Competencies Scale, which is a Likert type scale. The coefficient of internal consistency is .97 for the Nurses' Roles and Competencies Scale with fifty-one items, which indicates that scale has a high reliability. The reliability coefficients of internal consistency for the sub-dimensions of the scale are as follows: "Professionalism" .93; "Direct Care".90, "Clinical Reserach".91, "Practical Guidance".91, "Medical Assitance".86 and "Leadership and Reform" .84. The reliability coefficients for the entire scale and sub-dimensions range from 0.84 to 0.97. The

acceptable coefficient of internal consistency for nursing research is .70, and the scales with alpha coefficient ranging .60 to .80 are reported to be very reliable (Tezbasaran 1997). Accordingly, it is considered that items in the scale are consistent with each other, and the scale has items that examine the elements of the same property. In other words, uniformity of the scale is adequate. The original study on validity and reliability of the scale found that Cronbach's alpha was .98 and the Cronbach's alpha ranged .83 to .97 for the subscales. The scale and its sub-dimensions had similar internal consistency level to that of the original scale. This is a valuable finding for reliability of our scale (Lin, Lee, Ueng 2016).

The validity and reliability analyses were performed for the Nurses' Roles and Competencies Scale in order to use the scale in Turkey. As a result, the Nurses' Roles and Competencies Scale appears to be an assessment instrument with highly adequate validity and reliability indicators, and may be safely used to assess the perception of nurses for roles and competencies in Turkey. In addition, it is recommended to use this scale for nurses that work for different areas of clinic.

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