



Adaptation to Turkish of Nurse – Nurse Collaboration Scale¹

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Abstract

Background: Nurse-nurse collaboration increases occupational satisfaction and the health care quality, decreases medical errors.

Aim: This research was performed for the adaptation to Turkish of Nurse – Nurse Collaboration Scale to determine the collaboration level between nurses.

Methods: The research was planned methodologically (N=496) to test validity and reliability of “Nurse-nurse collaboration scale”. Original scale consists of 35 item and 5 sub-dimensions (problem solving, communication, process sharing, coordination and professionalism). The research was performed in one public, one university and four private hospitals. Content validity, construct validity and internal consistence were used to evaluate scale.

Results: Scale's content validity index was 0.98, Cronbach α reliability coefficient was 0.93, α values in sub-dimensions were respectively 0,75, 0,71, 0,80, 0,78 and 0,93. Turkish version of the scale was consisted of 26 items and 5 subscales.

Conclusion: It is reported that nurse-nurse collaboration scale is validated and reliable. Nurse-nurse collaboration directly affects the quality of nursing services and nursing occupation. Collaboration is very important for nurses. If collaboration happens job satisfaction will be happen because of quality of care and patient safety increase.

Keywords: Collaboration; Nurse; Communication; Coordination; Validity and Reliability

Introduction

“Collaboration” concept comes from two Latin words – col (meaning ‘together’) and laborare (meaning ‘to work’). The meaning of “Collaborare” is working together” (Dougherty and Larson 2005).

In the literature, collaboration is defined as a partnership that shares *authority* and power for decisions and communication. (Henneman,1995). However the nursing collaboration is defined as a process consisting communications and interactions between health care professionals in several fields aiming same targets. (Haire 2010). Nurse-nurse collaboration; is more common during shift change, patient change or service change, when there is communication with imperfect knowledge and lack of nurse-nurse knowledge and ability (Stefaniak 1998). An important dimension of collaboration is the lack of communication resulting in inevitable medical errors and negative

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patient outcomes. However most of health institutions and experts encourage collaboration between personnel to avoid medical errors (AACN 2005).

If there is no nurse-nurse collaboration; health care coordination is affected negatively, resulting in absenteeism or increases rotation speed and therefore decreases occupational satisfaction. (Dougherty 2009). Besides, ineffective nurse-nurse communication and collaboration results in conflicts, affecting nurses' work negatively. (McCallin 2001). Collaboration leads to positive relationships, facilitates team work or 2-person work, besides avoids conflicts and therefore increases occupational satisfaction and improves patient satisfaction (Apker et al. 2006; Karamanoğlu et al 2009).

When Turkish literature was reviewed, there were several scales and reports evaluating doctor-nurse collaboration, but there were no scales evaluating nurse-nurse collaboration. In America, Dougherty and Larson developed a Nurse-nurse collaboration scale in 2010 (Nurse-Nurse Collaboration Scale) which consisted 5 dimensions including problem solving (7 items), communication (8 items), coordination(8 items), process sharing (5 items) and professionalism (7 items). According to the results of literature of the this scale is not used in any country. Nurse – nurse collaboration scale (NNCS) was developed to increase occupational satisfaction and patient care quality, and to decrease medical errors (Dougherty and Larson, 2010). Original scale's Chronbach alpha coefficient is .89.

Purpose

This research was performed for the adaptation to Turkish Of Nurse – Nurse Collaboration Scale to determine the collaboration level between nurses.

Methods

Setting and Sample

The research was planned methodologically. The setting of the research is the nurses working at least 500 nurse capacity public and private hospitals in Istanbul European side. The sample consists nurses working in 1 public hospital, 1 university hospital and 4 private hospitals that had approved the research.

Dougherty and Larson (2010) who had developed the scale recommended to include nurses graduated at least bachelor degree. Therefore sample content included the nurses graduated at least bachelor degree. So, data forms were given to 750 nurses (graduated at least bachelor degree) in the sample for scale validity – reliability study. 110 of them found the questionnaire too long and returned the forms, 60 of them did not fill the forms since they had used annual leave or sick leave, and 84 of them were excluded because of the unfilled questions. The scale validity-reliability study analyzed the forms of N=496 nurses and found that the respond rate was % 63.

Data collection

The research (scale validity – reliability) was performed between October 2013 – December 2013.

Instrument

Sociodemographic features questionnaire: The researcher used the literature and, considering the aim of the research, 3 open-ended (age, professional time, working time in the current position) and 10

multiple choice (institution, sex, education and marital status etc.) total of 13 questions were included.

Nurse – nurse collaboration scale (NNCS): Nurse-nurse collaboration scale was developed by Mary B. Dougherty in 2009 as a PhD thesis study (Dougherty and Larson 2010). The scale was adjusted by Shortell et al. (1991), Ritter –Teitel (2001) and Sasagara et al. (2003) according to nurse –doctor collaboration scales. 35 items original scale consists of 5 sub-dimension including “Problem solving”, “communication”, “process sharing”, “Coordination” and “professionalism”. Nurses were asked to assess their collaboration according to 1-4 point scale for each item (1 “never agree”, 2 “do not agree, 3 “agree and 4 “totally agree”). 6 questions were reverse coded in the scale items (1.1, 1.2, 1.5, 2.3, 2.5, 2.7). The related dimensions were summed separately, the median values were calculated, nurse-nurse collaboration of the institutions were identified by dimensions. The cut point of scale was identified as 2,5 , when it approximates to 4, the level of collaboration increases, when it approximates to 1, the level of collaboration decreases. Original scale's Chronbach alpha coefficient was 89.

Data Analysis

Data assessment, was analyzed statistically by a computer. Besides, LISREL 8.7 program was used for confirmatory factor analyses. For Adaptation To Turkish Of Nurse – Nurse Collaboration Scale; t test was used for test-retest, confirmatory factor analyses was performed for the assessment of factor structure. Cronbach's alpha coefficient was calculated to identify the internal consistence of scale and sub-dimensions.

Ethical Approval

The institutions where the research was performed and İstanbul University Cerrahpaşa Medical Faculty Ethics Committee has approved the research.

Ethics Committee's Date of Approval: 02.04.2013, Number: 83045809/8240

Results

NNCS Adaptation To Turkish

Content Validity and Pilot schema

The original English form of “Nurse-nurse collaboration scale” was independently translated into Turkish by 2 linguists who speak 2 languages as a native language, no change was made. For content validity, 8 experts graduated at least bachelor degree were consulted. Content validity ratio was calculated as 0,98. Then the scale, was retranslated into English irrespective of the original scale, and sent to the developers of the scale by e-mail. They were asked to assess the scale items, and compare them with the original scale items in terms of content and meaning. Then, a pilot schema was performed with 28 nurses to check the intelligibility of scale items. Thus, no change, no deletion or no interpretation were made in terms of scale items after the pilot study.

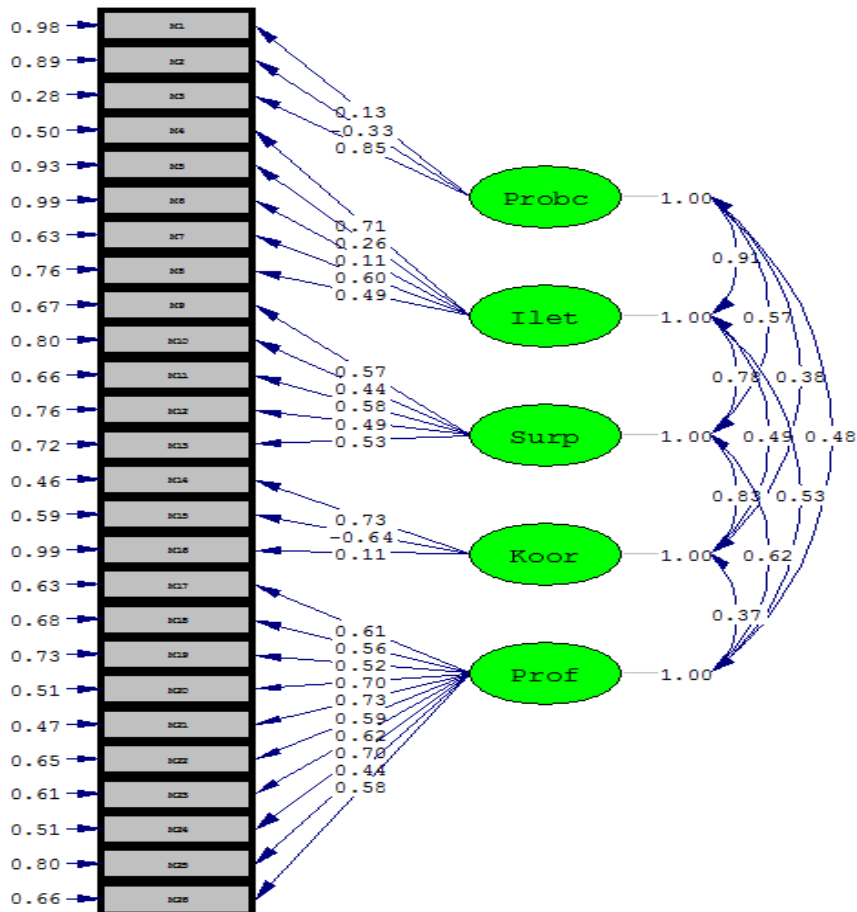
Construct Validity

For Construct Validity of “nurse – nurse collaboration scale”, data homogeneity of 496 nurses primarily was assessed by Kaiser-Meyer-Olkin Measure (KMO) of Sampling Adequacy test and since the test result was $0.962 > ,05$, data were considered optimal for factor analyses. Consistence of scale items and the significance of correlation matrix was assessed by Bartlett Test for Sphericity.

According to Bartlett Test for Sphericity ($\chi^2=8110,783$; $p<0,000$), there is adequate correlation between items to perform factor analyses on sample data. Then *Construct Validity* of “Nurse-nurse collaboration scale” was calculated by confirmatory factor analyses technique.

According to confirmatory factor analyses; these values named as factor loads showed that each item was a reliable indicator in terms of the identification of the relevant dimension. In this context, the relevant parameter values range between .11 to .85 (Figure 1).

Figure 1: Standardized Parameter Values according to NNCS's confirmatory factor analyses



*Probc: Problem solving, ilet: communication, Surp: process sharing, Koor: Koordinasyon, Prof: professionalism

The main indicator showing whether each indicator would remain in the scale is t-values produced for parameters associated with relevant factor loads, and these values were ranged from 2.06 to 17.87 and all values were significant if the level was .05 (the parameters above 1.96 were significant if the level was .05). Totally, good consistence values ($\chi^2 = 1059.23$, $sd = 293$, $CFI = .92$, $IFI = .92$, $RMSEA = .078$, $SRMR = .073$) used to show whether data supports this test model showed that the relevant model is supported adequately with the data. Confirmatory factor analyses suggest that total of 9 items should be removed from the model including items 1.1, 1.2, 1.5, 1.6 of problem solving dimension, 2.3, 2.5, 2.8 of communication dimension, 3.1 of process sharing dimension and 4.2 of Coordination dimension (Table 1).

Table 1: Item distribution in Original “nurse – nurse collaboration scale” and Turkish version by factors (N=496)

Factors	Original scale items	Turkish version items
Problem Solving	1.1., 1.2., 1.3., 1.4.,1.5., 1.6., 1.7.	1.3., 1.4., 1.7.
Communication	2.1., 2.2.,2.3., 2.4., 2.5., 2.6., 2.7., 2.8.	2.1., 2.2., 2.4., 2.6., 2.7.
Process Sharing	3.1., 3.2., 3.3., 3.4., 3.5., 3.6., 3.7., 3.8.	3.2., 3.3., 3.4., 3.5., 3.6.
Coordination	4.1., 4.2., 4.3., 4.4., 4.5.	3.7., 3.8., 4.1.
Professionalism	5.1., 5.2., 5.3., 5.4., 5.5., 5.6., 5.7.	4.3., 4.4., 4.5., 5.1., 5.2., 5.3., 5.4., 5.5., 5.6., 5.7.

Internal consistency (Cronbach α)

In this study, scale's item- total score correlation was ranged between 0.36-0.74. Scale's total Cronbach α internal consistency coefficient was .93. The factor alpha coefficients were calculated to identify scale's internal consistency and these coefficients were .75, .71, .80, .78, .93 for 5 sub-factors respectively.

Test – retest

Test retest technique was used for consistence of these 5 factors in time. For this reason, scale was retested in a sub-sample including 38 nurses (names hidden) after three (3) weeks. In both tests, t test was used to identify if there is any difference between item means and no statistically significant difference was found between items. ($p>0,05$).

Discussion

The nurses are the most crowded personnel in the health team (Apker et al 2006). Nurses become collaborative members of teams through their knowledge and skills. They should always work in collaboration with the other health professionals during the patient care. (Orchard 2010).

When Turkish and world literature was reviewed, most of them evaluate doctor-nurse collaboration.(Baggs et al 1999; Hojat et al 2001; Yıldırım et al 2005; Ushiro 2009; Hughes and Fitzpatrick 2010; Nair et al 2012; Matziou et al 2014 vb.). The one and only scale for nurse-nurse collaboration in the world was developed by Dougherty and Larson (2010). After the development of “nurse-nurse collaboration scale”, we did not find any use in nurse samples. In our country, we did not find any scale for nurse-nurse collaboration, so we can say that this is the first national study on this issue.

The research was performed on a sample consisting total of N=496 nurses working in one public, one university and four private hospitals. All nurses graduated at least bachelor degree. The scale consists of 5 dimensions (problem solving, communication, process sharing, coordination and professionalism). These dimensions suggest that the nurses consider all opinions when problem-solving, work very much, use expert experiences, communicate each other easily and openly, are asked opinions in the institutions or units they are working, have parts in decision making, have the authority to confirm patient safety, have the authority to stop violations associated with the standards of patient safety and infections, have received written documents of treatment protocols, politics and procedures of the health institutions, make nurse visits, have sincere and respectful nurse-nurse relationships, have adequate knowledge associated with the illness period and drugs, consult amateur nurses, and support leadership attitudes and collaboration.

However following confirmatory factor analyses under the title of construct validity, 4 items were removed from problem solving dimension, 3 items were removed from communication dimension, 1 item was removed from process sharing dimension and 1 item was removed from Coordination dimension. Besides item shifts were identified between process sharing, coordination and professionalism dimensions (Table 1).

Problem solving; contains communication, decision, problem solving, change, leadership, helping and education processes during nursing period. The research reported that, nurse did not see themselves as a good problem-solver, therefore they hold back when there is a problem. (Abaan and Altıntoprak, 2005; Sütçü, 2005). Communication is very important during nursing period. If there is no effective communication, patient care would be in danger and communication problems may occur among personnels. In conclusion, reconciliation, patient safety and care quality would be in danger (Nadzam, 2009)

According to NNCS's original form, the deleted items and shifting items in Turkish version lead to misunderstanding of the scale items including problem solving, process sharing and coordination dimensions in our country. Besides the nurses do not use problem solving, process sharing and coordination adequately during work or care, and they are inadequate in terms of effective communication. Maybe the cultural differences might affect the process. During scale development studies, the internal consistency of the scale items should be tested (Gözüm and Aksayan 2003). The internal consistency analyses of Turkish version of Nurse – Nurse Collaboration Scale showed that cronbach α reliability coefficient was 0,93 for the whole, scale. This result showed that the internal consistency between scale items was high and very reliable. Factors' alpha coefficients were calculated to identify the scale's internal consistency and these coefficients were .75, .71, .80, .78, .93 for 5 sub-factors respectively.

Alpha values approximate to the sub-dimensions of the original scale. (.76, .66, .81, .81, .90). The research showed that the correlation of scale's item total score was between 0.36–0.74, the Cronbach alpha consistence of sub-groups was between 0.93 to 0.71 and met the required criteria adequately. Tezbaşan (1997) suggested that there was a high correlation between items and scale scores, and they measured in the same dimension. He showed that the internal consistence of alpha coefficients were adequate and test retest correlations showed that the scale had an optimal consistence.

Conclusions and Recommendations

“Nurse- Nurse Collaboration Scale” developed by Dougherty and Larson (2010) was adapted to Turkish and named as “Nurse-nurse collaboration scale”(NNCS). It is suggested that nurse-nurse collaboration scale was highly valid and reliable. The scale's content validity index was 0.98, item total score correlations were 0,36-0,74. The scale's Cronbach α reliability coefficient was 0,93, and were 0,75, 0,71, 0,80, 0,78 and 0,93 in sub-dimensions respectively. It is found significant if it is above 0,70. Definitive factor analyses was performed under the title of construct validity, 5-factor scale construct was maintained and 9 items below 0,40 factor load were removed. Besides, following the confirmatory factor analyses, scale's validity was confirmed and it was compatible with the original scale, measuring the construct (nurse-nurse collaboration scale). Original scale had total of 35 items and 5 dimensions, but Turkish version total of 26 items and 5 (five) dimensions. Since nurse-nurse collaboration decreases patient death and medical errors, all world, especially hospital managers, civil society organizations such as WHO should consider it.

Nurse-nurse collaboration should be considered by the managers of the hospital and the practices that could increase collaboration should be performed.

Nurses should be in collaboration with other nurses and all other health care personnels.

Limitations

- The research is restricted to a sample consisting nurses working in 1 university, 1 public and 4 private hospitals in Istanbul City.
- The research results are restricted to the scale's (NNCS) items.
- The research results are restricted to the participant nurse's voluntary answers.

Author Contributions

All authors have been accredited as appropriate upon submission of the manuscript according to the International Committee of Medical Journal Editors' authorship criteria. Specifically, all the authors have been involved in the development of the study concept and design, critical revisions for important intellectual content in writing the manuscript, and administrative support. The data collection was performed by the first author

Conflict of Interest

There were no conflicts of interest to report.

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