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## International Journal of Nursing Sciences

journal homepage: <http://www.elsevier.com/journals/international-journal-of-nursing-sciences/2352-0132>

## Original Article

## Adaptation of the Turkish version of Nurses' Self Concept Questionnaire

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## ARTICLE INFO

## Article history:

Received 9 August 2018

Received in revised form

25 September 2018

Accepted 17 December 2018

Available online 20 December 2018

## Keywords:

Nurses

Self-concept questionnaire

Reliability

Self-esteem

Students, Nursing

Turkey

Validity

## ABSTRACT

**Objectives:** Nurse's self-concept is significant for professionalism. We aimed to determine the reliability and validity of the Turkish version of a Nurses' Self Concept Questionnaire.

**Methods:** A methodological study was conducted with the participation of a group of nursing students and nurses. For the statistical analysis, structural equation models, convergent validity analyses, discriminate validity analyses, internal consistency analysis, and test-retest reliability analyses were used.

**Results:** Correlation-coefficient for the test–retest reliability of the Turkish version of Nurses' Self-Concept Questionnaire was 0.87. The internal consistency of this questionnaire was calculated with Cronbach's  $\alpha$  coefficient and it was found high across the six subscales from 0.83 to 0.91. The goodness of fit indices was determined as acceptable.

**Conclusions:** According to results, this Nurses' Self-Concept Questionnaire is a valid and reliable instrument for assessing nurses' and nursing students' self-concept in Turkey.

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## 1. Introduction

There is still an ongoing controversy regarding the concepts of the nursing profession. Despite the increasing need for nurses and patients' growing expectations from nurses, the negative image of nurses in the community has not changed. In addition, problems related to professional qualifications and identity continue [1–3].

Self-concept is defined as all the beliefs an individual has regarding himself or herself and is also referred to as an image formed concerning one's identity. However, professional self-concept is defined, whether by choice or not, as the accumulation of the meanings of the profession according to individuals and their conversion to a professional choice [4]. The professional concept and the personal self-concept were reported as two different terms

by Arthur in 1992, and he suggested that it is important to find an explanation for the relationship between these two terms.

In the 1970s, new scales about professional self-concept were developed because of a lack of scales that measured not only self-concept but also professional concept. The Professional Self-Concept of Nurses Instrument (PSCNI) [5,6] and the Nurse's Self-Description Form (NSDF) [7] are pioneering scales related to self-concept in the nursing profession. Among the studies conducted on self-concept in nursing, research on self-concept specific to the profession rather than the general self-concept is conducted [5,8–10].

Cowin stated that the nursing profession includes not only technical expertise but also the psychological care of individuals. Therefore, professional self-concept has important roles in the development and sustainability of the nursing profession. Cowin has developed a new scale called the Nurses' Self-Concept Questionnaire (NSCQ) to eliminate the problems associated with measurement and the theoretical weaknesses of the concept in related scales [9].

Cowin pointed out that the development of professional self-concept begins during nurses' training, and that professional self-concept interacts with personal self-concept, may change over

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Peer review under responsibility of Chinese Nursing Association.

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time, and has transcultural differences. Therefore, Cowin (2002) took into consideration both nurses and students, different ethnic groups, and a cohort design when she was developing the NSCQ. The determination of professional self-concept in nursing is limited to self-concept studies in Turkey and not to the profession [11].

The aim of this study was to adapt the NSCQ to Turkish. The Nurses' Self-Concept Questionnaire (NSCQ) is specific to the nursing profession. This study aims to demonstrate that this scale has validity in different cultures.

## 2. Methods

### 2.1. Participants

This study was conducted with the participation of both randomly selected final-year students ( $n = 335$ , the nursing faculty) and nurses working ( $n = 338$ ) in two university hospitals in the Aegean region of Turkey. It was aimed to reach all nurses ( $n = 380$ ) working at these hospitals but 338 (88.9%) nurses were reached. There were 560 senior students in two universities. The universities were chosen according to the number of their students. The targeted 360 students were selected by random sampling method and 335 (93.1%) students were reached.

### 2.2. Design

The study was designed as a methodological study and included translation, content validity, a pilot study, test-retest, reliability and internal consistency, structural equation models (exploratory factor analysis [EFA] and confirmatory factor analysis [CFA]) for construct validity, convergent validity, and discriminate validity analyses during the process of adapting the scale.

For sample size, it is suggested that 5 or 10 subjects per item are appropriate regardless of the number of items for the sample size in EFA [12]. Comrey and Lee evaluated the sample size of 50 subjects as very poor, 100 as poor, 200 as fair, 300 as good, 500 as very good, and 1000 or more as excellent [13]. This study included 673 participants, therefore sample size is "good".

### 2.3. Instruments

In this study, a questionnaire which included socio-demographic characteristics [age, gender, position (*nurse or student*), the professional experience of nurses (*years*) and working shift], the NSCQ scale and The Rosenberg Self-Esteem Scale (RSES) were used.

#### 2.3.1. Nurses' Self-Concept Questionnaire (NSCQ)

The NSCQ measures the development and stability of domains in self-concept that relate specifically to the work of nurses. This scale contains 36 items that are positively worded, and participants respond using an eight-point Likert-type scale ranging from one (definitely false) to eight (definitely true). This scale includes six subscales: nurses' general self-concept (NGSC), caring, staff relations, communication, knowledge, and leadership. Cowin (2001) showed that the NSCQ is reliable and valid. Cronbach's  $\alpha$  was consistently high across the six subscales ranging from 0.78 to 0.95. The hypothesised six subscales of the NSCQ are supported from the results of a CFA. The NSCQ has been adapted to Chinese, Persian and Nigerian [14–16].

#### 2.3.2. Rosenberg Self-Esteem Scale (RSES)

The Rosenberg Self-Esteem Scale (RSES) was developed by Rosenberg (1979) and is a 10-item instrument that explores the personal view of self, which is self-esteem. Participants respond

using a four-point scale that ranges from 1 (strongly disagree) to 4 (strongly agree). Higher scores indicate higher levels of self-esteem. The validity and reliability of the Turkish version of the RSES has been assessed [17].

Rosenberg self-esteem scale is often used in self-esteem studies. In this study Rosenberg self esteem scale was preferred for convergent validity.

### 2.4. Procedure

#### 2.4.1. Translation procedure

The scale was translated using a four-step methodology: forward translation, back translation, reconciliation, and comparison for adapting the NSCQ to Turkish as follows. The original inventory was translated independently by 10 public health specialists and academic nurses with fluent English and an expert of linguistics. Two expert translators with a good command of both Turkish and English translated the reconciled version from Turkish back to English. Finally, the original and back-translated versions were re-evaluated. The back-translation was compared to the original inventory to determine whether any differences had occurred between the English and Turkish inventories in meaning and concept coherence. The inventory assumed its final target-language version and confirmed the conceptual and literal equivalence of the Turkish version of Nurses' Self-Concept Questionnaire (T-NSCQ).

#### 2.4.2. Content validity

Experts ( $n = 10$ ) including specialist nurses (2), assistant professors in nursing (5), clinical nursing managers (2), and a registered nurse (1) evaluated the Turkish version's content validity. Experts were asked to assess items' content, meaning, and comprehensibility using terms proposed as a four-point scale [18]. The cut-off value of the content validity ratio (I-CVR) over 0.78 or 0.80 has been considered acceptable (evidence of good content validity) [18,19]. The I-CVI value was determined to be higher than 0.78.

#### 2.4.3. Reliability (test-retest) and internal consistency

Pearson correlation coefficient with a two-week interval between evaluations was used to determine test-retest reliability [20]. Cronbach's  $\alpha$  coefficients for the overall T-NSCQ and six subscales were used to determine reliability and internal consistency.

#### 2.4.4. Convergent validity

Pearson correlation coefficient was used to determine convergent validity between the T-NSCQ and the RSES. Internal construct validity was assessed by examining the item-total correlation. Moreover, correlation analysis was performed to determine the relationships between the subscales [21].

#### 2.4.5. Construct validity

The structural validity of the T-NSCQ was determined by EFA and CFA. First, EFA was used for structural validity. The Kaiser-Meyer-Olkin (KMO) test was applied in order to test the sufficiency of the sample size. The KMO value is considered to be perfect if it approaches 1.0 [22]. To determine the factor structure of T-NSCQ, principle component analysis was applied to the data according to Kaiser normalization and oblique rotation transformation. T-NSCQ factors with an Eigen value  $> 1$  were considered to be significant [23]. Factor loading for items exceeding 0.40 was considered acceptable [24,25].

Next, a series of structural equation models for CFA using linear structural relationships was applied (LISREL) [26]. In this study, model fit was assessed by a combination of fit indices including  $\chi^2/df$ , RMSEA, SRMR, GFI, CFI and NNFI (TLI) [21,27–29].

#### 2.4.6. Discriminant validity

Discriminant validity was tested by comparing the self-concept scores among various subgroups by age, gender, and position. Parametric tests were used for discriminant validity. If the data did not show a normal distribution, non-parametric tests were used. The level of significance was acceptable as  $P < 0.05$ . Statistic analysis was applied by SPSS 17.0.

#### 2.4.7. Ethical considerations

For this study, ethics committee approval was received from the Nursing Faculty of Ege University (approval no. 2012–62). Informed written consent was received from the participants. Cowin's permission was obtained for adaptation of NSCQ questionnaire into Turkish, and also she was informed about the results of the our pilot study prior the submission.

### 3. Results

The majority of the nurses (93.8%) were female, and 72.8% of the students were female ( $P < 0.001$ ). The mean age was  $22.4 \pm 1.4$  years for students and  $30.6 \pm 6.9$  years for nurses. The professional experience of nurses was  $8.9 \pm 6.8$  years and 57.1% of nurses were working on alternating day and night shifts, 28.7% on permanent day shift.

#### 3.1. Test-retest; the internal consistency reliability

For all groups, correlation coefficient for test-retest reliability of the overall T-NSCQ was 0.87. The subscales had a high coefficient (for leadership  $r = 0.87$ ; NGSC  $r = 0.84$ ; knowledge  $r = 0.83$ ; caring  $r = 0.77$ ; communication  $r = 0.76$ ) except staff relations ( $r = 0.69$ ). The results of test-retest reliability were similar for both nurses and nursing students.

Cronbach's  $\alpha$  coefficient was 0.95 for the 36 items of the T-NSCQ and ranged from 0.83 to 0.91 in subscales (Table 1). There was a relationship between all NSCQ factors ranging from 0.414 to 0.789 (between nurses' general self-concepts and leadership and between staff relations and communications, respectively) (Table 2). Discrimination of the subscale items was determined by corrected item-total score correlations, and correlation coefficients were estimated as 0.406–0.707.

#### 3.2. Construct validity

First, factor analysis was performed to determine the original factor structure (EFA). Bartlett's test of sphericity was statistically significant ( $\chi^2 = 16134$ ,  $df = 630$ ,  $P < 0.001$ ), indicating that the sample matrix did not come from an identity matrix. The KMO of sampling adequacy was 0.95. These results supported the use of factor analysis as an appropriate procedure.

Among the 673 participants, the EFA yielded six factors with eigenvalues  $> 1.00$ , explaining 65.76% of the total variance. Except

for the NSCQ item 9, all factor loadings of the 36 items were above 0.40. The six-factor structure obtained was similar to that of the original study. However, the yielded items of factors were not fully compatible with the original scale. Two items in factor 6 (items 1 and 2) were yielded. Also, items of two different factors (communication and staff relations) in the original scale were loaded in a single factor (except items 2, 9, and 13) in our study. Of the items, 9 yielded communication–staff relationships (factor 1), 6 items in general (factor 2), 7 items in leadership (factor 3), 6 items in caring (factor 4), and 5 items in knowledge (factor 5). A difference from the original NSCQ item 25 (“I am respected as a nurse because of my nursing knowledge”) was yielded in leadership; item 19 (“I am constantly incorporating new nursing knowledge into my patient care”) in caring; and item 13 (“I enjoy communicating information and ideas with colleagues and patients”) in the knowledge subscale. Our findings indicated that item 9 (“I gain a lot of professional pleasure from my relationships with colleagues”) did not yield any of the factors. According to the original NSCQ, item 1 did not yield in caring; items 19 and 25 did not yield in the knowledge subscale. Items 1 and 2 collected on factor 6 were not defined as factors due to the fact that they took part in separate factors in the original subscale and that there was a dissimilarity between the items (Table 3).

Secondly, EFA was tested with a 5-factor structure model. Five factors explained 62.77% of the total variance. Yielding of the items was similar to the six-factor structure. Although two items in factor 6 (items 1 and 2) were yielded in the first analysis, item 2 was yielded in factor 1 (staff relations–communications), and item 1 was yielded in factor 5 (caring) in the second analysis.

#### 3.3. Confirmatory factor analyses for T-NSCQ

Our results demonstrated that the goodness of fit indices of the T-NSCQ were acceptable for all groups (RMSEA = 0.081, NNFI [TLI] = 0.97, CFI = 0.97, SRMR = 0.072, except GFI = 0.80,  $\chi^2$ : 3110;  $df$ : 579 and  $\chi^2/df = 5.37$ ). Moreover, the goodness of fit indices of the T-NSCQ were similar for both students and nurses. While RMSEA for students was lower than for nurses, it was higher for nurses. The results of the modification index values were examined in relation to all groups (Table 4).

In particular, it was determined that there was a stronger association in error covariance between item 2 and item 1, item 8 and item 5. The results were similar for both nurses and nursing students. In order to examine the compatibility of the model by checking the error variance, two error variances were added to the model, and CFA was repeated; the results of the CFA were as follows:  $\chi^2$ : 2896;  $df$ : 577;  $\chi^2/df = 5.01$ ; SRMR = 0.070, GFI = 0.81, CFI = 0.96, NNFI (TLI) = 0.097 and RMSEA = 0.077. All fit indices showed a positive change for all groups. The results showed a similarity for nurses and nursing students. When the results obtained by EFA for the T-NSCQ were also examined with CFA, we observed better results for all fit indices, except GFI, for all groups, nurses and students, than for the original model (Table 4).

#### 3.4. Convergent validity

##### 3.4.1. Dokümanı çevirin.Şu dilden çevir: Türkçe

Rosenberg's Self-Esteem Scale was also positively and significantly correlated with NSCQ subscales (ranging from 0.147 for NSGS to 0.375 for communications). Mean scores of the Rosenberg Self-Esteem Scale between nurses and students were significantly different ( $18.0 \pm 7.1$  for nurses and  $16.7 \pm 6.4$  for students) ( $P = 0.017$ ).

**Table 1**  
Cronbach's  $\alpha$  coefficient of the Turkish version of Nurses' Self-Concept Questionnaire.

Subscales	All groups	Students	Nurses
General self-concept	0.91	0.90	0.92
Caring	0.86	0.87	0.86
Staff relations	0.83	0.83	0.83
Communicating	0.89	0.89	0.89
Knowledge	0.85	0.86	0.83
Leadership	0.87	0.86	0.87
Total	0.95	0.96	0.95

**Table 2**  
Correlation coefficients among six factors of the Turkish version of Nurses' Self-Concept Questionnaire ( $n = 673$ ).

Subscales	General self-concept	Caring	Staff relations	Communicating	Knowledge	Leadership
General self-concept	–					
Caring	0.571	–				
Staff relations	0.471	0.621	–			
Communicating	0.445	0.648	0.789	–		
Knowledge	0.608	0.705	0.658	0.676	–	
Leadership	0.414	0.607	0.509	0.560	0.522	–
RSES	0.147	0.295	0.311	0.375	0.230	0.363

Note: All of the correlation coefficients are significant at the 0.01 level (2-tailed). RSES: Rosenberg Self-Esteem Scale.

**Table 3**  
Rotated factor loadings for exploratory factor analysis of the Turkish version of Nurses' Self-Concept Questionnaire ( $n = 673$ ).

Items	Factor 1 Communicating	Factor 2 General self-concept	Factor 3 Leadership	Factor 4 Caring	Factor 5 Knowledge	Factor 6 <sup>a</sup>
Item 26	0.83					
Item 30	0.83					
Item 36	0.82					
Item 32	0.79 <sup>b</sup>					
Item 7	0.78					
Item 24	0.76 <sup>b</sup>					
Item 15	0.69 <sup>b</sup>					
Item 21	0.64					
Item 11	0.62 <sup>b</sup>					
Item 12		0.99				
Item 18		0.89				
Item 6		0.89				
Item 3		0.88				
Item 16		0.78				
Item 27		0.44				
Item 8			0.89			
Item 5			0.89			
Item 22			0.82			
Item 33			0.67			
Item 17			0.56			
Item 28			0.55			
Item 25			0.44 <sup>b</sup>			
Item 9						
Item 20				0.79		
Item 34				0.68		
Item 29				0.64		
Item 19				0.62 <sup>b</sup>		
Item 23				0.59		
Item 31				0.50		
Item 14					0.81	
Item 10					0.76	
Item 35					0.71	
Item 4					0.65	
Item 13					0.47 <sup>b</sup>	
Item 2						0.77 <sup>b</sup>
Item 1						0.74 <sup>b</sup>
Variance, %	40.33	8.66	6.40	4.02	3.35	3.00
Cumulative, %	40.33	49.00	55.40	59.41	62.77	65.76

Note:

<sup>a</sup> Not accepted as a different factor with a new name.

<sup>b</sup> Item which yielded in different factors from the original NSCQ.

### 3.5. Discriminant validity

The staff relations ( $P = 0.002$ ), communication ( $P = 0.004$ ), knowledge ( $P = 0.001$ ) and leadership ( $P = 0.022$ ) subscale scores were higher among nurses compared to nursing students. The knowledge score was higher in women ( $P = 0.003$ ) than in men, and the leadership score was higher in men ( $P = 0.039$ ) than in women. We revealed a significant relationship between the scores for age and leadership of the nurses. The leadership score was relatively lower for nurses under the age of 25 (Table 5).

## 4. Discussion

In this study, the T-NSCQ showed good psychometric properties among registered nurses and nursing students in Turkey. The internal consistency of the NSCQ, as measured by Cronbach's  $\alpha$ , was consistently high across the six subscales ranging from 0.83 to 0.91 for staff relationships and the NGSC subscales, respectively. Also, Cronbach's  $\alpha$  coefficient was similar for both nurses and students. If the internal consistency reliability of each subscale were over 0.70 or 0.80, the scale would be considered reliable [30]. In this study,

**Table 4**  
Goodness of Fit Indices (GFI) for Turkish version of Nurses' Self-Concept Questionnaire.

	n	$\chi^2/df$	RMSEA	NNFI (TLI)	CFI	SRMR	GFI
Six factors structure (original)							
All groups	673	3110/579 (5.37)	0.081	0.97	0.97	0.072	0.80
Student	335	1808/579 (3.12)	0.080	0.96	0.97	0.072	0.77
Nurse	338	2070/579 (3.58)	0.087	0.96	0.96	0.080	0.75
Six factors structure by modification							
All groups	673	2896/577 (5.01)	0.077	0.97	0.96	0.070	0.81
Student	335	1709/577 (2.96)	0.077	0.97	0.97	0.071	0.78
Nurse	338	2007/577 (3.48)	0.077	0.97	0.96	0.070	0.81
Five factors structure							
All groups	673	2330/517 (4.51)	0.072	0.97	0.98	0.060	0.83
Student	335	1470/517 (2.84)	0.074	0.97	0.97	0.060	0.79
Nurse	338	1536/517 (2.97)	0.076	0.97	0.97	0.060	0.83
Five factors structure by modification							
All groups	673	2130/515 (4.14)	0.068	0.97	0.97	0.068	0.79
Student	335	1378/515 (2.68)	0.071	0.97	0.97	0.058	0.80
Nurse	338	1441/515 (2.80)	0.073	0.97	0.97	0.066	0.80

Cronbach's  $\alpha$  coefficient for each subscale being higher than 0.80 suggests high internal consistency reliability. Our internal consistency results were similar to others in the literature, as reported by Cowin [9,31,32]. In addition, our results were consistent with the previously reported Persian and Chinese studies [14,15]. However, Cronbach's  $\alpha$  for all the subscales we observed was lower than that of the original NSCQ.

The corrected item total correlations in the subscales ranged from 0.41 to 0.71. Generally, it is considered that if the item total correlation is 0.30 or higher, this indicates that the items are distinguishable; if the items are 0.40 or higher, it indicates that the items are very distinguishable [28]. The correlations among the six factors were moderate ( $r=0.414$  to  $0.789$ ), indicating that the factors were clearly distinguishable from one another (except between staff relations and communication). The correlations among the subscales ranged from small to moderate ( $r=0.30$  to  $0.63$ ) in the Nigerian study [16]. Our correlation coefficient results were lower compared to Cowin and Euckay's report ( $r=0.48$  to  $0.88$ ) [9,16].

It is observed that, although our EFA results confirmed 65.76% of the total variance of the items yielded in six subscales, these six factors were different from the original. Most of the items of communication and staff relations factors were yielded in one factor (except items 2, 9, and 13). Therefore, a 5-factor structure model was tested and the explained variance obtained was 62.77%.

Similarly, the items for communication and staff relations factors (10 items) were yielded under one common factor. Although what we obtained was lower than those of the Cowin and Persian versions (72.9% and 76.63% for the Cowin and Persian versions respectively), it was very similar to the Chinese version (61.6%). There were no significant differences related to the yielding factor in other studies, which differs from our results. In the Chinese version, the factor structure of C-NSCQ was, to some extent, different from the original item 9 (staff relationship) and item 25 (knowledge) belonging to the general self-concept subscale [14]. The factor structure was well defined with all factor loading being positive, significant and higher than 0.40 (from 0.49 to 0.73) in the Nigerian version [16].

In our study, we observed problems related to the staff relations and communications scales similar to those encountered during the development of the original scale. Although the expectations from two dimensions during the process of conceptualization were different, the current practice of nursing services is not sufficient to demonstrate this difference. Cowin (2001) explained this situation as follows: *Perhaps a reason for such problems lies with the fact that nurses may not readily distinguish any differences between communicating with other persons and working together with other persons. A nurse might assume that if he or she is able to relate comfortably in the former, then the latter must also be true* [9]. These two dimensions may yield in one common factor because of the current practice of nursing services and for cultural reasons.

The results demonstrated that the goodness of fit indices of the T-NSCQ was acceptable for all groups. The goodness of fit indices after the two proposed modifications for all groups were determined as ( $\chi^2/df=5.01$ ) SRMR = 0.070, GFI = 0.81, CFI = 0.96, NNFI (TLI) = 0.097 and RMSEA = 0.077) respectively). While RMSEA for students was lower than that of all groups, the value for nurses was higher than that of all groups.

Various criteria are used to assess goodness of fit indices. The value of  $\chi^2/df < 2$  is an excellent index; 2–3 is considered acceptable [33], and  $< 5$  is considered acceptable [27]. As seen in this study, while the value of  $\chi^2/df$  was 5.01 for all groups, when the sample size got smaller, it decreased to 3.48 for the nurses and 2.96 for the students. The value of  $\chi^2/df$  obtained by this study was acceptable. A GFI, CFI and NNFI (TLI)  $\geq 0.90$  -  $< 0.95$  is an acceptable fit index and  $\geq 0.95$  is an excellent fit index [21,27]. In this study, an excellent fit was obtained with CFI and NNFI (TLI) fit indices except for GFI. This result indicates that GFI value is effected by sample size; therefore, it should not be used as a goodness of fit index [34]. For RMSEA,  $\leq 0.06$  is a close fit index,  $0.06 - \leq 0.08$  is a reasonable (moderate) fit index, and  $\leq 1.0$  is a poor fit index [33]. For SRMR,  $>$

**Table 5**  
Discriminant validity of Turkish version of Nurses' Self-Concept Questionnaire (Mean  $\pm$  SD).

Groups	n	General self-concept	Caring	Staff relations	Communi-cating	Knowledge	Leadership	Total
All groups	673	5.76 $\pm$ 1.48	6.28 $\pm$ 1.03	6.53 $\pm$ 0.91	6.66 $\pm$ 0.90	6.45 $\pm$ 1.03	5.63 $\pm$ 1.30	6.18 $\pm$ 0.91
Position								
Nurse	338	5.69 $\pm$ 1.36	6.30 $\pm$ 1.09	6.61 $\pm$ 0.92	6.75 $\pm$ 0.88	6.57 $\pm$ 0.98	5.52 $\pm$ 1.39	6.24 $\pm$ 0.92
Student	335	5.64 $\pm$ 1.59	6.26 $\pm$ 0.97	6.45 $\pm$ 0.89	6.56 $\pm$ 0.92	6.33 $\pm$ 1.06	5.75 $\pm$ 1.18	6.17 $\pm$ 0.86
P		0.748	0.589	<b>0.002</b>	<b>0.004</b>	<b>0.001</b>	<b>0.022</b>	0.294
Gender								
Female	561	5.68 $\pm$ 1.50	6.31 $\pm$ 1.03	6.52 $\pm$ 0.92	6.66 $\pm$ 0.88	6.51 $\pm$ 0.99	5.59 $\pm$ 1.31	6.21 $\pm$ 0.90
Male	112	5.59 $\pm$ 1.34	6.13 $\pm$ 1.02	6.60 $\pm$ 0.86	6.65 $\pm$ 0.94	6.18 $\pm$ 1.16	5.86 $\pm$ 1.22	6.17 $\pm$ 0.85
P		0.527	0.088	0.427	0.916	<b>0.003</b>	<b>0.039</b>	0.627
Nurses' Age								
<25	76	5.99 $\pm$ 1.34	6.20 $\pm$ 0.97	6.79 $\pm$ 0.65	6.75 $\pm$ 0.73	6.64 $\pm$ 0.77	5.25 $\pm$ 1.24	6.27 $\pm$ 0.74
25–29	74	5.61 $\pm$ 1.60	6.16 $\pm$ 1.20	6.43 $\pm$ 1.05	6.67 $\pm$ 0.95	6.50 $\pm$ 1.03	5.41 $\pm$ 1.40	6.13 $\pm$ 0.96
30–34	81	5.80 $\pm$ 1.65	6.39 $\pm$ 1.14	6.66 $\pm$ 1.01	6.81 $\pm$ 0.83	6.54 $\pm$ 1.09	5.60 $\pm$ 1.40	6.30 $\pm$ 0.97
35–39	78	5.52 $\pm$ 1.70	6.49 $\pm$ 1.05	6.64 $\pm$ 0.86	6.80 $\pm$ 0.79	6.62 $\pm$ 0.96	5.78 $\pm$ 1.40	6.31 $\pm$ 0.93
$\geq 40$	29	5.70 $\pm$ 1.58	6.37 $\pm$ 0.96	6.53 $\pm$ 0.91	6.80 $\pm$ 0.80	6.68 $\pm$ 0.92	5.76 $\pm$ 1.52	6.25 $\pm$ 0.88
P		0.456	0.123	0.302	0.065	0.174	<b>0.032</b>	0.355

0.05– $\leq$  0.10 is an acceptable fit index, and  $\leq$ 0.05 is an excellent fit index [21]. Although  $\chi^2/df$  higher than 5 in CFA results which analyzed for all group, when each group analyzed separately  $\chi^2/df$  significantly improved. This may be due to the fact that the all group is not homogeneous and shows us that each group should be evaluated separately. Nonetheless, after modification, model (for all group) has significantly improved especially with  $\chi^2/df$  meeting the threshold values (less than 5). So,  $\chi^2/df$  is considered acceptable. In summary, the majority of the fit indices observed by the T-NSCQ were reasonable/acceptable.

The RMSEA value of the T-NSCQ was lower than that of other adaptation studies and Cowin's report [9,14,16]. While the RMSEA was 0.06 in the Chinese and Nigerian studies [14,16], it was reported as to be 0.71 for the combined group (nurses and students), 0.70 for students, and 0.75 for nurses in Cowin's study [9]. However, NNFI (TLI) was found to be higher than those of other studies [9,14,16].

The test-retest reliability of the T-NSCQ subscales ranged from 0.69 to 0.87. Only one subscale (staff relations) was relatively low (0.69); other subscales were 0.76 or higher. The test-retest reliability showed good stability over time. The overall test-retest reliability of C-NSCQ was 0.83, but the test-retest reliability of three subscales was relatively low (ranging from 0.62 to 0.69). The test-retest reliability of the overall C-NSCQ and general self-concept, caring, and communication subscales ranged from 0.73 to 0.83, indicating good stability over time. However, the coefficients of the other three subscales were lower than 0.70 (knowledge = 0.69, leadership = 0.67 and staff relationship = 0.62 respectively) [14].

There was a significantly positive correlation between T-NSCQ and RSES with self-esteem, but it was weak. While the RSES measures general self-esteem, the NSCQ includes professional self-concept. The weak correlation with the RSES illustrates that a separate instrument is required for professional self-concept, as it is reported that the term self-concept is different from self-esteem, body image, and self-image [35]. Self-concept researchers reported that self-esteem is more specifically an emotional evaluation of the self; by contrast, the term self-concept encompasses all affective and cognitive descriptors of the self [35,36].

In other studies, the correlation between burnout, job satisfaction, and nurses' retention plans was investigated with the NSCQ. Cao et al. (2013) demonstrated that nurses' self-concept was a significant predictor for burnout. It was shown that there is a correlation between job satisfaction (MSQ) and MBI (emotion, personal accomplishment and depersonalization subscales) using the NSCQ in the Nigerian study [16]. Nurses with high self-concept were expected to have low burnout; thus, the negative correlation was observed from the results.

The subscale scores obtained in our study are similar to the findings in Cowin's report [9]. The lowest score belonged to the leadership subscale. However, while the other five subscale scores were slightly lower than Cowin's, the leadership scores were higher. In our study, the staff relations, communication and knowledge subscale scores were relatively higher in nurses compared to students. Knowledge scores were higher in women, and leadership scores were higher in men. Leadership scores were relatively lower in nurses who were younger than 25 years old.

Cowin's (2001) greatest difference lies in the subscale of leadership, it was significantly lower in nursing students than in nurses for all six items. Moreover, significant differences were found on the subscales of caring, staff relations, and communication. In another study, there was a significant association between gender and interest in the nursing profession and professional self-concept; however, the relationship between age and professional self-concept was not significant [15]. Regarding seniority, it was

determined that student/new graduate nurses had lower self-esteem when compared to experienced nurses. It was reported that there were no statistically significant trends related to senior [31]. From these results, we can conclude that the NGSC is developing a lower range of specific nurse self-concept domains compared to communication and knowledge.

The decrease in the NGSC scores may be due to the effects of the nursing workplace on graduate nurses' self-esteem. These workplace issues include know-how, organizational supports, and specific work areas. Unlike the NGSC results, the domains of caring, staff relations, communication, and knowledge all rose significantly between six and twelve months in the workplace. These results indicate that once the reality shock of the initial workplace had dissipated, graduate nurses were able to take stock of their new career and gain confidence in their nursing abilities [31].

**Limitations:** The lack of monitoring students was the limitation of this study.

## 5. Conclusions

In this study, the validity and reliability of the Turkish NSCQ was investigated among both nurses and nursing students. The NSCQ could be used for monitoring the development of professional self-concept among nursing students and for revealing its relationship with other factors affecting the nurses' professional self-concepts.

## Author contributors

All authors have contributed significantly to this research; (GZ, MZ, LK) designed the study, interpretation of data and editing the manuscript. GZ carried out data collection. GZ and MZ analysed and data, supervised the correct performance of the study, writing manuscript. GZ, MZ and LK reviewed the manuscript critically and approved the final version of manuscript for publication.

## Conflicts of interest

The authors declare that they have no competing interests.

## Funding

No financial support.

## Ethical approval

For this study, ethics committee approval was received from the Nursing Faculty of Ege University (approval no. 2012–62).

## Acknowledgements

We would like to thank all nursing students and nurses who participated in this study.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ijnss.2018.12.004>.

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