

# The adaptation of the Nurse Turnover Intention Scale into Turkish: A validity and reliability study

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## Abstract

**Aim:** The aim of this study was to adapt the Nurse Turnover Intention Scale to Turkish and test its validity and reliability.

**Methods:** This methodological study was conducted with 200 nurses. The Personal Information Form and the Nurse Turnover Intention Scale were used for data collection between November and December 2021. Language and content validity, explanatory and confirmatory factor analysis, criterion validity, Cronbach's alpha coefficient, item-total score correlation and test-retest reliability methods were used for the validity and reliability analysis of the scale.

**Results:** Exploratory factor analysis showed that the Nurse Turnover Intention Scale had a single factor. Its single factor structure was confirmed using confirmatory factor analysis. Cronbach's alpha coefficient of the scale was 0.902, and factor loading was between 0.60 and 0.78. Statistical analyses indicated that each item in the Turkish version of the scale had a high internal consistency. The test-retest correlation value was found as  $p < 0.05$ .

**Conclusion:** The Nurse Turnover Intention Scale has been confirmed to be a suitable, valid and reliable measurement tool for Turkish society. Nurse turnover intention is the most powerful predictor of actual turnover within the nursing profession. This scale will help to easily attain valid and reliable outcomes.

## KEYWORDS

nursing, reliability, Turkey, turnover intention, validity

## Summary statement

What is already known about this topic?

- Nursing is a profession with a high rate of turnover intention.
- Nurse turnover intention is the most powerful predictor of actual turnover.
- There is no measurement tool in Turkey to evaluate the turnover intention specific to nurses.

What this paper adds?

- The revised structure that was developed in this study comprised of 10 items was found to be appropriate, valid and reliable for the Turkish nursing population.
- Nurse turnover intention can now be measured using a valid and reliable tool.

The implications of this paper:

- By using this scale, nursing services can contribute to the determination of the turnover intention levels of nurses and their reasons to take necessary precautions in the institution.

## 1 | INTRODUCTION

Turnover intention is defined as the idea or willingness of a person to resign from their current job, leave and look for another job (Chen et al., 2015). It is induced by intrinsic and extrinsic negative psychological events inside the working environment where these psychological responses evolve into cognitive withdrawal and behaviours and cause actual leave of employment (Labrague & de Los Santos, 2021; Liu et al., 2018).

Nurse turnover intention is the most powerful predictor of actual turnover (Mosallam et al., 2015). Nurse turnover intention describes a conscious and deliberate willingness for leaving the organization (Gebregziabher et al., 2020). There is a clear relationship between turnover intention and actually leaving. Turnover intention is the last cognitive step before actually leaving, and it is the most powerful predictor of actual leaving behaviour (Mosallam et al., 2015) For that reason, early determination of turnover intention is important for preventing nurses from quitting their jobs (Takase, 2010).

Nurse turnover is the process in which nurses leave their jobs or occupations due to various reasons (Dewanto & Wardhani, 2018; Mosallam et al., 2015). It creates adverse effects on nurses, patients and institutions. High turnover rates of nurses cause a failure in patient care services, a higher incidence of adverse events and complications, an increase in patient mortality and worsening of working conditions (Griffiths et al., 2019; Kang, 2018). Nurse turnover affects the motivation, productivity and effectiveness of nurses who are left behind in a negative way. Besides, it may increase workload and create a vicious cycle by further increasing the turnover rate (Duffield et al., 2014; Hayes et al., 2012). The hospital management's obligations arising from nurse turnover, such as the recruitment, orientation and training of new staff, affect the productivity and performance levels of the institution. It forces nursing managers to take several organizational precautions and approaches to maintain high quality nursing care and to protect the nursing workforce (Rajan, 2015).

A major global issue is the shortage of nurses induced by high turnover rates (Hølge-Hazelton & Berthelsen, 2020). The nurse turnover rates reported in Western countries such as the United States of America, Canada, Australia and New Zealand as well as in Asian countries such as Japan, China and Indonesia ranged between 12% and 44.3% (Dewanto & Wardhani, 2018; Duffield et al., 2014).

In a study which was carried out in 10 European countries, it was shown that nurse turnover intention within the institution varied

between 19% and 49% (Heinen et al., 2013). Also, in studies conducted in Sweden (Gardulf et al., 2005) and Ireland (McCarthy et al., 2007), turnover intention rates were found to be between 54% and 60%. In another study with intensive care nurses in China, it was reported that job satisfaction levels of the nurses were extremely low and two thirds of the nurses intended to leave their jobs (Labrague & de Los Santos, 2021). In Turkey, nurse turnover intention was reported as 34% by Topçu et al. (2016) and as 15.5% by Mert Haydari et al. (2016).

Nurse turnover intention maintains its importance both in Turkey and in the world. Ensuring that skilled nurses stay in the institution is among the most important responsibilities of management (Polat et al., 2016). No measurement tool could be found in Turkey that measures nurse turnover intention. For this reason, there is a need for a specially developed valid and reliable scale to determine the intention of nurses to leave their workplace and to identify the factors affecting this intention. This study originally describes the creation of the Turkish version of the Nurse Turnover Intention Scale (NTIS) (Yeun & Kim, 2013). While the validity and reliability of the NTIS has not yet been tested in different countries, it is thought that the results of this study will contribute to national and international literature. In addition, the sub-dimensions of the NTIS are job satisfaction, job performance and interpersonal relationships. These sub-dimensions facilitate classification and affect the nurses' intention to leave their workplace and they will provide the advantage of identifying more detailed content. Using this scale, nursing administrators can contribute to the determination of their nurses' intentions and their reasons for leaving their workplace, as well as to the implementation of necessary interventions in the institution.

## 2 | METHODS

### 2.1 | Aim

The aim of this study was to adapt the NTIS, which was developed by Yeun and Kim (2013), to Turkish and to test its validity and reliability.

### 2.2 | Study design, sample and settings

The study used a methodological research design. It included nurses working in the Pamukkale University Health Research and

Application Center. The number of individuals recommended for the sample size is generally 5–10 times the total number of items in the validity and reliability studies (Burns & Grove, 2009). Therefore, it was aimed to enrol at least 100 nurses in the study since the number of items in the NTIS was 10. A total of 200 nurses were enrolled to increase the reliability of the data considering that losses may also have occurred throughout the study. The study inclusion criteria included volunteering to participate in the study, working in a healthcare institution and being at least a high school graduate. The exclusion criteria of the study were refusing to participate in the study, being unemployed and not having at least high school degree.

## 2.3 | Measurements

The Personal Information Form, which was prepared by the researcher, and the NTIS was used to collect the data for the study.

### 2.3.1 | Personal information form

This form included 20 questions regarding age, sex, education status, marital status, income status, occupation and working conditions of the participants.

### 2.3.2 | Nurse Turnover Intention Scale

The scale was developed by Yeun and Kim (2013), and it was used to evaluate turnover intention of nurses. The scale is composed of 10 items. Each item is assessed as five-Likert type scale ranging from *disagree* (1 point) to *agree* (5 points). The scale consists of three sub-dimensions including Job Satisfaction (items 1, 5, 6 and 9), Job Performance (items 2, 7 and 10) and Interpersonal Relationships (items 3, 4 and 9). A minimum of 10 points and a maximum 50 points can be obtained from the scale. The Cronbach alpha coefficients were determined as 0.83 for total scale, 0.78 for Job Satisfaction, 0.80 for Interpersonal Relationships and 0.74 for Job Performance.

## 2.4 | Translation and adaptation of instrument

The authors of the original scale were asked for permission for its adaptation to Turkish. The translation process was done by the researchers and two independent translators who were fluent in English. All translations were examined and they were combined into a single form by the researchers. Back translation of the generated form was performed by two individuals who were able to understand and speak both languages (English and Turkish), who were living and

working in Turkey and whose native language was English. The items were revised again by comparing the original form and the back translated forms at the end of the back translation process. The form, which was compared in terms of grammar, was finalized for expert opinions.

Turkish and original English versions of the scale were submitted to six experts in the field of nursing (three academic staff in Basics of Nursing, one in Psychiatric Nursing, one in Paediatric Health and Diseases Nursing, and one in Obstetrics and Gynaecology Nursing) to evaluate the clarity, ability to answer and conformity to Turkish. All experts were specialist nurses with both academic and clinical experience. The experts assessed the scale items by scoring them between one and four points (1 = *not appropriate*, 2 = *the item needs to be modified to represent it appropriately*, 3 = *appropriate, but needs minor modification*, and 4 = *completely appropriate*) (Alpar, 2014; Karakoç & Dönmez, 2014). The Davis technique was used to determine content validity (Davis, 1992).

## 2.5 | Data collection

Data were collected between November and December 2021. The questionnaire forms were prepared as online surveys using Google Forms and were delivered to the participants via WhatsApp, Instagram, Facebook and e-mail. The participants were informed about the study and their consent was obtained online. It took approximately 5 min to complete the questionnaire.

## 2.6 | Statistical analysis

Analyses of the collected data were performed online by using the Statistical Package for the Social Sciences (SPSS) 21.0 software program, and the AMOS 23.0 (Analysis of Moment Structures) program was used for confirmatory factor analysis. The demographics of the participants were evaluated using frequency and percentage distributions. Language equivalence, content validity and construct validity were tested for validity analysis. Language equivalence was determined using the back translation method and the content validity index (CVI) was calculated using the Davis technique. Exploratory and confirmatory factor analyses were used to detect construct validity of the scale. The suitability of the data for factor analysis was assessed with the Kaiser-Meyer-Olkin (KMO) value using Bartlett's test. The scores obtained from the scale were compared using Pearson's correlation analysis, the Independent samples *t* test, one-way analysis of variance (ANOVA) and the Kruskal-Wallis test of various characteristics of the sample. Cronbach's alpha coefficient and test-retest methods were used to determine the reliability of the scale. The differences were considered statistically significant at  $p < 0.05$ .

**TABLE 1** Demographic and occupational characteristics of the participants ( $n = 200$ )

Variables	<i>n</i>	%
Sex		
Female	176	88.0
Male	24	12.0
Marital status		
Single	69	34.5
Married	120	65.0
Divorced	11	5.5
Education status		
High school	18	9.0
Associate degree	18	9.0
Undergraduate	134	67.0
Postgraduate	30	15.0
Where they live		
City	193	96.5
Rural	7	3.5
Economic situation		
Income less than expenses	66	33.0
Income equals expense	121	60.5
Income more than expenses	13	6.5
Status of willingly choosing nursing		
No	86	88.0
Yes	114	12.0
Satisfaction with nursing		
No	38	19.0
Partially	116	58.0
Yes	46	23.0
Squad status <sup>a</sup>		
4A/657	107	53.5
4B	65	32.5
4C	7	3.5
4D	18	9.0
3 + 1 contracted	3	1.5
Position status		
Executive nurse	5	2.5
Responsible nurse <sup>b</sup>	24	12.0
Service nurse	94	47.0
Intensive care nurse	53	26.5
Operating room nurse	4	2.0
Supervisor nurse	3	1.5
Outpatient nurse	17	8.5
Unit/service working		
Internal services	82	41.0
Surgical services	28	14.0
Intensive care	59	29.5
Operating room	3	1.5
Polyclinic	19	9.5
Administration	9	4.5

TABLE 1 (Continued)

Variables	n	%
Working status		
I only work during the day	61	30.5
I only work at night	3	1.5
I alternate day/night	136	68.0
Status of requesting the service <sup>c</sup>		
No	92	46.0
Yes	108	54.0
The state of being satisfied with the service		
No	48	24.0
Yes	152	76.0
Job change request <sup>d</sup>		
No	40	20.0
Yes	160	80.0
Age (mean ± SD)		32.63 ± 7.72
Professional experience period (mean ± SD)		11.14 ± 7.56
Length of experience in the hospital (mean ± SD)		8.33 ± 3.39
Hours worked per week (mean ± SD)		40.34 ± 7.72
Number of patients responsible for care (mean ± SD)		17.55 ± 5.62

<sup>a</sup>Working positions in civil servant, contract or worker staff.

<sup>b</sup>Person responsible for the general functioning of the unit.

<sup>c</sup>Choosing the unit to work.

<sup>d</sup>Desire to switch to another profession.

## 2.7 | Ethical considerations

The study was conducted in accordance with the principles of the Declaration of Helsinki. Ethics approval was obtained from the non-Interventional Research Ethics Committee of the university. Permission for use was received from the author of the original scale. All participants of the study provided consent for participation. Since the data were collected through an online questionnaire, it was indicated at the beginning of the questionnaire that answering the questions was on a voluntary basis and the information included in the questionnaire would not be shared with others. The questionnaire was activated for the participants who read this explanation and clicked on the 'I accept' button.

## 3 | RESULTS

### 3.1 | Characteristics of the participants

The demographic characteristics of the participants are shown in Table 1. The mean age of the participants was determined as 32.63 ± 7.72 years old. It was also determined that 88% of the participants were females, 65% were married and 67% had an undergraduate degree. Of the nurses in the study, 96.5% were living in the city, and

TABLE 2 Exploratory factor analysis results of the Nurse Turnover Intention Scale (n = 200)

Items	Factors load
1	0.650
2	0.652
3	0.712
4	0.702
5	0.793
6	0.704
7	0.769
8	0.776
9	0.728
10	0.810
Kaiser-Meyer-Olkin measure of sampling adequacy	0.905
Bartlett's test of sphericity	984.923
p	<0.05
Eigenvalue	5.351
Total variance	53.511

60.5% had an income equal to their expenses. It was also found that on average the professional experience of the participants was 11.14 ± 7.56 years, with 8.33 ± 3.39 years of experience in their current

**TABLE 3** Results of confirmatory factor analysis for the single-factor model ( $n = 200$ )

Items	Factors weight	
1	0.60	
2	0.60	
3	0.61	
4	0.60	
5	0.78	
6	0.69	
7	0.74	
8	0.73	
9	0.69	
10	0.78	
Fit indices	Values obtained from the scale	Result
$\chi^2$	68.425	Acceptable fit
$\chi^2/df$	2.012	Acceptable fit
RMSEA	0.071	Acceptable fit
SRMR	0.053	Acceptable fit
RMR	0.051	Acceptable fit
CFI	0.980	Good fit
GFI	0.950	Good fit
NFI	0.970	Good fit
NNFI	0.980	Good fit
AGFI	0.950	Good fit
IFI	0.980	Good fit
RFI	0.950	Good fit
$p$	<0.05	

Abbreviations:  $\chi^2$ , chi square value; AGFI, adjusted goodness of fit index; CFI, comparative fit index; df, degrees of freedom; GFI, goodness of fit index; IFI, incremental fit index; NFI, normed fit index; NNFI, nonnormed fit index; RFI, relative fit index; RMR, root mean square residual; RMSEA, root mean square error of approximation; SRMR, standardized root-mean-square residual.

hospital. The average weekly work time was  $40.34 \pm 7.72$  h, and the mean number of patients for whom the participants were responsible for care was  $17.55 \pm 5.62$ . Moreover, it was determined that 88% of the participants chose the occupation voluntarily, 58% were partially satisfied with their jobs and 41% were working in inpatient service. It was also determined that 68% of the participants were working alternately day/night shifts and 80% intended to change their jobs (Table 1).

## 3.2 | Validity

### 3.2.1 | Content validity

The CVI of the scale was 1.0. No item on the scale was excluded due to the maintenance of content validity.

### 3.2.2 | Construct validity

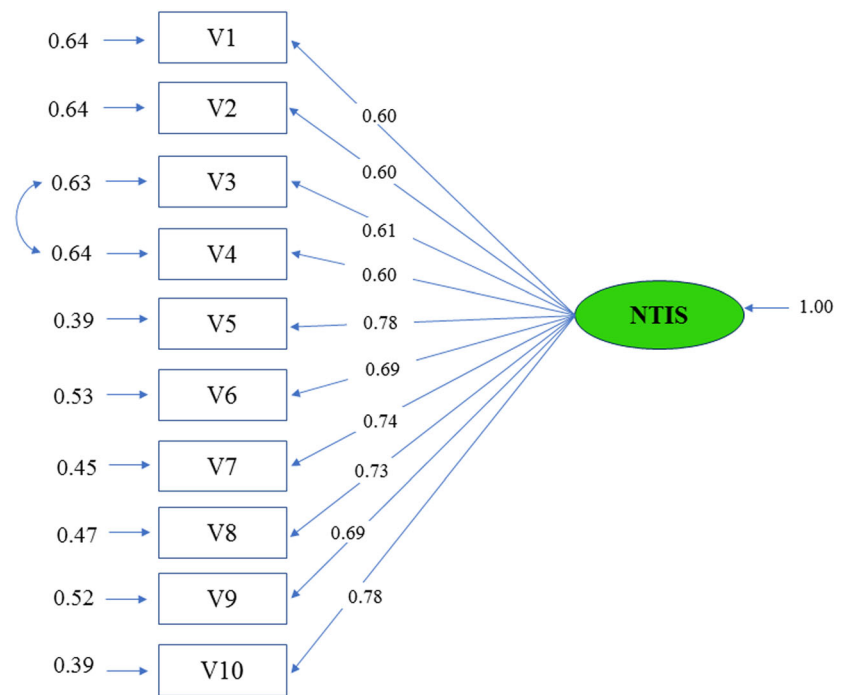
The results of the exploratory factor analysis are included in Table 2. Whether the data were suitable for performing factor analysis or not was examined using the KMO-Bartlett's test. Based on the analysis, the KMO coefficient was found as 0.905, the Bartlett test value was 984.923 and the  $p$  value was 0.05. The lower limit for the KMO coefficient was indicated as 0.50 (Çokluk et al., 2014; Erdoğan et al., 2015). In the original study (Yeun & Kim, 2013), KMO-Bartlett's coefficient was calculated as 0.820. Values of 0.50 and above revealed that dataset was available for factor analysis and a  $p$  value smaller than 0.05 in Bartlett's test revealed that data showed a normal distribution. The KMO value of 0.905 in the study indicated that the sample was adequate for factor analysis, and the significance of Bartlett's test indicated that the correlation matrix had excellent adequacy.

A single factor construct was obtained at the end of analysis. The scale had a single factor with an eigenvalue greater than one. It was also found that the scale eigenvalue was 5.351 and that the total variance was explained as 53.511. Factor loadings of the 10-item scale varied between 0.65 and 0.81 (Table 2).

Confirmatory factor analysis was carried out following the exploratory factor analysis (Table 3). According to the confirmatory factor analysis, it was determined that  $t$  values for all items exceeded 2.56 and all of these values were significant at the 0.01 level. When the error variances were examined, no item with an error variance of more than 0.90 was detected. In line with the modification suggestions, a modification was made between items 3 and 4. According to the results of the analysis, the chi-square ( $\chi^2$ ) value was 68.425, and the degree of freedom was 34. The ratio of chi-square to degrees of freedom ( $\chi^2/df$ ) was calculated as 2.012, and it can be said that the model showed acceptable fit. Data on the path diagram of the confirmed model are shown in Figure 1.

Fit values were the root mean square error of approximation (RMSEA) = 0.071, the normed fit index (NFI) = 0.97, the non-normed fit index (NNFI) = 0.98, the incremental fit index (IFI) = 0.98, the relative fit index (RFI) = 0.95, the goodness of fit index (GFI) = 0.95, the adjusted goodness of fit index (AGFI) = 0.95, the comparative fit index (CFI) = 0.98, the root mean square residual (RMR) = 0.051 and the standardized root mean square residual (SRMR) = 0.043. It can be stated that the  $\chi^2/df$ , RMSEA, SRMR and RMR values demonstrated acceptable fit while the CFI, GFI, NFI, NNFI, IFI, AGFI and RFI values showed good fit. The factor weight of the 10-item scale varied between 0.60 and 0.78 (Table 3). When evaluated in general, it is possible to say that the single-factor structure of the NTIS Scale was confirmed.

The distribution of the attitudes of the nurses towards the occupation and the NTIS comparisons is shown in Table 4 to examine criterion-related validity. According to the table, the mean NTIS score of the participants who were performing nursing voluntarily was found to be significantly lower than those who were partially satisfied or never satisfied ( $p < 0.05$ ). The mean NTIS score of the participants who were not satisfied by their department/service was found to be significantly higher than those who were satisfied by their

**FIGURE 1** Results of confirmatory factor analysis

Chi-Square = 68.42, df = 34, p-value = 0.00042, RMSEA = 0.071

**TABLE 4** Criterion validity of the NTIS: Comparison of nurses' attitudes towards the profession ( $n = 200$ )

Variables	Mean $\pm$ SD	Test value	P
Satisfaction with nursing			
No	41.63 $\pm$ 7.71	10.133 <sup>a</sup>	<0.05
Partially	40.80 $\pm$ 6.78		
Yes	35.32 $\pm$ 9.19		
The state of being satisfied with the service			
No	42.95 $\pm$ 6.03	3.918 <sup>b</sup>	<0.05
Yes	38.67 $\pm$ 8.17		
Job change request			
No	33.15 $\pm$ 8.73	-5.522 <sup>b</sup>	<0.05
Yes	41.33 $\pm$ 6.79		

<sup>a</sup>One-way ANOVA.

<sup>b</sup>Independent simple t test.

department/service ( $p < 0.05$ ). Moreover, the mean NTIS score of the participants who intended to change their jobs was found to be higher than the participants who did not. This difference between the two groups was found to be statistically significant ( $p < 0.05$ ) (Table 4).

### 3.3 | Reliability

Before performing a factor analysis, some items should be analysed to investigate their contributions to the scale. Statistical analysis of the items reveals questionable items. When the items are reviewed, the validity of the test is increased (Evrora, 2015). Table 2 shows the

results of the correlation matrix and item-total statistics analysis conducted for this purpose. The correlation coefficients between the items were between 0.31 and 0.65. The correlation matrix showed that the NTIS had a single factor structure because the relationships among the items were similar and there were no correlation coefficients that showed a high correlation between certain items (Table 5).

The Cronbach alpha coefficient was determined as 0.83 for the scale's total score. The Cronbach alpha coefficient was observed to range between 0.88 and 0.89 when an item was removed from the scale. Hotelling's  $T^2$  value was 224.052 ( $p < 0.05$ ). The differences between the means of the NTIS items

Correlation matrix of items										
Items	1	2	3	4	5	6	7	8	9	10
1	1.00									
2	0.429	1.00								
3	0.410	0.402	1.00							
4	0.351	0.427	0.702	1.00						
5	0.482	0.458	0.494	0.435	1.00					
6	0.471	0.412	0.313	0.310	0.636	1.00				
7	0.368	0.464	0.399	0.458	0.585	0.501	1.00			
8	0.351	0.391	0.536	0.508	0.560	0.494	0.656	1.00		
9	0.455	0.421	0.456	0.422	0.496	0.461	0.541	0.511	1.00	
10	0.507	0.433	0.504	0.530	0.603	0.544	0.593	0.601	0.549	1.00

$p < 0.05$ .

**TABLE 6** The reliability of the Nurse Turnover Intention Scale (NTIS) ( $n = 200$ )

Items	Mean $\pm$ SD	Scale mean if item deleted	Scale variance if item deleted	Corrected item–Total correlation	Squared multiple correlation	Cronbach's alpha if item deleted
1	3.63 $\pm$ 1.114	36.08	52.231	0.569	0.386	0.898
2	4.13 $\pm$ 1.029	35.57	52.970	0.575	0.350	0.897
3	3.69 $\pm$ 1.180	36.02	50.487	0.641	0.582	0.893
4	3.97 $\pm$ 1.109	35.74	51.372	0.631	0.556	0.894
5	3.96 $\pm$ 1.175	35.75	49.337	0.722	0.576	0.888
6	4.48 $\pm$ 0.896	35.23	53.633	0.624	0.496	0.895
7	3.76 $\pm$ 1.140	35.94	50.147	0.693	0.565	0.890
8	3.92 $\pm$ 1.102	35.79	50.411	0.704	0.566	0.889
9	4.13 $\pm$ 1.029	35.57	51.905	0.652	0.439	0.892
10	4.06 $\pm$ 1.054	35.64	50.362	0.746	0.571	0.887
Hotelling's T2	224.052	$F = 23.894$	$< 0.05^*$			
Scale mean	39.70 $\pm$ 7.91					
Cronbach alpha	0.902					

\* $p < 0.05$ .

were found to be highly significant. This finding suggests that the means of the scale items were different, the level of difficulty of the questions was not equal, the responses provided by the participants to the items were not similar and all items were important for the scale (Table 6).

The test-retest reliability of the scale was estimated by administering the same test to 56 participants selected from the study group twice over a 2-week period. The Pearson product-moment correlation analysis showed that the test-retest correlation coefficient was  $r = 0.996$  ( $p < 0.05$ ). This finding suggests that the first and second measurement results were similar. A paired-samples  $t$  test was applied to evaluate the difference between the mean scores obtained from the two measurements, and no statistically significant difference was found between both of them ( $p = 0.156$ ;  $t = -1.427$ ).

## 4 | DISCUSSION

This study explains basic results regarding the validity and reliability of the Turkish version of the NTIS by assessing its psychometric characteristics. As far as it is known, there have been no studies on the psychometric properties of the NTIS in other languages except for the original article. Language, content and construct validity methods were used to determine the validity of the NTIS. Language validity was initially assessed by the experts during the process of adapting the scale to the Turkish language and culture (Davis, 1992). The CVI score should be greater than 0.80 (Polit & Beck, 2006). According to the calculations made in this study, no item was removed from the scale since there was no item with a CVI below 0.80 and necessary revisions were made in line with the opinions taken from the experts. The CVI coefficients of the Turkish version of the NTIS showed that

**TABLE 5** Correlation matrix and item-total statistics of items on the Nurse Turnover Intention Scale ( $n = 200$ )



the content validity of the scale was quite good. The reason for this finding can be the fact that the scale items are simple and easy to understand. In addition, the participants completed the scale items in about 5 minutes.

In the study, exploratory and confirmatory factor analyses were carried out to detect construct validity of the NTIS. Factor analysis is performed to evaluate whether the items of a scale can be gathered under different factors or not (Erdoğan et al., 2015). In the scales, it is enough to have a total variance explained by the factors of greater than 30%. The items with values between 0.30 and 0.59 are considered to have a moderate factor loading and values of 0.60 and above are considered to have a high factor loading (Büyüköztürk, 2018). According to the exploratory factor analysis performed, the scale had a single factor and explained 53.51% of the total variance. Moreover, factor loadings of the scale items ranged between 0.65 and 0.81. The fact that the scale explained more than half of the variance with a single factor and that all its items had a high factor loading confirms that the scale measured nurse turnover intention well and accurately and its construct validity was sufficient.

The compatibility of the factor structure of the scale to the original version was evaluated using confirmatory factor analysis (Alpar, 2014; Gray et al., 2017). In confirmatory factor analysis, the results are required to be examined via fit indices (Kline, 2011). A  $\chi^2/df$  ratio below five indicates an acceptable fit (Çokluk et al., 2014). In the study, the  $\chi^2/df$  value was calculated as 2.012, and an acceptable fit was obtained. In the original study (Yeun & Kim, 2013), the  $\chi^2/df$  value was not indicated. For the RMSEA, RMR and SRMR indices, values below 0.05 show a good fit, and values below 0.08 show an acceptable fit. Indices above 0.10 indicate unacceptable fit (Kline, 2011). In this study, the RMSEA value was found as 0.071 where it was indicated as 0.04 in the original study (Yeun & Kim, 2013). GFI, AGFI, NFI, NNFI, IFI, RFI and CFI take a value between 0 and 1 where values above 0.95 indicate good fit and values above 0.90 indicate acceptable fit for these indices (Çokluk et al., 2014). Accordingly, the GFI, AGFI, NFI, NNFI, IFI, RFI and CFI indices were found to show a good fit in this study. In the original study of the scale (Yeun & Kim, 2013), the CFI, GFI, NFI, NNFI and RMR indices confirmed a good fit. In confirmatory factor analysis, factor loadings are expected to be above 0.30 (Gray et al., 2017). In the study, factor loadings of the scale items ranged between 0.60 and 0.78. In the original study of the scale (Yeun & Kim, 2013), factor loadings of the scale items based on confirmatory factor analysis were reported to range between 0.56 and 0.88. The original structure of the scale has three factors (Yeun & Kim, 2013). However, when the results of the exploratory and confirmatory factor analyses were evaluated, it was determined that the scale had a single factor structure according to Turkish culture.

The reliability of the scale was tested using the test-retest method and Cronbach's alpha internal consistency. To what extent a measurement tool measures a characteristic and the degree of consistency of the measurement reveals the reliability of that tool. Besides, no occurrences of an increase in the Cronbach alpha value

when an item is deleted from the scale shows that there is no need to remove any item (Koo & Li, 2016). According to literature, the measurement instruments are reliable if the Cronbach alpha coefficient is less than 0.40, have low reliability if the coefficient is between 0.40 and 0.59, are quite reliable between 0.60 and 0.79 and are extremely reliable between 0.80 and 1.00 (Grove et al., 2013). According to this, the Cronbach alpha coefficient was obtained as 0.90 in the study, and it was detected to be within the highly reliable range. In the original study of the scale, the Cronbach alpha coefficient was determined as 0.83 for the total scale score (Yeun & Kim, 2013). Based on these results, internal consistency of the scale can be considered to be high.

In this study, the intermittent method was chosen in test-retest method, and the scale was re-applied to 56 nurses after 2 weeks during the examination of invariance with time. Goodness of fit between two measurements was evaluated using the correlation coefficient. Invariance with time is considered as good for the items with a value of 0.30 and above and as moderate for the items between 0.20 and 0.30. Also, items with a value below 0.20 are suggested to be removed from the scale. The test-retest correlation value of the scale's total score was 0.99 in this scale, and there was no item with a value below 0.20. These findings show that test-retest reliability was always constant and that the scale was time invariant.

#### 4.1 | Limitation

The primary limitation of the study was that the study sample included only Turkish nurses who were working in a single university hospital. Accordingly, the study results may not be generalized to the other hospitals in Turkey. Future studies are needed with larger patient groups and in different healthcare settings.

## 5 | CONCLUSIONS

The study showed that the Turkish version of the NTIS has a single factor structure, and this version met the validity and reliability criteria of the Turkish psychometric values at good and acceptable fit levels. This study provides Turkish nursing managers and researchers with a new tool adapted to Turkish culture to evaluate turnover intention. The NTIS may help nursing managers to identify turnover intention of the nurses and to establish appropriate management strategies to aid in preventing actual turnover. This contribution will create a positive effect on promoting the quality of nursing services by preventing nurse turnover.

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#### CONFLICT OF INTEREST

The authors declare no conflict of interest.

## ETHICS STATEMENT

Ethical approval has been taken from the University's Non-Interventional Research Ethics Committee with the decision number 60116787-020-125122 on the date of 02.11.2021.

## AUTHORSHIP STATEMENT

AŞZ, ÖF and NÇK designed the study. AŞZ, ÖF and NÇK collected the data. AŞZ, ÖF and NÇK analysed the data. AŞZ, ÖF and NÇK performed study supervision. AŞZ, ÖF and NÇK wrote the manuscript. AŞZ, ÖF and NÇK critically revised the manuscript for important intellectual content.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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