

# The Turkish version of the Handover Evaluation Scale: A validity and reliability study

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## Abstract

**Aim:** The purpose of this study is to adapt the English version of the Handover Evaluation Scale to a Turkish nursing sample.

**Methods:** This is a methodological and cross-sectional study. This study was conducted with 192 nurses working in different units in a public hospital between September 2016 and January 2017. A descriptive information form and the Handover Evaluation Scale were used to collect data. First, language validity and content validity were determined regarding the adaptation of the scale.

**Results:** As a result of the adaptation process, it was determined that the scale's structure, which consisted of 10 items and two factors explaining 68.96% of the total variance, was valid and reliable for the Turkish nursing sample. A Kaiser-Meyer-Olkin test and Bartlett's test of sphericity indicated that the sample met the criteria required for factor analysis. The reliability coefficient for the overall scale was 0.92. The test-retest reliability results were 0.87 for the overall intraclass correlation coefficient, and the t-test result was  $P > .05$ .

**Conclusion:** This adaptation study revealed that the scale is a valid and reliable tool for evaluation of the handover of Turkish nurses.

## KEYWORDS

evaluation, handover, nursing, patient, reliability, validity

## SUMMARY STATEMENT

What is already known about this topic?

- Nurses transfer patient information to other colleagues and healthcare professionals in various ways.
- It is important for nurses to complete the handover process effectively, adequately and safely in terms of patient safety.
- Handover is a key component for sustaining daily basic clinical practices and a valid measurement tool is required to evaluate the process.

What this paper adds?

- The revised structure, developed in the present study comprised of two subscales with 10 items, was found to be valid and reliable for the Turkish nursing population.

The implications of this paper:

- The scale offers a valid and reliable means to evaluate the handover process of Turkish nurses.

## 1 | INTRODUCTION

Handover refers to the process of sharing patient information with other healthcare professionals and is important to maintain and enhance the quality of patient care (Australian Commission on Safety and Quality in Health Care, 2010; Cohen & Hilligoss, 2010). Being a key component for sustaining daily basic clinical practices (O'Connell, Macdonald, & Kelly, 2008; Riesenber, Leisch, & Cunningham, 2010), the handover process is essential to maintain safe patient care (Malekzadeh, Mazluom, Etezadi, & Tasseri, 2013; Patterson & Wears, 2010).

Healthcare professionals transfer patient information to other colleagues in various ways including written and oral records and at several times. For example, when a patient is transferred among units, patient information is handed over to the nurse who admits the patient to the unit (Carroll, Williams, & Gallivan, 2012; Stagers & Blaz, 2013). However, the handover process not only provides for communication of patient information but also allows determination of the existing problems, sharing of information and provision of emotional support to patients and their relatives (Nelson & Massey, 2010; Randell, Wilson, & Woodward, 2011). Studies have shown that many problems are encountered during the handover process. For instance, nurses may insufficiently transfer information among themselves (O'Connell et al., 2008; Stagers & Jennings, 2009; Streitenberger, Breen-Reid, & Harris, 2006). Additionally, the handover process is carried out over a limited period of time, and situations may occur that may distract healthcare professionals during the transfer of patient-related priorities, which makes the handover process risky and takes valuable time (Streitenberger et al., 2006). An ineffective handover process may increase medication errors, delay treatment, delay diagnoses of illnesses and life-threatening side effects, reduce patient satisfaction and lead to increased health costs and a prolonged hospital stay (Australian Commission on Safety and Quality in Health Care, 2010; Hoonhout et al., 2009; Reader, Flin, & Cuthbertson, 2007).

Nurse communication between shifts and the accuracy of the transmitted patient information are the main criteria by which to assess the effectiveness of the handover process. It is important to determine the effectiveness of communication (Riesenberg et al., 2010). Ineffective communication and information transfer lead to undesirable events in hospitals all over the world (Department of Health, 2009; Department of Quality Directorate General of Health Planning, 2009; Nadzam, 2009). In this regard, effective communication in the handover process must be established.

The Handover Evaluation Scale (HES) was developed, based on a literature review and expert opinions as well as theory developed by O'Connell and Penney (2001), which provides rich data for determining, providing and transferring nursing care. The items of the scale were prepared in accordance with data obtained from semi-structured interviews conducted with 27 nurses along with field observations. Additionally, other research in this field (e.g. Bosek & Fugate, 1994; Hopkinson, 2002; Sexton et al., 2004) was taken into consideration during the preparation of the original version of the HES. The validity and reliability of the items of the scale were tested by O'Connell, Ockerby, and Hawkins (2014) based on data obtained from nurses providing service in the health sector in Australia between 2006 and 2008 (O'Connell et al., 2008). The items were revised in line with feedback from five experts and at the end of the pilot application by 10 nurses (O'Connell et al., 2014).

There are a limited number of studies on the effectiveness and outcomes of the handover process, and there is a need for further studies (Matic, Davidson, & Salamonson, 2011; Patterson & Wears, 2010). Although health institutions have their own handover scales to perform this evaluation, there is no valid and reliable HES for measuring the handover of nurses in Turkey.

## 2 | METHODS

### 2.1 | Aim

This study was conducted to test the Turkish validity and reliability of the HES, which was developed by O'Connell et al. (2014) to evaluate the handover of nurses, with validity and reliability tested by O'Connell et al. (2014).

### 2.2 | Design

This is a methodological and cross-sectional study.

### 2.3 | Participants

Validity and reliability studies stated that the sample size should be 5-10 people for each scale item (Tavşancıl, 2014). In the present study, we aimed to include 180 nurses for the 18-item scale by considering the number of scale items. Data were obtained from 192 of 250 nurses working in a public hospital located in Istanbul, and the rate of participation was determined to be 76.8%. Inclusion criteria included that nurses were working in the hospital for at least 1 year.

### 2.4 | Data collection

The researchers collected the data for the study from hospitals between September 2016 and January 2017. The descriptive information form and the HES were used to collect the data.

#### 2.4.1 | Descriptive information form

The questionnaire included seven questions aiming to determine nurses' age, gender, educational level, unit, position, duration of working as a nurse and duration of working in the institution.

#### 2.4.2 | Handover Evaluation Scale

The original version of the scale, the validity and reliability of which were determined by O'Connell et al. (2014), consists of four subscales: (i) quality of information (seven items—with an internal consistency coefficient of 0.80); (ii) interaction and support (five items—with an internal consistency coefficient of 0.86); (iii) efficiency (three items—with an internal consistency coefficient of 0.67); and (iv) patient involvement (three items—with an internal consistency coefficient of 0.69). The final state of the original version of the scale after its reliability and validity were determined included 14 items and three subscales, including (i) quality of information (six items); (ii) interaction and support (five items); and (iii) efficiency (three items; O'Connell et al., 2014). This scale employs a 7-point Likert type scale, and each item is scored between 1 and 7 points. A high total mean score signifies a high handover efficiency of nurses (O'Connell et al., 2014).

## 2.5 | Procedures

There is no universal agreement on how to adapt an instrument for use in a different cultural setting (Gjersing, Caplehorn, & Clausen, 2010). However, scale adaptation studies consist of similar steps (Arafat, Chowdhury, Qusar, & Hafez, 2016). In the present study, we adopted the steps suggested by Gjersing et al. (2010) for scale adaptation studies.

- Adaptation process: language and content validity
- Validation process: Initially, the original items were tested through confirmatory analysis. Confirmatory factor analysis (CFA) was performed to test the fit of the original structure on the target population. Then, item analysis was performed to provide information regarding the reliability of each item in the scale. Subsequently, the original items were assessed using exploratory factor analysis. The model revealed through exploratory factor analysis was tested through confirmatory analysis to confirm the construct validity (Gjersing et al., 2010). Additionally, Cronbach's alpha was assessed to test internal consistency. Finally, the time invariance of the Turkish adaptation of the scale was tested.

## 2.6 | Ethical considerations

Permission was obtained via email from Beverly O'Connell, who developed the scale (O'Connell et al., 2014), for a Turkish adaptation of the scale. After obtaining the necessary permission to perform this study from the ethics committee and the hospital where the study was conducted, information was given orally and in writing regarding the purpose and method of the study to the participants. The nurses voluntarily participated in the study.

Ethics committee approval (the decision no. 2016/08/03 dated 29.06.2016) was received from the ethics committee of the related hospital (Bakırköy Dr. Sadi Konuk Training and Research Hospital Clinical Trials Ethics Committee) located in Istanbul.

## 2.7 | Data analysis

The data were analysed using IBM SPSS Statistics 21 and LISREL 8.51 software. To analyse the data, test-retest and internal consistency (Cronbach's alpha) were used for reliability, Lawshe's technique was used for content validity and factor analysis was used for construct validity (Arafat et al., 2016; Gjersing et al., 2010).

## 3 | RESULTS

### 3.1 | Sample characteristics

The participants were mostly female (83.3%), had a bachelor's degree (57.8%), and were working as staff nurses (90.1%) in inpatient units (80.7%). The participants' ages were from 19-48 years (mean 31.12,

SD 6.98). The duration that the participants worked in the hospital and profession varied from 1-29 years (mean 5.05, SD 5.47) and from 1-32 years (mean 8.90, SD 7.99), respectively.

### 3.2 | Adaptation process

#### 3.2.1 | Language and content validity

The language validity of the HES was determined based on the method recommended by the World Health Organization for the adaptation of tools developed in different languages (World Health Organization [WHO], 2008). First, the scale items were translated from English into Turkish. In this step, both researchers and four linguists providing professional support worked together. After translating the items of the scale into Turkish, the scale was translated back into English by a Dutch academician who lived in Turkey and had a good command of both English and Turkish as well as a Turkish academician who lived abroad. Thus, the items in the original version and Turkish translation of the scale were ensured to have the same/similar meaning.

Twelve experts outside of the research team who worked in the field of nursing and had experience with scale-development or adaptation evaluated the Turkish form (Polit & Beck, 2012). As the opinions of 10 experts according to Lawshe's technique were obtained, the content validity criterion was specified to be 0.62 (Ayre & Scally, 2014; Lawshe, 1975; Veneziano & Hooper, 1997), and no item was omitted at this stage as no item had a value less than 0.62. Finally, a pilot study was conducted with 20 nurses other than the sample group.

### 3.3 | Validation process

#### 3.3.1 | Confirmatory factor analysis

First, CFA of the original structure was performed to test its construct validity (Gjersing et al., 2010). In this study, CFA was performed to test both the four-factor and three-factor original structures of the scale. CFA revealed that neither the four-factor nor three-factor original structure of the scale could be confirmed (Table 1). As a result of the analysis, it was determined that the root mean square error of approximation (RMSEA), adjusted goodness of fit index (AGFI) and goodness of fit index (GFI) fit values were not at the desired level (Table 1).

**TABLE 1** Goodness of fit indices of original scales (Step 2)

Tests and indices	4-factor	3-factor
Chi-Square/df	593.25/13	368.88/74
RMSEA	0.14	0.144
GFI	0.74	0.78
AGFI	0.67	0.69
CFI	0.75	0.80

Abbreviations: AGFI, adjusted goodness of fit index; CFA, confirmatory factor analysis; CFI, comparative fit index; df, degrees of freedom; GFI, Goodness of fit index; RMSEA, root mean square error of approximation.

### 3.3.2 | Item-total correlation analysis

When the goodness of fit indices did not confirm the original scale structure, items that had a low correlation with the overall scale were omitted. In the analysis, it was found that the item total score correlation coefficients of items 6, 8, 12, 14, 16, 17 and 18 were  $r < 0.40$ ; therefore, these seven items were omitted from the scale. The analyses continued with 11 items.

### 3.3.3 | Explanatory factor analysis

After the original structure was not confirmed by CFA, all the items of the scale were considered to be a single item pool, and a new explanatory factor analysis (EFA) was performed. A Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) and Bartlett's test of sphericity were performed to assess whether the sample was adequate and whether a factor correlation matrix was appropriate to perform factor analysis. It was found that  $KMO = 0.90$ ,  $\chi^2 = 1344.50$ ,  $df = 55$ , and  $P < .001$ .

In the EFA conducted with principal component analysis and varimax rotation, item 7 was omitted from the scale because it had a high factor loading in both factors at the same time. After this step, the analyses continued with 10 items. Ten items were divided into two factors explaining 68.96% of the total variance that had eigenvalues greater than 1. The percentages of the factors explaining the total variance were 42.17% for the first factor and 26.79% for the second factor (Table 2). In the original version, item 2 in the 'patient involvement' subscale; item 10 in the 'efficiency' subscale; item 11 in the 'interaction and support' subscale; and items 3, 9, 13 and 15 in the 'quality of information' subscale were combined to create a new factor. This factor was called 'quality of information' as in the original version because it included items containing the quality of information. In the second factor, items 1, 4 and 5 from the original version were preserved, and the name of the subscale remained 'interaction and support' as in the original version. The third subscale, 'efficiency', and the fourth subscale, 'patient involvement', of the original version were omitted from the scale.

### 3.3.4 | Confirmatory factor analysis

CFA was performed again to evaluate the fit of the newly explored structure of the scale. In this study, two covariance assignments were made between items that had similar theoretical meanings and significant effects on the structure of the model. These items were item 3 'I am provided with sufficient information about patients' and item 9 'I am able to clarify information given to me' in the same subscale (Factor 1). Item 13 'The information that I receive is up to date' and item 15 'I am

able to keep my mind focused on the information given to me' were also included in Factor 1. The first two items showed similarities in quality and adequacy of information, whereas the second two items showed similarities in up-to-dateness, quality and efficiency of information (Figure 1). The goodness of fit indices were calculated as  $\chi^2 = 84.57$ ,  $df = 32$ ,  $RMSEA = 0.09$ ,  $GFI = 0.92$ ,  $CFI = 0.95$ ,  $AGFI = 0.86$  and  $IFI = 0.95$  (Table 3).

### 3.3.5 | Internal consistency coefficient

In the analysis carried out to determine the internal consistency of the measurements obtained from the remaining 10 items as a result of omitting eight items from the 18-item scale, it was found that Cronbach's  $\alpha$  coefficient was 0.92 for the overall scale and 0.82 and 0.91 for its subscales.

### 3.3.6 | Time-invariance analysis

To test the time invariance of the Turkish adaptation of the scale in the study, the same form was applied to a group of 30 nurses two times with a 2-week interval, and the measurements were analysed using the paired samples  $t$  test and Pearson's correlation analysis. As a result of the analysis, it was found that there was no statistically significant difference between the two measurements obtained from the overall scale ( $t = 1.28$ ,  $P > .05$ ). When the correlation between the scores obtained from the first and second measurements was examined by Pearson's correlation analysis, a strong positive and significant correlation was found between the scores of the two measurements performed with a two-week interval ( $r = 0.87$ ,  $P < .001$ ).

## 4 | DISCUSSION

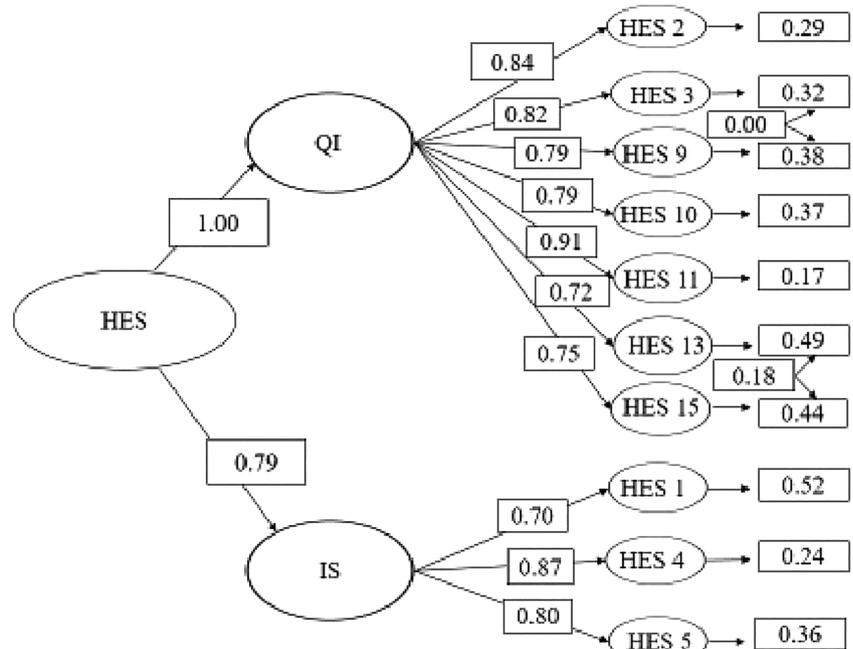
### 4.1 | Adaptation process

#### 4.1.1 | Language and content validity

The method recommended by the WHO (2008) for the adaptation of tools developed in different languages was taken into consideration to reduce the differences caused by psycholinguistic characteristics among cultures. For this purpose, the translation of the scale, which was originally developed in English, into Turkish and its back-translation into English were conducted by considering the method recommended by the World Health Organization (2008) for the adaptation of instruments developed in different languages.

**TABLE 2** Results of exploratory factor analysis for the Handover Evaluation Scale (Steps 4 and 6)

Factor numbers	Items	n	% of exp. variance	Factor loadings	Item-total corr.	Cronbach's alpha
F1	2, 3, 9, 10, 11, 13, 15	7	42.17	0.69-0.82	0.66-0.81	0.91
F2	1, 4, 5	3	26.79	0.75-0.83	0.67-0.69	0.82
Total		10	68.96	0.69-0.83	0.60-0.80	0.92



Chi-Square=84.57, df=32, P-value=0.00000, RMSEA=0.093

**FIGURE 1** CFA result of adapted version of the Handover Evaluation Scale (Step 5)

**TABLE 3** Goodness of fit indices of adapted version of the scale (Step 5)

Scale	$\chi^2$	df	RMSEA	GFI	AGFI	CFI	IFI
Handover Evaluation Scale	84.57	32	0.09	0.92	0.86	0.95	0.95

Abbreviations: AGFI, adjusted goodness of fit index; CFI, comparative fit index; df, degrees of freedom; GFI, goodness of fit index; IFI, incremental fit index; RMSEA, root mean square error of approximation;  $\chi^2$ , chi-square.

The content validity was then tested to evaluate whether the scale items covered the field to be measured (Büyüköztürk, 2011; Öner, 2008). Lawshe's technique was used for content validity in this study (Lawshe, 1975).

## 4.2 | Validation process

### 4.2.1 | Confirmatory factor analysis

Initially, CFA was performed to test the fit of the original structure on the target population (Gjersing et al., 2010). Factor analysis is the most common method used to test the construct validity of a scale in validity and reliability analyses. This method is associated with what the scale measures accurately (Büyüköztürk, 2011; Öner, 2008). There are numerous goodness of fit indices, and there is no absolute consensus as to which one should be reported. The chi-square/degree of freedom, RMSEA, AGFI, GFI and CFI results are reported as the most common fit indices used in the present study (Büyüköztürk, 2011).

### 4.2.2 | Item-total correlation analysis

Item analysis is performed to determine the power and consistency of the correlation between items. When the item total score correlation obtained from the analysis is low, the reliability of the scale also

decreases; therefore, the correlation between variables should not be negative or low (Polit & Beck, 2012; Şencan, 2005; Tavşancıl, 2014). It is stated in the literature that, although correlation values lower than 0.30 show that items are insufficient, correlation values higher than 0.40 indicate that the distinguishing characteristic of items is good (Polit & Beck, 2012; Şencan, 2005).

### 4.2.3 | Explanatory factor analysis

In the literature, it is recommended to evaluate KMO and Bartlett's test before performing factor analysis (Polit & Beck, 2012; Şencan, 2005). Also, it is recommended to list each item under the factor with the highest factor loading after performing EFA but to evaluate the items that include high factor loading under more than one factor. It is then recommended to eliminate the same item when there is a difference of less than 0.1 among the factor loading values taken by that item under different factors (Büyüköztürk, 2011).

### 4.2.4 | Confirmatory factor analysis

In accordance with the modification suggestions, CFA is a preferred method to assign the error covariance between the items. However, a higher number of error covariances means that the model gradually loses its confirmatory property. For this reason, identification of more

than two or three covariances may lead to a suspicion regarding the validity of the model. However, more than two or three covariances do not eliminate the validity of the established model. The important point is that the theoretical reasons for the assigned covariances are given very clearly (Şimşek, 2007).

#### 4.2.5 | Internal consistency coefficient

Cronbach's  $\alpha$  coefficient is used in scale development studies, especially to test the internal consistency of items in Likert-type scales (Öner, 2008; Polit & Beck, 2012). A coefficient of '0.80-1.00' indicates that the scale is highly reliable (Büyükoztürk, 2011; Öner, 2008; Polit & Beck, 2012).

#### 4.2.6 | Time invariance analysis

In the literature, it is recommended to assess the time invariance of a scale by testing it with the same group at intervals of 2-4 weeks (Polit & Beck, 2012). The mean scores obtained from the scale applied at intervals of 2-4 weeks are calculated using 'Pearson product-moment correlation analysis'. The obtained coefficient is accepted as an indication of the invariance of the scale, and this score is expected to be at least .70 (Polit & Beck, 2012; Tavşancıl, 2014). Because the mean scores of the responses given by participants with a 2-week interval after the paired samples *t* test are similar, the difference between the scores obtained from two measurements should not be statistically significant (Polit & Beck, 2012; Tavşancıl, 2014).

Table 4 shows the new structure formed after the adaptation study of the scale and the items in the subscales. The use of a valid measurement tool is required to evaluate the handover of nurses. Because handover is a key component for sustaining daily basic clinical practices in terms of patient safety, the scope of the scale seems to be an adequate tool to evaluate the handover of nurses. However,

**TABLE 4** Subscales and items of the Handover Evaluation Scale after the adaptation study

Factor 1 Quality of information	
2	I am able to check the patient during handover
3	I am provided with sufficient information about patients
9	I am able to clarify information that has been provided to me
10	Patient information is provided in a timely fashion
11	I have the opportunity to ask questions about things I do not understand
13	The information that I receive is up to date
15	I am able to keep my mind focused on the information being given to me
Factor 2 Interaction and support	
1	I have the opportunity to discuss difficult clinical situations I have experienced
4	I have the opportunity to debrief with other colleagues when I have had a difficult shift
5	I have the opportunity to discuss workload issues

considering that the structure of the scales is affected by intercultural differences, it is recommended to test the validity and reliability of the scale before its application in other cultures.

#### 4.3 | Limitations

Data were self reported by participants. Some participants may have subconsciously responded in a manner that does not reflect the truth to answer the scale correctly rather than giving their own personal answers. This bias may have affected the reliability of the responses. Therefore, there is a need to test the validity and reliability of the scale adapted into Turkish with sample groups independent from those used in this study to strengthen the validity and reliability of the scale.

### 5 | CONCLUSION

The HES developed by O'Connell et al. (2014) to evaluate the handover of the nurses did not work in the same structure in Turkish. As a result of the adaptation study, in the Turkish version of the scale, the structure including two subscales and 10 items directly related to handover of nurses was found to be valid and reliable and can be recommended for use in the Turkish context.

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#### CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

#### AUTHORSHIP STATEMENT

RT, BD were responsible for data management and study design. RT, BD was responsible for data analysis. All authors drafted and revised the manuscript.

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