


# Validity and reliability of the Turkish version of the readiness for hospital discharge scale/short form

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**Aim:** The aim of this study is to test the validity and reliability of the Turkish version of the readiness for hospital discharge scale/short form.

**Background:** Assessment of readiness for discharge from the patient's perspective is becoming increasingly important for patient safety, satisfaction and various patient outcomes such as readmission, health service utilization and mortality. The readiness for hospital discharge scale/short form allows health care providers to determine patients' discharge readiness.

**Methods:** Participants were 1,579 inpatients from internal medicine departments. The readiness for hospital discharge scale/short form was translated into Turkish via back-translation. We analyzed its reliability and validity via item analyses, an expert panel (content validity) and exploratory and confirmatory factor analyses (construct validity).

**Results:** The Cronbach's alpha of the whole scale was .74 and those for the subscales ranged from .79 to .93. The Spearman-Brown reliability coefficient was .92. The confirmatory factor analysis revealed good fit indices ( $\chi^2/df = 2.6$ ; RMSEA = .03; CFI = 1; GFI and AGFI = .99). The mean total score was  $7.27 \pm 1.85$ , while the subscale means ranged from  $6.62 \pm 3.41$  to  $7.69 \pm 2.24$ .

**Conclusion:** The Turkish version of the readiness for hospital discharge scale/short form is a valid and reliable tool for assessing discharge readiness. The subscales with low means suggest opportunities for improvement.

**Implications for nursing management:** If readiness for hospital discharge scale/short form is valid and reliable, patients who are unready for discharge can be determined with this scale. Thus, nurse managers can determine what kind of measures should be taken for patients who are not ready for discharge, can control nursing practices related to these patients and can provide cooperation between the nurses and other health professionals.

## KEYWORDS

discharge readiness, hospital, readiness for hospital discharge scale, reliability, Turkish version, validity

## 1 | INTRODUCTION

There is increasing economic pressure on health systems to reduce costs, which has led many hospitals to shorten patients' length of stay. Consequently, the time to prepare patients for discharge has decreased, and many patients are discharged without their needs being completely met or their condition fully recovered (Korttila, 1991; Mabire et al., 2015). In fact, worryingly, Harrison, Greysen, Jacolbia, Nguyen, and Auerbach (2016) showed that 90% of patients were discharged despite having at least one barrier to discharge, such as a lack of understanding of their recovery plan or an inability to perform self-care without help from others. Furthermore, in a study conducted by Forster, Murff, Peterson, Gandhi, and Bates (2003), adverse events were detected in 19% of patients within 3 weeks of discharge.

Assessing patients' readiness for discharge is becoming increasingly important for ensuring their safety, satisfaction, and physical, emotional, and social outcomes (Weiss, Ryan, & Lokken, 2006; Weiss et al., 2007). Recent research has offered convincing evidence that discharge readiness is associated with readmission likelihood, and even mortality (Coffey & McCarthy, 2013; Mixon et al., 2016; Weiss et al., 2007). To ensure safe discharge, patients' readiness for discharge must be assessed accurately (Patel & Mourad, 2015). A patient's readiness for discharge is decided by the medical team based on various clinical criteria. However, patients' own perceptions of their readiness might differ from that of their care providers (Congdon, 1994; Reiley et al., 1996). Therefore, readiness for discharge can be assessed from the perspectives of providers, patients and patients' relatives (Weiss & Piacentine, 2006). Weiss et al. (2006) developed a 22-item scale, called the readiness for hospital discharge scale (RHDS), to measure patients' perceptions of their readiness for discharge. Later, Weiss, Costa, Yakusheva, and Bobay (2014) developed a short form of this scale (RHDS/SF), including eight items and four subscales.

A patient's readiness for discharge depends on several factors, including physiological stability, self-care skills, availability of social support, and access to the health care system and community resources (Titler & Pettit, 1995). Turkey's Health Transformation Programme, which began in 2003, has rightly been commended for extending health insurance coverage, increasing the supply of primary care, and increasing access to hospital care (OECD 2014). Since 2006, Turkey has had the lowest average length of stay among the OECD countries (OECD 2017). Indeed, while the number of inpatients increased by around 80% from 2002 to 2015, during this same period, the average length of stay decreased from 5.7 to 4.4 days (The Ministry of Health of Turkey 2017). The discharge rates in Turkey are rising more rapidly when compared with the average of OECD countries (OECD 2014), showing an increase from 105 to 167 per 1,000 population between 2007 and 2014 in Turkey (OECD 2017). There are very few health care organisations other than hospitals that offer inpatient care in Turkey, so patients are generally discharged from hospitals directly to their homes. However, the family structure has been changing in Turkey: the number of extended families is decreasing while the numbers of nuclear and fragmented families are increasing (Hacettepe University Institute of Population Studies 2014). Since such changes in the family

structure are related to the social support of the patient, they might influence readiness for discharge, as well. Hence, the validation of Turkish version of the RHDS/SF is essential. However, there is no scale to measure the readiness for discharge among adult medical-surgical patients in Turkish. We aimed to determine the validity and reliability of a Turkish version of the short form of the RHDS and to use it to determine Turkish patients' perceptions of discharge readiness.

## 2 | METHODS

### 2.1 | Translation and adaptation of instrument

This was a prospective study conducted as a part of a comprehensive project for evaluating hospital readmissions in Turkey. We initially had planned to use the 22-item RHDS. We translated the original RHDS into Turkish, after which we conducted a pilot study on 101 patients discharged from internal medicine departments of the study hospital to check its comprehensibility to patients and its feasibility. The pilot study showed that many patients perceived some of the scale items as the same, and found the scale too long – they did not want to complete it because they became tired of responding to questions. As such, we ultimately decided to use the RHDS/SF, and therefore obtained permission to use this version of the scale from the scale developer. After translation of the RHDS/SF into Turkish, it was translated back into English by an independent translator who had never seen the original version before. The original RHDS/SF and back-translation were then compared by the authors. After we concluded that the items of both versions had the same meaning, we accepted the Turkish translation as valid. Then, we conducted another pilot study on 33 patients to determine whether any of the items were not understood by patients. This pilot study did indeed show that some of the questions were not understood by patients. As we did find this, we revised the relevant items to clarify their wording. We began collecting data with the RHDS/SF after rephrasing the unclear items.

All eight items in the RHDS/SF are assessed on a 0–10 scale, with high scores indicating greater readiness (Weiss et al., 2014). The subscales are as follows: (1) patient's personal status, (2) patient's knowledge, (3) patient's coping ability and (4) patient's expected support. Personal status measures how the patient feels on the day of discharge; knowledge measures patient's knowledge about discharge information regarding self-management at home (e.g., problems to watch for after going home and restrictions); coping ability refers to how well the patient can actually manage his/her care demands at home; and expected support measures how much help and emotional support will be available to the patient after discharge (Weiss, Yakusheva, & Bobay, 2010).

### 2.2 | Population and sample

The study population was all patients aged 18 or above who were discharged alive between 1 February 2015 and 31 January 2016 from internal medicine departments of a University hospital in

Ankara, the capital city of Turkey. This hospital had approximately 800 beds. We excluded patients who died in the hospital, who left the hospital against medical advice, or who were transferred into another department or hospital. The scale was administered to patients by nine trained research assistants via face-to-face interviews on the day of discharge. Overall, 62.8% of the patients (1,579 out of 2,514) responded to the survey. We obtained informed consent from all patients who participated in the survey. The study was approved by the ethical commission of the university where the study was conducted.

### 2.3 | Data analysis

The data were analysed using SPSS Statistics 20.0 and LISREL 8.7. The characteristics of participants were examined via frequency and percentage distributions. The content validity of the RHDS/SF was assessed via a panel of experts, while the construct validity was assessed via exploratory and confirmatory factor analyses (EFA and CFA, respectively). We also conducted an item analysis before moving on to the factor analyses. The Kaiser-Meyer-Olkin measure of sampling adequacy, Bartlett's test of sphericity, and the determinant of the correlation matrix were used to examine the factorability of the scale. Cronbach's alpha and the split-half reliability method were used to determine the reliability of the RHDS/SF.

## 3 | RESULTS

Approximately two-thirds of participants (68%) were over 50 years of age, and approximately half (47%) had an education level of primary school or were illiterate (Table 1).

Ten experts were recruited for the content validity analysis. We requested that each expert assess whether each item on the scale was necessary for the scale by having them choose from the following three options: 'necessary', 'beneficial but insufficient', and 'unnecessary'. Items should be retained when the majority of experts considered it 'necessary' (Alpar, 2014). Ultimately, at least six experts considered each item necessary, so all items were retained.

Item analyses were then performed to assess the contribution of each item to the scale. The correlation matrix and item-total statistics are shown in Table 2. The correlation coefficients between all items were less than .90. The correlation matrix further suggests a four-dimensional structure, with items 1 and 2, items 3 and 4, items 5 and 6, and items 7 and 8 showing stronger relationships. Furthermore, the relationships among these four subscales were rather weak. However, this rather rough finding must be supported with factor analysis. The item-total statistics revealed no significant changes in means or variances of the whole scale when each item was deleted. Furthermore, since the Cronbach's alpha coefficient of the whole scale (.74) decreased when each item was deleted, all items were considered necessary for inclusion in the scale.

Before conducting the factor analyses, we assessed the factorability of the sample: Bartlett's test of sphericity was significant

**TABLE 1** Socio-demographic characteristics of participants (n = 1,579)

	n	%
Sex		
Female	818	51.8
Male	761	48.2
Marital status		
Married	1105	70.0
Single	474	30.0
Age		
≤29	177	11.2
30-39	146	9.2
40-49	182	11.5
50-59	285	18.0
60-69	360	22.8
70-79	265	16.8
≥80	164	10.4
Education		
Illiterate	219	13.9
Primary school	523	33.1
Secondary school	188	11.9
High school	313	19.8
Associate degree	60	3.8
Undergraduate	233	14.8
Postgraduate	43	2.7

( $\chi^2 = 6450.85$ ;  $p = .00$ ), the determinant of the correlation matrix was .017, and the Kaiser-Meyer-Olkin measure of sampling adequacy was .635. These values indicate that the sample was suitable for factor analysis. We used the principal component method of factor extraction with a varimax rotation. In determining the number of factors, we used scree plots, the Kaiser criterion (eigenvalues of higher than 1), and whether the factors explained 80%–85% of the total variance. As shown in Figure 1, the slope reached stability at factor 5. However, the eigenvalue of factor 5 was lower than 1. Although the eigenvalue of factor 4 was also lower than 1, it was only slightly so; thus, we considered the RHDS/SF to have four factors.

The factor loading matrix, Cronbach's alpha coefficients for the whole RHDS/SF and its subscales, and the descriptive statistics are shown in Table 3. The results suggest that the scale has structural validity, given the high loadings of the items on each factor. The specific items that loaded onto each factor reflected the trend observed in the exploratory factor analyses. The four factors explained 87.56% of the total variance. The common variances of the items in the RHDS/SF explained by the first four factors ranged from .82 to .94; as a common variance above .5 is usually accepted as sufficient (Kalayci, 2014), these values were considered quite high.

The Cronbach's alpha coefficient for the total scale was .74, while it ranged from .79 to .93 for the subscales. Regarding the split-half reliability, because the items constituting the scale were not equivalent

**TABLE 2** Correlation matrix of items and item-total statistics

Correlation matrix of items								
Item	1	2	3	4	5	6	7	8
1	1							
2	.65 <sup>b</sup>	1						
3	.23 <sup>b</sup>	.23 <sup>b</sup>	1					
4	.17 <sup>b</sup>	.18 <sup>b</sup>	.79 <sup>b</sup>	1				
5	.45 <sup>b</sup>	.43 <sup>b</sup>	.20 <sup>b</sup>	.16 <sup>b</sup>	1			
6	.46 <sup>b</sup>	.40 <sup>b</sup>	.21 <sup>b</sup>	.17 <sup>b</sup>	.67 <sup>b</sup>	1		
7	.11 <sup>b</sup>	.16 <sup>b</sup>	.17 <sup>b</sup>	.19 <sup>b</sup>	.02	-.06 <sup>a</sup>	1	
8	.10 <sup>b</sup>	.15 <sup>b</sup>	.18 <sup>b</sup>	.19 <sup>b</sup>	.04	-.06 <sup>a</sup>	.88 <sup>b</sup>	1

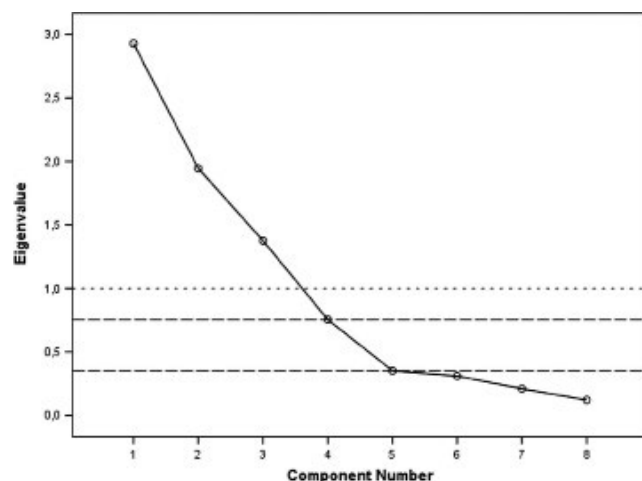
  

Item-total statistics					
Item	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Squared multiple correlation	Cronbach's alpha if item deleted
1	50.31	180.40	.49	.48	.70
2	50.70	179.57	.50	.46	.70
3	51.64	160.19	.50	.63	.69
4	51.50	163.29	.46	.62	.70
5	52.03	167.88	.44	.49	.71
6	50.09	176.85	.41	.50	.71
7	50.34	182.46	.34	.77	.73
8	50.73	180.64	.34	.77	.73

<sup>a</sup> $p < .05$  (2-tailed)<sup>b</sup> $p < .01$  (2-tailed)

in terms of content and meaning, the first half was created from odd-numbered items (1, 3, 5 and 7) and the second half from even-numbered ones (2, 4, 6 and 8). The Spearman-Brown reliability coefficient was quite high (.92). The overall mean discharge readiness score for patients was  $7.27 \pm 1.85$ ; the means of the subscales were between  $6.62 \pm 3.41$  and  $7.69 \pm 2.24$ .

To test the compliance of the four-factor structure determined via exploratory factor analyses with the theoretical or assumed factor structure (i.e., four); we employed a confirmatory factor analysis

**FIGURE 1** Scree plot of the factor analysis of the Turkish version of the readiness for hospital discharge scale/short form

(Özdamar, 2013). The data used in the model conformed to a multivariate normal distribution; thus, a maximum likelihood method was used as the estimation method. After the model was created, we determined the  $t$ -values. In structural equation modelling, relationships with non-significant  $t$ -values should be excluded from the analysis (Çokluk, Şekercioğlu, & Büyüköztürk, 2013). Because there was a non-significant relationship between the coping ability and expected support subscales ( $t = .92, p > .05$ ) in the model, we removed this relationship from the model and re-ran the model. Modification recommendations for the new model were then reviewed and it has been seen that modification that will be made between item 2 and 6 is going to make contribution to the model. It should be noted that any modification must be based on a theoretical rationale (Çokluk et al., 2013). Thus, in modifying the relationship between items 2 and 6, we did so based on the assumption that there was common variability between them. In particular, the greater the patient's energy (as assessed by item 2), the more able the patient is to meet his/her personal care needs (as assessed by item 6). Therefore, it is also theoretically correct that there is a common variability between item 2 and 6. After applying the modification, we found that the chi-square value was significant ( $\chi^2$  difference with 1  $df = 10.45; p = .0012$ ). At this point, the model was considered complete (Figure 2).

Note that the  $p$ -value of a chi-square test for model fit should be non-significant. However, it is normal for  $p$ -values to be significant when the sample is large (Çokluk et al., 2013), as is the case in this study ( $n = 1579$ ). Thus, other fit indices must be assessed. As shown

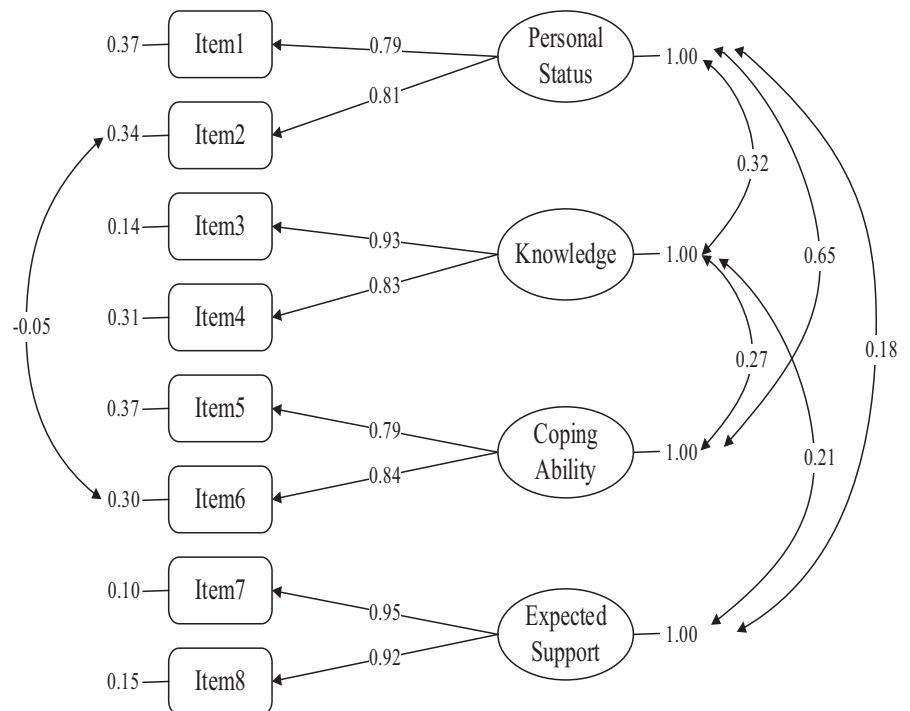
**TABLE 3** Descriptive statistics, reliability coefficients and factor loading matrix of the Turkish version of RHDS/SF

Four factors/subscales and survey items	Mean ± SD <sup>a</sup>	Factor loading				h <sup>2b</sup>
		Factor 1	Factor 2	Factor 3	Factor 4	
Personal status (Cronbach's α = 0.79)	7.69 ± 2.24					
1. Physical readiness	7.88 ± 2.45	0.04	0.09	0.28	<b>0.86</b>	0.82
2. Energy	7.49 ± 2.47	0.10	0.10	0.21	<b>0.88</b>	0.84
Knowledge (Cronbach's α = 0.88)	6.62 ± 3.41					
3. Knowledge of complications	6.55 ± 3.60	0.08	<b>0.93</b>	0.11	0.13	0.89
4. Knowledge of restrictions	6.69 ± 3.61	0.10	<b>0.94</b>	0.07	0.06	0.90
Coping ability (Cronbach's α = 0.80)	7.13 ± 2.96					
5. Ability to handle demands	6.16 ± 3.44	0.04	0.08	<b>0.88</b>	0.24	0.84
6. Ability to perform self-care	8.10 ± 3.02	-0.08	0.10	<b>0.87</b>	0.25	0.84
Expected support (Cronbach's α = 0.93)	7.66 ± 2.97					
7. Help with care at home	7.85 ± 2.99	<b>0.96</b>	0.09	-0.02	0.07	0.94
8. Help with medical care	7.46 ± 3.13	<b>0.96</b>	0.10	-0.01	0.06	0.94
Overall (Cronbach's α = 0.74)	7.27 ± 1.85					
Split-half reliability <sup>c</sup>	0.92					
Eigenvalues		2.93	1.95	1.38	0.76	
Variance (%)		36.59	24.32	17.21	9.44	
Cumulative (%)		36.59	60.91	78.12	87.56	

<sup>a</sup>Standard deviation

<sup>b</sup>Common variance

<sup>c</sup>Spearman-Brown coefficient



**FIGURE 2** Confirmatory factor analysis results of the Turkish version of the readiness for hospital discharge scale/short form

Fit indices	Good fit <sup>a</sup>	Acceptable fit <sup>a</sup>	Model	Fit status
$\chi^2/df$	$0 \leq \chi^2/df \leq 2$	$2 \leq \chi^2/df \leq 3$	36.45/14 = 2.60	Acceptable fit
RMSEA	$0 \leq RMSEA \leq 0.05$	$0.05 \leq RMSEA \leq 0.08$	0.03	Good fit
CFI	$0.97 \leq CFI \leq 1$	$0.95 \leq CFI \leq 0.97$	1	Good fit
GFI	$0.95 \leq GFI \leq 1$	$0.90 \leq GFI \leq 0.95$	0.99	Good fit
AGFI	$0.90 \leq AGFI \leq 1$	$0.85 \leq AGFI \leq 0.90$	0.99	Good fit

<sup>a</sup>Criteria for fit indices were taken from Yilmaz and Varol (2015)

in Table 4, almost all of the fit indices indicated that the model had a good fit (Yilmaz & Varol, 2015), which confirms the four-factor structure of the RHDS/SF.

## 4 | DISCUSSION

This study examined the psychometric features of the Turkish version of the RHDS/SF and presents basic data on the readiness of patients for discharge in a University hospital in Turkey. The RHDS, when translated into another language, has not shown comparable reliability and validity to the original version by Weiss and Piacentine (2006). For instance, when adapted into French, numerous items were removed, yielding 12 items with a 3-factor structure (Mabire et al., 2015). Furthermore, in an adaptation study into Chinese, a 3-factor structure was obtained, containing all of the items from the original scale (Zhao, Feng, Yu, Gu, & Ji, 2016). As far as we know, there is no study adapting the RHDS for general (adult medical-surgical) patients in Turkey. There is one study adapting the RHDS-New Mother Form to mothers who gave vaginal birth. They found a 4-factor, as with the original scale; however, all items were grouped onto different subscales, except for the expected support subscale (Akin & Şahingeri, 2010).

As far as we know, there have been no studies of the psychometric properties of the RHDS/SF in other languages except for the English version. In this study, 1,579 (response rate 62.8%) patients participated. The item analyses showed that all items in the scale could be kept; the same was found to be true of the content and construct validity analysis. The exploratory factor analyses revealed a four-factor structure, and all the items had rather high loadings onto the related factors (.86–.96). Furthermore, the four factors explained most of the total variance (87.6%), which accords with the RHDS/SF development study (93%) (Weiss et al., 2014). The four-factor structure was subsequently confirmed in a confirmatory factor analysis. The reliability of the whole RHDS/SF in this study (.74) was comparable to that in Weiss et al. (2014) (.79). The Cronbach's alpha coefficients of the subscales were also quite high (.79–.93), as was the Spearman-Brown coefficient (.92). In sum, we can say that the validity and reliability of the RHDS/SF is high, and have concluded that the Turkish version of the RHDS/SF would be useful for assessing the discharge readiness of Turkish-speaking patients.

We found that the overall mean score of the Turkish version of the RHDS/SF ( $7.27 \pm 1.85$ ) was lower than the means of the original RHDS ( $8.3 \pm .8$ ) (Weiss & Piacentine, 2006) and RHDS/SF ( $8.4 \pm 1.2$ )

**TABLE 4** Fit indices of the model

(Weiss et al., 2014). The subscale with the lowest mean score was knowledge ( $6.62 \pm 3.41$ ), while that with the highest was personal status ( $7.69 \pm 2.24$ ). This seems the direct inverse of the original study by Weiss and Piacentine (2006), wherein the lowest mean score was found for personal status ( $7.7 \pm .9$ ) and the highest mean scores were for knowledge ( $8.7 \pm .7$ ) and coping ability ( $8.7 \pm .5$ ). Mabire et al. (2015) similarly found that the highest subscale scores were knowledge ( $9.0 \pm 1.2$ ) and coping ability ( $9.4 \pm 1.1$ ), while the lowest was for expected support ( $3.9 \pm 1.8$ ). The overall mean was  $7.6 \pm .7$ . In our study, the reason that the knowledge subscale was the lowest might be because the education level and health literacy of participants are lower – specifically, more participants had education levels of less than high school (58.9%) when compared with the participants (7.7%) in the study of Weiss and Piacentine (2006), and general literacy skills are linked to health literacy (Australian Commission on Safety and Quality in Health Care 2013). Wallace, Perkhounkova, Bohr, and Chung (2016) found that discharge readiness varies according to patients' health literacy. Another possible reason is that health professionals might not give sufficient discharge information to patients.

## 5 | CONCLUSION

The Turkish version of the RHDS/SF is a reliable and valid tool for measuring the discharge readiness of patients. The knowledge subscale had the lowest mean, suggesting that it should be the first area to improve patients' readiness for discharge. Our findings provide a basis with which to make comparisons in the future and highlight key areas of discharge planning for improvement in the hospital where the study was conducted. However, the findings here were obtained from patients discharged from the internal medicine departments of a single university hospital; therefore, it might not be generalizable to patients discharged from other departments or hospital types. Future studies are needed with more patient groups and different health care settings. Another point to note is that readiness in this study was only from the patients' perspectives. Future studies should examine assessments of discharge readiness from the nurses' and physicians' perspectives, and compare their results with those from the patients' perspective. Furthermore, the relationships between patients' readiness for discharge and various patient outcomes such as readmission, health services utilization and mortality should also be investigated.

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## ETHICAL APPROVAL

The study was approved by Hacettepe University Ethical Commission.

## 6 | AUTHOR'S CONTRIBUTIONS

Sıdıka Kaya, Gülay Sain Güven: Study design; Mesut Teleş, Cahit Korku, Seda Aydan, Ahmet Kar, Nazan Kartal, Gülsüm Şeyma Koca, Ahmet Yıldız: Data collection; Mesut Teleş, Ahmet Yıldız: Data analysis; Sıdıka Kaya, Gülay Sain Güven, Mesut Teleş, Cahit Korku, Seda Aydan, Ahmet Kar, Nazan Kartal, Gülsüm Şeyma Koca, Ahmet Yıldız: Manuscript writing.

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