



## Research Article

# Psychometric Properties of Turkish Version of the Dutch Objective Burden Inventory



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## SUMMARY

**Purpose:** The purpose of this study was to assess the psychometric properties of the Dutch Objective Burden Inventory (DOBI) for the Turkish society.

**Methods:** This is a descriptive, methodological study. The sample was composed of 230 heart failure patients' caregivers.

**Results:** The DOBI was translated using translation and back-translation. The translated Turkish version was submitted to eight experts who analyzed it for its content validity. Scores from the experts were evaluated using the Kendall W analysis, and no statistically significant difference was found among the scores (Kendall W = .13,  $p = .338$ ). In the confirmatory factor analysis, factor loading was found to be between 0.75 and 1.00 for all subscales. Thus, the DOBI demonstrated acceptable internal consistency (the components displayed  $\alpha$  scores from .96 to .99), good test-retest reliability (no statistically significant differences were found,  $p > .050$ ).

**Conclusions:** The Turkish version of the DOBI scale is a valid and reliable tool for the Turkish population. It can be used in nursing practices and research.

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## Introduction

Heart failure (HF) is a frequent health problem whose incidence rate increases each year with high mortality and morbidity rates [1]. It is a significant health problem due to its high prevalence, and the very high morbidity and mortality rates it causes. It is a disease which leads to low quality of life due to the patient's failure to meet basic needs, change in body image [2], lack of self-care behaviors and activities of daily living [3,4], chronic fatigue, sexual dysfunction [5,6], and concerns about the future [7]. As the stages of the disease progress, patients require the help of others to meet their basic needs with most of the care being provided by family members. Frequent hospitalization of patients with HF due to the effects of their intensifying symptoms, their cognitive deficiency, medication regimens, and implanted devices can all cause an increase in the stress levels and overall burden on caregivers, causing the caregivers to experience depressive symptoms and the impairment of their emotional and physical health [8]. Since HF requires a long

period of treatment after the diagnosis, this affects not only patients but also the caregivers of the patients physically, psychologically, socially, spiritually and also causes an economic burden along with intense stress [9].

In the study of Hooley, Butler, and Howlett [10], in which they examined the relationship between the quality of life and depression of caregivers of HF patients and their burden, the authors stated that a caregiver's burden is related to his or her depression, and that they have a low level of quality of life [10]. Emotional and physical burden cause caregivers more anxiety and depression, more impaired health, more doctors' visits, and greater use of psychotropic medicine than the normal population [11]. In their work, Aldred, Gott, and Gariballa [12] stated that HF affects the whole life of patients and caregivers. Boyd et al [13] explained that patients and caregivers cannot receive professional support but have a great need for support during diagnosis. The caregivers and patients experience problems because of physical limitations and psychosocial effects. It has also been found that all these factors increase the burden of caregivers and negatively affect patients' and caregivers' psychosocial situation [13].

While the importance of support is emphasized for patients with HF, the physical [14], psychological [9,15], social [12], economic [9], and spiritual burden [9] on caregivers is ignored. A

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caregiver's burden has an obvious impact on HF care, but this issue has not been researched adequately. In order to reduce the burden of the caregiver, the first thing to do is to determine the nature of the burden experienced. Nursing interventions can be planned for caregivers. This information can become a part of the caregivers' support, and health providers can use it as a point of reference and as a continuous assessment tool when planning patient care. As a result, patients' and caregivers' quality of life can both increase. Thus, it is necessary to measure the burden of HF patients' caregivers through appropriate measurement tools. However, currently there is no reliable or valid measurement tool in Turkey. The Dutch Objective Burden Inventory (DOBI) developed by Luttik et al [14] is one of the most frequently used scales in the field, but a validated Turkish version has not been available.

The DOBI should be adapted to Turkish society so it may be used in Turkey. Although some concepts are common phenomena for many societies, tests developed in a specific culture and a specific language reflects comprehension, conceptualization, and sampling characteristics of that specific culture. Tests should be systematically examined in detail [16–18]. This study was carried out to assess the psychometric properties of a Turkish version of the DOBI.

## Methods

### Study design

This study used a descriptive, methodological design.

### Setting and sample

The study was conducted in the cardiology outpatient clinic and service of a university hospital. It is recommended that sample number should be 5 or 10 times the scale item number to perform the factor analysis for validity and reliability studies [19]. In this study, we aimed to reach at least 190 caregivers on the basis of scale item number, and 230 caregivers were included in the research sample. For test-retest purposes, the instrument should be administered for a second time. For test-retest analysis, a group of at least 30 participants is recommended [17,20]. In this study, 10 days following the first administration, the DOBI was given to 30 caregivers who were willing to take part in the retest. For the purposes of the study, a caregiver was defined as the person whom the HF patient identified as the primary helper with their daily activities, who voluntarily accepted to participate in the research, was literate in Turkish, had no hearing or speaking impairment, and was aged 18 years and older. Factors that disqualified caregivers from sampling were their diagnosis with any psychiatric disease and their care being provided to patients at a price.

### Instruments

#### Demographic and care-related characteristics

This form is comprised of 11 questions regarding caregivers' sociodemographic characteristics: age, sex, marital status, educational status, occupation, social insurance, economic condition, his/her relation to patient, whether he/she lives with patient, care giving period, and whether he/she has a chronic disease.

#### DOBI

The DOBI, which Luttik et al [14] developed in 2008, was used to examine its reliability and validity for the Turkish Society. The DOBI measures objective and subjective burden in caregivers for HF patients. This scale is composed of 38 items in total. It has four subscales including personal care (11 items), practical support (11 items), motivational support (10 items), and emotional support (6

items). Each item represents a specific caregiving task. Using a 3-point Likert scale, caregivers were asked to rate both the frequency and perceived burden for each caregiving task. If a caregiver did not perform a specific task, no response is required for the subjective component of that specific item. Frequency responses represent objective burden and perceived burden scores represent subjective burden. Higher scores represent higher levels of caregiver burden. Mean objective and subjective burden scores are reported for each domain. Total scores for all components range from 1 to 3. Total scores for each component were computed by adding the items values in each component and then dividing them by the number of items in that component. The internal consistency of the components was calculated using the Cronbach  $\alpha$ . The components of DOBI's objective burden displayed  $\alpha$  scores from .81 to .84 [14].

### Procedure

#### Translation of the DOBI

Language validity of the scale was analyzed as the first step of the research conducted to test the validity of the scale for the Turkish society. The DOBI was translated from English into Turkish by all the researchers and two linguists. The researchers reviewed this preliminary Turkish version of the scale and then drafted one Turkish version of the DOBI. The forward-translated version was then back-translated by a professional bilingual translator unfamiliar with either the English or the Turkish versions of the DOBI to ensure the accuracy of the translation. The translated English form and the original form were compared by the researchers. If the items or response choices between the forward-translated and back-translated instruments did not match, the choice of words was discussed among the translators until a final version was composed [17,18].

#### Content validity of the DOBI

The translated Turkish version was submitted for expert opinion (5 faculty members from the Faculty of Nursing and 3 clinical nurses from the Department of Cardiology) in an analysis of its content validity. Experts were asked to rate each item in the Turkish version of the DOBI based on relevance, clarity, and simplicity on a scale of 1 (not appropriate at all) to 10 (completely appropriate).

#### Pretest

Acquiring the final form with expert opinions, the scale was used in pre-interviews conducted with 12 caregivers. The data from these caregivers was not used in validity and reliability tests.

#### Data collection

The data was acquired by the researchers between March 2012 and March 2013 in face-to-face interviews, explaining the aim of the research to the caregivers who were part of the research sampling in the clinics where the research was carried out.

#### Data analysis

Analysis was conducted using descriptive statistics and appropriate reliability and validity statistical tests using SPSS 15.0 (SPSS Inc., Chicago, IL, USA). Confirmatory factor analysis (CFA) was assessed by using LISREL 8.0 (Scientific Software International, Inc, Lincolnwood, IL, USA). Expert opinions for the content validity of the scale were evaluated through Kendall W analysis. CFA was used for construct validity [21–23]. Pearson product-moment correlation coefficient was used in the reliability analysis, as well as item total score correlation and Cronbach  $\alpha$  analysis. Test-retest

measurement was assessed using Pearson correlation and a dependent *t* test with 10 days' interval [17,18].

### Ethical considerations

Written permission to examine the reliability and validity of the Turkish version of DOBI from Maria Louise Luttkik, who developed this scale, was received through e-mail. Written permission from Dokuz Eylül University Ethical Committee (246-GOA2011/22-19-30.06.2011) and the Dokuz Eylül University Hospital (334/25.05.2011) was also obtained. The objective of the research was explained to the participants and written permission was received from those agreeing to participate in the research.

## Results

### Sociodemographic characteristics

Caregivers had a mean age of  $53.71 \pm 12.49$  years, were mostly female (78.3%), married (83.9%), and graduated primary school (45.2%). Caregivers were either spouses (47.0%), adult children (41.3%), or other friends or relatives (11.7%). The average caregiving period was 5.8 years, while 87.8% of the caregivers live with the patient. Patients had a mean age of  $70.11 \pm 11.20$  years, were mostly men (50.9%) and married (67.4%). Patients' left ventricular ejection fraction value average was 34.1, and the average HF period was 6.5 years. Also, 91.3% of the patients and 45.7% of the caregivers had another chronic disease.

### Descriptive statistics of the DOBI—objective and subjective portion

The mean score of the caregivers was  $1.73 \pm 0.73$  in the personal care subscale,  $2.59 \pm 0.67$  in the practical support subscale,  $2.58 \pm 0.53$  in the motivational support subscale, and  $2.76 \pm 0.41$  in the emotional support scale (Table 1). The mean score for the subjective portion of the caregivers was  $1.65 \pm 0.72$  in the personal care subscale,  $1.64 \pm 0.78$  in the practical support subscale,  $2.07 \pm 0.62$  in the motivational support subscale, and  $2.09 \pm 0.64$  in the emotional support subscale (Table 2).

### Validity

#### Concordance validity

Scores of the eight experts were evaluated using the Kendall *W* analysis, and no statistically significant difference was found among the scores (for DOBI, Kendall *W* = .13,  $p = .338$ ). Consequently, we determined that expert scores were at a consistently low level with one another.

#### Construct validity

#### Exploratory factor analysis

Using exploratory factor analysis, we found that Kaiser-Mayer-Olkin coefficient was 0.88 and Barlett test result was  $\chi^2 = 15,749.30$  ( $p < .001$ ) for this study. The factor loadings of the scale ranged from 0.79 to 0.94. The explained total variance was

**Table 1** Caregivers' DOBI Subscale Scores and Cronbach  $\alpha$  Scores ( $N = 230$ ).

DOBI Scales	Cronbach $\alpha$	Min. to max.	$M \pm SD$
Personal care (Item No. 1–11)	.98	1–3	$1.73 \pm 0.73$
Practical care (Item No. 12–14)	.96	1–3	$2.59 \pm 0.67$
Motivational support (Item No. 23–32)	.99	1–3	$2.58 \pm 0.53$
Emotional support (Item No. 33–38)	.98	1–3	$2.76 \pm 0.41$

Note. DOBI = dutch objective burden inventory.

**Table 2** DOBI Objective Burden and Subjective Burden Scores.

DOBI subscales	Objective burden $M \pm SD$	Subjective burden $M \pm SD$
Personal care	$1.73 \pm 0.73$	$1.65 \pm 0.72$
Practical support	$2.59 \pm 0.67$	$1.64 \pm 0.78$
Motivational support	$2.58 \pm 0.53$	$2.07 \pm 0.62$
Emotional support	$2.76 \pm 0.41$	$2.09 \pm 0.64$

Note. DOBI = dutch objective burden inventory.

90.3%. The total variance explained by each factor was 48.0% for personal care, 27.5% for practical support, 8.1% for motivational support and 6.4% for emotional support.

### CFA

CFA was performed to confirm the consistency of the Turkish version of DOBI for construct validity. Consistency values were determined as follows:  $\chi^2/df$  was 3.24 (1201.55/370); root mean square error of approximation (RMSEA) was 0.09; standardized root mean square residual (SRMR) was 0.04, comparative fit index (CFI) was 0.97, non-normed fit index (NNFI) was 0.97, normed fit index (NFI) was 0.96, incremental fit index (IFI) was 0.97, goodness of fit index (GFI) was 0.76.

The personal care subscale factor loading was 0.75–0.96, the practical support subscale factor loading was 0.88–1.00, the motivational support subscale factor loading was 0.92–0.99, and the emotional support subscale factor loading was 0.92–0.97 (Figure 1). The factor loadings of the scale ranged from 0.75 to 1.00. The items that were less than 0.30 in terms of factor loadings were items number 15–22 in the practical support subscale. For that reason these items are removed from the scale.

### Reliability

#### Internal consistency analysis

When the item-item score correlations of 30 items were examined in the reliability analysis of the DOBI, the correlations were found to be .94–.99 in personal care, .92–.99 in practical support, .79–.99 in motivational support, and .67–.99 in emotional support scale, at a statistically significant level ( $p < .001$ ; Table 3).

When item-subscale score correlations of the 30 items were examined in the reliability analysis of the DOBI, they were found to be .80–.95 in personal care (11 items), .93–.98 in practical support (3 items), .93–.99 in motivational support (10 items), and .96–.98 in emotional support scale (6 items), at a statistically significant level ( $p < .001$ ) (Table 3).

In the analysis conducted to test the internal consistency, which is one of the reliability indicators of the DOBI, Cronbach  $\alpha$  was .98 for personal care, .96 for practical support, .99 for motivational support, and .98 for emotional support (Table 1).

#### Test-retest reliability

No statistically significant differences were found ( $p > .050$ ) (Table 4). When the relationship between scores obtained from the first and second administrations was evaluated with Pearson correlation analysis, there was a very strong, positive, and statistically significant relationship between the test-retest scores ( $r \geq .98$ ,  $p < .001$ ; Table 4).

## Discussion

If a scale were to be used in a different language, it must display the same reliability and validity characteristics as in its original form. Thus, the validity and reliability of the DOBI needed to be evaluated if it were to be used in a Turkish sample. The results of

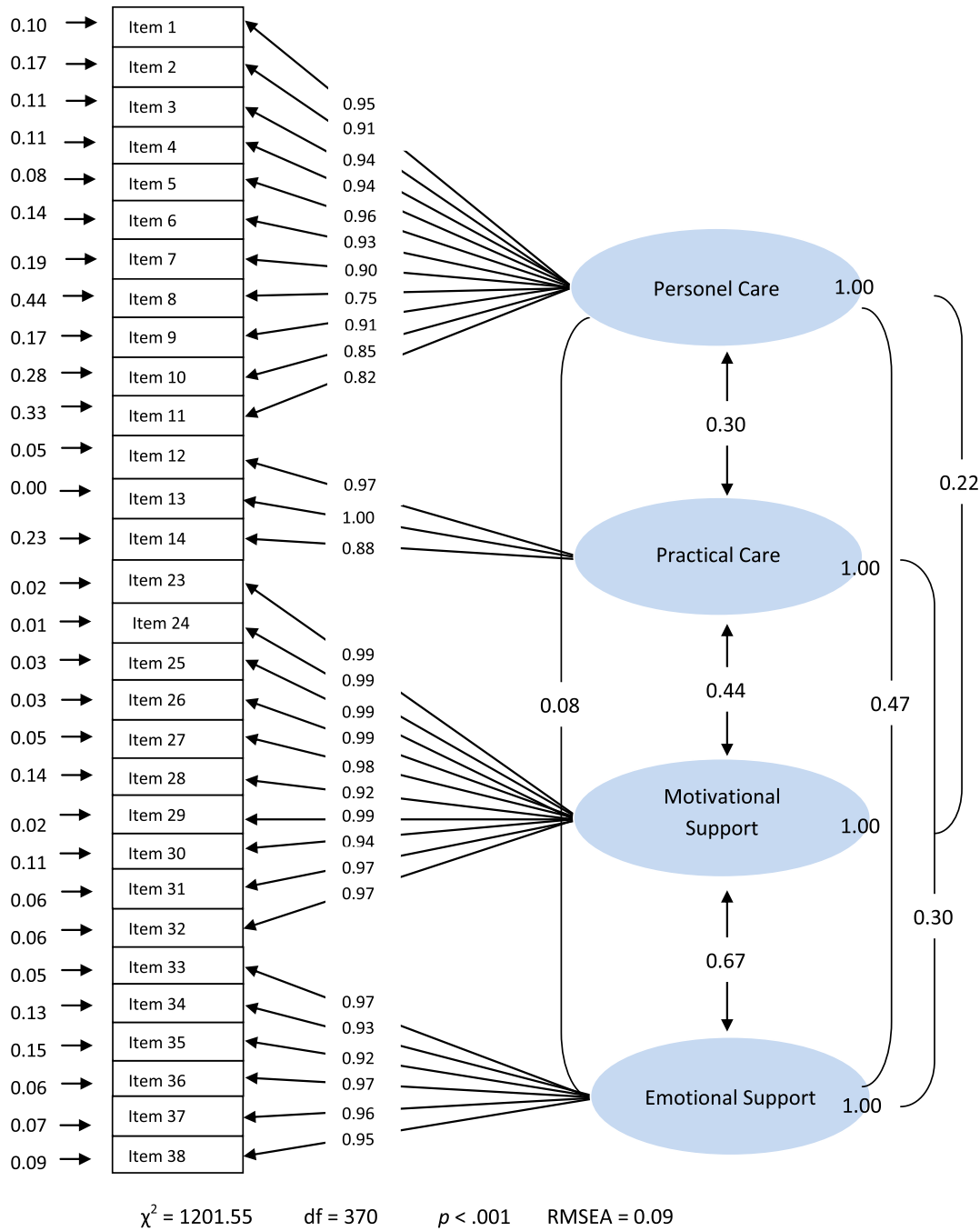


Figure 1. DOBI's confirmatory factor analysis model.

Note.  $df = 370$ ;  $p < .001$ ;  $RMSEA$ (root mean square error of approximation) = 0.09;  $\chi^2 = 1,201.55$ .

this study provide support for the reliability and validity of the DOBI to measure the caregivers' burden in Turkey of in Turkish HF patients' caregivers.

The use of CFA is recommended in examining the construct validity in scale adaptation studies to test an existing hypothesis regarding the structure of items in the scale, compare the factor structure of the adapted scale to the original factor structure, and evaluate the similarities and differences [17].

This study found that the factor loadings of all items were between 0.75 and 1.00 in CFA (Figure 1). CFA recommends that each item should have a model-data fit coefficient value of at least 0.30

and above [21]. Thus, the model-data fit was sufficient in this study. Goodness of fit statistics should also be at the desired level in CFA. In the chi-square test performed as the fit statistic, the chi-square fit value was significant [ $\chi^2/df = 3.24 (1,201.55/370)$ ]. The fact that this value is 2 or less means that it is a good model. However, the fact that this value is 5 or less shows us that the model has an acceptable goodness of fit [21]. This study observed that the model-data fit was poor but acceptable.

The other frequent tests used to measure goodness of fit are RMSEA, SRMR, CFI, NNFI [21,23–25]. RMSEA in the range of 0.05–0.10 was considered an indication of fair fit and values above

**Table 3** Characteristics of Items in DOBI Scale Scores (N = 230).

DOBI Subscales	DOBI Items	Item-item score correlations (r) <sup>a</sup>	Item-subscale score correlations (r) <sup>a</sup>	p	
Personal care (Item No. 1–11)	In the past 3 months, did you support your partner				
	(1) No, never				
	(2) Yes, sometimes or regularly				
	(3) Yes, often or always				
	1. in eating and drinking	.94	.94	<.001	
	2. in washing and bathing	.97	.92	<.001	
	3. in getting dressed and un-dressed	.97	.95	<.001	
	4. in going to the toilet	.97	.93	<.001	
	5. by assisting with appearance (brushing teeth, nail care, combing hair)	.94	.95	<.001	
	6. in walking in and around the house	.99	.94	<.001	
	7. in getting into and out of bed or chair	.99	.92	<.001	
Practical support (Item No. 12–14)	8. in walking stairs	.99	.80	<.001	
	9. in finding a comfortable position in bed	.96	.92	<.001	
	Which of the following statements fits your personal situation?				
	10. I have to be available for 24 hours a day to take care of my partner.	.99	.89	<.001	
	11. My partner also needs my help frequently at night.	.99	.87	<.001	
	Are you the one that				
	12. performs the light household activities (dusting/doing the dishes)	.92	.98	<.001	
	13. performs the heavy household activities (vacuuming/washing the floors)	.99	.98	<.001	
	14. does the shopping	.99	.93	<.001	
	Motivational support (Item No. 23–32)	In the previous 3 months, did you support your partner			
		23. in following the fluid prescriptions	.83	.99	<.001
24. in following the diet prescriptions (e.g. seeking low-salt products)		.79	.99	<.001	
25. in regular weighing		.99	.98	<.001	
26. in following the prescriptions on physical activity and exercise		.90	.98	<.001	
27. by motivating to stick to the diet prescriptions		.99	.97	<.001	
28. by motivating to quit or reduce smoking		.99	.93	<.001	
29. by motivating to activities and exercise		.99	.99	<.001	
30. by motivating to take medications (at the right time)		.99	.95	<.001	
31. by motivating to stick to the fluid prescriptions		.99	.98	<.001	
32. by motivating to start working again		.99	.97	<.001	
Emotional support (Item No. 33–38)	In the previous 3 months, did you support your partner				
	33. by providing comfort	.67	.96	<.001	
	34. by talking to reduce anxiety	.88	.96	<.001	
	35. by talking to reduce depressive feelings	.93	.96	<.001	
	36. by talking about worries and problems	.99	.98	<.001	
	37. by showing understanding	.99	.96	<.001	
38. by keeping him/her company	.99	.96	<.001		

Note. DOBI = dutch objective burden inventory.

<sup>a</sup> Pearson correlation at a statistically significant level ( $p < .001$ ).

**Table 4** Comparison of DOBI Test-retest Score Means and Correlations (N = 30).

DOBI subscales	First administration M ± SD	Second administration M ± SD	t	p	r	p
Personal care	1.73 ± 0.65	1.74 ± 0.65	-1.68	.103	.99	.001
Practical support	2.73 ± 0.44	2.72 ± 0.44	1.00	.326	.99	.001
Motivational support	2.18 ± 0.55	2.19 ± 0.55	-1.36	.184	.99	.001
Emotional support	2.26 ± 0.52	2.28 ± 0.50	-1.14	.264	.98	.001

Note. DOBI = dutch objective burden inventory.

0.10 indicated poor fit. It was then thought that an RMSEA of between 0.08 and 0.10 provides a mediocre fit and below 0.08 shows a good fit [21,23–25]. In this study, the fact that RMSEA value was significant at 0.09 showed that fit was mediocre but acceptable.

A value of SRMR lower than 0.10 and CFI, NNFI values equal to or more than 0.90 indicate that there is fit in the scale [21,23–25]. In this study, SRMR, CFI, and NNFI values indicated a good fit. Results of this study support the construct validity of the Turkish version of the DOBI and that it is a valid instrument for use in Turkish samples.

Unlike the initial DOBI validation study, this study recruited both spousal and nonspousal caregivers on the version of the DOBI tested in this study. In the scale, the second component of practical

support (items No. 15–22) factor loadings were lower than 0.30; for this reason, these items are removed from scale because they were not appropriate for the Turkish culture or its health care system. Caregivers do not fill out forms or pay for insurance, are not organized home care services or physical assistance services. If the patients had problems they went to the hospital polyclinics or emergency room. They do not use the telephone to reach health professionals when problems arise. Because of all these cultural features, these items were removed from the Turkish DOBI.

In this study, the DOBI scale demonstrated acceptable internal consistency. One of the methods used to evaluate the internal consistency in the adapted scales in terms of reliability is item analysis. Although sufficiency level of item-item score correlation coefficients displays variety in the literature, in general, the minimum level accepted is .20. Items with reliability coefficients between .30 and .40 are considered good, while items having reliability coefficients of above .40 are reported as ideally distinctive, and thus reliable [17,26]. In this study, item-item score correlation coefficients were .67 and above.

One of the methods recommended for evaluating the internal consistency is the Cronbach  $\alpha$  reliability coefficient. If Cronbach  $\alpha$  is lower than .40, the measurement tool is not reliable; if it is between .40 and .59, the measurement tool has a low reliability; if it is between .60 and .79, the measurement tool is considered relatively reliable; if it is between .80 and .90, the tool is considered highly

reliable [19]. In our study, the Cronbach  $\alpha$  of the scale was found to be within reliable limits (with minimum at .96 and maximum at .99). In the study conducted by Luttik et al [14], the internal consistency coefficient of scale varied from .81 to .84. In the study conducted by Makdessi, Harkness, Luttik, and Mckelvie [27] the internal consistency coefficient of the scale ranged from .81 to .92.

Test-retest analysis is one of the most frequently used reliability analyses and evaluates the invariance characteristic of the measurement tool. Obviously, there was consistency between measurements performed at specific intervals, as there was no difference between test-retest score averages. Test-retest reliability coefficient was above .98, and there was a statistically positive and highly significant relationship between test-retest scores [20,26]. Thus, the Turkish DOBI was found to have a high level of reliability.

## Conclusion

In this study, the reliability and validity of the DOBI for the Turkish society were examined; the study was conducted in accordance with international scientific methods. This study provided evidence that the Turkish version of the DOBI is a reliable and valid instrument for assessing Turkish HF patients' caregivers. We concluded that the scale could be employed in nursing practices and research in Turkey.

## Conflicts of interest

The authors declared no potential conflicts of interest with respect to the authorship and/or publication of this article. The authors received no financial support for the research and/or authorship of this article.

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