Validity and Reliability of the Turkish Version of the European Heart Failure Self-Care Behaviour Scale (Ehfscb-9)

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Abstract

Abstract To adapt the 9-Item European Heart Failure Self-Care Behaviour Scale to Turkish. A methodological design was used in this study. The study population consists of 120 patients that accepted to participate in this study and who had a heart failure. Firstly, the language validity of the scale was addressed. In the following step, for content validity, experts' views were obtained and the scale was revised accordingly. The construct validity was evaluated through factor analysis. As for reliability, it was determined using "test-retest reliability", "cronbach alpha method", "item total score correlation technique" and "scale alpha if item deleted". The 9-Item European Heart Failure Self-Care Behaviour Scale was translated into Turkish for language validity. For content validity, Kendall Goodness-of-fit Correlation Test was performed (W=0.29; p>0.05). The factor analysis revealed that the scale items were gathered under two factors, which explained 50.39% of the total variance, and the factor loadings ranged between 0.21-0.92**.** Test–retest reliability showed significant agreement for the total score (ICC: 0.84, 95%CI: 0.67–0.92). The item total correlation ranged from 0.10 to 0.80. Internal consistency was satisfactory with a Cronbach's alpha coefficient of 0.80. The 9-Item European Heart Failure Self-Care Behaviour Scale is deemed a valid and reliable scale in holistically assessing heart failure-specific self-care in Turkish patients.

Keywords: Heart failure, self care, validity, reliability

Introduction

Heart failure (HF) is one of the leading health problems worldwide because of being more frequent and widespread (Degertekin, 2012). Heart failure is seen in the second place among cardiovascular diseases (Efe and Olgun, 2011). The risk of HF is 20% for Americans over 40 years of age. In USA, HF incidence has mainly remained steady over the past several decades, with over 650000 new HF cases diagnosed yearly. The incidence of HF increases with age, rising from approximately 20/1000 patients 65 to 69

years of age to > 80/1000 patients among those over 85 years of age. Almost 5.1 million people in USA have clinically manifest HF, and the prevalence continues to increase (Yancy et al., 2013). Although Turkey has a younger population compared to western countries, its HF prevalence is reported to be significantly higher than others. As a result of the HAPPY (Heart failure prevalence and predictors in Turkey) study, the adult HF prevalence in our country was found as 6.9%. Based on 2010 data, assuming that >35 year-old population is 29.6 million people in Turkey, 2 million 424 adults can be said to have HF (Degertekin, 2012). In a study conducted in Turkey, it was found that nearly half of the patients applied to a hospital again in 90 days (Karaca and Mert, 2011: 4). The treatment of patients with HF accounts for up to 2% of total health care expenses (Köberich et al., 2013). Patients characteristically have numerous accompanying conditions, restricted functional status and a decreased quality of life.Heart failure management includes a complex clinical treatment and nutrition to reduce mortality and unnecessary hospitalization, and to provide the symptom management. For these reasons, self-care in HF patients has become an important issue that requires attention and effort. Facilitating self-care behaviours is one of the primary principles of HF managing programs along with accurately evaluating HF syndrome, optimisation of medical treatment, managing early signs and symptoms of decompensation, defining and managing companying conditions, identifying end-of-life desires and constant monitoring. Besides, it is also an important strategy for reducing the economic burden of HF (Köberich et al., 2013).

Self-care is an important element of nursing. The concept of self-care, which was developed by Dorethea Orem in 1959, focuses on meeting individuals' needs of continuing their health and life, recovering from diseases and injuries, coping with the negative effects, and in other words taking the responsibility of their own care. According to Orem, "self-care is practices individuals perform on their own behalf to maintain their life, health and well being" and this skill develops through communication, culture, training and interaction over time. Individuals' ability of performing activities about themselves is defined as self-care agency (Taylor and Renpenning, 2011).

As also indicated in the guidelines of European Society of Cardiology (ESC), self-care is a substantial part of successful treatment in HF, and has a significant effect on symptoms, functional capacity, general state of health, morbidity, and prognosis (Dickstein et al., 2008). In HF, which includes a life-long treatment, patients have to follow self-care activities such as diet (reducing the consumption of salt and liquids, and some special drugs), regular use of medicine, symptom control, quitting smoking and drinking alcohol, daily monitoring of weigh and exercising (González et al., 2005). Patients may have slight information about their health state and how to deal with it, or the motivation to modify their way of life and achieve self-care activity (Cockayne et al., 2014). Therefore, in the HF care management process, nurses should develop and evaluate self-care skills by conducting a comprehensive patient and family training aiming to maintain physical stability, avoid acts that would make the condition worse and recognize the early symptoms of getting worse (Ozer and Argon, 2005; Falk et al., 2007; Spaling et al., 2015). The valid and reliable measurement of HF self-care deals with the question of how we can optimize self-care and assist patients with HF (Lee et al., 2013). To evaluate HF self-care and to improve self-care interventions reliable and valid instruments are needed. Only two scales have undergone sufficient psychometric testing: the European Heart Failure Self-Care Behaviour Scale (EHFScBS) (12 item and 9 item version) and the Self-Care of Heart Failure Index (SCHFI) (Jaarsma et al., 2003; Jaarsma et al., 2009; Yu et al., 2010; Baydemir et al., 2013). Due to its validity, reliability, accuracy and supportive psychometric properties in clinical practices and studies evaluating self-care behaviors, EHFScBS is reported to be more useful in terms of ease of application than the 12-item version of the 9-item version. For this reason, 9-item EHFScBS was preferred in our study.

Aim of the Research: The aim of this study was to translate and adapt the EHFScBS-9 for use in the Turkish population with HF, and to evaluate their psychometric properties.

Materials and Methods: This study was conducted as a methodological study. Patients diagnosed with HF and admitted to the department of cardiology were screened for eligibility to contribute in this study. Exclusion criteria were as follows: age <18, could not sufficiently read/understand Turkish, diagnosed with HF for the first time, life expectancy <3 months as justed by the attending physician and disorientation towards one of the following perspectives: time, person, and situation. In the literature, the recommended sampling size for methodological studies is argued to be at least 5-10 times more than the number of items in the scale. In this regard, our study was conducted with voluntary 120 patients. The fact that the scale exceeds 90 times the number of items and the sample consists of 120 patients increases the power of the study (Portney and Watkins, 2000; Yurdugul, 2005). Study protocol was approved by the institutional research ethics committee, and the study conforms to the principles outlined in the Declaration of Helsinki. The patient information form and the answers on EHFScBS-9 were stored safely.

Collection of Data: To evaluate the validity and reliability of the Turkish version of the EHFScBS-9, a methodological and cross-sectional survey was conducted at the department of cardiology of a university hospital in Izmir, Turkey.

Data Collection Tools: The data of the study were gathered through face-to-face interview method using the "Patient Information Form" defining socio-demographic characteristics and those related to diseases and "EHFScBS-9". From the patients directly and by reviewing their medical records, socio-demographic and disease-specific data were collected.

European Heart Failure Self-Care Behaviour Scale: The scale was initially developed as 12 items by Jaarsma et al. in 2003 (Jaarsma et al., 2003). This form of the scale was translated into 14 different languages, and reliability and validity practices were conducted (Jaarsma et al., 2003; Jaarsma et al., 2009). The reliability and validity study of the 12-item scale for Turkish was carried out and published by Baydemir et al. in 2013. Jaarsma et al. revised the 12-item scale in 2009, and converted it into a new form which consisted of nine items and two factors: consulting behaviours and adherence to regimen.

The EHFScB-9 is a user-friendly, reliable, and valid instrument touse in research (This form was also tested with data from 6 countries) (Jaarsma et al., 2009). The 2nd, 3rd, 4th and 6th items of this 5-point likert type (from "1 = I completely agree" to "5 = I don't agree at all") scale are in the "monitoring/counselling behaviours" sub-dimension while the 1st, 5th, 7th, 8th and 9th items are in the "adherence to regimen such as food and liquid" sub-dimension. Scores of EHFScBS-9 range from 9 to 45; lower scores indicate better self-care (Jaarsma et al., 2009). The nine items can be grouped in two dimensions: consulting behaviours and adherence with the regimen. The consulting behaviours dimension investigates how often people with HF call their doctor/nurse in case of shortness of breath, ankle swelling, weight gain, and fatigue, whereas the adherence with the regimen dimension groups items that investigate how often patients weigh themselves, try to drink less water, follow a low-sodium diet, regularly take their medications, and exercise.

Analysis of Data: The data were coded and entered into IBM SPSS Statistics, Version 21.0. To describe the characteristics of patients, descriptive statistics were used. In the investigation of psycholinguistic characteristics/language adaptation, initially the translation method was used. In all these applications, the original scale developed in English was first translated into Turkish, and then Turkish version was translated into English, using translation-back-translation method. The validity and reliability analyses were conducted after the equality of the scale in terms of language was ensured. There should be at least two independent variables in this method (Yen et al., 2002). In this regard, the translation of the scale from English into Turkish was made by three academic members and two PhD lecturers.

One of the lecturers translated the English version into Turkish. The back translation of the Turkish version into English was done by the second lecturer. The original form and the one translated from Turkish into English were compared by the two lecturers, and the lecturers' final form of the Turkish version was prepared. Finally, three academic members, who were fully competent in both languages, controlled and revised the lecturers' final Turkish version to obtain the Turkish version used in this study.

Expert opinion was taken for the content validity of scale. Experts were asked to evaluate each item of the scale over 100 points. Kendall Coefficient of Concordance (Wª) Correlation test was used. In the investigation of psychometric characteristics, primarily the Kaiser-Mayer-Olkin Measure of Sampling Adequacy Analysis was made for sample adequacy prior to factor analysis, and Barlett's Test of Sphericity Analysis was used to determine whether study sample is adequate for factor analysis. Factor analysis was carried out for structure/concept validity. An intra-class correlation coefficient (ICC) with a 95% confidence interval was used to describe the test-retest reliability of EHFScBS-9 (Yen and Lo 2002). In the reliability study, Corrected Formula (Point-bi-serial) of Pearson Product-Moment Correlation was calculated for internal consistency analysis, and Cronbach Alpha Coefficient was calculated for analysis (Portney and Watkins 2000; Akgul, 1997).

Results

Demographic and disease-specific characteristics of 120 participants included in the study are shown in Table 1. Of the 120 patients (71 males, 49 females), the mean age was 61.15 ± 12.43 years. Time passed since the diagnosis of heart failure was 77.40 ± 6.19 months. Most of the patients (34.2%) were found to have Class III and 29.2% Class II New York Heart Association (NYHA) functional class. The prevalence of comorbidity was 78.3%. The most common comorbidity was cardiovascular followed by endocrine comorbidities. As for the medication use of the study group, 57.5% used diuretics, 56.7% ACE inhibitors, and the use of other drugs were 69.2%.

Validity

Content validity: Expert opinion was used for the content validity of scale. Experts were questioned to appraise each item of the scale over 100 points. Kendall Coefficient of Concordance (Wª) Correlation Test was applied and content validity was conducted and an insignificance was detected at p>0.05 level (Kendall's Wª = 0.29, χ^2=14.00, df=8, p=.082).

Structure validity: Kaiser-Meyer-Olkin value of nine items of the scale was 0.81. As the value obtained was greater than 0.60, it was concluded that factor analysis could be relevant to data. Results of Barlett's Test show that the sample size was adequate and the data set was suitable for the factor analysis. Varimax rotation and principal components analysis were applied to 9-item scale and two factors were obtained. These two factors clarify 50.39% of variance. A detailed investigation of the item loadings on two factors showed that items 2., 3., 4 and 6 were loading on factor one, with in factor loadings of 0.86 to 0.92. Items 1., 5., 7., 8. and 9 loaded on factor two, which factor loading of 0.21 to 0.73. Factors and their factor loads are presented in Table 2.

Reliability

Test-retest reliability: ICC analysis was used to identify test–retest reliability. The scale was repeated two weeks after the first application on 30 individuals. Test–retest reliability showed considerable agreement for the total score (ICC: 0.84, 95% CI: 0.67-0.92). ICC on an item level ranged from 0.63 to 0.82 showing fair to perfect agreement (Table 3).

Internal consistency: The EHFScBS-9 Cronbach alpha value for factor one and two was found to be 0.45 and 0.87. Turkish version of the EHFScBS-9, Cronbach's alpha coefficient for the internal consistency of the scale was found to be 0.80. Item-total correlations range 0.10–0.80, with two (items 8 and 9) weakly correlated (r<0.20) with the total score. Item-total correlations and cronbach's a if item deleted are presented in Table 4.

Table 1. Demographic and Disease-specific Characteristics of Patients

Characteristics (n=120)		n (%)
Age, years		61.15 ($\pm$12.43)[#]
Gender	Female	49 (40.8%)
	Male	71 (59.2%)
Marital status	Single	6 (5.0%)
	Married	99 (82.5%)
	Divorced	15 (12.5%)
Education level	Illiterate/No formal education	16 (13.4%)
	Primary/Secondary school	79 (65.8%)
	High school/University	25 (20.9%)
Time passed since diagnosis of heart failure (months)		77.40 ($\pm$6.19)[#]
NYHA functional class	I	18 (15.0%)
	II	35 (29.2%)
	III	41 (34.2%)
	IV	26 (21.7%)
Comorbidity	Yes	94 (78.3%)
	No	26 (21.7%)
Comorbidities	Cardiovascular	63 (52.5%)
	Endocrinology	58 (48.3%)
	Respiratory	18 (15.0%)
	Rheumotology	3 (2.5%)
Medications	Diuretics	69 (57.5%)
	ACE-I	68 (56.7%)
	ARB	8 (6.7%)
	Beta blocker	51 (42.5%)
	Digoxin	26 (20.0%)

ACE-I: Angiotensin-converting enzyme inhibitor; ARB: angiotensin receptor blocker.

[#]Mean$\pm$ (standard deviation)

Table 2. Factor Loads of the EHFSCB-9 Items

Items	Item description	Factor 1	Factor 2
1	I weigh myself every day	-	0.21
	Her gün tartılıyorum.		
2	If my SOB* increases I contact my doctor or nurse	0.90	-
	Nefes darlığım arttığında doktorum veya hemşireme haber veriyorum.		
3	If my legs/feet are more swollen, I contact doctor or nurse	0.91	-
	Ayaklarımda ve bacaklarımda çok fazla ödem/şişlik olduğunda doktorum veya hemşireme haber veriyorum.		
4	If I gain weight I contact doctor or nurse	0.86	-
	Kilo aldığımda doktorum veya hemşireme haber veriyorum.		
5	I limit the amount of fluids	-	0.70
	Aldığım sıvıların miktarını sınırlıyorum.		
6	If I experience fatigue I contact doctor or nurse	0.92	-
	Yorgunluğum arttığında doktorum veya hemşireme haber veriyorum.		
7	I eat a low salt diet	-	0.68
	Tuz oranı düşük bir diyetle besleniyorum.		
8	I take my medication as prescribed	-	0.73
	İlaçlarımı reçete edildiği şekilde alıyorum.		
9	I exercise regularly	-	0.37
	Düzenli olarak egzersiz yapıyorum.		

*SOB: Shortness of breath

Table 3. Test-retest Reliability of the EHFSCB-9

Items	Item description	ICC	95%CI
1	I weigh myself every day	0.79	0.56 – 0.90*
2	If SOB increases I contact my doctor or nurse	0.68	0.31 – 0.84*
3	If leg/feet are more swollen, I contact doctor or nurse	0.77	0.31 - 0.84*
4	If I gain weight I contact doctor or nurse	0.70	0.39 - 0.86*
5	I limit the amount of fluids	0.65	0.24 - 0.83*
6	If I experience fatigue I contact doctor or nurse	0.63	0.25 - 0.82*
7	I eat a low salt diet	0.74	0.45 - 0.87*
8	I take my medication as prescribed	0.78	0.54 - 0.89*
9	I exercise regularly	0.82	0.54 - 0.89*
Total score		0.84	0.67- 0.92*

*$p<0.001$

Table 4. Item Analysis for the EHFScB-9 Total Scale

Items	Item description	Mean	Item-total correlation	Cronbach's α if item deleted
1	I weigh myself every day	3.59	0.37	0.80
2	If SOB increases I contact my doctor or nurse	2.49	0.70	0.75
3	If leg/feet are more swollen, I contact doctor or nurse	2.41	0.72	0.75
4	If I gain weight I contact doctor or nurse	2.43	0.76	0.74
5	I limit the amount of fluids	1.64	0.32	0.81
6	If I experience fatigue I contact doctor or nurse	2.52	0.80	0.74
7	I eat a low salt diet	1.69	0.49	0.78
8	I take my medication as prescribed	1.21	0.15	0.81
9	I exercise regularly	4.57	0.10	0.82
Total score		22.54±6.06		

Discussion

Improving self-care is a vital consequence of patient education and counseling in critically ill patients. Nevertheless, to improve our understanding of clinical practice directed toward enlightening these consequences, measuring changes in self-care is essential.

The answers of patients to the questions on the demographic questionnaire were found to be comparable to that of patients from other countries the scale was used.13,15,22 In the present study, the total score of EHFScBS-9 was determined as 22.54±6.06. While Lee et al. identified the total score as 18.10±6.80, Koeberich et al. found it as 19.90±6.48 (Köberich et al., 2013; Lee et al., 2013).

Basic components analysis determines which variable each factor is more strongly connected to after rotation in the whole data set. Through this method, the balanced distribution of the variables forming the factor is also enabled (Portney and Watkins 2000; Akgul, 1997). Due to the basic components investigation, which we performed to find out the factor structure of the scale that adapted to Turkish, the items were gathered under two factors. Factor 1 explained 60.03% of the variance and the factor loadings of the four items in this factor ranged between 0.86 and 0.92 while the cronbach alpha coefficient was found to be 0.45. As for Factor 2, it explained 40.92% of the variance and had five items whose factor loadings ranged between 0.21 and 0.73 (Table 2). Its cronbach alpha coefficient was 0.87. In the original form of the scale, the cronbach alpha value of the 1st factor was 0.85 and the second factor 0.56. With respect to the factor distributions in our study, they were revealed to be similar to Jaarsma et al.'s study (Jaarsma et al., 2009). Test-retest reliability presented considerable agreement for entire scale. On an item level, the agreement ranges from fair to perfect (Table 3). In this study, the cronbach alpha coefficient was found to be 0.80; split half value for the first half (5 items) was 0.74, and the second half (5 items) was 0.46. These reliability values show consistency with the findings of similar studies. In their study, Koeberich et al. identified the cronbach alpha value as 0.71 (Köberich et al., 2013). The reliability coefficient of the original EHFScBS-9 was higher than that of the longer version including 12 items (Jaarsma et al., 2009). Although the importance of the total values of the scale is known in reliability studies, it is also emphasized that the loading of each item constituting the scale is of significance. In the literature, it is stated that a factor load of 0.45 or over is a good criterion for selection, but in practice, this value can be reduced to 0.20 for a limited number of items (Portney and Watkins 2000; Akgul, 1997). In our study, the factor loadings of two items (items 8 and 9) in the scale were revealed to be lower than 0.20 (Table 4). However, these items were not excluded from the scale since it would cause the items related to self-care behaviours to become narrow, and no significant amount of change would be seen in the cronbach alpha values if items were excluded. Item 8 was "I take my medicine as is prescribed" and Item 9 was "I regularly exercise". The correlations of these items being low may be due to the adherence to exercise and medicine being quite low in the Turkish society. Lee et al. found the total item correlations ranging between 0.25-0.65 while Koeberich et al. revealed it as 0.09-0.63 (Köberich et al., 2013; Lee et al., 2013).

Study limitations

The most important limitation is that the study includes patients with heart failure. In addition, the patients in the western region of Turkey were selected as the sample group of this study. Therefore, these results cannot be generalized for other individuals living in other regions of Turkey.

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