Validity of the Turkish version of the European Heart Failure Self-Care Behavior Scale

Avrupa Kalp Yetersizliği Öz-Bakım Davranış Ölçeği'nin Türkçe'ye uyarlanması

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ABSTRACT

Objective: The specific purpose of this study was to investigate the validity of the Turkish version of the European Heart Failure Self-care Behavior Scale by applying to 494 Turkish Heart Failure Patients.

Methods: The study was conducted as a cross-sectional sample survey, between October 2012 and January 2013. The 494 patients who applied with a diagnosis of heart failure were included in the study after determining the clinical diagnosis and type of treatment. Cronbach's alpha coefficient was used to evaluate the validity and reliability of the scale. Exploratory and confirmatory factor analyses were applied for the determination of the sub-factors of the scale in Turkish adaptation; content, item and factor adaption. Structural Equation Modeling was used for the purpose of creation and supervision of the structural models of the scale.

Results: Cronbach's alpha coefficient of internal consistency of Turkish version of the Scale was found to be 0.69. According to the results of the factor analysis, it was determined that the data is in a form suitable for factor analysis and the data have the assumption of multivariate normal distribution. The goodness of fit measures used for the validity of Structural Equation Modeling were obtained to be RMSEA=0.047 (CI=0.00-0.079), AGFI=0.83, GFI=0.91 respectively.

Conclusion: The scale is divided into 4 sub-factors according to the Structural Equation Modeling. The European Heart Failure Self-care Behavior Scale is a scale that easily applied to measure the behavior of self-care in heart failure patients. In addition, the scale reaches the conclusion as soon as possible and does not require additional training for researchers. Further, patients can apply themselves the scale easily.

(Anadolu Kardiyol Derg 2013; 13: 573-9)

Key words: The European Heart Failure self-care behavior scale, self-care, reliability

ÖZET

Amaç: Bu çalışmanın amacı, Avrupa Kalp Yetersizliği Öz-bakım Davranış Ölçeği Türkçe versiyonunun 494 Türk Kalp Yetersizliği Hastasında uygulayarak geçerliliğini araştırmaktır.

Yöntemler: Ekim 2012-Ocak 2013 tarihleri arasında kesitsel bir araştırma olarak yapılmıştır. Kalp yetersizliği tanısı ile başvuran, klinik tanı ve tedavi tipi belirlendikten sonra çalışmaya dahil edilen 494 hasta alınmıştır. Ölçeğin geçerliği ve güvenirliğini belirlemek için Cronbach's alfa katsayısı kullanılmıştır. Ölçeğin alt faktörlerinin belirlenmesi, Türkçe'ye uyarlamasında; içerik, madde ve faktör uyarlamasına tabi tutulması için açıklayıcı ve doğrulayıcı faktör analizleri kullanılmıştır. Ölçeklerin yapısal modellerin oluşturulması ve denetlenmesi amacıyla Yapısal Eşitlik Modellemesi uygulanmıştır.

Bulgular: Avrupa Kalp Yetersizliği Öz-bakım Davranış Ölçeği Türkçe versiyonunun iç tutarlığı Cronbach alfa katsayısı 0,69 olarak bulunmuştur. Açıklayıcı faktör analizi sonuçlarına göre verilerin faktör analizi için uygun bir yapıda olduğu ve verilerin çok değişkenli normal dağılım varsayımına uyduğu belirlenmiştir. Oluşturulan Yapısal Eşitlik Modelinin geçerliğinin değerlendirilmesinde kullanılan uyum ölçüleri; RMSEA=0,047 (CI=0,00-0,079), AGFI=0,83, GFI=0,91 olarak bulunmuştur.

Sonuç: Oluşturulan Yapısal Eşitlik Modeline göre ölçek 4 alt faktöre ayrılmıştır. Avrupa Kalp Yetersizliği Öz-bakım Davranış Ölçeğinin kalp yetersizliği hastalarında öz-bakım davranışlarını ölçmek için uygulanan kolay ve sonuca kısa sürede ulaşılan, uygulayan araştırmacılar için ayrı bir

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Accepted Date/Kabul Tarihi: 13.02.2013 **Available Online Date/Çevrimiçi Yayın Tarihi:** 10.05.2013

doi:10.5152/akd.2013.141

eğitim gerektirmeyen ve hastaların kendilerinin de uygulayabilecekleri bir ölçek olduğu belirlenmiştir.
(Anadolu Kardiyol Derg 2013; 13: 573-9)
Anahtar kelimeler: Avrupa Kalp Yetersizliği Öz-bakım Davranış Ölçeği, öz-bakım, güvenirlik

Introduction

Heart Failure (HF) is a chronic disease that is capable of progression. In general, HF results from inability of cardiovascular system to supply enough blood and oxygen to the body. The most common cause of HF is the destruction of the heart muscle due to any reason. The person with HF may experience heart failure after a strenuous physical activity. Today, the prolongation of life expectancy has led to increased prevalence of HF that became a global epidemic disease (1).

HF, is one of the major causes of death. Among the chronic diseases, heart and vascular diseases are the most common cause of all causes of death, with the ischemic HF and cerebrovascular diseases being the first two causes of death (2).

In recent years, there have been several pharmacological developments affecting the morbidity and mortality of cardiovascular diseases. Sudden death is reduced with the use of angiotensin-converting enzyme inhibitors, beta-blockers and spironolactone in the treatment (3). Pharmacological and non-pharmacological treatments (e.g., salt-controlled consumption), physical activity, and daily weight control affect the success of treatment (4). In addition, clinical follow-up, including the weight control, particularly reduces hospitalization rates for HF (5). Despite the rapid developments in the treatment of heart disease, increases in the symptoms, limited recovery and poor quality of life is common in these patients (6, 7).

Structural equation modelling

In recent years, a large number of scales (Scale, Inventory, Index) has been developed in the studies assessing the phenomenon such as knowledge-attitude-behavior, regards, trends and quality of life in the field of social sciences, behavioral sciences and health sciences (Medicine, Nursing, etc.) in order to assess the social, behavioral, and emotional effects of the disease on individuals, psycho-social tendencies of the individuals, the reactions of society against a phenomenon, risk of life and quality of life and to analyze these structural features according to their causal factors (8). Language, content, material and factor adaptation is needed for the adaptation of these scales into Turkish. Validity, reliability and consistency of the original variance-covariance components and the compatibility of the selected structural model in explaining the original variation should be tested (8). Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), Path Analysis (SEPATH) and Structural Equation Modeling (SEM) methods are used to develop the scales, to perform reliability analysis for the validity and reliability of the scales and to generate and control the structural models (8-11).

CFA; is a method used to convert the data set consisting of dependent p values into the data sets consisting of independent and fewer new variables, to determine the putative common factors explaining an instance or event by grouping the variables in these data sets, and to identify the major and minor factors from the groups of variables (factors) affecting the instance (9).

SEM is a statistical method for determining the structural relationship between the observed (manifest) and the unobservable / hidden (latent, construct) variables and it allows the estimation and testing of causal relationships using a combination of variables (8, 12, 13). SEM aims to examine the reliable and valid scales and to create reliable and valid relationship models by addressing the relationships between and in the factors and variables of the models (8, 10, 11).

The criteria developed for the evaluation of the model established are referred as consistency criteria (8). Most commonly used criteria include AIC (Akaike Information Criteria), RMSEA (Root Mean Square Error of Approximation), GFI (Goodness of Fit Index), AGFI (Adjusted Goodness of Fit Index) and CFI (Comparative Fit Index) (8, 10-11). AIC is a common criteria to estimate the number of parameters included in the model. RMSEA Index value of 0.05 or less is considered to be required for consistency. GFI=1, AGFI=1, and CFI=1, represent the perfect consistency (8, 10, 11).

Self-care

Self-care is a common definition of all behaviors of the individuals. It can be defined as performing daily activities and the naturalistic decision-making process to maintain a healthy lifestyle (14). The World Health Organization (WHO) defines self-care as "the activities individuals, families and communities undertake with the intention of enhancing health, preventing disease, limiting illness, and restoring health". These activities are limited to the knowledge and skills from the pool of both professional and lay experience (15).

Self-care is an essential process that is required to maintain a healthy life for people with chronic disease and particularly for those with HF. Self-care is usually inadequate in older patients with HF who have economic problems. Self-care of patients with HF is a multistep process (15).

Supportive strategies (e.g., communication, consulting and education between the patient and heath care provider) are needed for patients with HF to improve the clinical outcomes and to reduce the rate of hospitalization for HF (16-18).

Because it is difficult to measure and evaluate the self-care in patients with HF, previous studies have usually evaluated the compliance to the treatment or the information for the assessment of the self-care (19, 20).

Riegel et al. (21) defined the self-care in HF as decisive behaviors that maintain physiological stability (maintenance) and control the symptoms (management). Although self-care management is defined as routine monitoring of symptoms and

adherence to the treatment, self-care success can be defined as the use of self-care treatments and the assessment of the treatment. Inadequate self-care commonly seen in patients with HF is usually observed as incompliance to the treatment plan and the failure to cope with the increased symptoms (22-24). However, training and supportive services are needed to improve the outcomes, to reduce the number of hospitalizations and to promote the self-care behaviors (25).

Development of a large number of models for the patients with HF may improve quality of life and reduce the hospital admission rates and costs of health care in this group of patients (26, 27). Heart Failure Management Programs include various components such as the issues of increasing the compliance to treatment, reducing risk factors and providing social support.

There are a large number of scales, such as the Self-Care of Heart Failure Index (SCHFI), the Self-Management of Heart Failure Scale, the Self-Care of Hypertension Index (SC-HI) and the Self-Care of Coronary Heart Disease Index (SCCHDI), developed for the assessment of self-care in patients with HF.

Jaarsma et al. (28) developed the European Heart Failure Self-care Behavior Scale (EHFScBS) for the assessment of self-care in patients with HF. The scale has been developed to assess the effectiveness behaviors of the self-care in patients with HF and to determine whether any intervention is required. The scale initially developed in Dutch was subsequently translated into several languages and the validity and reliability of the scale were established. EHFScBS is a scale consisting of 12 questions and is easy to implement. The scale assesses the self-care of patients with HF by the ability of performing daily weighing, fluid intake control and regular drug use without consulting to the health care providers (28). Higher total scores indicate that the patient is notable to meet his/her self-care needs (28). The validity and reliability of the scale were established by the developer. The Turkish version of the scale is as publicly available on the web site provided by the developer of the original scale (29).

In this study, it was aimed to investigate the psychometric properties of the Turkish version of the EHFScBS in Turkish patients with HF and to establish the validity and reliability of the scale and its sub-dimensions by the clinical assessments in Turkish patients.

Methods

Study design and study population

This cross-sectional study included a total of 494 patients who had admitted to cardiology outpatient clinic of the Republic of Turkey, Eskişehir Osmangazi University Research and Practice Hospital between the period of October 2012 and January 2013 and in whom the clinical diagnosis and treatment modality were established. The institutional review board of the hospital approved the study. All patients were informed about that no data obtained from the study participants will not be used for different purposes and that they may quit the study at any time. The questionnaire of socio-demographic characteristics and the answers on EHFScBS were stored safely.

Inclusion and exclusion criteria

The patients (i) aged 18 years or over, (ii) conscious and capable to answering the questions, (iii) with non-critical illness, (iv) speaking in Turkish, (v) with a diagnosis of heart disease, and (vi) who agreed to participate in the study.

Data collection

Data were collected by using two tools:

1. Sociodemographic characteristics questionnaire
   The questionnaire includes the information on the age, gender, marital status, educational status, the time elapsed from the diagnosis of HF, etiology of HF, the New York Heart Association functional class, and the treatments administered.
2. The European Heart Failure Self-care Behavior Scale

The European heart failure self-care behavior scale

The 12 items included in the EHFScBS are rated on a 5-point Likert scale, with 1=totally agreeing, 2=partially agreeing, 3=neither agreeing nor disagreeing, 4=partially disagreeing, and 5=totally disagreeing. Total score is calculated by summing the scores of each item and ranges from 12 to 60.

Statistical analysis

The data were analyzed by using Statistical Package for the Social Sciences (SPSS v21.0, SPSS Inc., Chicago, IL, USA) and Linear Structural Relationships (LISREL v8.8, Inc. SSI. Lincoln, IL, USA) software packages. Normal distribution of the data was tested by means of the Kolmogorov-Smirnov test. Continuous variables were analyzed using the student *t*-test to determine the difference between the groups. The subdimensions of the EHFScBS items were determined by EFA and the accuracy of the factors were tested by CFA. The principle component analysis was used with CFA. In addition, SEM was used for the evaluation of validity and reliability of test items, factors and model. Internal consistency of the scale was determined by calculating Cronbach's alpha reliability coefficient and item analysis was performed. Continuous variables are presented as mean±standard deviation and categorical variables as number and percentage (%). There were no missing value in Sociodemographic Characteristics Questionnaire and EHFScBS. For all analysis, $p<0.05$ was considered as significant.

Results

Patient characteristics

Table 1 represents the characteristics of 494 patients included in this study. Of the patients, 54.9% were male and 45.1% were female, with 71.1% were married. With regard to the edu-

Table 1. Demographic and clinical characteristics of patients (n=494)

Characteristics	Mean±Standart Deviance/n (%)	
Age, years		
Female (n=223)	69.51±9.17	(**p<0.01)
Male (n=271)	66.97±11.36	
Female, n (%)	223 (45.1)	
Male, n (%)	271 (54.9)	
Marital status, n (%)		
Single	10 (2.0)	
Married	351 (71.1)	
Divorced	12 (2.4)	
Widow/widower	121 (24.5)	
Education level, n (%)		
Illiterate/No formal education	81 (16.4)	
Primary school	289 (58.5)	
Secondary school	24 (4.9)	
High school	60 (12.1)	
University	40 (8.1)	
Year of diagnosed heart failure, years	7.66± 8.10	
Comorbidities (*), n (%)		
Ischemic Heart Disease	171 (34.8)	
Hypertension	232 (47)	
Dilated cardiomyopathy	123 (24.9)	
Valvular Heart Disease	112 (22.7)	
New York Heart Association Grading, n (%)		
I	70 (14.2)	
II	131 (26.5)	
III	192 (38.9)	
IV	101 (20.4)	
CHF-Related medications, n (%)		
Diuretics	191 (38.7)	
ACE-inhibitor	20 (4)	
Anti-anginal	30 (6.1)	
Antiplatelets	172(34.8)	
Beta-blocker	123 (24.9)	
Digoxin	61 (12.3)	
Angiotensin receptor blockers	130 (26.3)	
Anti-coagulant	273 (55.3)	
EHFScB (TurkishVersion)[possible range: 12–60]	34.0±7.99	

(*): Marked more than one option.

**-Students` t-test

ACE - angiotensin-converting enzyme, CHF - chronic heart failure, EHFScB - European Heart Failure Self-Care Behavior Scale

cational status, the majority of patients (58.5%) were primary school graduates. There were some patients with more than one HF and the most common HF was the hypertension (47.0%) followed by ischemic HF (34.8%). The New York Heart Association Functional Class was mostly (38.9%) class III for patients admitted to the outpatient and inpatient clinics. The mean score on EHFScBS was found to be 34.0±7.99.

Reliability

According to the results of the reliability analysis Turkish version of the EHFScBS, Cronbach's alpha coefficient for the internal consistency of the scale was found to be 0.69. the reliability of four sub-factors determined by EFA were 0.79, 0.69, 0.12 and 0.28, respectively (Table 2).

Results of the confirmatory factor analysis and structural equation modeling

According to the EFA of the EHFScBS, Kaiser-Meyer-Olkin index was found to be 0.59, indicating that data were appropriate for EFA. Bartlett's sphericity test were found to be significant (Chi-square =1554.84 p<0.001), and the data were found to have a multivariate normal distribution.

The principle component method was used to determine the factors and varimax rotation method to determine the appropriate factors. The scale was found to be divided into 4 sub-factors to describe the self-care. Rotated factor loadings matrix is given in Table 3. The data structure used in the scale explained 61% of the total variance. The questions included in the sub-factors were "I call my doctor or nurse when I feel increased tiredness", "I call my doctor or nurse when my trouble in breathing increases" and "I call my doctor or nurse when my feet/legs swell more than usual" for factor 1; "I get the flu shot every year", "I call my doctor or nurse when I gain two kilograms in a week" and "I restrict the amount of liquid I drink" for factor 2; "I rest in the day", "I weigh daily", "I do exercise regularly" and "If I have trouble in breathing, I try to improve my breathing" for factor 3; and "I follow a low-salt diet" and "I take the medications as recommended" for factor 4. The highest contribution to the scale was from the Question 8 of "I call my doctor or nurse when I feel increased tiredness" (0.825) followed by the Question 11 of "I get the flu shot every year" (0.790). The lowest contribution was from the Question 1 of "I weigh daily" (-0.596) followed by the Question 12 of "I do exercise regularly" (-0.553).

SEM was created for 4 sub-factors determined by the results of EFA (Fig. 1). The questions consisted of "I weigh daily", "I call my doctor or nurse when my trouble in breathing increases", "I call my doctor or nurse when my feet/legs swell more than usual" and "I call my doctor or nurse when I feel increased tiredness" for sub-factor 1; I call my doctor or nurse when I gain two kilograms in a week", "I restrict the amount of liquid I drink" and "I get the flu shot every year" for sub-factor 2; "If I have trouble in breathing, I try to improve my breathing"

Table 2. Item analysis for the EHFScB (Turkish Version) (n=494)

Item	Corrected item-total correlation	Cronbach's alpha if item deleted
I weigh myself daily	.244	.680
If I get short of breath, I take it easy	.330	.666
If my shortness of breath increases, I contact my doctor or nurse	.539	.629
If my feet/legs become more swollen than usual, I contact my doctor or nurse	.619	.617
If I gain 2 kg in one week, I contact my doctor or nurse	.572	.627
I limit the amount of fluids I drink	.446	.646
I take a rest during the day	.086	.691
If I experience increased fatigue, I contact my doctor or nurse	.445	.646
I eat a low salt diet	.130	.700
I take my medication as prescribed	.362	.667
I get a flu shot every year	.309	.671
I exercise regularly	-.157	.734

EHFScB - European Heart Failure Self - Care Behavior Scale

Table 3. Factor loadings for the EHFScB (Turkish Version) (n =494)

Item	Component			
	1	2	3	4
If I experience increased fatigue. I contact my doctor or nurse	.825	.074	-.019	-.058
If my shortness of breath increases. I contact my doctor or nurse	.783	.193	.068	.029
If my feet/legs become more swollen than usual, I contact my doctor or nurse	.719	.254	.279	.207
I get a flu shot every year	-.101	.790	.266	.152
If I gain 2 kg in one week, I contact my doctor or nurse	.322	.744	-.083	-.016
I limit the amount of fluids I drink	.250	.743	-.093	.032
I take a rest during the day	.151	.011	.700	-.112
I weigh myself daily	.319	.164	-.596	.346
I exercise regularly	-.039	.006	-.553	-.368
If I get short of breath, I take it easy	.356	.271	.527	.034
I eat a low salt diet	-.101	.117	-.091	.784
I take my medication as prescribed	.471	-.023	.055	.603

Explaining total variance=61%
Determining factor method: Principle Component Analysis
Rotation method: Varimax with Kaiser Normalization.
EHFScB - European Heart Failure Self-Care Behavior Scale

and "I rest in the day" for sub-factor 3; and "I follow a low-salt diet" and "I take the medications as recommended" for sub-factor 4.

The consistency criteria used to assess the validity of the model were found as RMSEA=0.047 (CI=0.00-0.079), AGFI=0.83, and GFI=0.91.

Thus, in parallel to the literature, the model was divided into 4 sub-factors including "compliance to the treatment", "adherence to the activities", "adherence to the recommendations" and "getting help".

Discussion

HF is the leading cause of death in many countries of the world and in Turkey (30). As is all over the world, HF remains also a major health problem in our country and it will affect the mortality, morbidity and quality of life of patients.

Self-care can be expressed as maintaining a healthy lifestyle and the behaviors compatible with compliance to the treatment. Self-care management is adopting strategies in order to maintain mental and physical activities in a healthy manner (31).

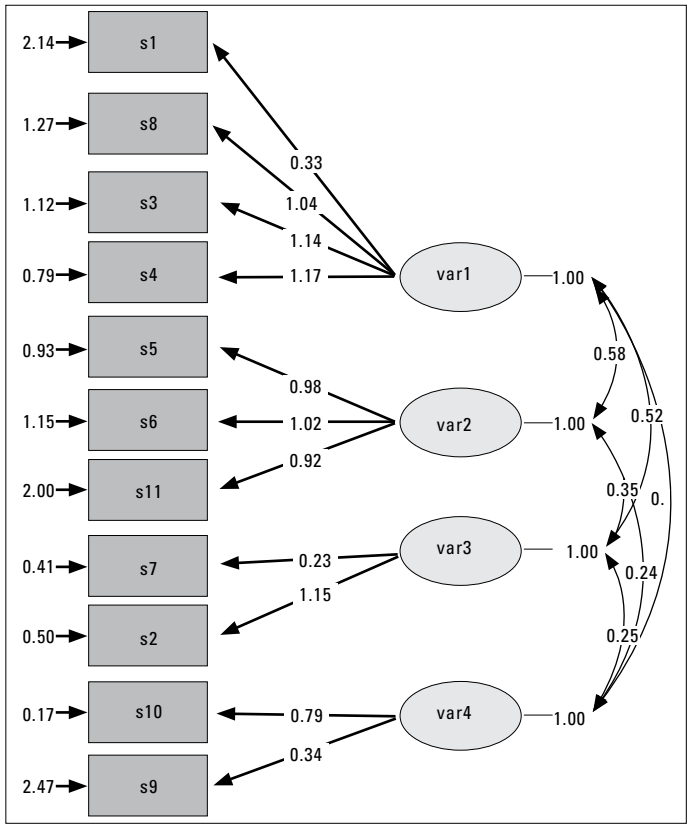

Figure 1. SEM for the EHFScB (Turkish Version) (n=494)
Sub-factors: Var1-compliance to the treatment, var2-adherence to the activities, var3-adherence to the recommendations, var4-getting help

Although it is not possible to reduce the number of patients with HF, the patients should manage their self-care behavior in order to achieve a successful treatment (30). Self-care has a major role to maintain a healthy life for patients with HF (32). Jaarsma et al. (28) stated that "assessment of the self-care behavior can be used as a clue for determining the self-care behavior as well as the other major health problems for that patient".

In the present study, validity and reliability of the Turkish version of EHFScBS was investigated on a total of 494 patients admitted to cardiology outpatient clinic of the Republic of Turkey, Eskişehir Osmangazi University Research and Practice Hospital with a diagnosis of HF.

The answers of patients to the questions on the demographic questionnaire were found to be similar to that of patients from other countries the scale was used. The total score of EHFScBS was 34.0±7.99, which was found to be 33.3±7.8, 32.6±9.1 and 24.8±7.6 in the studies of Jaarsma et al. (28), Kato et al. (33) and Lupon et al. (34), respectively. These differences might resulted from the differences in the patient characteristics and health conditions.

In the reliability study conducted by Jaarsma et al. (28), the Cronbach's alpha coefficient for the internal consistency of EHFScBS was found to be 0.81. It was found to be 0.69 in our study for the Turkish version of scale, indicating that the questions included in the scale are adequate to assess the self-care in patients with HF. The Cronbach's alpha coefficient has been found to be 0.69 in the study of Shuldham et al. (32) on British patients with HF and 0.92 in the study of Yu et al. (35) conducted in the People's Republic of China. On the other hand, it was 0.70 in an Brasilian study and 0.67 in an Japanese study (33, 36). Internal consistency of the Turkish version of EHFScBS appears to be similar to that found in the studies from other countries (34, 37). These results suggest that Turkish version of the EHFScBS is similar to the original scale and it may be used in Turkey for the assessment of Turkish patients.

Jaarsma et al. (28) has determined 3 sub-scales after performing the CFA and the reliability of the sub-scales were reported to be 0.67, 0.57 and 0.46, respectively. On the other hand, the scale was divided into 4 sub-factors according to the results of EFA in this study and the reliability of these subfactors were 0.79, 0.69, 0.12 and 0.28 respectively. All questions were found to contribute significantly to the whole scale. Similarly, Shuldham et al. (32) has also divided EHFScBS into 4 sub-factors. In our study, the 4 sub-factors were entitled as "compliance to the treatment", "adherence to the activities", "adherence to the recommendations" and "getting help". In the study conducted in People's Republic of China, Yu et al. (35) has divided the scale into 3 sub-factors (32). The authors has entitled these sub-factors as "compliance to the treatment", "adaptation to the activities" , "getting help" and the reliability of the sub-factors were reported to be 0.68, 0.41 and 0.72, respectively. These differences, albeit small, might be resulted from the cultural differences between the populations studied (38). The results might be different due to the differences in the opinions of Turkish people about the diseases and to the effect of self-care behavior in the Turkish culture.

According to the results of CFA, the fit of factor structure determined in SEM was adequate. The consistency criteria of SEM were found to be as RMSEA=0.047 (CI=0.00-0.079), AGFI=0.83 and GFI=0.91, indicating that the self-care scale developed for the patients with HF is acceptable.

Study limitations

This study is limited to covering the potential for regional patients Eskişehir, Afyon, Kütahya and Bilecik.

Conclusion

In conclusion, the EHFScBS was found to be easy and rapid self-administered tool to assess the self-care behavior in patients with HF and it does not necessitate any training program for the users. The scale can be implemented to represent the deficiencies in the treatment as well as in the self-care of patients with HF and to improve these deficiencies by educational measures. Moreover, improvements in the self-care behavior of patients with HF will contribute the successful treatment of this group of patients and reduce the costs of health care.

Conflict of interest: None declared.

Peer-review: Externally peer-reviewed.

Authorship contributions: Concept - C.B.; Design - K.Ö.; Supervision - C.B.; Resource - C.B., K.Ö., A.Ü.; Materials - A.Ü.; Data collection&/or Processing - C.B., K.Ö., A.Ü.; Analysis &/or interpretation - C.B.; Literature search - C.B.; Writing - C.B.; Critical review - C.B., K.Ö., A.Ü.

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