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The Psychometric Properties of the Symptom Status Questionnaire-Heart Failure

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Abstract

Background and Purpose—Many patients with heart failure (HF) experience physical symptoms, poor health-related quality of life (HRQOL), and high rates of hospitalization. Physical symptoms are associated with HRQOL and are major antecedents of hospitalization. However, reliable and valid physical symptom instruments have not been established. This study, therefore, examined the psychometric properties of the Symptom Status Questionnaire-Heart Failure (SSQ-HF) in patients with HF.

Method—Data on symptoms using the SSQ-HF were collected from 249 Patients (age 61, 67% male, 45% in New York Heart Association functional class III/IV). Internal consistency reliability was assessed using Cronbach's alpha. Item homogeneity was assessed using item-total and inter-item correlations. Construct validity was assessed using factor analysis and testing hypotheses on known relationships. Data on depressive symptoms (Beck Depression Inventory II), HRQOL (Minnesota Living with Heart Failure Questionnaire), and event-free survival were collected to test known relationships.

Results—Internal consistency reliability was supported: Cronbach's alpha was .80. Item-total correlation coefficients and inter-item correlation coefficients were acceptable. Factor analysis supported the construct validity of the instrument. More severe symptoms were associated with

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more depressive symptoms, poorer HRQOL, and more risk for hospitalization, emergency department visit, or death, controlling for covariates.

Conclusions—The findings of this study support the reliability and validity of the SSQ-HF. Clinicians and researchers can use this instrument to assess physical symptoms in patients with HF.

Keywords

heart failure; instrument; symptoms

Introduction

Patients with heart failure (HF) have poorer health-related quality of life (HRQOL) than healthy people and patients with other chronic diseases,^{1, 2} and higher rates of hospitalizations, which account for the high costs of HF.^{3, 4} Physical symptoms can affect both HRQOL and hospitalization. Approximately 90% to 100% of HF patients experience dyspnea,⁵ and 91% have multiple physical symptoms.⁶ Physical symptoms are one of the factors most strongly associated with HRQOL.^{1, 7, 8} In addition, approximately 90% to 100% of HF patients who visit emergency departments or are hospitalized experience physical symptoms.^{5, 9} Thus, improvement in physical symptoms in this population may lead to improvement in HRQOL and reduction of hospitalization rates. In order to manage and improve physical symptoms effectively, the first step is to assess physical symptoms using a reliable and valid instrument.

Several instruments have been used to assess physical symptoms in patients with HF: the Memorial Symptom Assessment Scale (MSAS),¹⁰ the MSAS-Short Form,¹¹ the MSAS-HF,¹² the Heart Failure Somatic Perception Scale (HFSPS),^{13, 14} the Dyspnea-Fatigue Index,¹⁵ and the Kansas City Cardiomyopathy Questionnaire (KCCQ).¹⁶ The MSAS was developed to assess multidimensional information on 32 physical and psychological symptoms with some additional open-ended questions for other symptoms, and the reliability and validity of this instrument have been supported in cancer patients.^{17, 18} The MSAS-HF is the modified version of the MSAS to use for patients with HF and includes 32 physical and psychological symptoms.¹² In patients with HF, number of symptoms, symptom prevalence, and symptom burden were associated with HRQOL.^{10–12} However, these instruments assess not only common HF symptoms, but also psychological and other physical symptoms. Thus, it is difficult to evaluate the unique effects of common HF symptoms on patient outcomes using these instruments. The HFSPS is used to assess the presence and severity of 18 common physical signs, symptoms, and the effects of dyspnea on daily activities in patients with HF.¹⁴ The Dyspnea-Fatigue Index has also been used to evaluate symptoms in patients with HF.¹⁵ It consists of 3 questions that assess only dyspnea and fatigue related to functional status.^{8, 15} It is difficult to assess physical symptoms independently from functional impairment in the former and latter instruments, and the latter instrument does not cover some common HF symptoms. The Symptom and Symptom Stability subscales of the KCCQ are used to measure the frequency, burden, and stability of physical symptoms, but cover only swelling, fatigue, and dyspnea and do not include assessment of severity of symptoms.¹⁶ Thus, a reliable and valid physical symptom

instrument is needed to assess and manage important common physical symptoms in patients with HF and examine their unique effects on patient outcomes.

Therefore, we developed the Symptom Status Questionnaire-Heart Failure (SSQ-HF), which is a modified version of the MSAS-HF.¹² The authors of the current study selected the most common HF-related physical symptoms reported in the literature.^{6, 12} The following items were selected because they have been noted to occur most frequently, with greatest severity and cause the most distress among patients with HF: dyspnea during the day time, dyspnea when lying down, fatigue, chest pain, edema, sleeping difficulty, and dizziness or loss of balance.^{6, 12} As in the MSAS-HF, the SSQ-HF measures the frequency, severity, and distress of each physical symptom.¹²

The current study was conducted to test the reliability and validity of the SSQ-HF. The first aim was to test the reliability and item homogeneity of the SSQ-HF using Cronbach's alpha, item-total correlations, and inter-item correlations. The second aim was to test construct validity using factor analysis and examine the hypothesized relationships between physical symptoms as measured by the SSQ-HF and depressive symptoms, HRQOL, and event-free survival. Depressive symptoms have been associated with physical symptoms in patients with HF. For instance, two recent studies have shown that higher levels of depressive symptoms were predictive of poor physical symptom status.^{8, 19} Another study demonstrated a positive association between number of depressive symptoms and number of physical symptoms.¹¹ Event-free survival was defined as the time from enrollment to first hospitalization, emergency department visit, or death. The majority of patients who were admitted to hospitals had physical symptoms.⁵ Therefore, hypothesis 1 was that the depressed group would have more severe physical symptoms than the non-depressed group, controlling for age,⁸ gender,²⁰ body mass index [BMI],²¹ comorbidities,²² and use of angiotensin converting enzyme inhibitors (ACEis) or angiotensin II receptor blockers (ARBs), beta blockers, and diuretics.^{23, 24} Hypothesis 2 was that physical symptoms would be associated with HRQOL, controlling for age,¹ gender,²⁵ comorbidities,²⁶ New York Heart Association [NYHA] functional class,²⁶ and depressive symptoms.²⁷ Hypothesis 3 was that physical symptoms would predict event-free survival, controlling for age, gender, BMI,²⁸ comorbidities,²⁹ NYHA functional class,³⁰ left ventricular ejection fraction [LVEF],³⁰ medications (ACEis or ARBs, beta-blockers, and diuretics),^{31–33} and depressive symptoms.³⁴

Methods

Design, Setting, and Sample

This was a prospective, observational study.^{27, 35} Patients were enrolled who met the following inclusion criteria: 1) had a confirmed diagnosis of HF with preserved or non-preserved systolic function, 2) stable doses of cardiac-related medications for 3 months or for two clinic visits, and 3) ability to speak and read English. Patients were excluded if they had any of the following: 1) HF originating from valvular heart disease, rheumatic disease, or pregnancy, 2) myocardial infarction or stroke within the past 3 months, or 3) other comorbid conditions that could considerably affect morbidity and mortality. Patients with severe cognitive impairment or psychiatric problems as determined by referring physicians

or through medical record review were excluded because of potential difficulties with data collection. Sample size was calculated based on the recommendations (at least 10–15 subjects per item) by Nunnally and Bernstein and Pett and the colleagues.^{36, 37}

Institutional review board approval for the study was obtained from appropriate institutions. Patients were enrolled from outpatient clinics in academic health centers or community hospitals in three Southern and Midwestern cities in the U.S. Signed informed consent was obtained from all subjects. Data on physical and depressive symptoms, demographic and clinical characteristics, and HRQOL were collected at patients' houses, clinics, or places that patients wanted to meet a research team member. Data on event-free survival were collected using monthly phone calls with patients and verified using medical record review when possible. The mean follow-up time for the sample was 571 days (standard deviation: ± 347 days). When necessary, clinical characteristics were confirmed using medical record reviews by research team members.

Measures

Symptoms referred to patients' perceptions of physical HF symptoms and were measured by the SSQ-HF. The instrument consists of 7 questions used to assess the presence, frequency, severity, and distress of common physical HF symptoms, including daytime dyspnea, dyspnea when lying down, fatigue, chest pain, edema, difficulty sleeping, and dizziness or loss of balance. Patients are asked to indicate the presence of each symptom during the past 4 weeks. If no symptom, the score is 0. If a patient has experienced a symptom, the patient is asked about the frequency, severity, and distress of the symptom. Responses on frequency range from 1 (*less than once per week*) to 4 (*nearly daily*); severity responses range from 1 (*slight*) to 4 (*very much*); and distress responses range from 0 (*not at all*) to 4 (*very much*). The total score for each physical symptom is calculated by summing the ratings for the symptom; scores range from 0 to 12. The total score on the instrument is calculated by summing the total scores of all the symptoms. Possible total scores range from 0 to 84, with higher scores indicating more severe symptoms.

Depressive symptoms were defined as cognitive, affective, and somatic depressive mood and assessed using the Beck Depression Inventory II.^{38, 39} The instrument consists of 21 items with four response options. Scores from 14 to 19 indicate mild depression; scores from 20 to 28, moderate depression; and scores from 29 to 63, severe depression.³⁹ In the current study, patients were divided into two groups using a cut point of 14 (the depressed group with a score ≥ 14 vs. the non-depressed group with a score < 14); this cut point indicates at least mild depressive symptoms and has been used as a cut point for depressive symptoms.⁴⁰ Internal consistency reliability has been supported in psychiatric outpatients.³⁹ Validity has been supported by hypothesized relationships which scores on this instrument and scores on other depression instruments in patients with HF,⁴¹ and by factor analysis in college students.³⁸ Cronbach's α in the current study was .91.

Health-related quality of life was defined as an individual's perception of how his/her clinical condition or treatment affected various aspects of daily life⁴² and was measured by the Minnesota Living with Heart Failure Questionnaire.⁴³ This instrument was selected because it is the most commonly used to measure HRQOL in patients with HF, has well-

established reliability and validity,⁴³ and has been shown to be predictive of hospitalization and death in patient with HF.^{44, 45} It consists of 21 items with 6 response options from 0 (*no impact*) to 5 (*very much impact*). The total score is calculated by summing all of the ratings; possible total scores range from 0 to 105, with higher scores indicating poorer HRQOL. Cronbach's alphas in several studies have been above .70, indicating acceptable internal-consistency reliability.^{43, 46, 47} In the current study, Cronbach's α was .93. Construct validity has been supported by significant relationships to NYHA functional class and symptoms.^{46, 47}

Event-free survival was defined as the time from enrollment in the study to any first event of hospitalization, emergency department visit, or death due to any cause. A research team member called each patient by phone monthly to collect data on hospitalization and emergency department visits. In addition, patients were given a hospitalization diary, so that they could record hospitalizations before they forgot. Patients were asked to record information on hospitalizations and emergency department visits, including admission date, discharge date, hospital name, and the reason(s) for the events. If patients were admitted to recruitment hospitals, their hospitalization data were verified through medical record review. If patients were admitted to hospitals or visited emergency departments other than the recruitment sites, discharge notes from the hospitals, when available, were used to collect data on hospitalization and emergency department visit in addition to patient interviews. A trained research associate clarified, organized, and verified hospitalization data.

Data on death from any cause were collected using several methods, including medical record review and interviews with the patient's family members or health care providers. The research team asked patients to provide one or two contact numbers to use if the team was unable to contact them after the patients gave written consent for the study. During monthly follow-ups, if the research team could not contact the patient, the team checked medical records to determine whether the patient had died. If the research team could not determine the patient's death through medical record review, the team contacted one of the numbers that the patient provided to determine the patient's event.

Data on sociodemographic characteristics (age, gender, and BMI) and clinical characteristics (comorbidities, NYHA functional class, LVEF, and medication) were collected using standard Sociodemographic and Clinical Questionnaires by patient interviews or in medical record review. New York Heart Association functional class was determined by trained research team members in in-depth face-to-face patient interviews.⁴⁸ Comorbidities were assessed using the Charlson Comorbidity Index, which was included in the Clinical Questionnaire.⁴⁹

Cronbach's alpha was used to assess the internal consistency reliability of the SSQ-HF. An acceptable coefficient for Cronbach's alpha is greater than .70.⁵⁰ Item-total correlations and inter-item correlations were used to assess item homogeneity.⁵¹ An acceptable coefficient for item-total correlations is greater than .30, indicating contribution of the item to the measure.⁵¹ Acceptable coefficients for inter-item correlations are greater than .30 and less than .70.⁵¹ Items with coefficients .30 or less mean lack of contribution of the item, and items with coefficients .70 or greater mean redundancy.

Common factor analysis was conducted because we assumed that variance in symptoms could be explained by the combination of the underlying common factors and the variance unique to symptoms.³⁷ Factors were extracted based on the results of a scree plot, eigenvalues, and total variance.³⁷ A loading score greater than .40 was used as a cut point.³⁷

T-test and general linear model analysis were used to test Hypothesis 1 that the depressed group would have more severe symptoms than the non-depressed group, after controlling for age, gender, BMI, comorbidities, and medications. Hierarchical multiple regression analysis with enter method was used to test Hypothesis 2 that physical symptoms would be associated with HRQOL, after controlling for age, gender, comorbidities, NYHA functional class, and depressive symptoms. Cox regression analysis with enter method was used to test Hypothesis 3 that physical symptoms would predict event-free survival, after controlling for age, gender, BMI, comorbidities, NYHA functional class, LVEF, medications, and depressive symptoms. In cox regression analysis, patients were divided into two groups based on their mean score on physical symptoms (a less severe physical symptom group 24 and a more severe physical symptom group > 24). We used the mean because the data showed normal distribution.

Results

Sociodemographic and Clinical Characteristics and Symptoms

Two hundred forty-nine patients with HF participated in the study (Table 1). More Caucasians than non-Caucasians belonged to the more severe physical symptom group. The more severe symptom group also had a lesser educational level, higher BMI, more comorbidities, more impaired functional status, and more depressive symptoms than the less severe physical symptom group. One hundred five patients (42%) experienced an adverse event during the follow-up period: 91 of the first events were hospitalizations, 8 emergency department visits, and 6 deaths. The mean score of SSQ-HF was 24 (standard deviation: $\pm$ 16).

Reliability and Item Homogeneity

Cronbach's alpha for the instrument was .80, indicating adequate internal consistency. In item-total correlation analysis, the correlation coefficients of all the items were greater than .30, indicating adequate contribution of all items to the measure (Table 2). The results of the interitem correlations are presented in Table 2. At least half of the correlation coefficients between all individual items and all other items were greater than .30 and less than .70, and all the correlation coefficients were less than .70.

Validity

In common factor analysis, the scree plot showed that the eigenvalue of one component was greater than 1.00, and one component was extracted and explained 46% of the total variance (Table 3). All of the items demonstrated moderate to strong loadings ($>$.40), indicating acceptable construct validity.

Hypothesis 1 was supported: the depressed group had more severe physical symptoms than the non-depressed group, after controlling for age, gender, BMI, comorbidities, and medications (Table 4). Among the covariates, BMI and comorbidities were significantly associated with physical symptoms. Patients with depressive symptoms, greater BMI, and more comorbidities had more severe physical symptoms.

Hypothesis 2 was also supported: physical symptoms were associated with HRQOL, after controlling for age, gender, comorbidities, NYHA functional class, and depressive symptoms (Table 5). Among the covariates, age and depressive symptoms were associated with HRQOL. Patients with more severe physical symptoms, younger age, and depressive symptoms had poorer HRQOL.

Finally Hypothesis 3 was supported: physical symptoms predicted event-free survival, after controlling for age, gender, BMI, comorbidities, NYHA functional class, LVEF, medications, and depressive symptoms (Table 6). Among the covariates, comorbidities, LVEF, and ACEis or ARBs predicted event-free survival. More severe physical symptoms, more comorbidities, lower LVEF, and no taking ACEis or ARBs were associated with shorter event-free survival. Figure 1 shows the survival curves for prediction of event-free survival between less and more severe physical symptom groups.

Discussion

This study supported the reliability and validity of the SSQ-HF. The findings of Cronbach's alpha and item analyses showed acceptable internal consistency reliability and item homogeneity. All of the items contributed to the measure, and there was no redundancy among the items. Factor analysis and hypothesis tests strongly supported the construct validity of the instrument. Unlike the MSAS, the MSAS-short form, and the MSAS-HF,¹⁰⁻¹² this instrument includes only common HF-related physical symptoms, but not psychological symptoms and other symptoms that are not common in this population. Thus, this instrument is relatively short compared with the instruments, but physical symptoms measured by this instrument were strongly associated with HRQOL and predicted event-free survival. Physical symptoms alone explained 56.4% of the variance in HRQOL in the current study. In this population, psychological symptoms, including depressive symptoms, are commonly included in studies and measured by several reliable and valid instruments such as the Beck Depression Inventory II and the Patient Health Questionnaire-9.^{27, 38, 39, 41} Thus, it is beneficial to provide a reliable and valid instrument to measure only physical symptoms. Compared with the Dyspnea-Fatigue Index,^{8, 15} this instrument is relatively long but covers important common HF-related physical symptoms and can measure only physical symptoms separated from functional impairment. Functional impairment is commonly measured using NYHA functional class in HF studies and clinics.^{12, 48} The SSQ-HF allows clinicians and researchers to assess the status of common physical symptoms and the unique effects on patient outcomes, including HRQOL and hospitalizations, among patients with HF.

The findings of the current study not only support the reliability and validity of this instrument, but also demonstrate the importance of physical symptoms for patient outcomes.

The findings of significant relationships between physical symptoms and depressive symptoms and between physical symptoms and HRQOL in the current study are consistent with the findings of prior studies.^{1, 7, 11, 19} In patients with HF, poor HRQOL is an important issue and outcome.⁵² Some studies have examined physical symptoms after patients hospitalized or visited emergency departments, and the majority of hospitalized patients had common HF-related physical symptoms.^{5, 9} For instance, 88% and 35% of patients who visited emergency department had dyspnea and chest discomfort, respectively.⁹ In ambulatory and hospitalized HF patients, more than 90% had dyspnea.⁵ However, the predictive relationship of physical symptoms to hospitalization and mortality rates has rarely been examined in patients with HF. This study has shown that physical symptoms are a predictor of event-free survival. The findings of the relationships of physical symptoms to HRQOL and event-free survival imply that physical symptoms should be assessed and managed to improve HRQOL and event-free survival.

As expected, depressive symptoms are the strongest factor associating with physical symptoms in this study. This finding was consistent with the findings of our prior and other studies.^{8, 11, 19} Depressive symptoms measured by the Brief Symptom Inventory^{8, 19} and the Geriatric Depression Scale-Short Form¹¹ were associated with number of symptoms, overall symptom distress, and symptoms combined with functional impairment. These findings demonstrate that depressive symptoms are strongly associated with physical symptoms regardless the instruments. Thus, depressive symptoms should be considered to manage physical symptoms properly.

Different types of interventions have been provided to improve depressive symptoms and physical symptoms, and the findings were inconsistent. Some interventions using telehealth communication device, small group education program, including diet and exercise, or comprehensive discharge program did not improve depressive symptoms.^{53–55} In contrast, a multidisciplinary comprehensive management program, including education about disease and symptom management, dietary counseling, adjustment of medications, and participation in an exercise program, improved depressive symptoms and reduced hospitalization rates.⁵⁶ However, this study was not a randomized controlled trial. A home-based disease management program and a mindfulness-based psycho-educational program improved physical and depressive symptoms, but the effects were not profound.^{57, 58} For instance, the home-based disease management program improved depressive symptoms, fatigue, and swelling, but did not improve the prevalence of dyspnea.⁵⁸ The mindfulness-based psycho-educational program improved physical symptoms and depressive symptoms, but the effects were not profound ($p = .03$ and $.05$, respectively).⁵⁷ In the sessions of this study, mastering mindfulness skills and coping skills and group support were targeted. Various topics related to HF and its management, including diet, exercise, stress, communication, spirituality and health, social support were discussed during the sessions. The findings of these studies suggest that comprehensive management programs, including situational-specific education and counseling and psychological alternative therapy, may improve physical and depressive symptoms, and, in turn, reduce hospitalization rates. However, further studies are needed to make more profound effects on physical and depressive symptoms.

Caution is needed in generalizing the findings of the current study to races other than Caucasians because the majority of the participants were Caucasian. With other races, symptoms and the effects on HRQOL and event-free survival may be different from those reported in the current study. Also necessitating caution in interpretation of the data is the use of symptom recall during the past 4 weeks. Although this may present a difficulty for patients with HF, gathering data across a longer timespan can provide valuable data on symptom frequency.

In conclusion, the outcomes of our study provide preliminary evidence that, clinicians and researchers who work with patients with HF can use the SSQ-HF to assess common HF-related physical symptoms and evaluate their effects on patient outcomes. Patients can easily fill out the questionnaire within 5 minutes after a brief explanation facilitating use during clinic visits. This instrument shows the presence, frequency, severity, and distress of 7 physical symptoms. Thus, it does not take much time for clinicians to review, but provides more information about symptoms than NYHA functional class. Further studies are needed to assess changes in symptoms over time, and to determine whether these changes are associated with changes in HRQOL and event-free survival.

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What's new?

- This study presents a symptom instrument that clinicians and researchers can use to assess common physical symptoms in patients with heart failure.
- This study provides information about factors associating with physical symptoms in patients with heart failure.
- This study provides information about the predictive effects of physical symptoms on event-free survival.

Figure 1.
Predictive Relationship Between Physical Symptoms and Event-Free Survival

Table 1

Characteristics of Sample

Characteristic	Total Sample (N = 249)	Symptom Score (n = 138)	24 Symptom Score > 24 (n = 111)	p value
Demographic Characteristics				
Age (years), Mean ($\pm$ SD) ^a	61.2 ($\pm$ 11.8)	62.2 ($\pm$ 12.5)	60.0 ($\pm$ 10.7)	.150
Male, N (%)	167 (67.1)	96 (69.6)	71 (64.0)	.350
Married, N (%)	132 (53.0)	77 (55.8)	55 (49.5)	.326
Caucasian, N (%)	179 (71.9)	92 (66.7)	87 (78.4)	.041
Education level (years), Mean ($\pm$ SD)	13.7 ($\pm$ 3.1)	14.1 ($\pm$ 3.1)	13.2 ($\pm$ 3.2)	.032
Body mass index, Mean ($\pm$ SD)	30.2 ($\pm$ 7.3)	29.1 ($\pm$ 6.9)	31.6 ($\pm$ 7.5)	.008
Clinical Characteristics				
Comorbidities, ^b Mean ($\pm$ SD)	3.1 ($\pm$ 1.9)	2.7 ($\pm$ 1.7)	3.7 ($\pm$ 2.0)	< .001
Left Ventricular Ejection Fraction (%), Mean ($\pm$ SD)	34.4 ($\pm$ 13.0)	34.1 ($\pm$ 13.3)	34.9 ($\pm$ 12.5)	.655
New York Heart Association class III/IV, N (%)	112 (45.0)	46 (33.3)	66 (59.5)	< .001
ACEis ^c or ARBs, ^d N (%)	215 (86.3)	119 (86.2)	96 (86.5)	.954
Beta-blockers, N (%)	221 (88.8)	124 (89.9)	97 (87.4)	.540
Diuretics, N (%)	189 (75.9)	100 (72.5)	89 (80.2)	.157
Heart failure etiology (ischemic), N (%)	115 (46.2)	59 (42.8)	56 (50.5)	.226
Depressive symptoms, N (%)	72 (28.9)	15 (10.9)	57 (51.4)	< .001
Health-Related Quality of Life, Mean ($\pm$ SD)	39.6 ($\pm$ 23.5)	26.4 ($\pm$ 17.7)	56.0 ($\pm$ 19.0)	< .001

t-test for continuous variables and Chi-square test for categorical variables were used to compare sociodemographic and clinical characteristics between patients with less and more severe physical symptom groups.

^aSD = Standardized deviation.

^bComorbidities: Charlson Comorbidity Index.

^cACEis = angiotensin converting enzyme inhibitors.

^dARBs = Angiotensin II receptor blockers.

Table 2**Item-Total and Interitem Correlations**

Items	Corrected Item-Total Correlations	Interitem Correlations					
		Item 1	Item 2	Item 3	Item 4	Item 5	Item 6
Item 1: Shortness of breath during day time	.622	1.000					
Item 2: Shortness of breath when lying down	.628	.562	1.000				
Item 3: Fatigue or lack of energy	.688	.603	.513	1.000			
Item 4: Chest pain	.452	.392	.383	.418	1.000		
Item 5: Leg or ankle swelling	.485	.317	.428	.432	.234	1.000	
Item 6: Difficulty sleeping at night	.414	.323	.354	.349	.194	.269	1.000
Item 7: Dizziness or loss of balance	.455	.326	.278	.418	.274	.341	.260

Table 3

Factor Analysis

Items	Mean ($\pm$ SD ^a)	Factor 1
Item 3: Fatigue or lack of energy	5.77 ($\pm$ 3.36)	.790
Item 1: Shortness of breath during day time	4.29 ($\pm$ 3.59)	.726
Item 2: Shortness of breath when lying down	2.39 ($\pm$ 3.51)	.712
Item 5: Leg or ankle swelling	4.19 ($\pm$ 4.21)	.541
Item 4: Chest pain	2.81 ($\pm$ 3.40)	.514
Item 7: Dizziness or loss of balance	3.06 ($\pm$ 3.18)	.499
Item 6: Difficulty sleeping at night	1.61 ($\pm$ 2.73)	.461

Items were organized according to the highest to lowest loadings.

^aSD = Standardized deviation.

Table 4

Relationships Between Physical Symptoms and Depressive Symptoms (N = 249)

Model	Variables	t statistics	p value				
Model 1	Depressive symptoms	-7.940	< .001				
Model 2	Variables	F statistics	Partial η^2	F statistics	R ²	p value	
	Depressive symptoms	61.853	< .001	.205	16.478	.355	< .001
	Age	1.340	.248	.006			
	Gender	1.602	.207	.007			
	Body mass index	12.133	.001	.048			
	Comorbidities	21.592	< .001	.083			
	ACEis ^a or ARBs ^b	.073	.787	.000			
	Beta-blockers	.177	.674	.001			
	Diuretics	3.651	.057	.015			

Model 1 = t-test analysis. Model 2 = General linear model analysis.

^a ACEis = angiotensin converting enzyme inhibitors.^b ARBs = Angiotensin II receptor blockers.

Table 5
Relationship Between Physical Symptoms and Health-Related Quality of Life (N = 249)

Model	Variables	t statistics	p value	F statistics	R ²	p value
Model 1	Physical Symptoms	17.879	< .001	319.653	.564	< .000
Model 2	Physical Symptoms	12.843	< .001	80.353	.666	< .001
	Age	-3.272	.001			
	Gender	-1.734	.084			
	Comorbidities	1.655	.099			
	NYHA function class	.784	.434			
	Depressive symptoms	6.210	< .001			

Table 6

Relationship Between Physical Symptoms and Event-Free-Survival (N = 249)

Model	Variables	Odds ratio	95% confidence interval	p value	Overall chi-square statistics	p value
Model 1	Physical Symptoms	1.938	1.31, 2.86	.001	11.451	.001
Model 2	Physical Symptoms	1.769	1.12, 2.78	.014	37.486	< .001
	Age	1.009	.99, 1.03	.352		
	Gender	.789	.60, 1.47	.789		
	Body mass index	1.016	.99, 1.05	.274		
	Comorbidities	1.129	1.02, 1.26	.024		
	NYHA ^a functional class	1.381	.89, 2.15	.153		
	LVEF ^b	.979	.96, 1.00	.016		
	ACEis ^c or ARBs ^d	.554	.32, .95	.031		
	Beta-blockers	.960	.52, 1.79	.897		
	Diuretics	.896	.54, 1.49	.674		
	Depressive symptoms	.930	.57, 1.53	.773		

Cox regression analysis was used.

^a NYHA = New York Heart Association.^b LVEF = left ventricular ejection fraction.^c ACEis = angiotensin converting enzyme inhibitors.^d ARBs = Angiotensin II receptor blockers.