HHS Public Access

Author manuscript

J Cardiovasc Nurs. Author manuscript; available in PMC 2018 March 01.

Published in final edited form as:

J Cardiovasc Nurs. 2017 ; 32(2): 140–147. doi:10.1097/JCN.0000000000000320.

Psychometric analysis of the Heart Failure Somatic Perception Scale as a measure of patient symptom perception

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Abstract

Background—Symptoms are known to predict survival among patients with heart failure (HF) but discrepancies exist between patients' and health providers' perceptions of HF symptom burden.

Objective—The purpose of this study was to quantify the internal consistency, validity and prognostic value of patient perception of a broad range of HF symptoms using a HF-specific physical symptom measure, the 18-item HF Somatic Perception Scale v.3.

Methods—Factor analysis of the HFSPS was conducted in a convenience sample of 378 patients with chronic HF. Convergent validity was examined using the Physical Limitation subscale of the Kansas City Cardiomyopathy Questionnaire (KCCQ). Divergent validity was examined using the Self-Care of HF index self-care management score. One-year survival based on HFSPS scores was quantified using Cox regression controlling for Seattle HF Model scores to account for clinical status, therapeutics and lab values.

Results—The sample was 63% male, 85% Caucasian, 67% functionally compromised (NYHA class III-IV) with a mean age of 63, SD12.8 years. Internal consistency of the HFSPS was α =.90. Convergent ($r=-0.54$, $p=<0.0001$) and divergent ($r=0.18$, $p>0.05$) validity were supported. Controlling for Seattle HF scores, HFSPS was a significant predictor of one-year survival with those most symptomatic having worse survival (HR=1.012 (95%CI=1.001–1.024), p=0.038).

Conclusions—Perception of HF symptom burden as measured by the HFSPS is a significant predictor of survival contributing additional prognostic value over and above objective Seattle HF Risk Model scores. This analysis suggests that assessment of a broad range of HF symptoms, or those related to dyspnea or early and subtle symptoms may be useful in evaluating therapeutic outcomes and predicting event-free survival.

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Keywords

heart failure; symptoms; survival; factor analysis; statistical

Symptoms of heart failure (HF) drive care-seeking, healthcare utilization and predict quality of life and survival.[1–4] Costs associated with HF are estimated to be over $30 billion annually and approximately half of patients with HF die within 5 years of diagnosis.[5,6] The high costs associated with HF are in part due to the need for repetitive hospitalization for treatment of escalating signs and symptoms of HF.[7] Patients with HF frequently experience multiple symptoms simultaneously[8–10] potentially increasing symptom burden; the cumulative sum, severity and impact of symptoms on the individual.[9,11] However, there is substantial variation in how signs and symptoms of HF are perceived and reported by patients. Assessment and documentation by clinicians also is variable.[12–17] Therefore, methodically assessing patient perception of symptoms is of potential value for prediction of both morbidity and mortality risk in this population. Reliable and valid tools to assess both the presence and burden/interference associated with signs and symptoms of HF are needed to improve the ability to predict outcomes.

The effect of HF symptoms on survival has been investigated using measures that vary considerably in method and the number and type of symptoms assessed.[3,4,12,18–20] For example, symptoms have been inferred from quality of life measures,[19] HF-specific symptom instruments,[3,4,20] study-specific questionnaires[18] and from symptom dairies.[12] Timeframes for symptom recall among the various measures range from one to 30 days, and the number of symptoms assessed ranges from a minimum of four up to eighteen. Finally, the type of signs and symptoms included in these measures vary considerably in scope. In particular, HF symptoms that are subtle in nature or early indicators of impending decompensation were limited in many measures used in studies on HF symptoms and survival.[4,12,18–20] Moreover, the measurement of dyspnea, a hallmark symptom of HF that is well-known to vary in intensity based on activity and illness severity, was limited to a single item in half of these studies[12,18,19] and dyspnea on exertion was only measured in one study.[3]

Clearly, robust and sound measures are needed that assess the breadth and complexity of HF symptoms including hallmarks and the early and subtle symptoms of impending decompensation. Therefore, the purpose of this study was to quantify the internal consistency, validity and prognostic value of patient perception of a broad range of HF symptoms using a HF-specific physical symptom measure, the 18-item HF Somatic Perception Scale v.3.

Method

A secondary analysis was conducted of 2 convenience samples with 18-item HF Somatic Perception Scale v.3 (HFSPS) data; one that assessed symptoms pre-randomization in a trial focused on symptom management[2] and one that evaluated symptoms among community-dwelling participants of two observational studies of heart failure symptoms.[3,21] Sampling criteria was similar between the samples. Inclusion criteria included (*a*) a confirmed

diagnosis of HF, (*b*) able to read and comprehend fifth grade English, (*c*) reachable by telephone, (*d*) absence of major cognitive impairment, and (*e*) willing and able to provide informed consent. Exclusion criteria included (*a*) major uncorrected hearing impairment, (*b*) major psychiatric illness (e.g. schizophrenia), (*c*) major uncorrected visual impairment, (*d*) not expected to live for months, and (*e*) reversible HF (e.g. HF due to high output states). Human subjects approval was secured from each of the principal investigator's institutions.

Measurement

Physical HF symptoms were measured using the HFSPS, V.3, an 18-item Likert scale. The original scale[22] was expanded from 12 items to 18 to capture the more subtle symptoms of HF. Importantly, the development of the original HFSPS and this current 18 item version were guided by Lenz's Theory of Unpleasant Symptoms, with respect to interactions among multiple symptoms, multiple influential pathophysiological mechanisms, situational factors, and performance (e.g. HRQOL and clinical event-risk).[23,24] Additional items were added to assess dyspnea on exertion, fatigue, nocturia, and symptoms associated with right-sided congestion (i.e. abdominal swelling and loss of appetite).[25] The HFSPS asks participants how much they are bothered by symptoms in the past week using 5 response options ranging from 0 (I did not have the symptom) to 5 (extremely bothersome). Scores are summed with higher values indicating higher symptom burden.

Convergent validity provides evidence of validity by examining the correlation between different measures of a construct. To support convergent validity, correlation of theoretically-related construct measures should be high.[26,27] The Kansas City Cardiomyopathy Questionnaire (KCCQ) is a 23-item Likert scale health status measure that assesses physical function, symptoms, social function, self-efficacy, and quality of life among patients with HF.[28] The KCCQ is a reliable and valid measure of health status responsive to change clinical status. The 6-item Physical Limitation subscale of the (KCCQ) was used to examine convergent validity. Scores range 1 to 36 on the Physical Limitation subscale. Higher scores indicate better function. The reliability of the Physical Limitation subscale is acceptable with a Cronbach's alpha of 0.90. We hypothesized that the correlation between the HFSPS and KCCQ Physical Limitation subscale would be significant.

Discriminant validity examines differentiation of constructs that are theoretically different. To support discriminant validity, correlation between two different constructs should be low.[26,27] The Self-Care of HF Index (SCHFI) was used to quantify self-care.[29] The SCHFI v.6.2 is a 22-item scale using a 4-point self-report response format to measure self-care maintenance (adherence behaviors), self-care management (response to symptoms) and self-care confidence. The 6-item Self-Care Management score was used to examine discriminant validity for this analysis because it reflects how quickly participants recognized and responded symptoms as opposed to the physical experience of symptoms. Symptom recognition options ranged from 0 (I did not recognize it as a symptom of HF) to 4 (very quickly). Response to symptoms options included rating the likelihood of taking action to manage symptoms (e.g. taking an extra diuretic, reducing fluid intake) from 1 (not likely) to 4 (very likely). Scores are standardized to range from 0 to 100 with higher values indicated better symptom response behaviors. The Self-Care Management subscale of the SCHFI is

multidimensional with a two factor structure representing symptom evaluation and treatment implementation. Therefore, a global reliability index is used to assess internal consistency. The global reliability index derived from the weighted least squares means and variance is 0.77 and 0.76 respectively.[30] We hypothesized that the correlation between the HFSPS and SCHFI Self-Care Management subscale would be weak and insignificant.

We completed a review of the electronic medical record at 1 year looking specifically for HF-related emergency room visits, hospitalizations or mortality. For the vast majority of events data were extracted directly from discharge summaries all participants received care locally and were part of an extensively-linked electronic medical record system. We also contacted study participants by phone to inquire about events that occurred outside of the health system network; we solicited sufficient detail directly from participants or their family members to determine whether or not the event was primarily related to their HF or for other reasons. All events underwent adjudication by two separate evaluators until 100% agreement was reached about the underlying reasons for emergent healthcare utilization.

Analysis

HFSPS item response means and standard deviations, and average inter-item correlations (i.e. the mean of all paired correlations between items) were quantified.[31] Item difficulty was assessed by quantifying the proportion of participants who provided the best possible response (I did not have this symptom). Item difficulty of 0.3 indicates that many (70%) participants had difficulty with the symptom, and item difficulty of 0.7 indicates that few (30%) participants had difficulty with the symptom; between 0.3 and 0.7 is the best range for item difficulty. Item discrimination was quantified by comparing item difficulty between participants with HFSPS total scores in the top and bottom thirds of the distribution.

Confirmatory factor analysis was performed using M*plus* v.6 (Los Angeles, California). Geomin (oblique) rotation was chosen for this analysis using weighted least square parameter estimation with mean-and variance-adjusted statistics. Results are presented in rotated factor loadings and standard errors. To assess model fit, overall model χ^2 tests, comparative fit indices (CFI), Tucker-Lewis indices (TLI), root mean square errors of approximation (RMSEA), standardized root mean square residuals (SRMSR), normed fit index (NFI), and adjusted goodness-of-fit index (AGFI) were calculated using common thresholds of acceptability.[32] As the HFSPS was developed as a unidimensional scale, Cronbach's alpha was calculated as an index of internal consistency.

Pearson's correlations were used to quantify convergent (KCCQ physical limitations score) and discriminant validity (SCHFI Self-Care Management). Finally, Cox proportional hazards modeling was performed using Stata MP v13 (College Station, TX) to quantify 1-year HF event-risk (emergency room visit or hospitalization for HF or all-cause death) as a function of the HFSPS scores. The proportional hazards assumption was justified based on Schoenfeld residuals. Hazard ratios (HR) and 95% confidence intervals (CI) are presented. To account for the influence of many other factors, the influence of symptom profiles on event-free survival was adjusted for the Seattle HF Score. The Seattle HF Score was calculated based on the original model developed by Levy and colleagues.[33] In brief, demographic (i.e. age, gender) objective clinical indices (i.e. ischemic etiology, NYHA

functional class, left ventricular ejection fraction, systolic blood pressure, hemoglobin, % lymphocyte count, uric acid, sodium, cholesterol) and HF treatment (i.e. beta blocker, angiotensin converting enzyme inhibitor, allopurinol, diuretic dose, statin use, and device therapy) were multiplied by respective slope coefficients[33] to generate a single composite risk-prediction score that in this sample ranged from −0.16 to 3.34.

Results

The samples used in this psychometric analysis are presented in Table 1. In brief, the sample was predominantly male (63.2%), Caucasian (85.2%) older adults (mean age = 62.6±12.8 years). A majority of participants (67.2%) had NYHA class III/IV symptoms.

Item Responses

Fatigue was the most commonly reported symptom (item difficulty = 0.09) and paroxysmal nocturnal dyspnea was the least commonly reported symptom (item difficulty = 0.66) (Table 2). Average inter-item correlations on the HFSPS were consistent and ranged from 0.32 (It was hard for me to breath) to 0.35 (I had a cough) indicating that removing single items would not likely improve internal consistency. Most items were discriminatory regarding the top and bottom 33.3% of physical HF symptom burden. In contrast, having a cough, being tired, and waking up at night to urinate were not helpful in discriminating between participants who reported least versus most burdensome physical HF symptoms because they were either highly-prevalent or because they were relatively normally distributed across response options.

Factor Analyses

The confirmatory factor analysis of the HFSPS is presented in Table 3. Several fit indices reached and others were close to reaching thresholds of acceptability; thus, the fit of the HFSPS as a single scale could be improved. The best fit exploratory factor analysis of the HFSPS, based on fit statistics and thresholds of acceptability, is also presented in Table 3. The resulting subscales were labeled according to dominant features as “dyspnea,” “chest discomfort,” “early and subtle” and “edema.” Considering these four factors, the fit of the HFSPS was improved considerably.

Internal Consistency

Cronbach’s alpha of the 18-item HFSPS was 0.90. Single item deletion did not result in significant improvement of internal consistency. Cronbach’s alpha was 0.89 on the 6-item dyspnea subscale. Cronbach’s alpha was 0.75 on the 7-item “early and subtle” subscale. Cronbach’s alpha was 0.75 and 0.68 on the edema and chest discomfort subscales, respectively; but, these scales contain too few items for meaningful analysis.

Convergent and Divergent Validity

Convergent validity testing of the HFSPS with the KCCQ Physical Limitations score, and discriminant validity testing of the HFSPS with the SCHFI Self-Care Management are presented in Table 4. There were strong correlations between both the HFSPS and subscales and the KCCQ Physical Limitations score indicating similarity between measures of

theoretically-related constructs. The HFSPS and subscales were not correlated with SCHFI Self-Care Management score confirming discriminant validity. Convergent and discriminant validity testing was limited to the total HFSPS and subscales for “dyspnea” and “early and subtle” subscales because the “chest discomfort” and “edema” subscales had few items.

Predictive Validity

The results of predictive validity testing are presented in Table 5. The 18-item HFSPS, 6-item dyspnea subscale, and 7-item early and subtle subscale were significantly associated with 1-year event-risk when controlling for the Seattle HF Score. Survival curves depicting event-free survival differences across a gradient of physical symptoms by HFSPS tertiles are presented in Figure 1. The severe symptom tertile is associated with markedly increased risk of HF-related clinical risks compared with the low symptom tertile on the 18-item HFSPS (HR=1.65, p=0.048), 6-item dyspnea subscale (HR=1.70, p=0.029) and 7-item early and subtle subscale (HR=1.99, p=0.010).

Discussion

The HFSPS is a valid and reliable measure of HF symptom perception and burden in this sample of 378 adults with symptomatic HF. The HFSPS total, “dyspnea” and “early and subtle” subscale scores were associated significantly with a measure of physical limitations, and predicted HF event-free survival independent of a commonly used prognostication model.[33] Thus, the analysis indicates that patient perception of the physical symptoms of HF adds value when predicting clinical events.

The “dyspnea subscale” is a robust subscale with good reliability and validity that examines a broad range and severity of dyspnea symptoms related to HF. We found that the dyspnea subscale was effective in predicting HF-related clinical events. Clinical events were adjudicated for HF specific events in this study. Conversely, dyspnea did not predict HF-related hospitalizations in the study by Ekman.[18] However, only two dyspnea symptoms were assessed and one (orthopnea) was assessed as present or absent. Similarly, dyspnea did not predict cardiac events in the study by K. Lee and colleagues.[19] A potential explanation of is that dyspnea was limited to one item and clustered with fatigue and sleep disturbance in the survival analysis. The flexibility of using the HFSPS dyspnea subscale is of interest for clinical and research use.

Importantly, assessment of the early and subtle symptoms of HF has clinical value. We found that increased severity of the early and subtle HF symptoms is associated with almost two times the risk of a clinical event within one year. Fatigue as a singular symptom (RR=1.09, p=0.018)[18] or clustered with other early and subtle symptoms (HR=1.00, p=0.011)[4] was a significant predictor of HF event risk in other studies. Accordingly, there are important implications of this finding for both patients and health care providers. First, patients often have difficulty recognizing and responding to escalation in burden of the subtle nonspecific symptoms of HF.[14,34] Patients normalize and adjust to chronic symptoms decreasing symptom interference on daily living.[14] However, lack of attention to early and subtle signs of decompensation may contribute to delay in self-management and or care-seeking.[14] Patients with HF are typically instructed to monitor daily weights as an objective

measure of increasing congestion. However, a disassociation between weight and dyspnea has been reported potentially increasing the importance of assessing additional symptom parameters.[35–37] Second, among patients with HF, cognitive impairment is common, can be subtle, and potentially impedes symptom reporting.[38–40] Despite the prevalence of cognitive impairment in this population, it is infrequently documented in the medical record by health care providers.[41] Therefore, educating patients regarding the importance of monitoring the early and subtle symptoms of HF that are commonly attributed to less threatening illness is warranted. In addition, involving family and significant others in the education may improve effectiveness in detecting insidious increases in symptom severity. Taken together, evidence suggests that assessment of a broad range of HF symptoms may be useful in evaluating therapeutic outcomes, predicting survival, and informing clinical decision making.

Strengths and Limitations

There are several strengths and limitations to be considered in interpreting these results. Strengths of this analysis lie in use of a HF-specific symptom scale and prospective documentation of symptom burden. Use of the HFSPS also afforded assessment of a broad range of symptoms including those potentially not reported by patients unless specifically asked. The survival analysis was strengthened by adjusting for clinical and treatment variables known to influence survival.

Limitations include a primarily male Caucasian sample limiting generalizability of the findings. In addition, the fit indices in this analysis were not perfect, but very good by most metrics. Although survival analyses are robust with smaller samples, additional testing of the predictive validity of the HFSPS and subscales is needed. Future testing also is needed to examine differential item functioning by gender, race, ethnicity and other factors.

Acknowledgments

This work was supported by the Office of Research on Women’s Health and the National Institute of Child Health and Human Development (HD043488-08 [PI: CSL]) and by awards from the American Heart Association (11BGIA7840062 [PI: CSL]; 07SDG0730128N [PI: CYJ]). The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health or American Heart Association.

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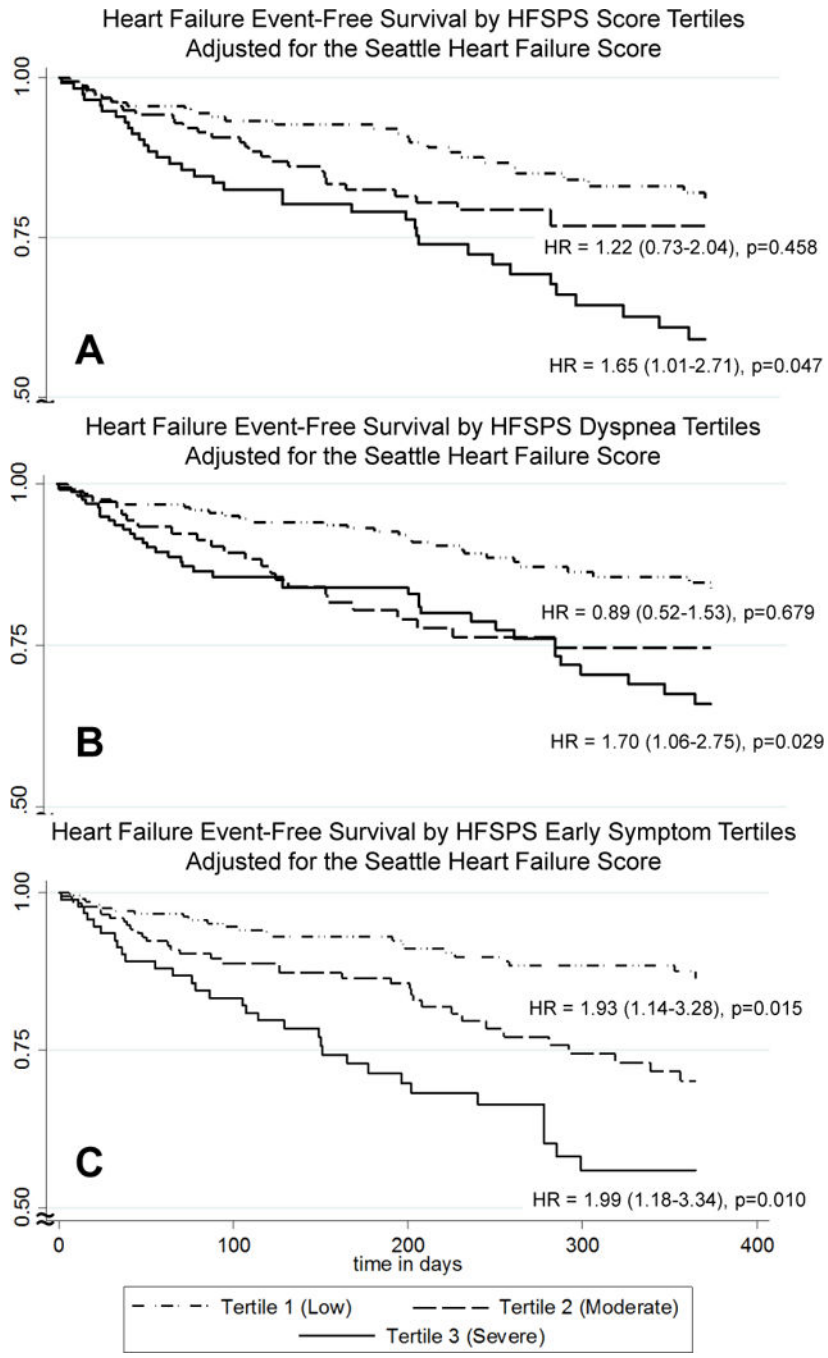

Figure 1.

Table 1

Characteristics of the sample (n=378)

	Sample 1 (n=105)	Sample 2 (n=273)	Full Sample (n=378)
Patient Characteristics:	mean±SD, n (%), median [IQR]	mean±SD, n (%), median [IQR]	mean±SD, n (%), median [IQR]
Age (years)	67.9±12.3	57.3±13.2	62.6±12.8
Female	33 (31.4%)	106 (38.8%)	139 (36.8%)
Non-Hispanic Caucasian	93 (88.6%)	229 (83.9%)	322 (85.2%)
Married/Living with Partner	62 (59.1%)	173 (63.4%)	235 (62.2%)
Charlson Comorbidity Index (weighted)	3.1±1.5	2.3±1.4	2.5±1.3
General Heart Failure Characteristics:			
Time with heart failure in months:	48 [12–102]	49 [16–96]	49 [14–98]
NYHA Functional Class:			
Class I/II	17 (16.3%)	106 (38.8%)	123 (32.5%)
Class III	48 (46.2%)	157 (57.64%)	205 (54.2%)
Class IV	39 (37.5%)	10 (3.7%)	49 (13.0%)
Left ventricular ejection fraction (%)	37.5±16.8	28.3±12.4	32.8±14.0
Prescribed a β-blocker	91 (86.7%)	248 (90.8%)	339 (89.7%)
Prescribed an ACE-I or ARB	64 (61%)	223 (81.7%)	287 (75.9%)
Serum sodium (mEq/L)	138.9±3.8	137.8±3.3	138.3±3.4
Serum BUN-to-creatinine ratio (mg/dL:1)	23.6±8.8	20.2±9.5	21.8±9.1

Abbreviations: ACE-I = Angiotensin Converting Enzyme-Inhibitor, ARB = Angiotensin Receptor Blocker, BUN = blood urea nitrogen, IQR = interquartile range, NYHA = New York Heart Association, SD = standard deviation.

Table 2

Item Responses, Inter-item Correlation and Discrimination for the Heart Failure Somatic Perception Scale (n=378)

Item	I did not have this symptom	Not at all		→		Extremely	Mean ± SD	Inter-item correlation	Discrimination
1. I could feel my heart beat get faster	50.1%	14.2%	16.7%	9.3%	6.3%	3.3%	1.17±1.45	0.345	0.413
2. I could not breathe if I lay down flat	51.3%	5.2%	14.5%	8.7%	13.7%	6.6%	1.48±1.75	0.330	0.718
3. I felt discomfort or pain in my chest	51.2%	10.1%	16.7%	11.5%	7.9%	2.5%	1.22±1.49	0.344	0.447
4. I had an upset stomach	55.7%	6.8%	18.3%	10.3%	5.7%	3.0%	1.13±1.46	0.346	0.437
5. I had a cough	40.8%	15.1%	20.8%	11.2%	6.6%	5.5%	1.44±1.53	0.353	0.259
6. I was tired	9.1%	8.5%	25.5%	17.9%	23.4%	15.7%	2.85±1.50	0.331	0.203
7. I could not catch my breath	39.7%	5.8%	18.9%	14.5%	12.1%	9.0%	1.81±1.75	0.324	0.787
8. My feet were swollen at the end of the day	47.0%	14.2%	11.7%	11.2%	6.8%	9.0%	1.44±1.71	0.339	0.473
9. I woke up at night because I could not breathe	66.0%	6.6%	9.6%	5.5%	7.4%	4.9%	0.96±1.56	0.335	0.633
10. My shoes were tighter than usual…	59.7%	9.0%	10.7%	9.0%	6.0%	5.5%	1.09±1.58	0.340	0.505
11. I gained weight in the past week	56.5%	10.7%	12.9%	9.4%	6.6%	3.8%	1.10±1.51	0.347	0.399
12. I could not do my usual activities because of SOB	32.0%	10.9%	17.5%	15.3%	14.2%	10.1%	1.99±1.74	0.325	0.694
13. Getting dressed made it hard to breathe	51.0%	11.5%	15.6%	8.8%	8.8%	4.4%	1.26±1.56	0.326	0.751
14. My clothes felt tighter around my waist	59.3%	11.7%	11.2%	7.1%	6.3%	4.4%	1.02±1.50	0.336	0.533
15. I woke up at night because I had to urinate	16.7%	25.4%	23.0%	16.4%	11.5%	7.1%	2.02±1.48	0.350	0.200
16. I had to rest more than usual during the day	23.9%	10.7%	25.8%	16.2%	14.8%	8.5%	2.13±1.60	0.330	0.499
17. It was hard for me to breathe	41.3%	10.1%	15.0%	12.3%	12.6%	8.7%	1.71±1.76	0.323	0.859
18. I did not feel like eating	53.8%	14.8%	13.9%	9.8%	4.1%	3.6%	1.06±1.42	0.345	0.485

Table 3

Confirmatory and Exploratory Factor Analysis for the 18-Item Heart Failure Somatic Perception Scale (n=378)

	HFSPS	Dyspnea	Chest Discomfort	Early Subtle	Edema
1. I could feel my heart beat get faster	0.51 ±0.04		0.78±0.05		
2. I could not breathe if I lay down flat	0.77±0.02	0.69±0.05			
3. I felt discomfort or pain in my chest	0.53±0.04		0.68±0.07		
4. I had an upset stomach	0.49±0.05			0.43±0.07	
5. I had a cough	0.38±0.04			0.35±0.09	
6. I was tired	0.71±0.03			0.72±0.06	
7. I could not catch my breath	0.89±0.01	0.78±0.07			
8. My feet were swollen at the end of the day	0.71±0.03				0.77±0.06
9. I woke up at night because I could not breathe	0.76±0.03	0.72±0.06			
10. My shoes were tighter than usual at the end of the day	0.74±0.03				0.78±0.06
11. I gained weight in the past week	0.50±0.04				0.52±0.06
12. I could not do my usual activities because I was short of breath	0.83±0.02	0.59±0.09			
13. Getting dressed made it hard to breathe	0.81 ±0.02	0.58±0.07			
14. My clothes felt tighter around my waist	0.66±0.04			0.53±0.06	
15. I woke up at night because I had to urinate	0.38±0.04			0.27±0.07	
16. I had to rest more than usual during the day	0.73±0.03			0.76±0.06	
17. It was hard for me to breathe	0.92±0.01	0.79±0.08			
18. I did not feel like eating	0.50±0.04			0.48±0.08	
Goodness of Fit					
χ^2 (df)	1176 (135)		358 (87)		
p-value	<0.001		<0.001		
RMSEA‡	0.143		0.091		
SRMR	0.100		0.046		
CFI	0.880		0.969		
NFI	0.867		0.960		
TLI	0.864		0.945		
AGFI	0.849		0.929		

Abbreviations: AGFI = Adjusted Goodness-of-fit Index; CFI = Comparative Fit Index; df = degrees of freedom; NFI = Normed Fit Index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residuals; TLI = Tucker-Lewis Index.

Thresholds for Acceptable Fit

AGFI ≥ 0.85

CFI and TLI ≥ 0.95

NFI ≥ 0.90

RMSEA = 0.05–0.08

SRMR <1.0

Table 4

Convergent and Divergent Validity for the Heart Failure Somatic Perception Scale

Linear correlations	**KCCQ Physical Limitations**	**SCHFI Self-Care Management**
HFSPS	−0.544†	0.181
HFSPS dysnea	−0.529†	0.182
HFSPS early	−0.390†	0.106

† p<0.0001 for all correlations with Bonferroni correction for multiple measures

Abbreviations: HFSPS = Heart Failure Somatic Perception Scale; KCCQ = Kansas City Cardiomyopathy Questionnaire; SCHFI = Self-Care of Heart Failure Index (v6).

Table 5

Predictive Validity for the Heart Failure Somatic Perception Scale

365-day	Adjusted Hazard Ratio†	95%CI	p-value
HFSPS	1.012	1.001–1.024	0.038
HFSPS dyspnea	1.031	1.003–1.060	0.031
HFSPS early	1.030	1.003–1.058	0.028

† adjusted for the Seattle Heart Failure Score

Abbreviations: HFSPS = Heart Failure Somatic Perception Scale