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Gender Differences in and Factors Related to Self-Care Behaviors: A Cross-Sectional, Correlational Study of Patients With Heart Failure

Seongkum Heo

Debra K. Moser

Terry A. Lennie

Barbara Riegel
University of Pennsylvania, briegel@nursing.upenn.edu

Misook L. Chung

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Abstract

Background

Although self-care may reduce exacerbations of heart failure, reported rates of effective self-care in patients with heart failure are low. Modifiable factors, including psychosocial status, knowledge, and physical factors, are thought to influence heart failure self-care, but little is known about their combined impact on self-care.

Objectives

The objective of this study was to identify factors related to self-care behaviors in patients with heart failure.

Design

A cross-sectional, correlational study design was used.

Participants and settings

One hundred twenty-two patients (77 men and 45 women, mean age 60 ± 12 years old, 66% New York Heart Association functional class III/IV) were recruited from the outpatient clinics of an academic medical center and two community hospitals.

Methods

Data on self-care behaviors (Self-Care of Heart Failure Index), depressive symptoms, perceived control, self-care confidence, knowledge, functional status, and social support were collected. Factors related to self-care were examined using hierarchical multiple regression.

Results

Mean self-care behavior scores were less than 70 indicating the majority of men and women with HF did not consistently engage in self-care behaviors. Higher self-care confidence and perceived control and better heart failure management knowledge were associated with better self-care (r^2 = .25, p < .001). Higher perceived control and better knowledge were related to better self-care behaviors in men (r^2 = .18, p = .001), while higher self-care confidence and poorer functional status were related to better self-care behaviors in women (r^2 = .35, p < .001).

Conclusion

This study demonstrates the substantial impact of modifiable factors such as confidence in one's self-care abilities, perceived control, and knowledge on self-care behaviors. This study demonstrates that there are gender differences in factors affecting self-care, even though at baseline men and women have similar knowledge levels, physical, psychological, and behavioral status. Effective interventions focusing on modifiable factors and the unique characteristics of men and women should be provided to improve self-care behaviors in patients with heart failure.

Keywords

gender, heart failure, self-care

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Gender Differences in and Factors Related to Self-Care Behaviors: A Cross-Sectional, Correlational Study of Patients with Heart Failure

Seongkum Heo, PhD, RN [Assistant Professor],
Indiana University, School of Nursing

Debra K. Moser, DNSc, RN, FAAN [Professor and Gill Chair of Nursing],
University of Kentucky, College of Nursing

Terry A. Lennie, PhD, RN [Associate Professor],
University of Kentucky, College of Nursing

Barbara Riegel, DNSc, RN [Associate Professor], and
University of Pennsylvania, School of Nursing

Misook Chung, PhD, RN [Associate Professor]
University of Kentucky, College of Nursing

Introduction

Heart failure (HF) is a serious worldwide health problem with high rehospitalization and mortality rates (Koelling et al., 2004, Stewart et al., 2001). The one-year rehospitalization rate in patients with HF is about 50% (Johansen et al., 2003). In the United States, hospitalizations due to a primary diagnosis of HF increased from 810,624 in 1990 to 1,088,349 in 1999 (Koelling et al., 2004). The five-year survival rate after the first admission for HF in both men and women is about 25% which is worse than ovarian, prostate, breast, and bowel cancers (Stewart et al., 2001). The estimated total cost of HF care in 2007 was about 33 billion dollars in the United States and most of this cost was for hospitalizations (Rosamond et al., 2007).

Results from several studies suggest that many hospitalizations for HF may be preventable. In a study of 122,630 patients hospitalized for HF, Braunstein and colleagues (2003), estimated that 50% of admissions were potentially preventable, and 55% of preventable readmissions could be explained by exacerbation of HF symptoms. The primary causes of symptoms precipitating a hospitalization for HF were sodium retention (Bennett et al., 1998) and nonadherence to prescribed diet and medication regimens (Buckle et al., 2002, Hope et

al., 2004). Engaging in self-care behaviors such as daily monitoring of body weight and edema, eating a low sodium diet, and taking prescribed medication may prevent symptoms and decrease the number of hospital admissions in patients with HF (Vinson et al., 1990). Estimates of adherence to self-care recommendations in patients with HF range from 10% to 96% for medication taking (Evangelista et al., 2001, Monane et al., 1994) and 38% to 71% for diet (Evangelista et al., 2001, Ni et al., 1999). If we consider adherence to all components of the treatment regimens, the adherence rate is markedly poorer than that reported for studies of individual behaviors. Therefore, to increase adherence and decrease hospitalizations, it is important to determine factors that may be related to self-care behaviors that can be modified by interventions.

The relationships of modifiable factors such as psychological status, knowledge, and functional status with self-care behaviors have not been examined fully in HF. A few researchers have reported that emotions such as depression and neuroticism were related to poor self-care behaviors including diet, medication, exercise, and daily weighing (Evangelista et al., 2001, Riegel and Carlson, 2002, van der Wal et al., 2006). Others reported lower perceived control and self-efficacy were related to poorer self-care behaviors (Oka et al., 1996). Patients' knowledge about HF and self-care behaviors were related to self-care behaviors (Artinian et al., 2002, Riegel and Carlson, 2002), but the extent of the relationship between knowledge and self-care behaviors varied depending on country of study and the way knowledge and self-care behaviors were measured (Artinian et al., 2002, Ni et al., 1999, van der Wal et al., 2006). Even though patients with HF experience considerable functional impairment, the relationships between self-care and physical function have been rarely examined (Katz et al., 2005). To improve self-care, it is necessary to determine the relationships between self-care and modifiable factors.

A major non-modifiable factor that may be related to self-care behaviors is gender. Women with HF and other cardiac conditions are more likely to have psychosocial distress and need more social support than men (Davidson et al., 2003), and psychological distress and lower social support were related to poor self-care in several studies (Chriss et al., 2004, Evangelista et al., 2001, van der Wal et al., 2006). Women also have poorer physical function than men (Friedman, 2003), and dysphoria is related to poor physical function (Vaccarino et al., 2001) and to poor self-care (Chriss et al., 2004). Few investigators examined the relationship between gender and self-care behaviors in HF, and the results were not consistent (Artinian et al., 2002, Chriss et al., 2004, Rockwell and Riegel, 2001). To improve self-care effectively, correlates of self-care in men and women should be examined separately. Accordingly, the purpose of this study was to identify correlates of self-care in patients with HF and to determine whether there are gender differences in the correlates.

Methods

Design, Sample, and Setting

A cross-sectional, correlational study design was used for the current study. Patients who visited the outpatient clinics of one academic medical center and two community hospitals in a Midwestern city in the United States for their routine cardiology follow-up were

recruited by research associates based on the following inclusion criteria: 1) a primary diagnosis of HF confirmed by clinical signs and symptoms and radiographic evidence of congestive HF; 2) able to read and speak English; 3) no diagnosis of psychiatric or cognitive problems as determined by medical record review and patient interview; and 4) age 18 years and older. The sample size was calculated based on prior studies (Artinian et al., 2002, Ni et al., 1999). Considering an α of .05, power = 80%, 6 predictors, and a total expected R^2 = .25, the sample size needed was 48.

Measures

Self-Care Behaviors—Self-care behaviors were daily weighing, eating a low sodium diet, getting regular physical activity, maintaining current body weight, and getting a flu shot every year. Use of these self-care behaviors was measured using the self-care maintenance subscale of the Self-Care of Heart Failure Index (SHFI) (Riegel et al., 2004). The SHFI consists of three subscales: self-care maintenance, management, and confidence. The maintenance subscale was used to assess self-care behaviors. The management subscale was not used in this study because this subscale is appropriate only for symptomatic patients, and we included both symptomatic and asymptomatic patients. The confidence subscale was used separately to assess patients' self-confidence in their abilities to engage in self-care behaviors. The self-care maintenance scale consists of 5 items with four response options ranging from 1 to 4. The total score is calculated by adding the ratings and transforming to 100 (total rating × 5). Higher scores mean better self-care behaviors (Riegel et al., 2004). This instrument was developed for and has been used to measure self-care behaviors of patients with HF (Chriss et al., 2004, Riegel et al., 2004). Cronbach's α in the current study was acceptable (.71). Construct validity was supported in a recent study in HF using confirmatory factor analysis (Riegel et al., 2004).

Depression—Depression was measured using the Beck Depression Inventory (BDI)-II (Beck et al., 1996). The BDI-II consists of 21 items and screens severity of self-reported depressive symptoms over the past two weeks in adolescent and adults with or without psychiatric disease (Beck et al., 1996, Storch et al., 2004). Each item has four response options from 0 to 3. The total possible score ranges from 0 to 63. In the BDI-II, scores from 14 to 19 indicate possible mild depressive symptoms, scores from 20 to 28 possible moderate depressive symptoms, and scores 29 to 63 possible severe depressive symptoms (Beck et al., 1996). The internal consistency reliability of this measure in adults with psychiatric illness is good (Cronbach's α: .91) (Beck et al., 1996) and in adults without psychiatric illness (Cronbach's α: .90) (Storch et al., 2004). Content, construct, and/or criterion validity have been supported in adults with and without psychiatric illness (Beck et al., 1996, Storch et al., 2004). The Cronbach's α in the current study was .92.

Perceived Control—Perceived control was defined as patients' perception about their ability to control their heart, HF symptoms, and lives. Perceived control was measured by the Control Attitudes Scale-Revised (Moser et al., 2005). This measure consists of eight items rated on a Likert scale with 5 response options. The Control Attitudes Scale-Revised was used in patients with coronary disease, cardiac disease, and HF (Moser et al., 2005). The internal consistency measured by Cronbach's α in each group was > .70. The score is

calculated by totaling ratings of all items after reverse coding of two items. The possible range is from 8 (no perceived control) to 40 (high perceived control). Cronbach's α in the current study was .80.

Self-Care Confidence—Patients' confidence in their ability to self-manage HF symptoms was measured by the self-care confidence subscale of Self-Care of Heart Failure Index (Riegel et al., 2004). The self-care confidence subscale consists of 4 items with response options ranging from 1 to 4. The total score is calculated by adding the ratings and transforming the total to a 100 point scale (total rating X 6.25). Higher scores mean better confidence (Riegel et al., 2004). The reliability of the subscale was acceptable in the previous study (Cronbach's α = .82) (Riegel et al., 2004). The Cronbach's α in the current study was .89.

Knowledge of Heart Failure Management—Knowledge of HF management was measured by the Heart Failure Knowledge and Barriers to Adherence Scale (Chung et al., 2006). This instrument consists of 25 items: 13 items related to knowledge of HF management and 12 items related to barriers to HF management. The 13 knowledge items assess patients' knowledge about HF management such as swelling, dyspnea, cough, smoking, weighing behaviors, daily activities, eating habits, and symptom management. In the current study, the knowledge items were used to measure patients' knowledge status. The barriers subscale was not used in this study because the items are only related to dietary adherence, not to overall self-care behaviors. Patients respond to each item using a 5-point response option ranging from 1 (bad) to 5 (good). For example, patients respond to whether "fluid build-up in the body" is bad or good. Total score for patients' knowledge level is calculated by adding all ratings after reverse coding of seven of the items. Possible scores range from 13 to 65 with higher scores indicating better knowledge. This is a newly developed instrument and no prior reliability has been published. The Cronbach's α as an indicator of internal reliability in the current study was .70. The construct validity of this instrument was supported in a sample of patients with heart failure (Chung et al., 2006).

Functional Status—Functional status was measured by the Duke Activity Status Index with 12 items (Hlatky et al., 1989). This is a self-report measure that assesses functional status based on individuals' assessment of their abilities to perform specific daily activities. Each item is weighted based on the known metabolic cost of an activity in metabolic equivalent units. The possible range of this measure is from 0 (greatest functional impairment) to 58.2 (no functional impairment). The reliability of this instrument was acceptable (intraclass correlation coefficient: .95) (Arena et al., 2002). The construct and criterion-related validity of this instrument were supported (Carter et al., 2002, Hlatky et al., 1989). Cronbach's α in the current study was .82.

Social Support—Social support was defined as emotional support from others and was measured by the Multidimensional Scale of Perceived Social Support (Dahlem et al., 1991, Zimet et al., 1988, Zimet et al., 1990). This measure consists of 12 items with a 7-Likert scale, ranging 1 (very strongly disagree) to 7 (very strongly agree). Participants rated the level of emotional support received from patients' family, friends, and significant others in

their daily lives. The possible score ranges from 12 to 84 with higher scores indicating better social support. The reliability was supported (Cronbach's α: greater than .90) (Dahlem et al., 1991), and the construct validity was supported by confirmed substructures in factor analysis and relation to depression (Dahlem et al., 1991). In the current study, Cronbach's alpha was .95.

Other variables of interest.—Other demographic (age, educational level, marital status, and ethnicity) and clinical characteristics (New York Heart Association [NYHA] functional class, and Charlson Comorbidity Index score) were collected by the Demographic and Clinical questionnaires, medical record reviews, and patient interviews. The NYHA functional classification was developed to evaluate the effect of cardiac symptoms on daily activities of a cardiac patient (Bennett et al., 2002). It consists of 4 classes ranging from NYHA I (no symptoms that have an impact on ordinary daily activities) to IV (symptoms occur even at rest). The NYHA functional class was determined by in-depth interviews with patients using a standardized instrument (clinical characteristics questionnaire) by investigators or the trained nurse research associates. The Charlson Comorbidity Index was developed to assess the number and the seriousness of comorbid conditions that may impact the risk of mortality (Charlson et al., 1987).

Procedure

Institutional review board approval was obtained. Eligible patients were identified by referral from clinicians at the institutions. Eligibility was confirmed through medical record review by the research associates. Written, informed consent was obtained from all participants by investigators or the nurse research associates. Baseline data including demographic and clinical characteristics, self-care, and psychological, knowledge, and functional status were collected by investigators or the nurse research associates using questionnaires, medical record reviews, and patient interviews at patients' homes, the clinics, or the general clinical research center of a university-affiliated hospital. All data were collected between 2004 and 2006.

Data analysis

Descriptive data such as means, standard deviations, and percentages were used to describe demographic and clinical characteristics of the sample. Chi-square test for nominal variables, Mann-Whitney U for ordinal variables, and independent t-test for interval variables were used to test gender differences in demographic and clinical characteristics and psychological, knowledge, functional, self-care, and social support status. Separate models were constructed for the total sample, men and women. Hierarchical multiple regression analysis was used to identify factors related to self-care behaviors in the total sample, in men, and in women. Depression, perceived control, self-care confidence, knowledge, functional status, and social support were included in the first block in each analysis to determine the impact of these modifiable factors on self-care behaviors, followed in the second block by age, which was entered to control this non-modifiable confounding factor. For multivariate analysis, significance was set at $p \leq .05$.

Results

Characteristics of Sample

Seventy-seven men and forty-five women with HF were included in the analyses. A comparison of demographic and clinical characteristics of the sample by gender is shown in Table 1. The sample was primarily Caucasian, however there were more minority women than men. More men were married than women. There were no gender differences in the age, educational level, HF etiology, New York Heart Association functional class, and comorbidity status.

Self-care behaviors, depressive symptoms, perceived control, self-care confidence, knowledge of HF management, functional status, and social support are presented in Table 2. In both men and women, self-care behavior scores were less than 70% of the standardized score, indicating the majority of men and women with HF did not consistently engage in self-care behaviors. Men had better functional status than women, but there were no other gender differences.

Correlates of Self-Care Behaviors

Correlates of self-care behaviors are presented in Table 3. In multiple regression analyses, depressive symptoms, perceived control, self-care confidence, knowledge, functional status, and social support were entered in the analysis in the first step. Higher self-care confidence, better perceived control over HF and symptom management, and knowledge of how to manage HF were related to better self-care behaviors ($F[3, 116] = 13.16$, $R^2 = .25$, $p = < .001$). When age was entered in the model in the second step, self-care confidence, perceived control, and knowledge remained significantly related to self-care behaviors, and older age was also related to better self-care behaviors ($F[4, 115] = 12.85$, $R^2 = .31$, $p = < .001$). Depressive symptoms, social support, and functional status were not significantly related to self-care behaviors.

Gender Difference in Correlates of Self-Care Behaviors

Correlates of self-care behaviors in men and women are presented in Table 4. In multiple regression analyses, better perceived control and HF management knowledge were related to better self-care behaviors in men ($F[2, 73] = 7.90$, $R^2 = .18$, $p = .001$). When age was entered in the second step, perceived control and HF management knowledge remained significantly related to self-care behaviors, and older age was also related to better self-care behaviors in men ($F[3, 72] = 8.36$, $R^2 = .26$, $p = < .001$). Higher self-care confidence and poor functional status were related to better self-care behaviors in women ($F[2,41] = 10.82$, $R^2 = .35$, $p < .001$). Age was not related to self-care behaviors in women. Depressive symptoms and social support were not related to either men or women's self-care behaviors.

Discussion

The results of this study provide insights into self-care behaviors in patients with HF. First, patients with HF did not fully engage in self-care behaviors such as daily weighing, eating a low sodium diet, getting regular physical activity, maintaining current body weight, and

getting a flu shot every year. Second, important modifiable factors including self-care confidence, perceived control, and HF management knowledge were identified that may contribute to improvement in self -care behaviors. Third, different factors affected men and women's self-care behaviors despite their similarity in baseline psychosocial status and knowledge level. These insights provide important information for developing effective interventions to improve self-care behaviors in men and women with HF.

These factors identified are important targets for intervention. Further studies are needed to examine additional factors affecting self-care behaviors in men and women with HF. Symptom burden, and perceived benefits and barriers to conducting self-care behaviors may impact self-care behaviors in patients with HF (Evangelista et al., 2003, Rockwell and Riegel, 2001, van der Wal et al., 2006). The Chronic Care Model is a source of information about other factors the may affect self-care and that should be studied. These factors include decision support and health care system organization (Glasgow et al., 2002).

In the current study, both men and women failed to engage in self-care. The mean standardized scores for self-care behaviors in men and women were slightly lower than previous studies of patients with HF (Chriss et al., 2004, Riegel et al., 2004). The scores were between 50 (the score that would be seen if a patient perform all five self-care behaviors sometimes) and 75 (patients perform all five self-care behaviors frequently). Ideally, patients with HF should engage in these self-care behaviors all the time. Non-adherence to self-care behaviors is related to worsening HF symptoms, poor quality of life, and high rehospitalization and mortality rates (Bennett et al., 1998, Ghali et al., 1988, Vinson et al., 1990). Therefore, it is important for patients with HF to consistently engage in these basic self-care behaviors. Interventions targeting modifiable factors should be developed and implemented to improve self-care behaviors and subsequently, patient outcomes.

The modifiable factors related to self-care behaviors were self-care confidence, perceived control, and HF management knowledge. Self-care confidence was the strongest factor affecting self-care behaviors. The impact of self-care confidence on self-care behaviors has not been examined fully in HF previously. In a few studies of HF patients, higher self-efficacy for general activities was related to higher activity levels (Oka et al., 1996). Lower perceived self-efficacy was related to poor self-care behaviors such as adherence to medication as prescribed and dietary recommendations (Ni et al., 1999). The impact of interventions on self-care confidence is not clear. Patients' self-care confidence was not significantly improved by provision of a comprehensive education program (Hershberger et al., 2001). However, peer support provided by trained peers with HF improved patients' self-confidence at 90 days (Riegel and Carlson, 2004). Patient mentors were trained by a cardiovascular clinical nurse specialist about the mentoring role and self-care in HF, and the mentors supported their mentees in following the treatment regimen (Riegel and Carlson, 2004). In another study, a comprehensive intervention focusing on lifestyle changes and social support (a seven day retreat) had a positive effect on self-efficacy in women with coronary heart disease (Toobert et al., 1998). The commonality in the latter two studies is use of social support to improve self-care confidence or self-efficacy. Further studies are

needed to develop effective interventions for improving self-care confidence and to examine the role of social support on improving self-care confidence.

The impact of perceived control on self-care behaviors has also not been examined fully in HF. In the current study, patients' perception of their ability to control their clinical condition, symptoms, and their lives was an important factor in the performance of self-care. In one study of patients with hypertension (Patel and Taylor, 2002), better perceived control was related to better medication adherence. Therefore, effective interventions to improve perceived control should be provided to improve self-care behaviors in HF. Perceived control over pain was improved after interventions focused on pain and stress management skills and/or relaxation in patients with cancer (Yates et al., 2004). Interventions focusing on perceived control to improve self-care behaviors or health-related quality of life have not been tested in HF.

Knowledge is a factor affecting the performance of self-care behaviors in patients with HF. In qualitative studies, patients reported that knowledge about their clinical condition and the management was important to their self-care behaviors (Riegel and Carlson, 2002). In quantitative studies, knowledge of HF and self-care also were related to self-care behaviors (Artinian et al., 2002, Ni et al., 1999, van der Wal et al., 2006). Knowledge score was strongly (odds ratio: 5.6) (van der Wal et al., 2006) or mildly related to self-care (Artinian et al., 2002, Ni et al., 1999). These studies demonstrate the impact of knowledge on self-care behaviors in patients with HF. Knowledge about HF and its symptoms and self-care in patients with HF can be improved by nurse-guided (Gonzalez et al., 2005) or collaborative team interventions (Baker et al., 2005).

The findings of studies regarding the impact of age on self-care behaviors in HF are not consistent. In some studies, age was not related to self-care behaviors such as symptom management or medication adherence (Michalsen et al., 1998, Rockwell and Riegel, 2001). In some studies, age was associated with only some of the self-care behaviors measured (Artinian et al., 2002, Evangelista et al., 2003). For example, Artinian et al. (2002) found that age was related to medication adherence, but not related to diet adherence and symptom management.In another study (Chriss et al., 2004), age was related to overall self-care behaviors in HF. In the current study, even though men and women had similar mean age, older age was related to better self-care behaviors in men, but not in women. The relationship of age and gender with self-care behaviors has not been examined fully in patients with HF. Thus further studies are needed to examine the impact of age and gender on each self-care behavior in patients with HF.

Factors affecting men and women's self-care behaviors were different in the current study. In men, perceived control and knowledge were important factors affecting their self-care behaviors, while self-care confidence and functional status were important factors affecting women's self-care behaviors. It is interesting that impaired functional status facilitated only women's self-care behaviors. The majority of patients with HF experience limitations in their ability to engage in daily activities owing to physical and emotional symptoms (Heo et al., 2006). In our and a prior study (Friedman, 2003), women's functional status was poorer than men's. These results imply that women with better functional status do not engage in

self-care behaviors to the same extent as women with poor functional status. To provide effective interventions to improve self-care behaviors in patients with HF, men and women's unique situation should be considered.

Limitations

There are a number of limitations that must be considered in examining the results of this study. No inferences about causal relationships can be made because of the cross-sectional design used. Future studies should employ longitudinal, predictive designs and ultimately, intervention studies that target the correlates of self-care behaviors found in this study will allow inference about causality. Another limitation is that data on self-care behaviors were collected using self-report questionnaires that may not reflect patients' actual self-care behaviors. Self-reported adherence rates may over or underestimate adherence rates (Straka et al., 1997). If adherence was not accurately reflected in this study, the consequence would be inaccurate identification of correlates of self-care.

In addition, caution should be used in generalizing the results of the current study to patients whose native language is not English, and those with psychiatric or cognitive problems because we excluded these subgroups of patients. In these subgroups, factors affecting self-care behaviors in men and women may be different from those reported in this study. Regardless, the results provide important information for clinicians caring for a majority of patients with heart failure.

Another limitation is the wide range seen in our patient sample in time since diagnosis of heart failure. One might speculate that self-care abilities might be quite different in patients with a new compared to an older diagnosis. Because patients had difficulty recalling (and clinicians had difficulty tracking) the time of diagnosis, concerns about the reliability of this variable kept us from including it in analyses. If this variable was included in the analyses, factors affecting self-care behaviors might be different from factors presented in the current study.

Conclusion

Important conclusions from the data reported in this study are that patients' self-care behaviors were poor, but several modifiable factors affecting patients' self-care behaviors were identified that can be targeted. The results suggest however, that different factors need to be targeted for men and women to improve self-care behaviors, even though their psychological status, knowledge level, and self-care behaviors were similar. Researchers and clinicians who work with patients with HF should assess patients' self-care status and provide interventions focusing on modifiable factors that include unique characteristics of men and women.

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Table 1

Demographic and Clinical Characteristics by Gender (N = 122)

Characteristics	Range (Total)	Men (N = 77) Mean (± SD) or n (%)	Women (N = 45) Mean (± SD) or n (%)	Total (N = 122) Mean (± SD) or n (%)	p value*
Mean age (years)	24 - 85	59.7 (± 12.1)	61.2 (± 12.0)	60.3 (± 12.0)	.507
Education level (years)	0 - 21	12.5 (± 3.9)	12.9 (± 3.4)	12.6 (± 3.7)	.516
Marital status (married)		48 (62.3)	18 (40.0)	66 (54.1)	.017
Ethnicity (Caucasian)		71 (92.2)	35 (77.8)	106 (86.9)	.023
Etiology (ischemic)		48 (62.3)	20 (44.4)	68 (55.7)	.064
NYHA: Class I		5 (6.5)	1 (2.2)	6 (4.9)	.371
Class II		21 (27.3)	14 (31.1)	35 (28.7)	
Class III		34 (44.2)	15 (33.3)	49 (40.2)	
Class IV		17 (22.1)	15 (33.3)	32 (26.2)	
Charlson Comorbidity Index score	1 - 9	3.6 (± 1.9)	3.6 (± 1.8)	3.6 (± 1.9)	.809
Time from diagnosis with HF (years)	.4 - 17.8	5.9 (± 4.3)	6.3 (± 4.4)	6.0 (± 4.4)	.644

Notes. HF = heart failure. NYHA = New York Heart Association functional class. SD = standard deviation.

*comparison between men and women.

Table 2

Self-Care Behaviors, Depression, Perceived Control, Self-Care Confidence, Knowledge of Heart Failure Management, Functional Status, and Social Support Compared by Gender

Scale	Possible range	Mean (± SD)			p value*
		Men	Women	Total	
Self-care behaviors (SCHFI)	25 – 100	62.5 (± 17.9)	61.8 (± 20.9)	62.3 (± 19.0)	.841
Depression (BDI)	0 – 63	11.8 (± 9.2)	13.0 (± 10.3)	12.2 (± 9.6)	.508
Perceived control (CAS-Revised)	8 – 40	28.6 (± 5.4)	28.5 (± 5.6)	28.6 (± 5.4)	.909
Self-care confidence (SCHFI)	25 – 100	69.6 (± 18.5)	68.3 (± 16.6)	69.2 (± 17.8)	.697
Knowledge (HFKBAS)	13 – 65	57.7 (± 5.6)	57.7 (± 6.4)	57.7 (± 5.9)	.988
Functional status (DASI)	0 – 58.2	14.5 (± 12.7)	10.2 (± 10.3)	12.9 (± 12.0)	.045
Social support (PSS)	12 - 84	64.7 (± 20.1)	63.7 (± 20.1)	64.3 (± 20.3)	.786

Notes. BDI = the Beck Depression Inventory II. CAS-Revised = the Control Attitudes Scale-Revised. DASI = the Duke Activity Status Index. HFKBAS = the Heart Failure Knowledge and Barriers to Adherence Scale. PSS = the Multidimensional Scale of Perceived Social Support. SCHFI = the Self-Care of Heart Failure Index.

*comparison between men and women.

Table 3

Multiple Regression Analysis: Correlates of Self-Care Behaviors in Total Sample

	Variables	Unstandardized Beta	Standardized Beta	Unique R^2	Accumulated R^2	F	P value
Step 1							
Total Sample	Self-care confidence (SCHFI)	.28	.27*	.15	.15	13.16	< .001
	Perceived control (CAS-Revised)	.81	.23*	.06	.21		
	Knowledge (HFKBAS)	.72	.22*	.04	.25		
Step 2							
Total Sample	Self-care confidence (SCHFI)	.29	.27*	.15	.15	12.85	< .001
	Perceived control (CAS-Revised)	.58	.17*	.06	.21		
	Knowledge (HFKBAS)	.78	.24*	.04	.25		
	Age (Demographic questionnaire)	.38	.24*	.06	.31		

Notes. CAS-Revised = the Control Attitudes Scale-Revised. DASI = the Duke Activity Status Index. HFKBAS = the Heart Failure Knowledge and Barriers to Adherence Scale. SCHFI = the Self-Care of Heart Failure Index.

† $p < .001$.

* $p < .05$.

Table 4

Multiple Regression Analysis: Correlates of Self-Care Behaviors by Gender

	Variables	Unstandardized Beta	Standardized Beta	Unique R^2	Accumulated R^2	F	P value
Men	Perceived control (CAS-Revised)	.99	.29*	.13	.13	8.15	.001
	Knowledge (HFKBAS)	.75	.24*	.05	.18		
	Perceived control (CAS-Revised)	.76	.22*	.13	.13	8.36	< .001
	Knowledge (HFKBAS)	.85	.27*	.05	.18		
	Age	42	.28*	.08	.26		
Women	Self-care confidence (SCHFI)	.72	.58†	.27	.27	10.82	< .001
	Functional status (DSAI)	−.58	−.29*	.08	.35		

Notes. In men, the first model presents factors affecting self-care behaviors when depressive symptoms, perceived control, self-care confidence, knowledge status, functional status, and social support were entered at once in the multiple regression analysis. The second model represents variables affecting self-care behaviors when age was added in the first model. In women, there was no impact of age on self-care behaviors. CAS-Revised = the Control Attitudes Scale-Revised. DASI = the Duke Activity Status Index. HFKBAS = the Heart Failure Knowledge and Barriers to Adherence Scale. SCHFI = the Self-Care of Heart Failure Index.

*p < .05.

†p < .001