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## Social Support and Self-Care of Patients with Heart Failure

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# Social Support and Self-Care of Patients with Heart Failure

## Abstract

### Background

Social support can influence treatment adherence of patients with chronic illnesses, which may explain the positive effects of social support on heart failure (HF) outcomes.

### Purpose

To investigate the effects of social support among patients with HF, we examined whether aspects of social support were associated with self-care, including medication adherence, dietary adherence, and HF symptom monitoring functions.

### Methods

We recruited 74 patients with HF from cardiology clinics of a Veterans Affairs Medical Center and a university-affiliated hospital, and tested the relationships between social support and the patients' self-care.

### Results

Consistent with previous research in older adults, family members, especially spouses, were often involved in the medical care of patients with chronic HF and provided a range of levels of support to patients. Self-care was generally poor, as measured across several self-care domains. Perceived social support was moderately associated with relatively better self-reported medication and dietary adherence, and other aspects of self-care such as daily weighing.

### Conclusions

These findings suggest that a relatively higher level of self-care is an important correlate of social support and may explain how social support influences HF outcomes. This study also suggests that family members should play a greater part in clinical care focused on improving self-care.

## Keywords

heart failure, social support, self-care

## Disciplines

Behavioral Medicine | Cardiology | Cardiovascular Diseases | Circulatory and Respiratory Physiology | Medical Humanities | Medicine and Health Sciences | Nursing | Preventive Medicine

Social support and self-care of patients with heart failure

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## Abstract

**Background:** Social support can influence treatment adherence of patients with chronic illnesses, which may explain the positive effects of social support on heart failure (HF) outcomes. **Purpose:** To investigate the effects of social support among patients with HF, we examined whether aspects of social support were associated with self-care, including medication adherence, dietary adherence and HF symptom monitoring functions. **Methods:** We recruited 74 patients with HF from cardiology clinics of a Veterans Affairs Medical Center and a University-affiliated hospital, and tested the relationships between social support and the patients' self-care. **Results:** Consistent with previous research in older adults, family members, especially spouses, were often involved in the medical care of patients with chronic HF and provided a range of levels of support to patients. Self-care was generally poor, as measured across several self-care domains. Perceived social support was moderately associated with relatively better self-reported medication and dietary adherence, and other aspects of self-care such as daily weighing. **Conclusions:** These findings suggest that a relatively higher level of self-care is an important correlate of social support and may explain how social support influences HF outcomes. This study also suggests that family members should play a greater part in clinical care focused on improving self-care.

### Social support and self-care of patients with heart failure

Chronic heart failure (HF) is a highly prevalent clinical syndrome affecting over 5 million Americans (1). Furthermore, this figure will likely increase over the next several decades due to changing demographics in the US (2). Chronic HF results in significant functional impairment, a high degree of medical burden on the patient and his or her family members, and a 1-year risk of mortality of 20%(1). Close to half of patients are rehospitalized within 3-6 months of discharge of a hospitalization for HF (3-5). Despite medical advances(6) and the evidence that hospital-based heart failure management programs can improve patients' self-care,(7) the risk of rehospitalization due to clinical exacerbations remains high.

The goal of the current study is to examine the potential for social support to exert its effect on outcomes through a positive, direct impact on self-care. There is mounting evidence that positive social support is associated with fewer hospitalizations and decreased risk of mortality due to HF (8-12), and evidence among the broader range of chronically ill patients that social support is associated with better treatment adherence(13). Supportive others have the potential to encourage better self-care, including adherence to medications and special diets (14, 15).

Self-care of patients with HF is conceptualized as a cognitive and behavioral process aimed at maintaining hemodynamic stability and managing symptoms when they occur (16). It involves regular maintenance tasks such as being adherent to multiple medications, engaging in moderate physical activity, and following a sodium-restricted diet, as well as monitoring and responding to water retention-related weight gain, dyspnea and edema (17). Another important component is the decision-making process around managing increased symptoms, in addition to patient's understanding about when to seek out additional care from providers. Also, patients' confidence about their self-care may be a key determinant in their actual performance of these behaviors. This self-care regimen is complex, time-consuming, burdensome, and difficult to

follow and likely leads to poorer HF outcomes. Medication nonadherence (18-20) and poor adherence to a low-sodium diet (19, 20) lead to clinical exacerbation and rehospitalization in up to 64% of cases. As many as 40% of patients do not recognize the need for daily weighing and one-quarter weigh fewer than 3 times a month (21). Social support could have an impact on self-care through practical assistance (22) or direct attempts of family members to influence health behaviors (23, 24).

Structural support, or the availability of support through one's social circumstances or social network, has been associated with more positive health behavior and health outcomes in general medical populations (24) and in cardiovascular populations (8, 9). Previous research suggests that spouses are most commonly involved in the medical care of older general outpatients, compared to adult children or friends, especially in performing such functions as reminding patients to take medications (25). It appears that men, in particular, are the recipients of direct attempts from their wives to influence their self-care behavior (24). Married patients, and those living with other close family members appear most likely to have support that would influence self-care, although this has not been specifically examined in patients with HF.

It is possible that structural support through being married or living with others is not sufficient to affect self-care. Functional support, or the degree to which one perceives that others are emotionally and/or practically supportive, may be an essential factor. DiMatteo (13) reported in a comprehensive review that structural aspects of social support (e.g., marital status) were less robustly associated with better medication adherence for those with chronic illness than perceived support and relative absence of family conflict. In one of the few studies linking social support to adherence specifically in patients with HF, however, Simpson (26) found that patients who reported that having a network of friends and family members to support them reported fewer self-reported barriers to taking medication for HF.

Within the general category of functional support, there is some question as to whether emotional vs. instrumental support has the greatest impact on self-care in persons with HF.

None of the existing research examines this question directly. Luttik and colleagues (10) found that most of the existing studies of patients with HF suggested that social support had a positive impact on the risk of hospitalization as well as mortality, and those that examined both instrumental and emotional support suggested that both were relevant. One well-conducted prospective study of patients with chronic HF suggested that changes in both emotional and instrumental support may have an impact on the functioning of HF patients over time (27).

Black or African American race is an important potential moderator of social support discussed in the literature in the past three decades. The consensus among researchers has been that Black individuals benefit from higher levels of social support due to greater kinship ties compared to White individuals.(28, 29) The empirical findings, however, are mixed regarding the relatively greater availability and satisfaction of social support within Black families (29-32) or friends (33, 34). Also, much of the existing research is not specifically applicable to our population of older, chronically ill adults. In addition, existing research suggests that other factors, such as source of the support (33, 35), living situation/marital status, social class (36), are all important to consider when examining social support.

Drawing from existing research (25), we hypothesized that those who were married and those living with others had greater structural support as indicated by involvement in various aspects of the patients' care (e.g., reminders to take medication, going to appointments, making medical decisions). In addition, we hypothesized that spouses or intimate partners, compared to adult children or others, were more involved in the patients' medical care. We also hypothesized that those who were married and those living with others perceived greater levels of social support (i.e., functional support) than those who were not married or were living alone. We tested whether Black vs. White race moderated the perceived levels of support within these categories.

We hypothesized that patients with relatively high levels of social support from friends, a significant other, and other family members would report higher levels of self-care. Consistent

with the existing literature (13), we hypothesized that functional and structural support were associated with self-care in simultaneous models predicting self-care. Absent a clear indication from the literature, we anticipated that both emotional and instrumental functional support were associated with higher levels of self-care.

## Methods

### Participants

Patients with a diagnosis of heart failure were recruited from the cardiology clinic of the Philadelphia Veterans Affairs Medical Center (PVAMC) and a University-affiliated cardiology practice for a study of psychosocial factors in HF functioning. Potential participants were identified as part of a screening process for recruitment into the study and the cardiology provider confirmed the diagnosis of HF and referred the patient for recruitment by study staff. All patients had structural heart disease and past or current symptoms of HF as indicated by any of the following: 1) impaired left ventricle ejection fraction (LVEF) by echocardiogram, 2) diastolic dysfunction as evidenced by diminished compliance of the left ventricle by echocardiogram, or 3) other heart disease documented as responsible for chronic HF.

Exclusion criteria for recruitment were: 1) cognitive impairment, based on a Blessed Test of Orientation, Memory, and Concentration (37) score of greater than 16, and 2) impaired vision or hearing, as documented in the medical record or by observation, such that neither an interview nor completing written forms was possible.

Of the 214 patients meeting the criteria for the study and subsequently approved by the provider, 140 (65.4%) agreed to be scheduled for an initial visit, 52 (24.3%) refused participation, and we were unable to contact 21 (9.8%) patients. Of the 140 who initially agreed to the study interview, 4 (2.9%) were excluded at the initial interview, 20 (14.3%) withdrew before starting or completing the interview. Forty-two patients (30%) interviewed did not complete the Self-care of HF Index (SCHFI), which was central to the current study, because it was added to the protocol after



the onset of recruitment. A total of 74 patients (52.9%) completed the forms relevant to the current study

There were no differences between those who were interviewed vs. those who were not interviewed (i.e., those we were unable to contact, who had refused, or who were excluded at the interview) on basic clinical and demographic characteristics. We conducted a series of *t*-test comparisons using the clinical information obtained during the screen of the electronic medical record on behalf of providers. We found no significant differences in age, number of comorbid conditions (see below), and minimum LVEF (of those values in the clinical record) between those interviewed and those who were not interviewed (all *p*'s > .05). We conducted a similar examination of those interviewed vs. not interviewed concerning whether they were more functionally compromised, as indicated by NYHA Functional Class II or greater. The results of a 2 (interviewed/not interviewed) X 2 (functionally compromised/not compromised) chi-square test was not statistically significant, *p* > .05. Not all participants had NYHA Functional Class recorded on their clinical record. There were no demographic or clinical differences between the patients with (*N* = 53) vs. without (*N* = 21) complete data on NYHA functional class (all *p*'s > .05). Similar tests between those who completed research interviews prior to the addition of the SCHFI to the protocol vs. those with interviews that included the SCHFI, also revealed no differences on clinical or demographic variables.

All of the analyses in the current study focus on the 74 patients with complete data on the SCHFI. Six of the patients whose data were used for the current study were recruited from the university-based clinic (2 were female), and the other 68 were recruited from the VA site. Among the demographic and clinical differences examined (see above), the patients from two sites differed only on minimum LVEF: university-based—*M* = 22.3% (*SD* = 5.2), VA—*M* = 31.8% (*SD* = 16.6); *t*(17.3) = -3.23, *p* < .05. The other tests of site on demographic factors were not significant (all *p*'s > .05). The relative proportions of nonwhite participants at the university-based site was 66.7% compared to 58.8% in the VA site and was not significantly different, by chi-square test, *p* > .05.

Most of the 74 patients were 60 years of age or older, male, and Black (Table 1), with less than 5% of participants representing other nonwhite ethnicities. As shown in Table 1, the patients reported relatively low levels of education, income, with significant cardiac morbidity as well as medical comorbidity.

Overall, patients' levels of self-care were demonstrably low. Approximately 65% acknowledged at least one type of medication nonadherence during the last month (e.g., not taking medication because of forgetting) on the Morisky medication nonadherence measure (38) (see below). Most of the patients (79.7%) reported having eaten at least 1 high salt food in the past week on the Eating Behavior Questionnaire (see below).

### Measures

Demographic and clinical characteristics. Chart review and semi-structured interview were used to obtain information on age, race, marital status, number of persons in the household, education, income, etiology of HF, minimum LVEF value, NYHA functional class, and an unweighted index of the number of comorbid medical conditions (39).

Blessed test of Orientation, Memory, and Concentration. (37) The Blessed test is a brief screening measure of cognitive impairment with demonstrated reliability(37) and validity when compared to the Mini Mental Status Exam(40). The measure is easily administered and discriminates between mild, moderate and severely impaired patients (37). A cut-off of 16 was used in order to screen out those who would not be able to provide informed consent, while at the same time not eliminating patients with only mild impairment, which is common among patients with chronic HF (41).

Family Involvement. We used the Medical Care Questionnaire (MCQ) (25) to assess the degree to which family members and/or friends were involved in patients' overall medical and self-care decisions. The MCQ provided a more refined estimate than marital status or living situation of the availability of structural support for patients' medical care. A stem question on the MCQ asks the patient to indicate whether family members had regular involvement in

patients' care in each of the following five ways: "schedule doctor's appointments," "go with you to doctors' appointments," "pick up prescriptions," "help you to remember to take medication," and "participate in making decisions about medical care." Patients could also offer friends as the source of involvement in, and support of, their medical care.

We examined the MCQ in two ways. We created an index from the responses to indicate the degree of family and other involvement in patients' care. For each item, a positive response was worth 1 point (i.e., a "yes" = 1 for involvement by any family member for each question). The value of the index for each patient was the sum of positive responses to these questions, and ranged from 0 (no involvement) to 5 (involvement of family/others in all areas). In addition, we examined the percentages of spouses indicating the involvement of spouses/partners, sons/daughters, and other family members or friends in the patient's care in each of the ways listed above. Creation of these three categories was based on frequency and previous studies. (25) When respondents named more than one type of relation in each area of involvement (e.g., the spouse and a daughter took the patient to medical appointments), the first listed response was taken as the primary response for these analyses.

Existing data on the psychometric properties of the MCQ suggest that patients can respond reliably to the questions. (25) The test-retest coefficient of the overall degree of family involvement from the current study, using the Spearman rank-order correlation, was  $r = .63$ ,  $p < .0001$ ,  $n = 63$ . Using a broader sample of patients with HF interviewed at the Philadelphia VAMC and University based clinics, the total number of areas of family involvement was positively correlated with an index of total support from the Multidimensional Scale of Perceived Social Support (see below),  $r = .25$ ,  $p < .01$ ,  $N = 114$ .

Multidimensional Scale of Perceived Social Support (MSPSS) (42-44). The MSPSS separates the possible sources of social support into Friends, Family, and Significant Other subscales and has received good empirical support for its reliability and validity (43, 44). The Significant Other subscale assesses the support from a "special person in my life" as opposed

to necessarily referring to a romantic/marital partner as the provider of support. Thus, it is suitable for use in a sample of patients mixed with regard to marital status. The test-retest coefficients in the current sample were adequate: Friends,  $r = .74$ ,  $p < .0001$ , Significant Other,  $r = .88$ ,  $p < .0001$ , and Family,  $r = .69$ ,  $p < .0001$ , all  $N$ 's = 63.

The items of the MSPSS represent various types of support, thus we were able to create Emotional and Instrumental Support subscales (item list available from the first author upon request). The internal consistency coefficients of the Emotional and Instrumental Support subscales were as follows: Cronbach's alpha = 0.87, and alpha = 0.73, respectively (both  $p$ 's < .001,  $N = 64$ ). The test-retest coefficients of the Emotional and Instrumental Support subscales were as follows: and  $r = .85$  and  $r = .73$ , respectively ( $p$ 's < .0001,  $N$ 's = 63).

The three original subscales of the MSPSS measure (e.g., Friends, Family, and Significant Other) were moderately highly intercorrelated ( $.39 < r$ 's <  $.56$ , all  $p$ 's < .001,  $N$ 's = 74), and the Emotional and Instrumental subscales of the MSPSS were highly intercorrelated ( $r = .82$ ,  $p < .001$ ,  $N = 74$ ). The Emotional and Instrumental subscales of the MSPSS share items with the Friends, Significant Other, and Family subscales and so their respective intercorrelation coefficients are not presented.

Self-care of Heart Failure Index. The Self-care of Heart Failure Index (SCHFI) (16, 45) is based on research in naturalistic decision-making theory (46), that addresses decision-making in real-world settings. It captures the following components of self-care (a) maintenance or adherence behaviors that prevent an acute exacerbation of HF (e.g., eating a low salt diet) (b) the patient's ability to recognize symptoms when they occur; (c) independent and interdependent self-care treatments implemented by the patient (e.g., taking an extra diuretic for edema or shortness of breath); (d) ability to evaluate the effectiveness of the treatments implemented; and (e) confidence in the perceived ability to engage in each phase of self-care. The SCHFI contains 15 items measured on a four-point Likert-type scale. Three subscales measure self-care Maintenance (a. above), self-care Management or decision-making in

response to symptoms (b. through d. above), and self-care Confidence. Scores on each subscale are standardized to range from 0-100 for greater interpretability. Higher scores indicate better self-care.

The SCHFI is a well-validated and reliable measure of self-care developed specifically for the HF population. Coefficient alpha for SCHFI is .77, and the construct validity has been demonstrated through a satisfactory fit of three factors corresponding to the subscales on a confirmatory factor analysis in a sample of 760 HF patients (45). Construct validity was further supported by significant differences between patients experienced with HF and those newly diagnosed with the syndrome, consistent with underlying theory that experience with symptoms is necessary in order to develop adequate decision-making in self-care activities (45, 46). The scales are moderately intercorrelated in the current sample,  $.17 < r's < .43$ .

Medication Nonadherence (38). This is a 4-item measure of self-reported reasons for medication nonadherence, including forgetting, being careless, improved subjective health, and worsened subjective health. It has adequate internal consistency, and demonstrates adequate concurrent and predictive validity for blood pressure control at 2 and 5 year follow-up (38). The test-retest reliability was  $r = .53$ ,  $p < .0001$ ,  $N = 64$  in the current study.

Eating Behavior Questionnaire (EBQ) (47). The EBQ is a brief self-report questionnaire that measures adherence to a low sodium diet for patients with HF. The original 22 items were designed to tap food preparation and eating behavior, beliefs about food and fluid intake for patients with HF, and knowledge of low sodium diets. Response options range from "Strongly Agree" to "Strongly Disagree" along a 5 point scale (-2 to +2). Illustrative items include: "Canned soups are healthy for me" and "For health reasons I kept track of what I ate and how much I ate for most days in the past week." An 11-item yes/no checklist of high sodium food items the respondent indicates he or she has eaten in the past week (e.g., "2 slices of pizza"). Some of the items not used in computing the final score were designed to disguise the intent of the measure by providing content irrelevant to HF (e.g., "I have added sugar to foods"). Item

analysis of internal consistency and item-to-total correlations of the full complement of items in an initial test of the measure yielded a version with 9 items and 4 yes/no items in the food list. The food list items, each scored as 1 or 0 (yes = 1, no = 0), were summed and centered to form a single item ranging from -2 to +2 consistent with the other attitudinal and behavioral items.

A principal axis factor analysis of responses by HF patients (N = 84) on the 10 item measure extracted 3 factors that accounted for 60%, 24%, and 16% of the variance. The measure was tested in the current sample and was found to have adequate internal consistency,  $\alpha = .69$ . Both findings support a single underlying dimensionality of the measure. The total score was approximately normally distributed, with higher scores indicating greater adherence to a low sodium diet. The EBQ total score was correlated with SCHFI Maintenance subscale,  $r = .58$ ,  $p < .001$ , N = 73, and inversely correlated with mean sodium intake assessed by 24-hour recall,  $r = -.25$ ,  $p < .05$ , N = 47 (47).

#### Procedures

Recruitment and assessment. Patients who potentially met criteria for inclusion in the study were referred to study staff following a clinical visit with their provider, given a full description of the study and invited to participate. Written consent was obtained either at this initial meeting or at the assessment interview. Participants were paid \$15 for the completion of this interview. Follow-up interviews focused on test-retest of the MSPSS, MCQ, and medication nonadherence, and other measures not examined for the current report. Subjects who participated in the second interviews were paid \$10.

Data analysis. We conducted tests of group comparisons by marital status and living situation (e.g., married, unmarried/not living alone, and living alone) of total level of family involvement from the MCQ and social support from the MSPSS using omnibus ANOVA tests of the model for each variable. Demographic and clinical covariates, including number of medical comorbidities, age, years of education, income in dollars, and race (dummy variable Black =1, White = 0) were also included in the omnibus test of the model. Covariates that were not

significant were removed from subsequent tests prior to testing the effects of interest, and the tests conducted for individual effects in the context of the reduced model were reported. We also examined the interaction between the demographic covariates of race and marital status/living situation prior to testing the main effects. Tukey's studentized range (HSD) tests were used to follow-up significant model tests, which control for Type I experimentwise error rate. We did not examine gender differences due to the small number of female participants in the current sample.

We used 2 X 3 chi-square analyses to examine differences in proportions of patients who reported (yes/no) that spouses/partners, sons/daughters, or other family/friends were involved in their care in the areas on the MCQ as described above.

We tested the association of structural and functional social support to self-care in a series of planned multivariate regression models. Effects were entered in a hierarchical fashion. Order effects were examined in the hierarchical regression analysis by entering the structural support variable prior to functional support variables and vice versa. Because of the items that were shared in the MSPSS subscales indicating the source of support (i.e., Family, Significant others, and Friends) and types of support (i.e., Emotional and Instrumental), we tested these groups of MSPSS variables in separate blocks of variables (i.e., testing them in the same block would artificially inflate multicollinearity). The self-care variables from the SCHFI, the EBQ total score, and the Morisky nonadherence score were analyzed separately for several reasons: 1) they are conceptually distinct, 2) they have nonsignificant to moderate associations with one another, and 3) their individual associations with social support variables may have different clinical implications. Demographic and clinical covariates were tested in the regressions models in the manner described above in the ANOVA models.

## Results

Marital status/living situation and family involvement in care. We hypothesized that those who were married and those who lived with others had greater structural support as indicated by

involvement in various aspects of the patients' care as indicated by the total score on the MCQ. The omnibus ANOVA was significant,  $F(2, 72) = 7.15, p < .01$ , indicating systematic differences in MCQ total scores by marital status and living situation. Follow-up Tukey's tests indicated that married patients ( $N = 31$ ) had significantly greater involvement by others in their medical care,  $M = 1.94$  ( $SD = 1.46$ ), compared to those not married and not living alone ( $N = 17$ ),  $M = 1.00$ , ( $SD = 1.37$ ), and those living alone ( $N = 26$ ),  $M = 0.69$  ( $SD = .97$ ), all  $p$ 's  $< .05$ . None of the demographic background variables were associated with total involvement of family members in the patients' medical care, and there was no interaction between Black vs. White race on the MCQ total score.

We used chi-square analyses to test our hypothesis that spouses were more involved in the patient's care compared to other relatives or friends, focusing on the 59.5% of patients who acknowledged any involvement in their medical care by others. Types of involvement were examined separately, because respondents could acknowledge involvement in one area of care by one type of relative (e.g., "spouse reminding patient to take medication") and involvement by a different relative in another (e.g., "son takes patient to appointments"). The results partially confirmed our hypothesis. More patients reported their spouses/partners were involved than other types of relatives or friends in reminding them about taking medications— $X^2(2) = 14.2, p < .001$ , spouse/partners (69.6%), sons/daughters (21.7%) and others (8.7%). Spouses/partners were more involved in medical decisions than other types of relatives— $X^2(2) = 14.5, p < .001$ , spouse/partners (68.0%), sons/daughters (24.0%) and others (8.0%). A similar pattern was found regarding the type of relative that went to medical visits with them:  $X^2(2) = 13.2, p < .001$ , spouse/partners (61.1%), sons/daughters (25.0%) and others (13.9%). There were no differences in the percentages of spouses/partners vs. others who reportedly helped schedule doctors appointments,  $X^2(2) = 3.8, p > .05$ , or to pick up prescriptions for them,  $X^2(2) = 2.0, p > .05$ .



Marital status/living situation and functional support. We used ANOVAs to test the hypothesis that those who were married and those living with others perceived greater levels of social support than those who were living alone, using race (Black vs. White) as a moderator variable. The pattern of results partially supported our hypothesis and we found significant interactions between race and living situation with regard to perceived support. The omnibus test for MSPSS Significant Other support was significant,  $F(9, 61) = 4.28, p < .0001$ , and the interaction between race and living situation also significant,  $F(2, 64) = 5.96, p < .01$ . The means for MSPSS Significant Other by race and living status are presented in Table 2. Follow-up t-tests indicated White patients, not married and living alone perceived significantly lower levels of support from significant others than patients in all other groups. Age was the only covariate that was significant in the omnibus or final models,  $F(1, 64) = 12.68, p < .01$ . The partial correlation of age with significant other support in the context of the final model was  $r = .31$ . Although the findings were statistically significant they were tempered by the small sample of participants who were White, nonmarried, and living with others ( $N = 5$ ); all other cells were  $N = 10$  or greater. Neither the omnibus test for the MSPSS Friends subscale was significant,  $F(9, 61) = 1.61, p > .05$ , nor the test for MSPSS Family subscales,  $F(9, 61) = 1.25, p > .05$ .

The omnibus test for MSPSS Emotional support was significant,  $F(9, 61) = 3.09, p < .01$ , and the interaction between race and living situation also significant,  $F(2, 64) = 4.88, p < .05$ . The means for MSPSS Emotional support by race and living status are presented in Table 2. Follow-up t-tests indicated that White patients, not married and living alone perceived significantly lower levels of emotional support from significant others compared to patients in all other groups. Age was the only covariate that was significant in the omnibus or final models,  $F(1, 64) = 13.19, p < .001$ . The partial correlation of age with emotional support, in the context of the final model was  $r = .33$ . The omnibus test for MSPSS Instrumental support was significant,  $F(9, 61) = 2.17, p < .05$ , justifying the examination of interaction, main effects, and covariates. Age was the only significant covariate,  $F(1, 67) = 10.15, p < .01$ , but the interaction between

race and living situation was not significant and the main effects of race or living situation also were not significant.

Associations of social support with indices of self-care. We used regression models to test the hypothesis that relatively higher levels of perceived support from friends, a significant other, and other family members would be associated with higher levels of self-care. Dependent variables tested in these models included the SCHFI Maintenance, Management, and Confidence scales, the EBQ dietary adherence measure, and Morisky measure of medication nonadherence. The findings partially support our hypotheses. The omnibus  $F$  tests using MSPSS Significant Other, Family, and Friends subscales as predictors yielded significant findings only in the model of SCHFI Confidence,  $F(3, 70) = 2.96, p < .05$ . As shown in Table 3, support from friends was positively associated with self-care confidence, and support from significant others was negatively associated with self-care confidence, in the simultaneous test of these effects. We also tested the contribution of structural support using the MCQ involvement score, and found that it was not significantly associated with any of the self-care variables. The omnibus  $F$  tests for the remaining models were not significant. We also repeated the modeling testing procedure by entering the MCQ total score first, in order to test order effects. The MCQ was not significantly associated by itself as the first step in hierarchical model testing with any of the self-care measures as dependent variables.

Using simultaneous regression models we also tested the hypothesis that emotional and instrumental support were significantly associated with self-care, using the SCHFI Maintenance, Management, and Confidence subscales, the EBQ dietary adherence measure, and Morisky measure of medication nonadherence as dependent measures. The omnibus  $F$  tests were significant for medication adherence,  $F(2, 71) = 3.71, p < .05$ , and dietary adherence,  $F(2, 71) = 3.41, p < .05$ . As shown in Table 4, emotional support was marginally significantly related to adherence ( $p = .05$ ), but the Instrumental Support subscale was not significantly related to these self-care measures in the context of the model. The omnibus  $F$  tests for the remaining models

were not significant. As reported above, the MCQ was not significantly associated by itself with any of the measures of self-care. None of the clinical and demographic covariates were significant in the context of any these models. Also, race (i.e., Black vs. White) did not moderate the associations between social support variables and self-care variables in any of the models tested above.

### Discussion

The current study addressed several extant questions in understanding the role of social support in the outcome of patients with chronic HF. The findings confirm that being married increases the likelihood of the availability of others and the involvement of others in various medical care tasks. Reminding the patient to take medications appears to be a function that is more typical of spouses and other intimate partners than other types of relationships, similar to our previous findings (25). Consistent with reviews of studies in other populations (13), living situation alone does not dictate whether patients with HF are intimately and emotionally connected to and supported by others. White patients who are not married but live with others may be at particular risk of low emotional support, particularly from significant others. This may suggest stronger kinship ties among nonwhite, predominantly Black patients, consistent with previous literature (28, 29). Also, age was consistently associated with increased levels of perceived social support, which may reflect that those involved in supporting aging HF patients' respond to their needs for greater support.

Our findings add to the evidence that social support is associated with better self-care among HF patients, consistent with existing literature (13). Emotional support was consistently related to medication adherence and dietary adherence, adjusting for instrumental support. Emotional support may have beneficial effects in buffering stress across a number of contexts or situations, whereas the positive effects of instrumental support may be contingent on specific contexts or needs of specific patients.(14) In addition, work by Trobst (48) suggests that emotional support has an impact based on the degree of love and esteem communicated by the

support provider, and that instrumental support only provides the context by which these interpersonal messages are communicated. In any event, it is important now to examine in longitudinal designs whether self-care actually mediates the effects of social support over time on important HF outcomes such as hospitalization and mortality risk.

Social control theory (23, 24, 49) suggests that it matters how others attempt to influence a patient's self-care and other forms of health behavior. Negative attempts to influence a patient's self-care (e.g., making the person feel guilty) may lead to increased psychological distress, without improving self-care (49). Positive tactics in control efforts (e.g., pointing out successful change) lead to more desirable changes in health behaviors than negative tactics (49). Thus, positive methods of direct influence may in part explain why HF patients perceive those around them to be emotionally supportive. Although we did not measure positive direct influence through an assessment of actual interactional behaviors, understanding these specific transactions should be a high priority in future research. Assessing these effects will require close measurement of both relationships and HF self-care behaviors.

Interestingly, we found that support from significant others was inversely related to self-care confidence. This could be because support from significant others may have subtly undermined the patient's perceived abilities. Alternatively, patients who were more ill, and as a consequence less confident in their ability to manage their illnesses, might draw more support from their social environment. However, the number of comorbid conditions was not associated with self-care confidence, thus undermining the second interpretation. Future research should examine whether this finding emerges in other samples.

Strengths of the current study include participation of large percentages of Black patients and those with relatively low socioeconomic status, both typically underrepresented groups. Limitations include the predominance of male patients, stemming from the fact that most patients (91%) were recruited at a Veterans Affairs Medical Center (VAMC). Patients from this VAMC may not be typical of the broader population on degree of illness, socioeconomic status,

and other disease factors. Also, there might be different patterns of social support and self-care among women, compared to men, and we did not have sufficient statistical power to examine these differences. A complete examination of gender differences is warranted. Another limitation was that a portion of patients chose not to take part in the study or were unavailable, and we cannot rule out attitudinal or behavioral differences in these patients. It is possible that several other psychological factors that we could not address in the current study are responsible for different levels of self-care of patients with HF and future studies should take these into account. Last, various aspects of HF self-care, particularly medication and dietary adherence, were assessed using self-report. Self-report measures of these constructs are subject to minimization of nonadherence by respondents; thus, future studies should consider using electronic monitoring methods for assessing medication adherence, and urinary analysis methods for assessing sodium intake.

Understanding the link between the emotional aspects of family relationships and self-care serves the broader goal of understanding how social relationships may influence clinical outcomes and mortality. Indeed, current evidence suggests that interventions that enhance social support in cardiovascular patients (50) do not necessarily reduce mortality (51). It is possible that these interventions did not address the link between social relationships and self-care. Enhancing social relationships in a way that maximizes self-care may be crucial to the effort to improve outcomes of patients with cardiovascular disease. Additional research should examine the role that family members can play in supporting effective patient self-care, as well as the function of emotional support in encouraging patients to perform self-care activities.

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Table 1

## Demographic and Clinical Characteristics

	N = 74
<u>Age: M (SD)</u>	63.21 (11.9)
<u>Gender (% male)</u>	96.0
<u>Race (%)</u>	
Black/African American	55.4
White	40.5
Native American	2.7
Other	1.4
<u>Income (\$/year) M (SD)</u>	22,208 (16,117)
<u>Education (years; 12 = High School Degree) M (SD)</u>	10.9 (1.7)
<u>Married or partnered (%)</u>	43.2
<u>% Relatives in the home</u>	
0	36.5
1	32.4
2	12.2
> 2	18.9
<u># Relatives in house of those not living alone M (SD)</u>	2.1 (1.5)
<u>Etiology of Heart Failure (%)</u>	
Ischemia (Primary or secondary)	37.8
Alcohol or Substance Abuse (Non-ischemic)	8.1
Hypertension (Only)	20.3
Idiopathic or no etiology stated	33.8
<u>Diastolic dysfunction only (%)</u>	12.2
<u>Number of comorbid medical conditions: M (SD)</u>	3.6 (1.5)
<u>Minimum Left Ventricle Ejection Fraction (systolic dysfunction only): M % (SD)</u>	25.9 (10.1)

Table 2 ANOVA Models of Social Support Family involvement, by living situation and race

		Living situation		
		Married N = 29	living alone N = 16	Living Alone N = 26
<i>MSPSS Social Support</i>				
Significant Other				
	White	6.2 <sup>A</sup>	2.8 <sup>A,B,C,D,E</sup>	5.9 <sup>B</sup>
	Black	5.8 <sup>C</sup>	5.3 <sup>D</sup>	5.2 <sup>E</sup>
Emotional				
	White	5.9 <sup>A</sup>	3.2 <sup>A,B,C,D,E</sup>	5.6 <sup>B</sup>
	Black	5.4 <sup>C</sup>	5.4 <sup>D</sup>	5.2 <sup>E</sup>

Notes: MSPSS = Multidimensional Scale of Perceived Social Support. Means that share superscripts differ significantly at  $p < .05$ .



Table 3

Hierarchical Regression model of predicting SCHFI Self-care Confidence (N = 74)

	<i>B</i>	<i>SE B</i>	<i>β</i>
Step 1			
MSPSS Friends	3.76	1.63	0.34*
MSPSS Significant Other	-3.16	1.44	-0.29*
MSPSS Family	-2.40	1.54	-0.21
Step 2			
MCQ Family Involvement	0.04	1.62	0.03

Notes: MCQ = Medical Care Questionnaire. MSPSS = Multidimensional Scale of Perceived Social Support; SCHFI = Self-care of Heart Failure Index.

\*  $p < .05$ .  $R^2 = .11$  for Step 1,  $p < .05$ ,  $\Delta R^2 = .00$  for Step 2,  $p > .05$ .

Table 4

Hierarchical Regression model of predicting Medication Nonadherence and Dietary Adherence  
(N = 74)

	<i>B</i>	<i>SE B</i>	<i>β</i>
<u>Medication nonadherence</u>			
Step 1			
MSPSS Emotional Support	-0.28	0.13	-0.41*
MSPSS Instrumental Support	0.10	0.15	0.50
Step 2			
MCQ Family Involvement	0.06	0.08	0.08
 <u>EBQ Dietary Adherence</u>			
Step 1			
MSPSS Emotional Support	1.95	0.98	0.39†
MSPSS Instrumental Support	-0.73	1.11	-0.13
Step 2			
MCQ Family Involvement	0.39	0.61	0.07

Notes: Medication Nonadherence measure = higher scores indicate poorer medication adherence.

MSPSS = Multidimensional Scale of Perceived Social Support; SCHFI = Self-care of Heart Failure Index;

EBQ total = Eating Behavior Questionnaire; EBQ total = Eating Behavior Questionnaire.

\* $p < .05$ . †  $p = .05$ .

Medication nonadherence:  $R^2 = .09$  for Step 1,  $p < .05$ ,  $\Delta R^2 = .02$  for Step 2,  $p > .05$ .

EBQ Dietary adherence:  $R^2 = .09$  for Step 1,  $p < .05$ ,  $\Delta R^2 = .00$  for Step 2,  $p > .05$ .

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