Family Context Influences Psychological Outcomes of Depressive Symptoms and Emotional Quality of Life in Patients With Heart Failure

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Abstract

Background—Although family influences in heart failure (HF) care are considered important, little evidence is available regarding relationships between the family context and specific outcomes for patients with HF.

Objective—To examine the relationships of patient perceptions of family functioning, autonomy support, and perceived criticism, as well as their family member's (FM) HF knowledge with patient outcomes of depressive symptoms and HF quality of life (QOL).

Methods—Participants (n = 117) with HF were enrolled in a family partnership intervention study. Self-report questionnaires measuring the HF patient's perceptions of family context and the FM's knowledge were analyzed relative to the HF patient's outcomes using correlations and sequential multivariate regression analyses. Only pre-intervention, baseline data are reported here.

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Results—Age, ethnicity, Charlson comorbidity index, global family functioning and FM's HF knowledge accounted for 37.8 % (p < .001) of the variance in patient's depressive symptoms. An additional moderating effect of ethnicity on the association between global family functioning and patient's depressive symptoms was significant (change R2 = .06, p = .001) resulting in a final model that accounted 43.3% of depressive symptom variance. Age, ethnicity, global family functioning and autonomy support accounted for 24.9% (p < .001) of the variance in emotional HF QOL. An additional moderating effect of ethnicity on the association between global family functioning and patient's emotional HF QOL was significant (change R2 = .05, p = .009) resulting in a final model that accounted for 28.9% of emotional QOL variance.

Conclusions—This study underscores the importance of the patient's perspective on family functioning and autonomy support, along with FM's HF knowledge, on HF patient outcomes moderated by ethnicity. Future interventions could target the modifiable patient-family context relationships for improving depressive symptoms and QOL in HF patients. These findings point to the need for greater family assessment to identify those at risk for worse outcomes and to guide family focused interventions.

Introduction

The incidence and prevalence of heart failure (HF) has become a major public health problem in the United States (U.S.). Currently, 5.7 million Americans have a diagnosis of HF, and an additional 670,000 cases are diagnosed each year. [1] The incidence of this disease is increasing at epidemic proportions, and the impact of HF is taking a tremendous toll on the quality of life (QOL) of patients with HF and their family members (FM).[1] Most recent estimates place HF incidence at 10 per 1000 population after age 65 with an equal lifetime risk for both men and women of developing HF at 1 in 5.[2]

While family education and counseling are important, the way a family functions and communicates may also be key. The term 'family functioning' has been defined as the ability of the family and patient to adapt, especially in the setting of chronic illness, and specific aspects of family functioning include problem solving and communication.[3] Consequently, when family functioning is not optimal, the effects on a patient's level of depressive symptoms and QOL outcomes maybe affected. [3] The literature regarding the effect of family functioning on levels of depressive symptoms in individuals with HF is limited. However, prior research has reported that spouse or FM caregivers with negative problem-solving abilities increase the levels of depression in HF patients, and this is similar in other chronically ill populations.[4,5] Moreover, ineffective family functioning and communication exhibited by FMs through judgmental verbal or nonverbal behaviors may increase the chronically ill patient's level of depressive symptoms. [6]

In addition, individuals with HF have reported lower levels of QOL compared to patients with other types of chronic illnesses.[7] The symptom burden and complex treatment regimens require patients with HF and their FMs to make moderate to major lifestyle

changes, which can affect their overall QOL. [8] Variables that are reported to reduce QOL in individuals with HF are functional status, symptom burden, levels of depression and social/ family support.[4,6,7,9-11] Moreover, ethnicity may play a role in the level of QOL and family functioning. There is scant literature in this area, however, it has been reported that the presence of effective family functioning has had positive effects on African American (AA) and Mexican American adolescents attitudes compared to adolescents that experience ineffective family functioning.[13] However, at this time it is unclear how ethnicity and family function affects the perception of QOL in a chronically ill individual (i.e. patient with HF).

FMs can provide support through autonomy support, which was derived from Self-Determination Theory.[3,14] Autonomy support occurs when FMs provide encouragement, empathy and a sense of choice for patients. Thus, patients with HF can engage in their care regimen according to their perception of importance and choice instead of adhering to their prescribed regimen because of controlling demands or threats from a FM or health provider. [3,14] Research has shown that patients with other chronic conditions that lacked autonomy support were less successful with adhering to their care regimen or making behavior change.[15-18] The opposite of autonomy support is perceived criticism, which can occur when a patient perceives a level of judgment and pressure with little acceptance of their feelings, thoughts, and decisions regarding how they choose to care for their chronic illness.[19,20]

In addition, knowledge is an important and foundational element for maintenance and management of the disease and is needed to empower patients with HF and their FMs.[21] There is clear evidence that patients with HF and their FMs exhibit low levels of knowledge regarding their HF care regimen.[22,23] Furthermore, education and counseling programs for patients with HF and their FMs have improved outcomes such as better adherence to a low sodium diet, daily weights, medication adherence and a decrease in rehospitalizations.[3,14,24] FM knowledge about HF is important to assist with and promote patient self-care, thus it represents an important component of family context, but little is known about its impact on other outcomes such as depressive symptoms and QOL of the patient with HF.

A better understanding of the relationship of family context to outcomes for patients with HF is important for the design and testing of successful family focused interventions that may improve patient's depressive symptoms and QOL outcomes. The purpose of this study was to examine the relationships between patient perceptions of family functioning, autonomy support, and perceived criticism, as well as the FMs HF knowledge with patient outcomes of depressive symptoms and QOL. We hypothesized that the patient's who perceived better family functioning, greater autonomy support, lower family criticism and greater FM knowledge when controlling for selected demographic variables including gender, ethnicity, age, education, and NYHA (New York Heart Association) functional class and other comorbidities would report lower levels of depressive symptoms and better QOL.

Materials and Methods

Design

This was a descriptive study using baseline data from a family partner intervention study.[14,24] Only baseline data collected from the patient prior to intervention are reported in this analysis of family context [family functioning, level of family knowledge, autonomy support, perceived criticism] and patient outcomes [depressive symptoms and QOL].

Sample

The sample consisted of patients with HF and their FMs (N = 117 dyads) who were recruited from 3 large medical centers in the southeastern U.S. that had outpatient HF clinics. Inclusion criteria for patients with HF were: 1) diagnosis of HF per echocardiogram report, NYHA (New York Heart Association) class II-III per medical record, 2) age 30-79 years, 3) ability to read, write, and speak English, 4) telephone access, 5) on medications regimens that included ACE-inhibitors or angiotension II receptor blockade, beta-blocker, and diuretics unless contraindicated, 6) ambulatory, 7) glomerular filtration rate > 30, and 8) availability of a participating FM who assisted with the HF self-care (i.e. interacted with the patient at least 2-3 times per week). Items 1, 5 and 7 were verified from the medical record.

Exclusion criteria for patients with HF consisted of: 1) NYHA class I or IV determined by the medical record, 2) myocardial infarction within last 6 months, 3) unstable angina, 4) renal failure, 5) impaired cognition, 6) psychiatric diagnosis of schizophrenia, dementia, or any other psychiatric illness that would impair their ability to participate, 7) HF secondary to a medical condition, 8) planned cardiac surgery, or 9) uncorrected visual or hearing problems. Items 1 through 8 were verified from the medical record.

FMs had to be at least 19 years of age and have no evidence of conditions that would impair their ability to participate if randomized in the intervention sessions such as impaired cognition or psychiatric diagnosis. FMs also had to interact routinely with the patient regarding their HF self-care 2-3 times a week.

Measures

Baseline demographic and clinical characteristics (age, gender, relationship to the participant with HF, marital status, comorbidities, and education) for participants with HF and their FMs were collected by self-report questionnaires and information derived from the patient's medical record. The Charlson comorbidity score (CCI) was calculated as a measure of the presence (weighted sum) of other comorbidities.[25]

Family Context Variables

Family Functioning: The Family Assessment Device Questionnaire (FAD) is based on the McMaster Model of Family Functioning, which is used to conceptualize the organization of families and their interactions.[26] This tool has been validated to distinguish between healthy and unhealthy family interactions. Three subscales of the FAD[27] were used to measure the patient's perceived level of family functioning. This included a total of 27-items, and the 3 subscales used were global family functioning (12 items), problem solving (6 items), and

communication (9 items). The global family functioning subscale assesses the overall health of the family, the problem solving subscale assesses the ability of the family to solve problems at a level that will maintain effective family functioning, and the communication subscale assesses how FMs exchange information among each other.[26] The final mean score for global family functioning, problem solving and communication ranged from 1 to 4 (healthy family functioning to unhealthy family functioning). The Cronbach's alpha for each subscale reflecting internal consistency reliability was 0.90 for the global family functioning, 0.85 for problem solving, and 0.72 for communication in this study. Standard cut scores for each subscale (2.0 for global family functioning; 2.2 for problem solving and communication) were used to determine the percentage in the highest and lowest category for family functioning.[26,28] A higher family function variable score on this instrument indicates less healthy family functioning.

Autonomy Support: The Family Care Climate Questionnaire – patient version (FCCQ-P) was used to measure the patient's perceived autonomy support of the FM participating in the study.[29] This is a 14-item Likert-type scale that addresses the amount of perceived support regarding lifestyle changes associated with their HF self-care and their interactions with the participating FM about these lifestyle changes. The FCCQ-P questions are focused on the patient's perceptions of how much acceptance and support they have experienced regarding their choice of HF care behaviors, how open and communicative they can be with their FM about their care decisions and disease process, and the level of trust within the patient/FM relationship. The range for the final scores are from 1 to 7 (not true at all to very true) with higher scores indicating greater amounts of FM autonomy support perceived by the patient concerning their HF self-care management. The original version of the FCCQ-P has established reliability and validity (Cronbach's alpha = 0.89)[29] and in the current study was 0.85.

Perceived Family Criticism: Perceived family criticism (PFC) was measured by the PFC scale of the Family Emotional Involvement and Criticism Scale (FEICS-PC).[19] This scale measures general criticism from the family, which is viewed as the opposite to autonomy support, and it consists of 7 items scored on a 5-point Likert-type scale from 1-5 (1 = almost never to 5 = almost always). The average score ranges from 1-5 with higher scores representing higher perceived criticism from the family in general. The original version of the FEICS has reported adequate reliability coefficients of 0.82,[30] and Cronbach's alpha was 0.82 in the current study.

Heart Failure Knowledge: The Atlanta Heart Failure Knowledge Test (AHFKT) was used to measure the FM's level of knowledge regarding HF.[22] The AHFKT is a 27-item questionnaire that tests knowledge regarding the pathophysiology, dietary self-care, symptom assessment, and medication taking behaviors for HF. The sum of the scores range from 0 – 27 and can be converted to a 0 – 100% scale. The percent correct was used in this study. Higher scores represent higher knowledge regarding HF self-care. Content and construct validity has been established with good internal consistency reliability for this cohort (Cronbach's alpha of 0.84).[22]

Outcome Measures

Depressive Symptoms: Depressive symptoms were measured with the Beck Depression Inventory – II (BDI-II).[31] The BDI-II is a well-established measure of depression with 21-items representing such feelings as sadness, guilt, self-criticism, crying, and pessimism, for example. These items are rated on a 0 - 3 scale to the degree in which the symptoms were experienced in the past two weeks. Total scores range from 0-63 with   14 indicate the presence of depressive symptoms. Cronbach's alpha in this study was 0.92, which indicates acceptable internal consistency reliability.

Quality of Life: The Minnesota Living with Heart Failure Quality of Life Questionnaire (MLHFQ) was used to measure the patient's perceived QOL.[32] This tool is a self-assessment of how HF affects the patient's daily life. It is a 21-item Likert-type measure with an overall score based on 2 dimensions (physical and emotional). A total score can also be obtained. Possible total scores for the emotional component range from 0 to 25, for the physical component 0 to 40, and for the total component 0 to 105. Cronbach's alpha in this study for the physical subscale was 0.91 (8 items), the emotional subscale was 0.88 (5 items) and the total Cronbach's alpha was 0.92 for all 21 items. Higher scores represent a worse perceived QOL.

Data Analysis

Descriptive statistics were used to describe the sample, evaluate underlying distribution assumptions and missing data. Pearson correlations were run to test for bivariate associations between patient's characteristics, perceptions of their family context, and outcomes of depressive symptoms and HF QOL based on the variable type (continuous or categorical). The only FM variables included in these analyses were the FM's relationship to the patient and FM's HF knowledge. While data were collected on the FMs, the primary outcomes and focus of this study was the impact of the family context from the HF patients' perspectives. As such no dyadic (joint patient-FM) statistical models were employed.

Sequential (hierarchical) linear regression was used to build models for assessing the relationships between (block 2) patient perceptions of family context (FAD scales for global family functioning, problem solving and communication, autonomy support and their FMs HF knowledge) with patient's depressive symptoms (BDI-II total) and HF QOL (MLHFQ - total, physical and emotional scores) after adjusting for patient characteristics (age, gender, ethnicity, education, NYHA functional class, FM's relationship to the patient and the CCI (block 1). Multicollinearity model assumptions were checked for condition index <30, variance inflation factors (VIF) < 2 and tolerance levels > 0.5. With all variables entered into the models, multicollinearity was evident, so the stepwise (SPSS SYNTAX / METHOD=STEPWISE) variable selection method (p < .05 for variable entry, p >.10 for removal) was used within each block to optimize each final model. To check the covariates for the regression assumption of homogeneity of slopes, all possible pairwise (2-way) interactions between the independent variables in each model were assessed for significance, which would challenge the homogeneity of slopes assumption. Only one significant interaction was found (ethnicity and family functioning) and was added to the model in an

additional step (block 3) to complete each regression model. SPSS v.20 was used for all analyses.

Results

Sample Characteristics

As presented in Table 1, participants were middle aged with slightly half being AA and the majority of the sample classified as having NYHA class II HF. Patients had several comorbidities on average, with CCI scores ranging from 1 to 14. A majority of the sample was fairly well educated with almost half having some college education. FMs on average were middle-aged; predominately women and more than half were spouses. The FM's were also on average 3.7 years younger than the HF patients (p = .001). African American HF patients were significantly younger (M = 53.25 ±10.5) than whites, (M = 59.57± 9.3, p =. 001).

The patient perceived autonomy support scores (FCCQ-P) were relatively high (Table 2). Patient scores on the FAD indicated on average that they perceived their family functioning to be effective (lower scores indicated healthier family functioning). On average, patient perceived family criticism scores were low as reflected by the mean FEICS scores. The FM HF knowledge was moderately low with average AHFKT scores of 68% (Table 2).

Average patient depressive symptom scores were below the clinical mild depression level of 14 (Table 2). The average MLHFQ QOL scores were in the middle of the range for the total scores (possible range from 0 to 105) and the physical subscale scores (possible range of 0 to 40). However, the average emotional subscale scores for the MLHFQ of 9.65 were less than the scale's midpoint (possible range from 0 to 25), indicating that on average, the HF patient's emotional HF QOL was in the moderate range (Table 2).

Significant bivariate associations were found between patient characteristics and patient's perceptions of family context variables. Older patients had lower perceived criticism scores (r = -.19, p = .043); AA FMs scored lower on the HF knowledge test than white FMs, with AA average AHFKT scores of 63.42% (SD 13.9%), versus white FM average knowledge test 73.69% (SD 10.9%), (p < .001). Patients with higher education scored lower on the FAD global family functioning (r = -.27, p<.01) and on the FAD communication scores (r = -.27, p .01) indicating better family functioning. There were also significant associations between FMs relationship to patient and patient's perception of autonomy support (r = .21, p<.05) with lower perceived autonomy support when the FM was an adult child versus a spouse/partner. Mean FMs HF knowledge was also slightly lower in the adult child and sibling FMs (63.31%, SD 12.7%), versus spouse/partner FMs (71.73%, p = .001). Additionally, bivariate correlations among the patient's perceptions of family context variables were also significant (Table 3). The significant correlations among the patient characteristics as noted above, and between the patient characteristics and family context variables and among the family context variables (Table 3) suggest the need for variable selection methods for reducing multicollinearity and optimizing each final regression model.

Patient Perspectives on Family Context and Depression

The bivariate relationships between the patient characteristics and patient's perceptions of family context variables with the patient's outcomes of depressive symptoms and HF QOL (MLHFQ total, emotional and physical scores) were examined using Pearson correlations. Age was significantly associated with all four outcomes (depressive symptoms, MLHFQ total, MLHFQ emotional and MLHFQ physical). Additionally, ethnicity was significantly associated with depressive symptoms (correlation $r = 0.21$, p<.01), with AA mean depressive symptoms 11.36 ±8.2), and white mean depressive symptoms 15.56± 11.7, p = .036). The CCI was significantly correlated with depressive symptoms. Patient autonomy support, scores on all three scales of the FAD and perceived criticism were significantly associated with depressive symptoms and the MLHFQ emotional subscale. Other than age, there were almost no significant associations between the patient characteristics and patient's perceptions of family context with either the MLHFQ total or physical subscale scores. There was a small significant correlation between the FAD global family functioning scale and MLHFQ total, which was investigated but was not significant after adjusting for age. The lack of significant bivariate correlations for the MLHFQ total and physical subscales was further reflected in the non-significant regression models for these two outcomes.

Identification of Family Predictors of Patient Depressive Symptoms

As a final assessment, when considering all of the patient characteristics (block 1: age, gender, ethnicity, education, NYHA class, relationship to FM and CCI) and patient's perceptions of family context variables (block 2: FAD global family functioning, FAD problem solving, FAD communication, FEICS perceived criticism, autonomy support and FM's HF knowledge) together for building the regression models for patient depressive symptoms and emotional HF QOL, significant multicollinearity was noted by condition index of 53.63 (much higher than 30) and three variables having variance inflation factors (VIF) > 2 and tolerance levels < 0.5. Thus, for both regression models stepwise variable selection methods were used within each sequential block. Table 4 lists the complete regression results for depressive symptoms after each step of the stepwise variable selection methods within each block. These methods alleviated the multicollinearity problems such that after step 5, prior to the addition of the interaction term, the condition index was 25.58 and all variables had VIF < 1.37 and tolerance levels > 0.73. After step 5, it can be seen that younger patients, whites, and patients with higher (unhealthy) FAD global family functioning scores had a higher level of depressive symptoms (Table 4). Prior to the addition of the FAD global family functioning in step 4, in step 3 the CCI was a significant predictor of depressive symptoms where patients with more comorbidities had higher depressive symptoms, but this effect was no longer significant after the addition of the FAD global family functioning scores in step 4.

As indicated in the methods section, all possible bivariate interactions were investigated for each model to check the homogeneity of slopes assumptions for the patient characteristics in block 1 as covariates. For depressive symptoms, there was a significant interaction between ethnicity and FAD global family functioning (step 6 change R^2 = .058, p = .001), indicating that ethnicity was a significant moderator of the association between global family

functioning and depressive symptoms. Figure 1 illustrates this effect where the positive slope is much steeper for whites than for AAs. It should be noted that ethnicity and global family functioning are still both significant effects in the model, but after the addition of the interaction term in step 6, the main effects are non-significant, but the interaction term is significant. This is due to underlying mathematical associations and does not discount the individual effects. All effects are appropriately included in the final model.[33] The combined effects of age, ethnicity, Charlson comorbidities, global family functioning, FM's HF knowledge and the moderation effect of ethnicity on global family functioning, accounted for 43.3% of patient's depressive symptom variance.

Patient Perspectives on Family Context and Heart Failure Quality of Life

The same multicollinearity diagnostics were used for the regression models for the MLHFQ outcomes (total, physical and emotional scores) since the same independent variables were under consideration. For the MLHFQ total and physical scores, no independent predictors were retained after adjusting for age using the stepwise variable selection process within each block, which was expected from the initial assessment using bivariate correlations. As such no further regression results are presented for these two outcomes.

Table 5 lists the complete regression results for MLHFQ emotional scores after each step of the stepwise variable selection method within each block. These methods minimized the multicollinearity problems such that after step 4, prior to the addition of the interaction term, the condition index was 28.34 and all variables had VIF < 1.37 and tolerance levels > 0.73. After step 4, it can be seen that younger patients, whites, patients with higher (unhealthy) FAD global family functioning scores and lower (worse) autonomy support had higher (worse) MLHFQ emotional QOL (Table 5).

After investigating all possible bivariate interactions to check the homogeneity of slopes assumptions for the patient characteristics in block 1 as covariates, for MLHFQ emotional scores, there was a significant interaction between ethnicity and FAD global family functioning (step 5 change R^2 = .046, p = .009), indicating that ethnicity was a significant moderator of the association between global family functioning and emotional QOL. Finally, the effects of age, ethnicity, global family functioning, autonomy support and the moderation effect of ethnicity on global family functioning, accounted for 28.9% of the patient's emotional QOL variance.

Discussion

Patient Perspectives on Family Context and Depressive symptoms

In the multiple regression models, older age and higher levels of FM knowledge were significantly related to lower levels of depressive symptoms in patients with HF. Our finding of the relationship between older age and level of depressive symptoms is similar to that of other research findings that greater levels of depressive symptoms are more apparent in younger versus older adults with HF.[34] A possible reason for this finding in our study could be related to the developmental phase of life of the participants. For example, younger patients may still be of working age, but have a lower functional capacity, which interferes

with the activities of daily living that would be normal for their specific age group. The finding regarding the relationship between higher levels of FM knowledge of HF and lower levels of depressive symptoms may be explained in a couple of ways. First, higher levels of FM knowledge may lead to a greater understanding of HF and the HF care regimen, which may lead to a greater level of involvement in HF care management as well as perceived control by the patient. Second, the greater level of perceived control by the FMs may increase their ability to provide a higher level of support to the patient with HF. Although the research is limited concerning the association of FM knowledge and level of depressive symptoms in chronically ill patients, our findings were consistent with Sebern and Woda[35] who found that higher levels of depressive symptoms in patients with HF were associated with lower levels of FM knowledge and ineffective family functioning.[35]

Increased levels of depressive symptoms in patients with HF are related to a decrease in their ability to care for their condition of HF.[36,37] Therefore, assessing patient characteristics (i.e. age and ethnicity) and family context variables such as family functioning and FM knowledge is important to consider when developing interventions to improve depressive symptom outcomes in patients with HF. For example, if family functioning is not optimal, assisting the patient to identify and seek other sources of assistance and support may be useful as well as helping them understand how to cope when the family is disrupted.

A serendipitous finding was that patients' depressive symptoms might differ by ethnicity based on the level of family functioning. In this study AA's level of depressive symptoms did not significantly change in the presence of ineffective family functioning. In contrast, whites appeared to be more sensitive to poor family functioning (as global family functioning worsened, depressive symptoms increased). This finding is contradictory to the literature that reports effective family functioning decreases the risk of AA suicide, depressive symptoms, and behavioral problems.[13,38] A possible explanation is that our sample was comprised of chronically ill patients with HF and their relationships may differ from studies of family functioning in the general population. Another possible explanation may be the cultural norms for AAs in the southeast region of the U.S. where this study was conducted may be comprised of larger support systems such as extended families, religious faith groups within churches or associations and larger community affiliations. Therefore, AAs with HF in this study may have greater resiliency and other avenues for support when family functioning was low, however further study is needed to verify both of these suppositions.

Patient Perspectives on Family Context and Heart Failure Quality of Life - Emotional

In the multiple regression models, older age and higher levels of family functioning and autonomy support were significantly related to a greater perceived QOL in patients with HF. The relationship of age to greater perceived QOL is similar to that of other research findings that have reported greater perceived QOL in older versus younger patients with HF.[39,40]

Higher levels of family functioning and autonomy support were independent predictors of better emotional QOL for patients with HF in this study. This was an expected finding since autonomy support refers to the ability of a FM to listen to the patient's perspective, encourage self-initiation, offer choice, provide alternatives, minimize pressure, and accept

the health care decisions of the patient with HF.[24,41] Similarly, the opposite of autonomy support is perceived criticism, which can be described as a controlling behavior by a FM such as negative communication that may occur in an effort to control the behavior of the patient (i.e. the performance of a patient's care behaviors).[20,24] Perceived criticism was less influential on QOL than autonomy support in this study.

Autonomy support has been studied with a variety of populations such as healthcare providers and FMs of patients with chronic illnesses. However, much of the current literature has yielded mixed results based on the type of chronic illnesses studied and who provided the autonomy support (i.e. healthcare provider or FM). For example, Holm and colleagues[6] found that patients with chronic obstructive pulmonary disease who reported lower levels of autonomy support and higher levels of perceived criticism by FMs exhibited a decrease in health related QOL and an increase in physiological symptoms.[6] Gibson and colleagues found that autonomy support by healthcare providers was not correlated with QOL in patients with asthma.[42] Karlsen and colleagues found that less autonomy support by FMs led to increased self-blaming and decreased coping in individuals with type 2 diabetes.[43]

These findings revealed that when the patients with HF perceived a higher level of family functioning and greater autonomy support their reported QOL was improved. This was not surprising considering the focus of the items, which reflected how much support patients received in managing their illness and how burdensome they may or may not have felt to their FM. These findings suggest that clinicians need to assist FMs in understanding the importance of supportive communication with their loved one who has HF.

We found that ethnicity and level of family functioning moderated the emotional aspect of QOL for patients with HF. The level of family functioning of AAs with HF did not significantly change their emotional QOL, whereas, whites with HF who reported lower levels of family functioning also reported lower levels of emotional QOL. There is a paucity of literature concerning the effect of ethnicity and family functioning on emotional QOL of patients with HF. However, this finding is similar to and overlaps with the results related to depressive symptoms, and AAs with HF in this study may have greater resiliency and other avenues for emotional support when family functioning was low. Again, further study is needed.

Limitations

Several limitations of our study should be acknowledged. There may be other important family and support variables such as family cohesion, family conflict, or social support from a wider network that we did not measure. Such variables could help illuminate the specific family and social context variables that are most influential in psychological outcomes for patients with HF in general as well as by ethnicity. Moreover, the rigorous inclusion and exclusion criteria were selected to remove variation within the outcome variables of the larger intervention study, and may limit generalizability of these findings. Nevertheless the significant associations between family context variables and both depressive symptoms and QOL were consistent and fairly strong.

Conclusion

Our findings suggests that age, ethnicity, family functioning, autonomy support, and FM knowledge of HF may be important influences on the levels of depressive symptoms and the emotional aspect of QOL in this diverse sample of patients with HF. The results indicate that further work concerning family context variables on psychosocial outcomes in patients with HF is necessary. An important finding is that younger patients and those with poor perceptions of their family support and context should be viewed at risk for greater depressive symptoms and lower QOL. The clinical significance of these results directs practitioners to better understand the family context and its effect on psychosocial outcomes and to incorporate and evaluate culturally sensitive, family focused interventions geared towards decreasing depressive symptoms and increasing QOL for patients with HF.

Acknowledgments

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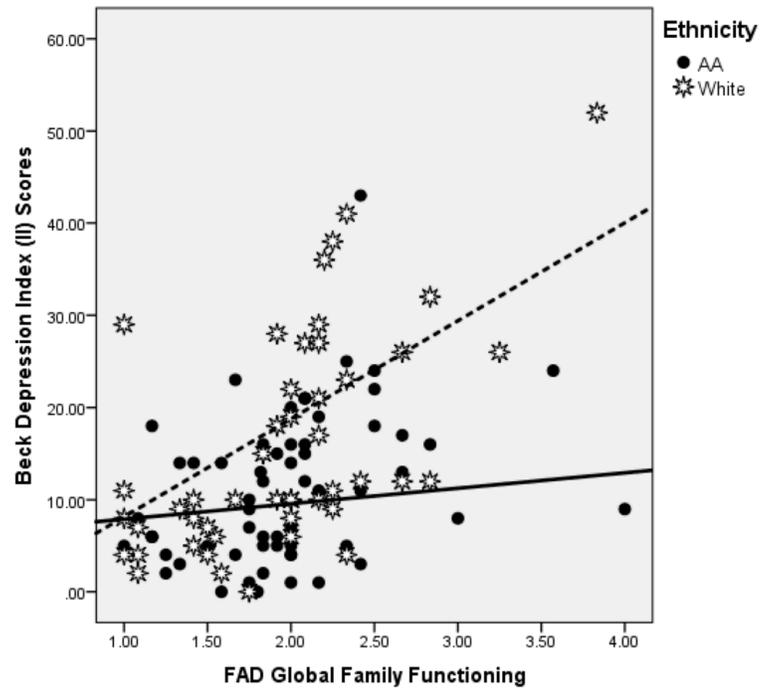
Figure 1. Moderation Effects of Ethnicity on the Association Between Global Family Functioning and Depression

Predictions for AA (solid line) and Whites (dashed line) – Model Evaluated at Covariates:

Average Age (55.63), Average Charlson Comorbidity Index (3.07) and Average Family HF

Knowledge (68.03)

AA (African Americans)

FAD (Family Assessment Device)

Table 1

Demographic and Clinical Characteristics of Persons with HF and their Family Members (N=117 unless otherwise specified)

Variable	Patient	Family Member
	Mean (SD) [min – max]	Mean (SD) [min – max]
Age (years)		N=114
	55.9 (10.5) [28 – 78]	52.1 (13.4) [19 – 78]
Charlson Comorbidity Index		N=115
	3.1 (2.2) [1 – 14]	0.9 (1.4) [0 – 6]
	n (%)	n (%)
Gender		
Male	74 (63.2)	20 (17.1)
Female	43 (36.8)	95 (81.2)
		2 (1.7) missing
Education		
Vocational, High School, Less	61 (52.1)	59 (50.4)
College or Higher	56 (47.9)	56 (47.9)
		2 (1.7) missing
Ethnicity		
AA	68 (58.1)	68 (58.1)
White	49 (41.9)	46 (39.3)
		1 (0.9) other
		2 (1.7) missing
FM Relationship to Patient		
adult child/sibling[*]	na	26 (22.2)
other[*]		30 (25.6)
spouse/partner		61 (52.1)
NYHA Class		
Level II	85 (72.6)	na
Level III	32 (27.4)	

Key: FM (Family Member), NYHA (New York Heart Association)

[*] NOTE: adult child/sibling and other were combined for the later analyses Family Member (FM) data were not available for 2 FM's gender, education and ethnicity and 3 were missing FM Age

Table 2

Descriptive Statistics of Patient's Perceptions of Family Context, Depressive symptoms and Heart Failure Quality of Life Variables

	Overall
Family Context Variables	**M (SD) [min – max]**
Autonomy Support	5.85 (0.93) [3.00 – 7.00]
FAD Global Family Functioning	1.96 (0.57) [1.00 – 4.00]
[% < 2.0]	[46.5%]
FAD Problem Solving	1.97 (0.51) [1.00 – 4.00]
[% < 2.2]	[78.9%]
FAD Communication	2.18 (0.43) [1.22 – 3.44]
[% < 2.2]	[46.5%]
FEICS Perceived Criticism	1.86 (0.88) [1.00 – 4.43]
Family Member HF Knowledge	67.78 (13.63) [33.33 – 88.89]
Beck Depression Index - II	13.13 (9.98) [0.0 – 52.0]
[% ≥ 14]	[39.5 %]
MLHFQ Total	50.34 (22.8) [2.0 – 97.0]
MLHFQ Emotional	9.65 (7.5) [0.0 – 24.0]
MLHFQ Physical	22.17 (10.2) [0.0 – 40.0]

Key: FAD (Family Assessment Device)

FEICS (Family Emotional Involvement and Criticism Scale)

MLHFQ (Minnesota Living with Heart Failure)

HF (Heart Failure)

Table 3

Correlations Between Family Context Variables

Pearson's Correlation (r)	1	2	3	4	5	6
1. Autonomy Support	1.000					
2. FAD Global Family Functioning	$-.501^{***}$	1.000				
3. FAD Problem Solving	$-.407^{***}$	$.824^{***}$	1.000			
4. FAD Communication	$-.432^{***}$	$.826^{***}$	$.789^{***}$	1.000		
5. FEICS Perceived Criticism	$-.536^{***}$	$.421^{***}$	$.344^{***}$	$.380^{***}$	1.000	
6. Family Member HF Knowledge	$.365^{***}$	$-.221^{*}$	$-.144$	$-.179$	$-.230^{*}$	1.000

*
 p < .05,

**
 p < .01,

***
 p < .001

Key: FAD (Family Assessment Device)

FEICS (Family Emotional Involvement and Criticism Scale)

HF (Heart Failure)

Table 4

Stepwise Linear Regression Model for Depressive symptoms

Variable	B	95% CI for B		β	p-value	F(df1,df2)	p-value	Adj R2	R² (p-value)
Block 1									
STEP 1						F(1,109)=9.874	.002	.075	.083 (.002)
(Constant)	28.434	18.610	38.258		.000				
Age	−.275	−.449	−.102	−.288	.002				
STEP 2						F(2,108)=12.671	<.001	.175	.107 (<.001)
(Constant)	31.445	22.035	40.856		.000				
Age	−.382	−.556	−.209	−.401	.000				
Ethnicity	6.987	3.320	10.654	.346	.000				
STEP 3						F(3,107)=10.249	<.001	.201	.033 (.035)
(Constant)	29.698	20.298	39.098		.000				
Age	−.393	−.564	−.222	−.412	.000				
Ethnicity	6.491	2.853	10.128	.321	.001				
Charlson Comorbidity	.830	.060	1.599	.185	.035				
Block 2									
STEP 4						F(4,106)=15.762	<.001	.349	.150 (<.001)
(Constant)	13.153	2.451	23.854		.016				
Age	−.332	−.488	−.176	−.348	.000				
Ethnicity	6.334	3.050	9.619	.314	.000				
Charlson Comorbidity	.585	−.117	1.286	.130	.101				
FAD GFF	7.205	4.366	10.044	.395	.000				
STEP 5						F(5,105)=14.349	<.001	.378	.033 (.018)
(Constant)	24.997	10.706	39.288		.001				
Age	−.340	−.492	−.187	−.356	.000				
Ethnicity	8.106	4.579	11.633	.401	.000				
Charlson Comorbidity	.513	−.176	1.201	.114	.143				
FAD GFF	6.389	3.532	9.245	.350	.000				

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Variable	B	95% CI for B		β	p-value	F(df1,df2)	p-value	Adj R2	R^2 (p-value)
Family HF Knowledge	−.153	−.278	−.027	−.206	.018				
Block 3									
STEP 6						F(6,104)=15.001	<.001	.433	.058 (.001)
(Constant)	37.413	21.922	52.903		.000				
Age	−.356	−.502	−.209	−.372	.000				
Ethnicity	−8.718	−19.217	1.781	−.432	.103				
Charlson Comorbidity	.439	−.219	1.098	.098	.189				
FAD GFF	1.673	−2.226	5.573	.092	.397				
Family HF Knowledge	−.187	−.309	−.066	−.252	.003				
Ethnicity-x-FAD GFF	8.946	3.658	14.234	.925	.001				

• Stepwise variable selection used within each Block

• Variables Considered in Block 1: Age, Gender (0 Male 1 Female), Ethnicity (0 AA 1 White), NYHA (0 Class II 1 Class III), Education (0 Vocational, High School or Less 1 College or Higher), Relationship (0 Adult Child, Sibling, Other 1 Spouse/Partner), Charlson Comorbidity Index

• Variables Considered in Block 2: FAD Global Family Functioning (GFF), FAD Problem Solving, FAD Communication, FEICS Perceived Criticism, Family Member HF Knowledge, Autonomy Support

• Variable Entered in Block 3: Interaction between Ethnicity – and – FAD Global Family Functioning

Table 5

Stepwise Linear Regression Model for Heart Failure Quality of Life - Emotional

Variable	B	95% CI for B		β	p-value	F(df1,df2)	p-value	Adj R2	R² (p-value)
Block 1									
STEP 1						F(1,109)=9.833	.002	.074	.083 (.002)
(Constant)	21.180	13.810	28.550		.000				
Age	−.206	−.336	−.076	−.288	.002				
STEP 2						F(2,108)=7.265	.001	.102	.036 (.038)
(Constant)	22.487	15.124	29.850		.000				
Age	−.253	−.388	−.117	−.353	.000				
Ethnicity	3.033	.164	5.902	.200	.038				
Block 2									
STEP 3						F(3,107)=11.797	<.001	.227	.130 (<.001)
(Constant)	10.679	1.945	19.412		.017				
Age	−.213	−.340	−.086	−.297	.001				
Ethnicity	2.823	.160	5.487	.186	.038				
FAD GFF	4.986	2.689	7.284	.364	.000				
STEP 4						F(4,106)=10.095	<.001	.249	.027 (.048)
(Constant)	21.735	7.790	35.679		.003				
Age	−.203	−.329	−.077	−.284	.002				
Ethnicity	3.154	.507	5.802	.208	.020				
FAD GFF	3.697	1.095	6.300	.270	.006				
Autonomy Support	−1.574	−3.135	−.013	−.193	.048				
Block 3									
STEP 5						F(5,105)=9.962	<.001	.289	.046 (.009)
(Constant)	28.984	14.391	43.577		.000				
Age	−.213	−.335	−.090	−.297	.001				
Ethnicity	−8.177	−16.989	.635	−.540	.069				
FAD GFF	.593	−2.833	4.019	.043	.732				

Variable	B	95% CI for B		β	p-value	F(df1,df2)	p-value	Adj R2	R² (p-value)
Autonomy Support	−1.698	−3.219	−.177	−.209	.029				
Ethnicity-x-FAD GFF	5.887	1.509	10.266	.811	.009				

• Stepwise variable selection used within each Block

• Variables Considered in Block 1: Age, Gender (0 Male 1 Female), Ethnicity (0 AA 1 White), NYHA (0 Class II 1 Class III), Education (0 Vocational, High School or Less 1 College or Higher), Relationship (0 Adult Child, Sibling, Other 1 Spouse/Partner), Charlson Comorbidity Index

• Variables Considered in Block 2: FAD Global Family Functioning (GFF), FAD Problem Solving, FAD Communication, FEICS Perceived Criticism, Family Member HF Knowledge, Autonomy Support

• Variable Entered in Block 3: Interaction between Ethnicity – and – FAD Global Family Functioning

Table 6

What's New

- More effective global family functioning and higher levels of FM knowledge were associated with decreased depressive symptoms in patients with HF.

- As levels of global family functioning and autonomy support increased, patients with HF reported greater QOL emotional.

- African Americans and Caucasians showed differences in how level of global family functioning affected their level of depressive symptoms and QOL emotional.