Illness knowledge moderates the influence of coping style on quality of life among women with congestive heart failure

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ARTICLE INFO

Article history:
Received 18 April 2009
Revised 13 December 2009
Accepted 22 December 2009
Online 8 April 2010

Keywords:
Congestive heart failure
Illness knowledge
Coping style
Quality of life
Anger-in
Alexithymia
Emotional expression

ABSTRACT

OBJECTIVE: This study evaluated the relationship of coping style with quality of life (QoL) among women with congestive heart failure (CHF), and the role of illness knowledge in this relationship.

METHODS: Thirty-five women with CHF completed measures of coping style (anger-in, alexithymia, and emotional expression), illness knowledge, and emotional/physical QoL.

RESULTS: Symptoms of depression and anxiety were positively associated with anger-in (P < .001) and alexithymia (P < .01), and were negatively correlated with emotional expression (P = .05). Furthermore, illness knowledge moderated the relationship between anger-in and depressive symptoms (P = .01), such that high anger-in individuals with greater illness knowledge displayed greater depressive symptoms. Knowledge also moderated the relationship between emotional expression and anxiety (P = .02), indicating that low emotional expression was associated with greater anxiety among those with less illness knowledge. Depressive and anxiety symptoms, anger-in, alexithymia, and emotional expression were not correlated with physical QoL.

CONCLUSION: Illness knowledge is associated with poorer emotional QoL among those using denial-based coping styles, but a better QoL among those avoiding communication of their emotions.


Congestive heart failure (CHF) has been diagnosed in more than 5 million people in the United States, and contributes to more than 250,000 deaths each year. Congestive heart failure is associated with impaired quality of life and reduced functional status, as reflected in physical role impairment and psychological...
In turn, reduced quality of life (QoL) is associated with poor illness prognoses among cardiac patients. Because of the prognostic implications of QoL in CHF patients, it is critical to identify factors associated with reduced physical and emotional QoL.

Factors affecting QoL are quite variable among patients with CHF and, more generally, among patients with coronary heart disease (CHD). One factor found to influence QoL in CHD patients is coping style (i.e., their cognitive approach to stress). In particular, 3 aspects of coping were studied among patients with CHD, including repressive coping (i.e., individuals copes by avoiding their feelings), anger-in (i.e., a tendency to withhold angry emotions), and alexithymia (i.e., an inability to describe emotions in words). Although each of the 3 styles reflects unique elements, 1 common factor in the 3 coping styles is a tendency to avoid or minimize distress. Repressive coping (denial) is associated with depression and an increased risk of mortality among both male and female CHF patients. Anger-in is a significant predictor of disease severity in CHD patients, possibly mediated by increased depression. In addition, anger-in is associated with increased resting blood pressure and greater blood-pressure reactivity during behavioral stress, both of which may serve as mechanisms for the development or exacerbation of cardiac illness. Alexithymia is associated with greater symptom expression and anxiety among patients with CHD. Thus, avoiding or minimizing emotional expression may result in poorer disease outcomes for cardiac patients. This is consistent with meta-analysis results indicating that greater emotional expression among Type A men was associated with a lower risk of CHD. Overall, data indicate health benefits of expressing emotion as well as negative health effects of avoiding or minimizing emotional expression. However, few studies evaluated emotional expression among patients with CHF, and no previous research examined the influence of anger-in, alexithymia, and emotional expression on QoL among CHF patients.

In addition, the relationship between coping styles and QoL may be moderated by the patient’s knowledge about the illness. Patient education is a common component of hospital care in cardiac units and in cardiac rehabilitation. At a minimum, education is intended to inform patients about their illness, including medication management and recommended health behavior changes. However, illness knowledge may not be beneficial for all patients. One study documented greater sleep disturbance, depression, and tension among postmyocardial-infarction patients who engaged in repressive coping and who retained a high level of knowledge about their condition after hospital discharge, than among those repressors with low levels of illness knowledge. No previous study examined illness knowledge as a moderator of the relationship between coping style and QoL among patients with CHF, despite the central role of education in the treatment of CHF.

Most previous research on cardiovascular disease focused on men, yet cardiovascular disease remains the leading cause of death among women in the United States. Fortunately, recent studies have addressed this critical gap in the research literature. Several studies found that women with cardiac disease have poorer QoL than men, which may lead to an increased risk for the development of CHF, higher levels of risk factors for cardiac disease (e.g., cholesterol, smoking, and body mass index), and faster progression of CHD. Thus, psychological factors appear to be especially important for health and QoL among women with heart disease.

This study sought to examine the influence of coping style on QoL among women with CHF. A racially diverse sample was recruited to increase the generalizability of the results. The primary outcomes were emotional (depression and anxiety) and physical (general and disease-specific) QoL. This study also evaluated the moderating influence of illness knowledge. It was hypothesized that elevated anger-in and/or alexithymia, and/or low emotional expression, in the presence of greater illness knowledge, would be associated with poorer emotional and physical QoL.

Methods

Participants

The sample included 35 women (60% Caucasian and 40% African-American; mean age, 55.7 ± 14.5 years) who participated in an 8-week social-support intervention study. Data from the baseline assessment were used for this study. All patients had received a physician’s diagnosis of CHF, and most of the women (n = 30) were diagnosed with stage C CHF, according to the American Heart Association and American College of Cardiology guidelines. Heart-failure stage was indeterminate for 5 women who were at either stage C or stage D. The mean left-ventricular ejection fraction (LVEF) was 42.0% (SD = 15.8%), and the mean body mass index (BMI) was 34.7 (SD = 8.7). Additional demographic and health information is included in Table 1.

Procedures

All experimental procedures received institutional review board approval. The requirements for study participation included female sex, age of at least 18 years, fluency in English, a diagnosis of stage C or D CHF by a cardiologist, and willingness to participate in a randomized study of a social-support intervention. Participants were recruited during an outpatient visit after being identified by medical staff as meeting the study requirements. At the point of recruitment, all participants provided written, informed consent, and
received a packet of questionnaires in a self-addressed, stamped envelope to complete at home and return as soon as possible. This investigation included data from the initial assessment of participants in the intervention study.

**Measures**

**Coping Style**

Three measures of coping style were included, to evaluate the degree to which participants used repression or expression of emotional responses. The Anger Expression Scale (AES) measures the tendency to withhold anger (anger-in) and to express anger (anger-out). The AES is a 24-item measure. Each item is rated on a 4-point scale (1 = almost never to 4 = almost always), and total scores range from 24 to 96. The anger-in subscale is comprised of 8 questions pertaining to withholding angry emotions (e.g., “I boil inside, but don’t show it”), with scores ranging from 8 to 32. This measure was used with cardiac patients,16,32 and showed satisfactory internal consistency in previous studies, as reflected by \( \alpha \) coefficients ranging from .73 to .84.33 In the present study, the anger-in subscale had a coefficient \( \alpha \) of .71.

The 20-item Toronto Alexithymia Scale (TAS-20) measures self-expression and interpretation of emotions. Each of the 20 items is rated on a 5-point scale (1 = strongly disagree, to 5 = strongly agree), and total scores range from 20 to 100. The TAS-20 incorporates 2 subscales: difficulty identifying feelings (DIF, e.g., “I am often confused about what emotion I am feeling”), and difficulty describing feelings (DDF, e.g., “It is difficult for me to find the right words for my feelings”). The DIF subscale consists of 7 questions, with scores ranging from 7 to 35, and the DDF subscale is comprised of 5 questions, with scores ranging from 5 to 25. Published data indicate a coefficient \( \alpha \) of .79 for the full TAS-20, .80 for the DIF subscale, and .64 for the DDF subscale, demonstrating adequate internal consistency in cardiac patient populations.22 In the present study, the coefficient \( \alpha \) for the full TAS-20 was .81. The 2 subscales had \( \alpha \) coefficients of .78 (for DIF) and .71 (for DDF).

Emotional expressivity was measured using the 16-item Emotional Expressiveness Questionnaire (EEQ), which demonstrated adequate reliability (coefficient \( \alpha \) of .78).34 Each item on the EEQ (e.g., “People can tell from my facial expressions how I am feeling”) is rated on a 7-point scale (1 = do not agree at all, to 7 = strongly agree). The EEQ was not used previously among cardiac patients, but exhibited very good internal consistency in this sample (\( \alpha \) coefficient, .82).

**Illness Knowledge**

Illness knowledge was evaluated with the Heart Failure Quiz (HFQ), which was developed for this study. The HFQ includes 8 questions covering topics such as the symptoms, consequences, and treatment of CHF. The internal consistency for the HFQ measured .60 in the present study.

**Emotional QoL**

Emotional QoL was evaluated with measures of depression and anxiety. The Center for Epidemiological Studies Depression Inventory (CES-D) is a 20-item measure of frequency of depressive symptoms during the preceding week. Each item is rated on a 4-point scale (0 = rarely or some of the time, i.e., \(<1\) day, to 3 = most or all of the time, i.e., 5 to 7 days), and total scores range from 0 to 60, with scores of \( \geq 16\) indicating possible clinically significant depressive symptoms.35 The measure’s internal consistency is satisfactory, as indicated by an \( \alpha \) coefficient of .87 in a previous study of cardiac patients.36 In the present study, the \( \alpha \) coefficient for the CES-D was .91.

Anxiety symptoms were measured with the state subscale of the State-Trait Anxiety Inventory (STAI).
The STAI is a 40-item inventory whose first 20 items reflect current levels of anxiety (state anxiety). Each item is rated on a 4-point scale (1 = not at all, to 4 = very much so), and total scores range from 20 to 80. This measure demonstrated fair to good reliability (test-retest for the scale is .76 to .84, and was used in previous studies of cardiac patients. The coefficient \( \alpha \) for the state anxiety subscale in the present study was .91.

Physical QoL

Physical QoL was evaluated with a disease-specific measure and a generic measure. Disease-specific physical QoL was assessed with the Minnesota Living With Heart Failure Questionnaire (MLHFQ). The MLHFQ is a 21-item questionnaire assessing perceived effects of CHF on daily life (e.g., “Did your heart failure prevent you from living as you wanted during the last month by making your work around the house or yard more difficult?”). Each item is rated on a 6-point scale (0 = no, to 5 = very much), and total scores range from 0 to 105, with higher scores indicating poorer physical outcomes. Published internal consistency reliabilities for the scale are > .79, and the \( \alpha \) coefficient in the present study was .96.

Generic physical QoL was evaluated with the Physical Component Score of the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36). The SF-36 is a widely used measure with demonstrated validity and reliability in various sociodemographic groups and among cardiac patients. Higher scores indicate better physical QoL. In the present study, the \( \alpha \) coefficient was .84.

Statistical Analyses

Pearson correlations were used to evaluate the associations of anger-in, alexithymia, and emotional expression with emotional QoL (depressive and anxiety symptoms). Partial correlations, controlling LVEF, were also conducted as a statistical control for the influence of illness severity. To examine illness knowledge as a moderator of the relationship between higher anger-in and/or alexithymia and poorer QoL, the sample was dichotomized into “high” and “low” scoring respondents on each of the dispositional traits, using a median split. Knowledge was operationalized as “high” or “low,” based on a cutoff score of 75% from the HFQ, which resulted in an evenly divided sample. Thus, separate analyses of variance (ANOVAs) were planned for each dependent measure of emotional (CES-D and STAI) and physical (MLHFQ and SF-36 Physical Functioning subscale) QoL, evaluating interactions of knowledge with anger-in, alexithymia, and emotional expression. Although the study required multiple statistical comparisons, no statistical adjustment (e.g., Bonferroni correction) was used, because such an adjustment is likely to be overly conservative, especially with a small sample size, and may inadvertently increase the risk of type II error.

Results

As shown in Table 1, women in the study were obese (mean BMI, > 30) and had impaired cardiac function (LVEF < 42% vs. > 55% in healthy adults). Because African-American women were well-represented in the study (40%), and because of the higher CHF mortality among African-Americans, post hoc ANOVAs were conducted to evaluate possible racial differences in demographic variables, in coping styles, and in QoL. The results indicated that Caucasian women reported more years of education than African American women (13.4 years vs. 12.3 years, respectively), but no other racial differences were evident for demographic or baseline variables. Overall, women in the study reported elevated symptoms of depression and anxiety, as well as reduced physical QoL, compared with healthy adults, as shown in Table 2.

Pearson correlations revealed that depressive symptoms were positively associated with anger-in (\( r = .61, P < .001 \)) and alexithymia (\( r = .49, P = .008 \)), and negatively correlated with emotional expression (\( r = -.36, P = .05 \)). Because the TAS-20 was significantly correlated with depressive symptoms, analyses were conducted for the DIF and DDF subscales. The results indicated that depressive symptoms were correlated with both the TAS-20 DIF (\( r = .67, P < .001 \)) and TAS-20 DDF (\( r = .41, P = .03 \)) subscales. When analyses were repeated controlling for LVEF, the correlations remained largely unchanged and statistically significant, as shown in Table 3.

Symptoms of anxiety were positively correlated with anger-in (\( r = .57, P < .001 \)) and alexithymia (\( r = .59, P < .001 \)), and negatively associated with emotional expression (\( r = -.49, P = .002 \)). Symptoms of anxiety were positively correlated with the DIF (\( r = .40, P = .04 \)) and DDF (\( r = .43, P = .02 \)) subscales of TAS-20. The correlations remained relatively unchanged and statistically significant when controlling for LVEF, as shown in Table 3. Depressive and anxiety symptoms, anger-in, alexithymia, and emotional expression were not correlated with disease-specific or general physical QoL.

To determine the moderating influence of illness knowledge, a series of 2-way ANOVAs were conducted, evaluating the relationship of emotional QoL (according to CES-D and STAI) with anger-in, alexithymia, and emotional expression. Because physical QoL was not associated with dispositional variables, no further analyses were conducted with the physical QoL variables. Thus, 6 ANOVAs in total were conducted for this portion of the study.

Results indicated a significant anger-in by knowledge interaction for depressive symptoms (\( F(3,26) = 4.28, P = .01 \)), as shown in Figure 1. Among women with
higher knowledge, higher anger-in was associated with greater depressive symptoms \((F(1,21) = 8.53, P < .01)\). Knowledge did not moderate the relationship of alexithymia or emotional expression with depressive symptoms. Analyses also revealed a moderating influence of knowledge on the relationship between state anxiety and TAS-20 \((F(3,26) = 7.41, P = .001)\). However, for women with both higher and lower knowledge, higher alexithymia was associated with greater anxiety \((F(1,7) = 9.23, P = .02)\). Knowledge moderated the relationship between TAS-20 DDF and anxiety \((F(3,26) = 3.09, P = .04)\), indicating that among women with low illness knowledge, difficulty in communicating emotions was more strongly associated with anxiety. Knowledge also moderated the relationship of the EEQ with anxiety \((F(3,26) = 4.16, P = .02)\). As shown in Figure 2, among women with low illness knowledge, symptoms of anxiety were associated with low emotional expression. Knowledge did not moderate the relationship between anger-in and anxiety. All interactions remained significant when analyses were repeated controlling for LVEF, age, and years of education.

### Discussion

The data confirm that anger-in and alexithymia are associated with depressive and anxiety symptoms among women with CHF. These findings are consistent with previous studies demonstrating an association of depression with repressive coping and alexithymia, and an association of anxiety with alexithymia, among male and female patients with CHF and CHD. Thus,
among women with CHF, poorer emotional QoL was associated with both repression of anger and an inability to identify and communicate emotions.

Consistent with our study hypotheses, knowledge about CHF moderated the relationship between coping styles and emotional QoL. High anger-in combined with greater illness knowledge appeared to have negative consequences for emotional QoL among women with CHF. Because anger-in is conceptualized as a form of repression, the results of our study are consistent with those of Shaw et al, who found that male and female postmyocardial-infarction patients who engaged in repressive coping and had greater illness knowledge reported poorer emotional QoL. These results support the notion that receiving and retaining information about one’s illness may be associated with greater negative affect among individuals who generally tend to avoid experiencing negative emotions such as fear.

Illness knowledge also moderated the effect of alexithymia on anxiety. Specifically, difficulty in describing emotions was more strongly associated with symptoms of anxiety among women who retained less illness knowledge than among those with greater knowledge. Previous research suggests that individuals high in alexithymia endorse symptoms of anxiety, in contrast to repressors, who deny experiencing negative affect. Thus, those high in alexithymia may respond to a stressful situation, such as being diagnosed with a chronic illness, with increased anxiety, unless they retain information or knowledge about their condition.

The present study makes several contributions to research in this area. First, previous studies concentrated primarily on men with cardiac disease. Few studies focused on QoL among women with heart failure. Second, our study achieved significant minority participation (40% African American) and indicated minimal racial differences in women with CHF. Previous research in this area focused primarily on Caucasian samples, despite the prevalence of cardiac disease in African Americans.

One primary limitation of this study was its small sample size, resulting in reduced statistical power. Coping styles were not associated with general or disease-specific physical QoL, which may be attributable to insufficient power in the statistical analyses. The small sample size may limit the generalizability of results to the wider population of women with CHF, and the results may not generalize to men with CHF. Also, the data for this study were cross-sectional, and thus causal relationships among symptoms of distress (depression/anxiety), illness knowledge, and coping style cannot be evaluated.

Education is a central component in both inpatient and outpatient cardiac rehabilitation programs. However, these data suggest that education may not be associated with enhanced well-being in some CHF patients, specifically in those using denial-based coping styles. The method of conveying illness-related information to CHF patients may be critical in determining how patients process and respond to information. Because patients using denial-based coping try to avoid receiving information that is fear-provoking, cautioning these patients about the consequences of noncompliance may be ineffective and possibly detrimental for emotional QoL. Mindfulness-based meditation, which aids individuals in monitoring their own arousal levels and observing their thoughts nonjudgmentally, may prove useful to individuals high in both repressive coping and alexithymia.Tacón et al found reduced suppression of negative emotions among 20 female cardiac patients who completed 8 weeks of mindfulness meditation. For patients high in repressive coping, mindfulness-based meditation may enhance coping with negative emotions, making it easier to receive information about their illness.

Future studies should examine the impact of varying methods and styles of delivering information to patients, with the goal of determining optimal strategies for educating patients high in denial-based coping styles such as anger-in. A broader range of educational materials may be needed to treat patients.

Figure 1 — Depressive symptoms (CES-D) as a function of repression (anger-in) and illness knowledge.

Figure 2 — State anxiety (STAI) as a function of emotional expressiveness and illness knowledge.
with CHF, and theoretical models of educational approaches may require adjustments to account for the influence of dispositional traits among patients. Further explorations of the mechanisms underlying repressive coping may provide insights into new educational approaches that could prove useful for improving emotional QoL among “repressors.” Traditional information-giving educational approaches may need to be modified for the adequate treatment of patients with CHF who engage in repressive coping. In addition, moderating variables such as socioeconomic status may require further examination for a full exploration of the relationship between knowledge, personality style, and QoL.

The results of this study suggest that illness knowledge plays an important role in the emotional QoL of women with CHF, but also that knowledge is not always beneficial for the well-being of patients. This finding is contrary to traditional assumptions about the benefits of education. Education is considered an integral aspect of treatment for cardiac patients. Although greater illness knowledge may benefit women who have difficulty communicating or identifying emotions, greater illness knowledge may contribute to increased distress among women who tend to deny their emotions. Thus, a consideration of individual coping styles may be important when educating CHF patients about their illness.

**References**

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