COPING STRATEGIES AND HEALTH-RELATED QUALITY OF LIFE IN PATIENTS WITH HEART FAILURE

By

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ABSTRACT

Heart failure (HF) contributes to poor physical and emotional health-related Quality of Life (HRQoL) and poor health outcomes. Coping strategies have been identified as essential in enhancing HRQoL. This 3-manuscript dissertation focuses on the stressor of heart failure (HF) associated severity and its relationship with coping and health-related quality of life (HRQoL). This dissertation is comprised of 3 manuscripts (a) a scoping review of literature on coping strategies and HRQoL; (b) a quantitative study of the associations between the stressor (HF severity), influencing factors (demographics [age, sex, education, and income] and HF duration), coping strategies (problem-focused, active emotion-focused, and avoidant emotion-focused), and physical and emotional HRQoL outcomes; and (c) a multiple mediation study that examines the mediating role of coping strategies between the stressor of HF severity and physical and emotional HRQoL.

In chapter 2, a literature review was conducted following the Arksey and O'Malley template. This scoping review was guided by the TSCM. Eligibility criteria involved patients with HF, reported on coping strategies and HRQoL, and published in English. In chapters 3 and 4, a cross-sectional survey design was used. A convenience sample of individuals with HF were recruited online using Researchmatch.org. Using PROCESS macro for SPSS, a multiple mediation model was applied to evaluate if one or more coping strategy types served as a mediator between HF severity and emotional and/or physical HRQoL.

In chapter 2, thirty-five studies were included (4 RCTs, 27 cross-sectional, and 4 qualitative/mixed methods). Active emotional coping (e.g., acceptance) and problem-focused (e.g., seeking social support) coping strategies were linked with better HRQoL, while avoidant emotional coping (e.g., denial) was linked to worse HRQoL. In the presence of the stressor of HF severity, key factors that influenced the types of coping strategy included sex, age, social support, income, education, spiritual beliefs, and illness duration. However, the evidence on the effectiveness of the type of coping on HRQoL remains inadequate due to the majority of studies being cross-sectional. The results of chapter 3 showed that 108 participants completed the study with an age range of 20-81 years (37.03±11.77 years).

Most participants were male (57.4%, n=62) and self-identified as Black or African American (60.2%, n=65). The mediation analysis results showed that active emotion-focused coping mediated the relationship between all three NYHA classifications (II, III, and IV) and emotional, but not physical HRQoL. Finally, chapter 4 showed a statistically significant indirect effect on the emotional HRQoL through only active emotion-focused coping (X1=0.74 [95% CI: 0.01 to 1.97]; X2=0.73 [95% CI: 0.01 to 1.91]), which suggests that active emotion-focused coping served as a mediator between HF severity (all three NYHA classifications) and emotional HRQoL.

This dissertation contributes to the science by recommending a consistent definition of the three types of coping and a better understanding of the influence of age, sex, education, income, and HF duration on coping strategies. This dissertation found that problem-focused and active emotion-focused coping were linked with improved physical and emotional HRQoL. Factors such as older age, male, and having a low level of education and lower level of income were showed as significantly associated with using more avoidant emotion-focused coping strategies, which can direct interventional work. Finally, this dissertation advances science by demonstrating that active emotion-focused coping serves as a mediator, playing an important role in mediating the effects between HF severity and emotional HRQoL. This will help initiating new intervention directions for nursing research, broadening the scope of education to enhance symptom management and QoL through nursing programs, and providing empirical evidence for clinicians to smoothly integrate into their practice. These contributions are expected to advance the field of HF science and care.

This dissertation is dedicated to my dear Mom and Dad.
Your love, wisdom, and guidance continue to inspire me, and I am grateful for the profound impact you have had on my life and this work.

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CHAPTER I: INTRODUCTION

This 3-manuscript dissertation focuses on the stressor of heart failure (HF) associated severity and its relationship with coping and health-related quality of life (HRQoL). This dissertation is comprised of 3 manuscripts (a) a scoping review of literature on coping strategies and HRQoL; (b) a quantitative study of the associations between the stressor (HF severity), influencing factors (demographics [age, sex, education, and income] and HF duration), coping strategies (problem-focused, active emotion-focused, and avoidant emotion-focused), and physical and emotional HRQoL outcomes; and (c) a multiple mediation study that examines the mediating role of coping strategies between the stressor of HF severity and physical and emotional HRQoL.

Heart Failure (HF) is a chronic health condition that affects more than 37 million adults worldwide (Bragazzi et al., 2021). In the United States (U.S.), HF contributes to high mortality and morbidity rates, and poor HRQoL especially among individuals over 65 years of age (Deady et al., 2017; Obiegło et al., 2016; Virani et al., 2020). Despite advances in HF treatment in recent years, morbidity and mortality rates remain significantly high (Bloom et al., 2017; Inamdar & Inamdar, 2016). According to the National Center for Chronic Disease Prevention and Health Promotion (CDC), HRQoL is defined as the impact of HF on the patients' physical and emotional health. Furthermore, living with HF is challenging as patients experience poor HRQoL due to overwhelming symptoms and impaired physical functioning (Deady et al., 2017; Virani et al., 2020). Evidence shows that HRQoL as a significant predictor of hospitalization and subsequent mortality among HF patients (Lawson et al., 2023). As such, improving the HRQoL is an essential goal in the management of patients with HF (Sepehrvand et al., 2020). There is growing evidence that effective coping with the challenges of HF is key to reducing the morbidity and mortality rates and improving HRQoL in this population (Blumenthal et al., 2019; Moser et al., 2010; Sherwood et al., 2017; Svensson et al., 2016). Coping strategies are commonly used by HF patients to manage the stressors linked with the severity of the disease, which is measured by the New York Heart Association (NYHA) functional classification (I-IV; Hundt et al., 2015; Miller, 2000; Obiegło et al., 2016; Ponikowski et al., 2014).

Objective. Overall, the objective of this dissertation is to examine how the stressor of HF severity and influencing factors impact patients' adoption of various coping strategies and the impact of coping strategies on HRQoL outcomes. Further, this dissertation aims to explore the potential meditation of coping strategies between the stressor of HF severity and HRQoL outcomes.

Background & Significance

Given the main concept of this dissertation is coping, a discussion of coping is presented, followed by how it is operationalized for this dissertation. Although coping has been characterized in a variety of ways in the literature, the three manuscripts for this dissertation are guided by Lazarus and Folkman's Transactional Stress and Coping Model (TSCM; Lazarus & Folkman, 1984). The TSCM is a well-established model that provides a useful framework for how individuals attempt to manage or alter chronic health stressors. The TSCM includes the following concepts: influencing factors, cognitive appraisal, coping strategies, and health outcomes. The conceptual adaptation of the TSCM for this dissertation is depicted in Figure 1.1 and the operational version in Figure 1.2, both are described in the theoretical framework section of this chapter.

In the HF literature, three types of coping have been observed, but have not been consistently presented. The three types include problem-focused, active emotion-focused, and avoidant emotion-focused coping (Rabinowitz & Arnett, 2009, 2013). First, problem-focused coping strategies are defined as behaviors that aim to directly and positively alter the stressor (i.e., seeking social support, taking medication, planning for meals, and physical activity engagement). Second, active emotion-focused coping is defined as self-reflection strategies that attempt to manage and facilitate the emotional consequences of the stressor (i.e., turning to religion, use of humor, acknowledging feelings, and expressing emotions with others). Third, avoidant emotion-focused coping is defined as self-distraction strategies that aim to isolate the aversive impact of the stressor (i.e., denial, behavioral disengagement, substance use, and self-blaming; Alhurani et al., 2018; Bose et al., 2016; Carver et al., 1989; Cooper et al., 2008; Eisenberg et al., 2012).

Combination of Coping Types. While active emotion-focused and avoidant emotion-focused coping strategies are occasionally combined in the literature as emotion-focused coping, there is evidence that this approach detracts from clarity. For example, emotion-focused coping strategies (active and avoidant) produce different effects on health outcomes, such as acceptance versus denial (Bose et al., 2020; Holahan & Moos, 1987). Studies found that those who use acceptance as a coping strategy were more likely to experience improved HRQoL, whereas those who used denial were at risk of developing negative health outcomes and lowered HRQoL (Hundt et al., 2015; Livneh, 2019). Grouping these two types of emotion-focused coping strategies can lead to confusion in the interpretation of disparate outcomes (Cooper et al., 2008; Endler & Parker, 1990). To overcome this challenge when measuring coping as a variable, Carver et al. (1989) modified their measure by dividing their original emotion-focused subscale into two distinct types: active emotional coping and avoidant emotional coping. This psychometric work by Carver et al. (1989) provided an early theoretically and empirically sound classification of coping strategies into three main types: problem-focused, active emotion-focused, and avoidant emotion-focused coping. Therefore, this dissertation utilizes the three coping strategies established by Carver et al. (1989).

HF severity, influencing factors (demographic characteristics and HF duration). Considering HF severity, Hundt et al. (2015) found that patients who experience higher HF severity were more likely to use avoidant coping strategies. Similarly, in a study on 273 HF patients, Eisenberg et al. (2012) showed that higher symptom severity was significantly associated with using avoidant coping, while problem-focused and active coping were not associated with symptom severity or health outcomes.

The severity of the disease may hinder the patient's ability to engage in problem-focused or active coping strategies (Hundt et al., 2015). As a result, patients would be more dependent on avoidant coping strategies (e.g., denial) to manage their condition. However, evidence on the association between HF severity and coping strategies is limited and inconsistent regarding the measurement and conceptualization of coping strategies. Hundt et al. (2015) classified coping strategies into two groups, active coping and avoidant/emotion-focused coping, which makes it difficult to clearly assess the of the

relationship between coping and HF severity as described above. Similarly, Eisenberg et al. (2012) examined the moderation effect of coping between anxiety and physical functioning. They categorized coping into two groups, namely approach and avoidant coping strategies, while also excluding two coping strategies, namely humor and religion, from the original Brief COPE. This introduces an additional layer of ambiguity because this exclusion can lead to uncertainty regarding the comprehensiveness and robustness of the coping measurement.

Specific demographic features are another component that may influence factors related to the selection of coping strategies among HF patients. These factors include age, sex, education, and income. According to the Atherosclerosis Risk in Communities Study (ARIC) and the Cardiovascular Health Study (CHS) Cohort, the incidence of HF in people aged 45 ranges between 6.0 to 8 per 1000 people and increases to 21 per 1000 population after 65 years of age (Virani et al., 2021) Higher incidences of HF were seen in White males, followed by Black males and White females (Virani et al., 2021). The literature shows that problem-focused and active emotion-focused coping strategies were dominant types of coping among HF patients who were less than 60 years of age, male, high school educated and higher, and who had more than $40,000 in annual income (Alhurani et al., 2018; Bose et al., 2015; Lynggaard et al., 2017; Nilsson et al., 2017; Svensson et al., 2016). On the other hand, avoidant coping was dominant among HF patients who were older than 60 years of age, a female, had less than high school education, and who had less than $40,000 in annual income (Bose et al., 2015; Grady et al., 2016; Nilsson et al., 2017; Rong et al., 2018).

While the aforementioned literature is helpful, it must also be noted that many studies demonstrated a lack of quality and consistency in how demographics were examined in association with coping strategies. Several studies reported no significant association between demographics (age, gender, education, and income) and the selection of coping strategies among HF patients (Alhurani et al., 2018; Jackson & Emery, 2011; Rong et al., 2018; Svensson et al., 2016). The inconsistencies in understanding demographic factors that contribute to the selection of different coping strategies need further investigation to uncover which strategies are most useful in maintaining positive health outcomes.

In addition to demographics, HF duration was linked to the selection of coping strategies among ethnic minority Chinese patients with HF (Rong et al., 2018). This study found that a longer duration of HF was associated with problem-focused coping, and a shorter duration was associated with avoidant emotion-focused coping (Rong et al., 2018). Further, patients diagnosed with HF for more than 10 years adapted positively and had better health outcomes. This may help explain the contrasting finding that high levels of depressive symptoms were observed in early stages and among HF patients who were younger than 65 years (Bordoni et al., 2018; Moser et al., 2013). It is reasonable to speculate that the use of avoidant emotion-focused coping earlier in the duration of HF may contribute to a more rapid increase in severity.

Regarding the influencing factors of demographics and duration of HF, several studies found that problem-focused and active coping were prominent among younger HF patients (Bose et al., 2015; Grady et al., 2016; Nilsson et al., 2017). This may suggest that younger patients have also had a shorter duration of their HF diagnosis and possibly both influencing factors (age and duration) can be associated with the use of problem-focused and active emotion-focused coping. However, there is no robust evidence to support this statement, and the relationship between coping and HF duration is not well-understood, especially how coping strategies may shift over time. Since problem-focused and active coping strategies were linked with improved HRQoL, they may also slow the advance of HF by enhancing the HRQoL. Furthermore, influencing factors (age, sex, education, income, and disease duration) may alter the selection of coping strategies, and subsequently, HRQoL. However, there is limited evidence to support these two hypotheses.

HRQoL. Turning next to relationships between coping and HRQoL outcomes, the Centers for Disease Control and Prevention (CDC) define HRQoL as perceptions of multiple aspects of the individual's life, including a physical, emotional, and social components that are linked to health and well-being (National Center for Chronic Disease Prevention and Health Promotion [NCCDPHP], n.d.). Facing a complex disease, such as HF, patients engage in different coping strategies to manage and control symptoms, maintain function, and ultimately their health outcomes (Folkman et al., 1986). The

use of problem-focused and active emotion-focused coping was generally associated with positive physical and emotional health and improved HRQoL outcomes. Where are avoidant emotion-focused coping was linked to poor health outcomes and low perceived HRQoL (Alhurani et al., 2018; Bose et al., 2015; Hundt et al., 2015). However, the work on coping and health outcomes including HRQoL for HF has been limited. Specifically, previous studies were predominantly cross-sectional, descriptive studies, and lacked a clear conceptualization of coping strategies (Alanazi et al., 2022). Such limitations make it difficult to determine what types of coping strategies (one or multiple types) contributes to physical and emotional HRQoL and how coping strategies may mediate the relationships between HF severity and HRQoL.

In summary, this dissertation contributed to understanding HF severity, coping strategies, and outcomes, as well as how the selected demographics and HF duration influence the selection of coping strategies in relation to the stressor of HF severity. This work focused on clarifying three unique types of coping strategies among HF patients and provide evidence on the factors that affect the selection of these coping strategies. This study also evaluated the potential for mediation by the three types of coping strategies between the stressor of HF severity and emotional and physical HRQoL outcomes. Finally, it has the potential to contribute to advancing HF symptom management by laying the groundwork for interventions that improve HRQoL which would potentially contribute to a reduction in suffering for the millions of patients with HF.

Dissertation Aims

The purpose of this dissertation is to advance nursing science related to coping among patients with HF by increasing the knowledge of the association of variables in the TSCM for patients with NYHA classfications II, III, and IV HF and exploring potential mediators. This assessment work will lay the foundation for building future coping interventions to help improve the HRQoL for this population of patients. The TSCM, gaps in the literature, and the state of the science, have provided direction for this dissertation. The following are the three aims that guided this dissertation:

Dissertation Aim 1: to identify the factors that influence coping and type of coping strategies used by patients with HF to improve HRQoL.

Dissertation Aim 2.1: to examine how the stressor of HF severity and influencing factors impact patients' adoption of various coping strategies.

Dissertation Aim 2.2: to describe the relationship between coping strategies and physical and emotional HRQoL outcomes.

Dissertation Aim 3: to explore the potential mediation role of coping strategies between the stressor of HF severity and physical and emotional HRQoL outcomes.

Theoretical Framework

Multiple theoretical models have been utilized to examine the concept of coping. Each perspective provides essential details to help understand the process of coping and the individual's coping strategies. Historically, Lazarus (1966) in his book *Psychological Stress and the Coping Process*, was among the first who defined the concept of coping. Due to the lack of generalizability of this model, Folkman and Lazarus (1984) articulated the alternative, two-dimensional TSCM model. The TSCM is one of the most known and widely accepted theoretical model for coping. This model defines coping strategies as cognitive, behavioral, and emotional actions that aim to control, adapt, or reduce stressors (Lazarus & Folkman, 1984).

The TSCM includes the following concepts influencing factors: cognitive appraisal, coping strategies, and health outcomes. For this dissertation, the variables under study included the HF stressor, influencing factors, coping strategies, and health outcomes (see Figures 1.1, 1.2, and 1.3). This section discusses the significance of the following key TSCM variables: stressor (i.e., HF severity), influencing factors (i.e., age sex, education, income, and HF duration), coping strategies (problem-focused, active, and avoidant), and physical and emotional HRQoL (Cooper et al., 2008; Lazarus & Folkman, 1984). Finally, relevant literature was discussed to illustrate the development of the dissertation research questions.

Stressor. Lazarus and Folkman (1984) defined a stressor as a situation in which the "relationship between the individual and the environment is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (p. 19). For HF patients, the stressor is HF severity, specifically symptom severity and functional limitations captured by the NYHA classifications captured by the NYHA classifications.

Influencing factors. The TSCM defines the influencing factors as the personal and situational factors that underlie the decisions that individuals make. Influencing factors refer to how individuals perceive the surrounding environment and their relationship to it (Schneider & Stanis, 2007). The model suggests that these factors influence the cognitive appraisal of a given stressor and therefore the selected coping strategies (Lazarus and Folkman, 1984). Personal factors involve areas such as age, belief system, experience, values, and cognitive coping styles. Situational factors include all external influencing factors, such as environment, social support, sense of control, available resources, disease-related factors, and relationships (Folkman & Lazarus, 1985; Lazarus & Folkman, 1984). For this work, the influencing factors are age sex, education, income, and HF duration.

Cognitive appraisal. The individuals' interpretation of a stressor and their ability to cope with it is influenced by the cognitive appraisal. According to Lazarus and Folkman (1987), the cognitive appraisal is defined as the ability to evaluate the situation to determine the appropriate response based on the available resources. The cognitive appraisal has two phases, primary and secondary. The first component of cognitive appraisal is the primary appraisal. When encountering a stressor, the individuals begin to evaluate how it may relate to their well-being or if it's threatening. If the individual appraises the event as threatening, then the secondary appraisal takes place where the available resources are being evaluated and an appropriate coping response is considered (Lazarus, 2013). However, the two components of cognitive appraisals (primary and secondary) are not distinct or systematic. The secondary appraisal could take place before the primary appraisal (Park & George, 2013). Cognitive appraisal is an assumption of this study and therefore not directly measured.

Coping strategies. Lazarus and Folkman (1984) identified coping strategies as behavioral and emotional strategies that individuals adopt when confronting stressors. There are two main types of coping strategies, problem-focused and emotion-focused (Lazarus & Folkman, 1984). Problem-focused strategies are defined as behaviors that aim to directly alter the stressor (i.e., planning, direct coping, use of Instrumental Support). Emotion-focused is defined as strategies that aim toward isolating, managing, or facilitating the emotional impact of the stressor. Examples of emotion-focused coping strategies include acceptance, positive reframing, use of emotional support, spirituality, use of humor, and venting emotions to someone coping include denying that this is happening, consuming alcohol or other substance, and self-blaming (Carver, 1997; Vungkhanching et al., 2017). For this dissertation, the included coping strategies are problem-focused, active emotion-focused, and avoidant emotion-focused.

Health Related Quality of Life. The TSCM identifies outcomes as the physical and emotional responses to coping strategies, and are divided into short and long-term outcomes (Schneider & Stanis, 2007). Short-term outcomes include emotional and physiological health outcomes. Long-term outcomes include satisfaction, social functioning, and long-term health (Lazarus & Folkman, 1984; Schneider & Stanis, 2007). For this dissertation, the outcomes are evaluated as physical and emotional HRQoL.

Transactional Process. The transactional process indicates that individuals are constantly reappraising (interpreting) their interaction with the stressor with the outcome (Folkman et al., 1986). This process offers an ongoing feedback loop between outcomes and cognitive appraisal in which the individual continues to evaluate coping strategies to determine if adequate or additional action is needed. This process is also an assumption of the model and not measured explicitly.

Adapted TSCM for this Dissertation

The adapted model omitted two concepts from the original TSCM (i.e., cognitive appraisal and transactional process). However, the selected variables of the modified model provide a clear illustration of the relationship among the stressor of HF severity, influencing factors, coping strategies, and health outcomes. Further, utilizing perceived HRQoL outcomes to determine the effectiveness of coping strategies captures both appraisal and transactional processes. Knowing the relationship of how coping

strategies are selected by HF patients to improve their health outcomes would provide a better understanding of their perceived outcomes. Moreover, it would yield evidence to identify patients who are at risk of utilizing maladaptive coping strategies. In future work, all model concepts could be included for their contribution to outcomes.

Adapted Conceptual Model Relationships

The adapted TSCM retains three main concepts from the original model and added the stressor of HF severity, which was not explicitly depicted in the original model. All arrows in the adapted model follow the direction shown in the original TSCM. First, the model starts with the stressor (HF severity) on the left side. Next, are the influencing factors. A single-headed dotted arrow leading from stressor to influencing factors (i.e., demographics and HF duration) was added to indicate a potential interaction. Then, two one-direction arrows heading from the stressor and influencing factors to the coping strategies (problem-focused, active emotion-focused, and avoidant emotion-focused). These two arrows follow the original TSCM, where the stressor is the basis for the coping process and coping strategies are affected by the type of stressor (Lazarus & Folkman, 1984). Further, the influencing factors play a role in the selection of coping strategies. Next, coping strategies are linked to the outcomes (physical and emotional HRQoL) with a single-headed one-way arrow. This arrow illustrates that coping strategies can have a direct impact on outcomes. Finally, each research question was included to show how they fit within the model.

To capture the potential of a mediating effect, a multiple mediation model was proposed to assess the effect of coping strategies on the relationship between HF severity (i.e., the stressor) and the physical and emotional HRQoL (Figure 1.3). This mediation model is consistent with the TSCM which views coping strategies as a mediator between the stressor and outcomes (Park Heppner, & Lee, 2010). Three single-headed arrows were added from the HF severity on the left to the three types of coping strategies (potential mediators). Next, three single-headed arrows lead from the three types of coping strategies to the physical and emotional HRQoL outcomes. Preacher and Hayes' (2008) method of multiple mediation analysis was utilized in the design of this mediation model within the TSCM.

Operational model: Adapted Stress and Coping Model

Stressor

The stressor in this study is the HF severity, which was measured by a self-assessed New York Heart Association (NYHA) classification for HF. The NYHA is a widely used classification system to describe the severity of HF and provide an assessment of the symptom's severity and functional limitations (Bennett, 2000). Studies showed that the NYHA Classes are significant predictors of disease severity, survival, hospitalization, and mortality (Holland et al., 2010; Williams et al., 2017). Further, this tool is being used in both practice (e.g., by physicians as a prognostic measure) and research (e.g., interventional studies as inclusion/exclusion criteria or an outcomes measure; Holland et al., 2010).

In this study, the NYHA was used to cluster HF patients into four classes (I, II, III, and IV), where higher classes indicate more severe symptoms. In Class I, patients experience no symptoms nor limitations in physical functioning. In Class II, patients exhibit minor symptom severity, including fatigue, palpitations, dyspnea with ordinary activity, and slight limitation in physical functioning. In Class III, HF patients experience fatigue, palpitations, and dyspnea with less than the ordinary activity, and moderate limitation in physical functioning. Finally, those in Class IV experience fatigue, palpitations, and dyspnea at rest, and have significant limitations in physical functioning (Ancheta et al., 2009). Classes II-IV were included in this dissertation. Class I was omitted since these patients are often asymptomatic.

Influencing Factors

In this dissertation, the influencing factors include the demographic factors (i.e., age, sex, education, and income) and HF duration. Age was measured in years, sex as a male, female, or other, education in years of education, and income in categories of total annual income. HF duration is defined as the time from the onset of HF diagnosis by a cardiologist and was measured in months since diagnosis.

Coping Strategies

The Brief Coping Orientation to Problems Experienced (COPE) developed by Carver (1997) was used in this study to measure coping strategies. The Brief COPE is a short version of the original 60-item

COPE scale (Carver, 1989, 1997). The Stress and Coping Model was used as a theoretical guideline in the development of the Brief COPE (Carver, 1997). This tool has 28 items that measure 14 different coping strategies, two items for each coping strategy (Appendix D). The Brief COPE is a self-reported questionnaire in which individuals are asked how they deal with a stressor and answer on a scale of 1 to 4, where 1 indicates "I usually do not do" and 4 "I usually do." Lower scores indicate less use of the coping strategy. Scores can be totaled for each type of coping with the following score ranges: problem-focused (6 to 24), active coping (10 to 40), and avoidant coping (12 to 48).

The validity and reliability of this tool have been tested among different patient populations, including HF patients (Amoyal et al., 2011; Bose et al., 2016; Carver, 1997; Coolidge et al., 2000). Further, the literature supports the grouping of Brief COPE items into three types of coping strategies, problem-focused, active emotion-focused, and avoidant emotion-focused (N. C. Bose et al., 2015; Coolidge et al., 2000; Cooper et al., 2008). The reliability and validity of the Brief COPE when grouping coping strategies has good internal consistency, test-retest, and construct validity.

Health Outcomes

The Minnesota Living with HF Questionnaire (MLHFQ) was used to measure patients' HRQoL. The MLHFQ is a disease-specific measure that evaluates the patients' subjective perception of the physical and emotional impact of the disease on their daily life (Alla et al., 2002; Hwang et al., 2014). The MLHFQ has a total of 21 items with three subscales (physical, social, and emotional); however, this study focuses only on two subscales, physical (8 items) and emotional (5 items). The psychometric properties of the MLHFQ have been previously investigated (Bilbao et al., 2016; Hwang et al., 2014; Napier et al., 2018; Zahwe et al., 2020).

Chapter 2 is a scoping review of the literature pertinent to this area of study. Chapters 3 and 4 are manuscripts on the quantitative outcomes of this dissertation. Finally, chapter 5 provides a conclusion and implication of the work to the profession of nursing and society.

Figures

Figure 1.1 Adapted Conceptual Model.

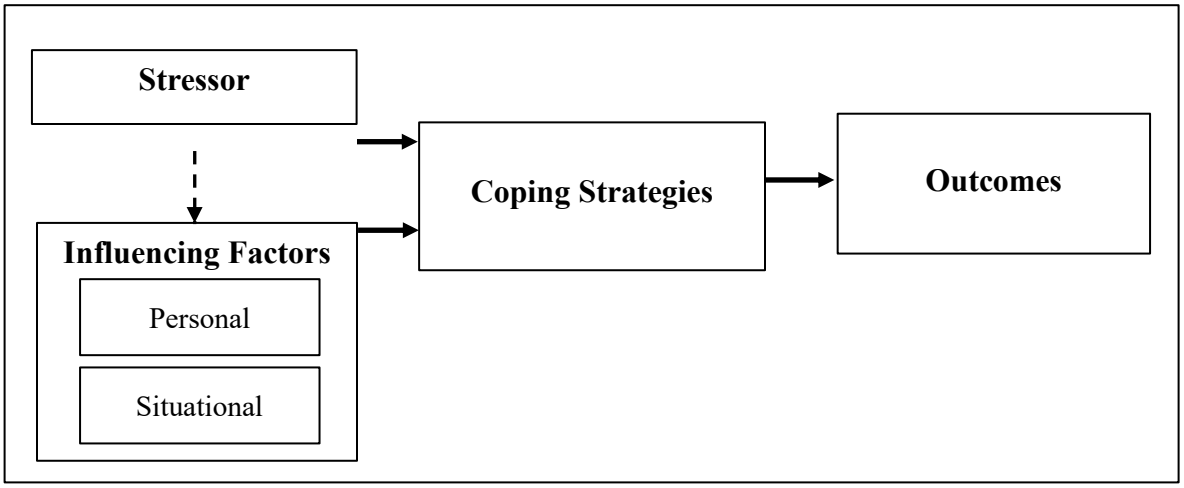


Figure 1.2 Adapted Operational Model.

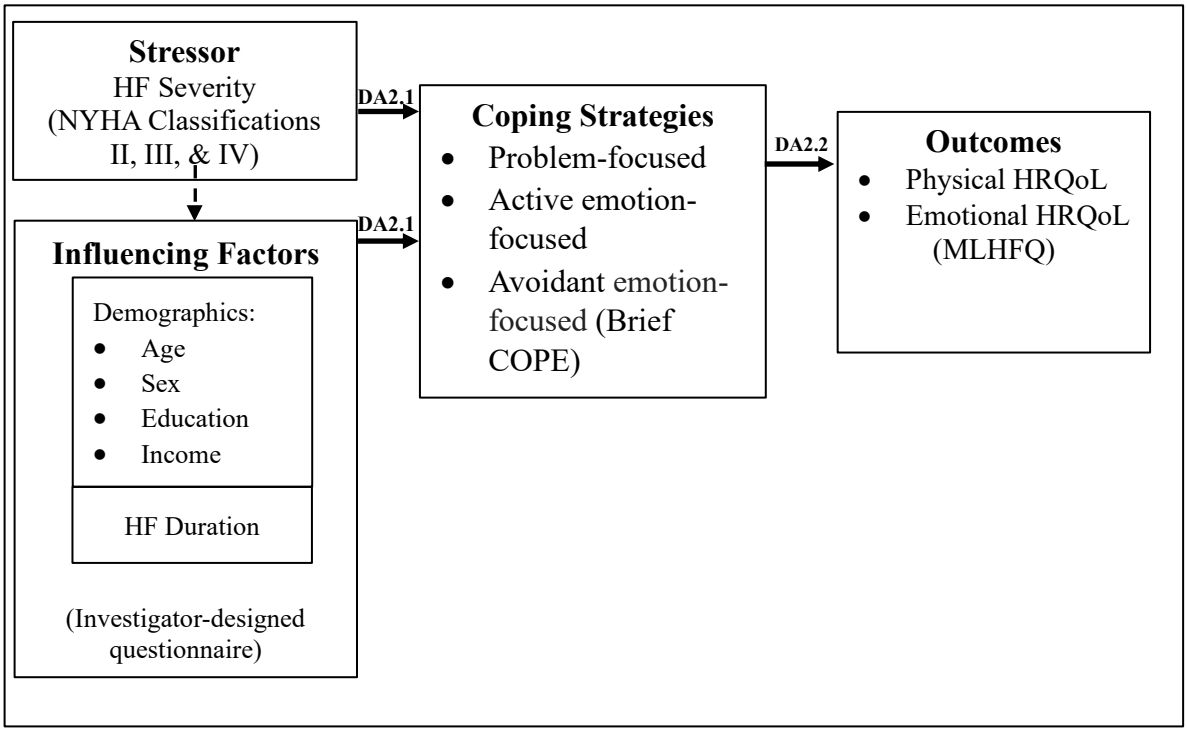
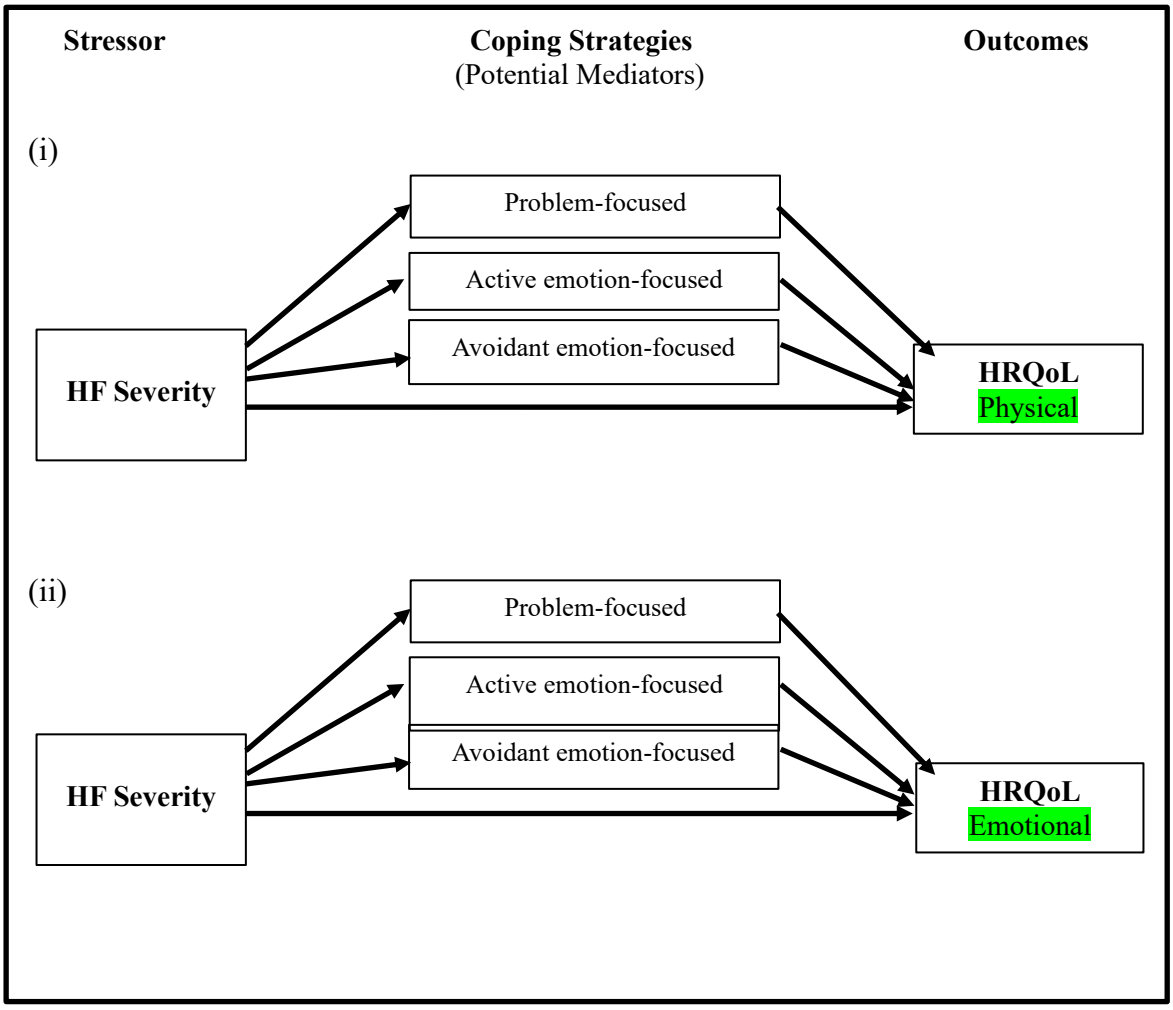


Figure 1.3 A multiple mediation model for RQ 4 assessing the mediating effect of coping strategies in the relationship between HF Severity (stressor) and HRQoL outcomes.



BIBLIOGRAPHY

Alanazi, M. O., Given, C. W., Deka, P., Lehto, R., & Wyatt, G. (2022). A literature review of coping strategies and health-related quality of life among patients with heart failure. *European Journal of Cardiovascular Nursing*, *22*(3), 236–244. https://doi.org/10.1093/eurjcn/zvac042

Alhurani, A. S., Dekker, R., Ahmad, M., Miller, J., Yousef, K. M., Abdulqader, B., Salami, I., Lennie, T. A., Randall, D. C., & Moser, D. K. (2018). Stress, cognitive appraisal, coping, and event free survival in patients with heart failure. *Heart & Lung*, *47*(3), 205–210. https://doi.org/10.1016/j.hrtlng.2018.03.008

Alla, F., Briançon, S., Guillemin, F., Juillière, Y., Mertès, P., Villemot, J., Zannad, F., & EPICAL Investigators. (2002). Self-rating of quality of life provides additional prognostic information in heart failure. Insights into the EPICAL study. *European Journal of Heart Failure*, *4*(3), 337–343.

Amoyal, N. R., Mason, S. T., Gould, N. F., Corry, N., Mahfouz, S., Barkey, A., & Fauerbach, J. A. (2011). Measuring coping behavior in patients with major burn injuries: A psychometric evaluation of the BCOPE. *Journal of Burn Care & Research*, *32*(3), 392–398.

Ancheta, I. B., Battie, C., Cobb, S., Ancheta, C., Miller, A., & Chiong, J. R. (2009). The impact of B-type natriuretic peptide, New York Heart Association classification and depression on quality of life in nonhospitalized heart failure patients. *Progress in Cardiovascular Nursing*, *24*(4), 124–130. https://doi.org/10.1111/j.1751-7117.2009.00050.x

Bennett, J. A. (2000). Mediator and moderator variables in nursing research: Conceptual and statistical differences. *Research in Nursing & Health*, *23*(5), 415–420.

Bilbao, A., Escobar, A., García-Perez, L., Navarro, G., & Quirós, R. (2016). The Minnesota living with heart failure questionnaire: Comparison of different factor structures. *Health and Quality of Life Outcomes*, *14*(1), 1–11.

Bloom, M. W., Greenberg, B., Jaarsma, T., Januzzi, J. L., Lam, C. S., Maggioni, A. P., Trochu, J.-N., & Butler, J. (2017). Heart failure with reduced ejection fraction. *Nature Reviews Disease Primers*, *3*(1), 1–19.

Blumenthal, J. A., Zhu, Y., Koch, G. G., Smith, P. J., Watkins, L. L., Hinderliter, A. L., Hoffman, B. M., Rogers, J. G., Chang, P. P., O'Connor, C., Johnson, K. S., & Sherwood, A. (2019). The modifying effects of social support on psychological outcomes in patients with heart failure. *Health Psychology : Official Journal of the Division of Health Psychology, American Psychological Association*, *38*(6), 502–508.

Bordoni, B., Marelli, F., Morabito, B., & Sacconi, B. (2018). Depression and anxiety in patients with chronic heart failure. *Future Cardiology*, *14*(2), 115–119. https://doi.org/10.2217/fca-2017-0073

Bose, C. N., Saboonchi, F., Persson, H., Björling, G., & Elfström, M. L. (2020). Adaptation of Coping Effectiveness Training for Patients With Heart Failure and Patient-Reported Experience of the Intervention. *Journal of Patient Experience*, *7*(6), 1054–1061.

Bose, N. C., Bjorling, G., Elfstrom, M. L., Persson, H., & Saboonchi, F. (2015). Assessment of Coping Strategies and Their Associations With Health Related Quality of Life in Patients With Chronic Heart Failure: The Brief COPE Restructured. *Cardiology Research*, *6*(2), 239–248.

Bose, N. C., Persson, H., Bjorling, G., Ljunggren, G., Elfstrom, M. L., & Saboonchi, F. (2016). Evaluation of a Coping Effectiveness Training intervention in patients with chronic heart failure—A randomized controlled trial. *European Journal of Cardiovascular Nursing : Journal of the Working Group on Cardiovascular Nursing of the European Society of Cardiology*, *15*(7), 537–548.

Bragazzi, N. L., Zhong, W., Shu, J., Abu Much, A., Lotan, D., Grupper, A., Younis, A., & Dai, H. (2021). Burden of heart failure and underlying causes in 195 countries and territories from 1990 to 2017. *European Journal of Preventive Cardiology*, zwaa147. https://doi.org/10.1093/eurjpc/zwaa147

Carver, C. S. (1997). You want to measure coping but your protocol's too long: Consider the brief cope. *International Journal of Behavioral Medicine*, *4*(1), 92–100.

Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology*, *56*(2), 267.

Coolidge, F. L., Segal, D. L., Hook, J. N., & Stewart, S. (2000). Personality disorders and coping among anxious older adults. *Journal of Anxiety Disorders*, *14*(2), 157–172.

Cooper, C., Katona, C., & Livingston, G. (2008). Validity and reliability of the brief COPE in carers of people with dementia: The LASER-AD Study. *The Journal of Nervous and Mental Disease*, *196*(11), 838–843.

Deady, M., Choi, I., Calvo, R. A., Glozier, N., Christensen, H., & Harvey, S. B. (2017). eHealth interventions for the prevention of depression and anxiety in the general population: A systematic review and meta-analysis. *BMC Psychiatry*, *17*(1), 310.

Eisenberg, S. A., Shen, B.-J., Schwarz, E. R., & Mallon, S. (2012). Avoidant coping moderates the association between anxiety and patient-rated physical functioning in heart failure patients. *Journal of Behavioral Medicine*, *35*(3), 253–261. https://doi.org/10.1007/s10865-011-9358-0

Endler, N. S., & Parker, J. D. (1990). Multidimensional assessment of coping: A critical evaluation. *Journal of Personality and Social Psychology*, *58*(5), 844.

Folkman, S., & Lazarus, R. S. (1985). If it changes it must be a process: Study of emotion and coping during three stages of a college examination. *Journal of Personality and Social Psychology*, *48*(1), 150.

Folkman, S., Lazarus, R. S., Gruen, R. J., & DeLongis, A. (1986). Appraisal, coping, health status, and psychological symptoms. *Journal of Personality and Social Psychology*, *50*(3), 571.

Garin, O., Herdman, M., Vilagut, G., Ferrer, M., Ribera, A., Rajmil, L., Valderas, J. M., Guillemin, F., Revicki, D., & Alonso, J. (2014). Assessing health-related quality of life in patients with heart failure: A systematic, standardized comparison of available measures. *Heart Failure Reviews*, *19*(3), 359–367.

Grady, K. L., Andrei, A.-C., Li, Z., Rybarczyk, B., White-Williams, C., Gordon, R., & McGee Jr, E. C. (2016). Gender differences in appraisal of stress and coping 5 years after heart transplantation. *Heart & Lung*, *45*(1), 41–47.

Holahan, C. J., & Moos, R. H. (1987). Personal and contextual determinants of coping strategies. *Journal of Personality and Social Psychology, 52*(5), 946.

Holland, R., Rechel, B., Stepien, K., Harvey, I., & Brooksby, I. (2010). Patients' self-assessed functional status in heart failure by New York Heart Association class: A prognostic predictor of hospitalizations, quality of life and death. *Journal of Cardiac Failure, 16*(2), 150–156. PubMed. https://doi.org/10.1016/j.cardfail.2009.08.010

Hsu, T., Chang, H., Huang, C., Chou, M., Yu, Y., & Lin, L. (2018). Identifying cut-off scores for interpretation of the Heart Failure Impact Questionnaire. *Nursing Open, 5*(4), 575–582.

Hundt, N. E., Bensadon, B. A., Stanley, M. A., Petersen, N. J., Kunik, M. E., Kauth, M. R., & Cully, J. A. (2015). Coping mediates the relationship between disease severity and illness intrusiveness among chronically ill patients. *Journal of Health Psychology, 20*(9), 1186–1195.

Hwang, S., Liao, W., & Huang, T. (2014). Predictors of quality of life in patients with heart failure. *Japan Journal of Nursing Science, 11*(4), 290–298.

Inamdar, A. A., & Inamdar, A. C. (2016). Heart failure: Diagnosis, management and utilization. *Journal of Clinical Medicine, 5*(7), 62.

Jackson, J. L., & Emery, C. F. (2011). Illness knowledge moderates the influence of coping style on quality of life among women with congestive heart failure. *Heart & Lung, 40*(2), 122–129. https://doi.org/10.1016/j.hrtlng.2009.12.005

Lawson, C. A., Benson, L., Squire, I., Zaccardi, F., Ali, M., Hand, S., Kadam, U., Tay, W. T., Dahlstrom, U., & Lund, L. H. (2023). Changing health related quality of life and outcomes in heart failure by age, sex and subtype. *eClinicalMedicine, 64*.

Lazarus, R. S. (2013). Psychological stress in the workplace. *Fifty Years of the Research and Theory of RS Lazarus: An Analysis of Historical and Perennial Issues, 312*.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer Publishing Company.

Livneh, H. (2019). The use of generic avoidant coping scales for psychosocial adaptation to chronic illness and disability: A systematic review. *Health Psychology Open, 6*(2), UNSP 2055102919891396. https://doi.org/10.1177/2055102919891396

Lynggaard, V., Nielsen, C. V., Zwisler, A.-D., Taylor, R. S., & May, O. (2017). The patient education—Learning and Coping Strategies—Improves adherence in cardiac rehabilitation (LC-REHAB): A randomised controlled trial. *International Journal of Cardiology, 236*, 65–70. https://doi.org/10.1016/j.ijcard.2017.02.051

Miller, J. F. (2000). *Coping with chronic illness: Overcoming powerlessness* (Vol. 3). FA Davis Philadelphia, PA.

Moser, D. K., Dracup, K., Evangelista, L. S., Zambroski, C. H., Lennie, T. A., Chung, M. L., Doering, L. V., Westlake, C., & Heo, S. (2010). Comparison of prevalence of symptoms of depression, anxiety, and hostility in elderly patients with heart failure, myocardial infarction, and a coronary artery bypass graft. *Heart & Lung, 39*(5), 378–385.

Moser, D. K., Heo, S., Lee, K. S., Hammash, M., Riegel, B., Lennie, T. A., Arslanian-Engoren, C., Mudd-Martin, G., Albert, N., & Watkins, J. (2013). "It could be worse ... Lot's worse!" Why health-related quality of life is better in older compared with younger individuals with heart failure. *Age and Ageing*, *42*(5), 626–632. https://doi.org/10.1093/ageing/aft078

Napier, R., McNulty, S. E., Eton, D. T., Redfield, M. M., AbouEzzeddine, O., & Dunlay, S. M. (2018). Comparing measures to assess health-related quality of life in heart failure with preserved ejection fraction. *JACC: Heart Failure*, *6*(7), 552–560.

National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP). (n.d.). *Health-Related Quality of Life (HRQOL)*. https://www.cdc.gov/hrqol/concept.htm

Nilsson, A., Carlsson, M., Lindqvist, R., & Kristofferzon, M.-L. (2017). A comparative correlational study of coping strategies and quality of life in patients with chronic heart failure and the general Swedish population. *Nursing Open*, *4*(3), 157–167.

Obiegło, M., Uchmanowicz, I., Wleklik, M., Jankowska-Polańska, B., & Kuśmierz, M. (2016). The effect of acceptance of illness on the quality of life in patients with chronic heart failure. *European Journal of Cardiovascular Nursing*, *15*(4), 241–247.

Park, H., Heppner, P. P., & Lee, D. (2010). Maladaptive coping and self-esteem as mediators between perfectionism and psychological distress. *Personality and Individual Differences*, *48*(4), 469–474.

Ponikowski, P., Anker, S. D., AlHabib, K. F., Cowie, M. R., Force, T. L., Hu, S., Jaarsma, T., Krum, H., Rastogi, V., & Rohde, L. E. (2014). Heart failure: Preventing disease and death worldwide. *ESC Heart Failure*, *1*(1), 4–25.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, *40*(3), 879–891. https://doi.org/10.3758/BRM.40.3.879

Rabinowitz, A. R., & Arnett, P. A. (2009). A longitudinal analysis of cognitive dysfunction, coping, and depression in multiple sclerosis. *Neuropsychology*, *23*(5), 581.

Rabinowitz, A. R., & Arnett, P. A. (2013). Coping in neurological disorders. In *Positive Neuropsychology* (pp. 13–24). Springer.

Rong, X., Peng, Y., Yu, H., & Li, D. (2018). Factors associated with adoption of coping strategies among Chinese patients with heart failure in ethnic minority regions. *Journal of Clinical Nursing*, *27*(17–18), 3324–3334. https://doi.org/10.1111/jocn.14199

Schneider, I. E., & Stanis, S. A. W. (2007). Coping: An Alternative Conceptualization for Constraint Negotiation and Accommodation. *Leisure Sciences*, *29*(4), 391–401. https://doi.org/10.1080/01490400701394915

Sepehrvand, N., Savu, A., Spertus, J. A., Dyck, J. R. B., Anderson, T., Howlett, J., Paterson, I., Oudit, G. Y., Kaul, P., McAlister, F. A., Ezekowitz, J. A., & null, null. (2020). Change of Health-Related Quality of Life Over Time and Its Association With Patient Outcomes in Patients With Heart Failure. *Journal of the American Heart Association*, *9*(17), e017278. https://doi.org/10.1161/JAHA.120.017278

Sherwood, A., Blumenthal, J. A., Koch, G. G., Hoffman, B. M., Watkins, L. L., Smith, P. J., O'Connor, C. M., Adams, K. F., Rogers, J. G., Sueta, C., Chang, P. P., Johnson, K. S., Schwartz, J., & Hinderliter, A. L. (2017). Effects of Coping Skills Training on Quality of Life, Disease Biomarkers, and Clinical Outcomes in Patients With Heart Failure: A Randomized Clinical Trial. *Circulation. Heart Failure*, *10*(1).

Svensson, T., Inoue, M., Sawada, N., Yamagishi, K., Charvat, H., Saito, I., Kokubo, Y., Iso, H., Kawamura, N., & Shibuya, K. (2016). Coping strategies and risk of cardiovascular disease incidence and mortality: The Japan Public Health Center-based prospective Study. *European Heart Journal*, *37*(11), 890–899.

Virani, S. S., Alonso, A., Aparicio, H. J., Benjamin, E. J., Bittencourt, M. S., Callaway, C. W., Carson, A. P., Chamberlain, A. M., Cheng, S., & Delling, F. N. (2021). Heart disease and stroke statistics—2021 update: A report from the American Heart Association. *Circulation*, *143*(8), e254–e743.

Virani, S. S., Alonso, A., Benjamin, E. J., Bittencourt, M. S., Callaway, C. W., Carson, A. P., Chamberlain, A. M., Chang, A. R., Cheng, S., & Delling, F. N. (2020). Heart disease and stroke statistics—2020 update: A report from the American Heart Association. *Circulation*, E139–E596.

Vungkhanching, M., Tonsing, J. C., & Tonsing, K. N. (2017). Psychological Distress, Coping and Perceived Social Support in Social Work Students. *The British Journal of Social Work*, *47*(7), 1999–2013. https://doi.org/10.1093/bjsw/bcw145

Williams, B. A., Doddamani, S., Troup, M. A., Mowery, A. L., Kline, C. M., Gerringer, J. A., & Faillace, R. T. (2017). Agreement between heart failure patients and providers in assessing New York Heart Association functional class. *Heart & Lung*, *46*(4), 293–299. https://doi.org/10.1016/j.hrtlng.2017.05.001

Zahwe, M., Isma'eel, H., Skouri, H., Al-Hajje, A., Rachidi, S., Tamim, H., & Noureddine, S. (2020). Validation of the Arabic Version of the Minnesota Living with Heart Failure Questionnaire. *Heart & Lung*, *49*(1), 36–41. https://doi.org/10.1016/j.hrtlng.2019.10.006

CHAPTER 2: A LITERATURE REVIEW OF COPING STRATEGIES AND HEALTH RELATED QUALITY OF LIFE AMONG PATIENTS WITH HEART FAILURE

Abstract

Aims: To identify and provide clarity on factors that influence coping and type of coping strategies used by patients with HF to improve HRQoL.

Method: The Arksey and O'Malley template framed this scoping review guided by the Stress and Coping model. Five databases were explored: PubMed, Web of Science, Cochrane, CINAHL, and PsycINFO. Keywords included HF, quality of life, coping, influencing factors. Eligibility criteria involved patients with HF, reported on coping strategies and HRQoL, and published in English.

Results: Thirty-five studies were included (4 RCTs , 27 cross-sectional, and 4 qualitative/mixed methods). Active emotional coping (e.g., acceptance) and problem-focused (e.g., seeking social support) coping strategies were linked with better HRQoL, while avoidant emotional coping (e.g., denial) was linked to worse HRQoL. In the presence of the stressor of HF severity, key factors that influenced the types of coping strategy included sex, age, social support, income, education, spiritual beliefs, and illness duration. However, the evidence on the effectiveness of the type of coping on HRQoL remains inadequate due to the majority of studies being cross-sectional.

Conclusion: Problem-focused and active emotional coping strategies are associated with improved HRQoL. However, their effect is inconclusive due to the lack of experimental studies. Additional predictive studies will enhance the understanding of coping among HF patients.

Introduction

Heart Failure (HF) is a chronic health condition that affects more than 37 million adults worldwide (Bragazzi et al., 2021). The prevalence of HF is projected to increase to more than 8 million cases by the year 2030 in the United States (U.S.; Virani et al., 2021). The American Heart Association estimates that 3% of the total U.S. population will be diagnosed with HF at some point in their lifetime (Virani et al., 2021). While in Europe, 1-2% of adults are diagnosed with HF (McDonagh et al., 2021; Virani et al., 2021). Further, HF contributes to high mortality and morbidity rates, and poor health-related quality of life (HRQoL) especially among individuals over age 65 (Obiegło et al., 2016). The Centers for

Disease Control and Prevention (CDC) defines HRQoL as a perception of multiple aspects of the individual's life, including physical, emotional, and social that are linked to health and well-being (National Center for Chronic Disease Prevention and Health Promotion [NCCDPHP], n.d.). Studies show that HRQoL is a significant predictor of hospitalization and mortality among HF patients (Pokharel et al., 2017; Sepehrvand et al., 2020). As such, improving the HRQoL is considered an essential goal in the management of patients with HF (Sepehrvand et al., 2020).

In order to maintain HRQoL, patients with HF use coping strategies to manage the stress and limitations linked with the severity of the disease, commonly indicated by the New York Heart Association (NYHA) functional classification (I-IV; (Hundt et al., 2015; Miller, 2000; Obiegło et al., 2016; Ponikowski et al., 2014). Effective coping, as highlighted by the Transactional Stress and Coping Model (TSCM), is an essential requirement for an individual's response to stressors in order to maintain or improve the HRQoL (Lazarus & Folkman, 1984). The TSCM posits that personal and situational factors influence coping strategies. Also, influencing factors contribute to the selection of different coping strategies. Lazarus and Folkman (1984) identified coping strategies as behavioral and emotional strategies that individuals adopt when confronting stressors. Three types of coping strategies are prominent in the HF literature, i.e., emotion-focused (active), emotion-focused (avoidant), and problem-focused (Alhurani et al., 2018; Sendra & Farré, 2020; Wright et al., 2012). Guided by the TSCM, this review aimed to identify coping strategies that impact HRQoL, as well as situational and personal factors that influence the selection and use of coping strategies when patients are faced with the stressor of a HF severity. This knowledge uncovers areas that need further investigation and provides a foundation for future interventional studies.

Method

This review utilized Arksey and O'Malley (2005) five-stage template for conducting a scoping review, namely: (1) identifying the research questions; (2) identifying relevant studies; (3) study selection; (4) charting the data; and (5) collating, summarizing, and reporting the results. This review was guided by

the TSCM. A special focus was placed on searching for articles that addressed one or more of the three types of coping.

Stage 1: Identifying Research Questions

To achieve the objectives of this review, the following research questions were asked:

1. What coping strategies are linked with HRQoL in HF patients: emotion-focused (active); emotion-focused (avoidant); and/or problem-focused?
2. What factors influence HF patients' choice of coping strategies?

Stage 2: Identifying Relevant Studies

Publications were included if they: a) involved patients with HF as a primary diagnosis; b) reported on coping strategies and HRQoL; c) published in English. Publications were excluded if only an abstract was available. The search was done in consultation with a university librarian. Reference lists from the reviewed studies were screened for additional publications. Studies that measured single or all dimensions of the coping strategies and HRQoL were included. Further, studies that have no measure for coping strategies and HRQoL were excluded. The following electronic databases were searched: PubMed, Web of Science, Cochrane, Cumulative Index to Nursing and Allied Health Literature (CINAHL), and PsycINFO. No time restrictions were applied to increase the likelihood of finding all relevant studies. Search strings for all databases used in the search are presented in supplementary materials.

Stage 3: Study Selection

A modified Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) was used to depict the selection process for articles (see Figure 2.1). The initial search generated 821 articles. Duplicates (n=270) were removed. Next, title and abstract screening for relevance to review aims yielded 97 articles. Upon closer investigation, 62 articles were excluded for not meeting the inclusion criteria. A total of 35 articles met all the inclusion criteria and were included in this review. Based on the level of evidence, studies were grouped as randomized controlled trials (n=4); quantitative (cross-sectional; n=27), qualitative (n=3), and mixed method (n=1). Two authors MA and RL came to a

consensus on publications meeting eligibility criteria and minor discrepancies were resolved through discussion.

Quality Appraisal

The Joanna Briggs Institute (JBI) tool was used to assess the quality of the 35 studies. Three JBI Critical Appraisal Checklists were used based on the study design: 1) Checklist for RCTs; 2) Checklist for cross-sectional studies; and 3) Checklist for qualitative studies. Mixed methods were evaluated via the cross-sectional checklist. Two authors MA and RL independently evaluated all studies. Based on established cut points, the following ranges were used for quality level: low (0-3); moderate (4-6); and high (>7), see Table 2.1 (Cave et al., 2020; Critical-Appraisal-Tools - Critical Appraisal Tools [JBI], n.d.).

Results

Stages 4 and 5: Charting the Data and Collating, Summarizing, and Reporting the Results

Coping strategies, influencing factors, and HRQoL were assessed in all 35 studies. The sample size across studies ranged from 18 to 825 participants. The age ranged from 20 to 94 years. Of the selected studies, 20 were conducted in the U.S., and 15 were conducted in European and Asian countries, including Sweden (n=5), Denmark (n=1), Iran (n=2), China (n=2), Poland (n=2), Germany (n=1), Japan (n=1), and Spain (n=1). In most studies, the impact of coping and HRQoL (physical, emotional, social health) was evaluated. Of the 35 studies, only 8 studies (2 were RCTs) explicitly described the theoretical underpinning of their work (Alhurani et al., 2018; Bose, Elfstrom, et al., 2016; Bose, Persson, et al., 2016; Ghafoor et al., 2019; Kristofferzon et al., 2018; Lynggaard et al., 2017; Perez-Garcia et al., 2014; Sherwood et al., 2017). Further, while Arksey and O'Malley do not focus on assessing the quality of publications, we have presented articles according to their hierarchy of evidence, beginning with RCTs.

Only 5 studies incorporated three types of coping, making a clear distinction between the two types of emotion-focused coping (i.e., active and avoidant). Most studies reported coping strategies as problem-focused and emotion-focused without a clear distinction between the two types of emotion-focused. However, two authors evaluated the coping strategies reported in all studies and were able to distinguish between active and avoidant emotion-focused coping strategies. It is necessary to distinguish

between active and avoidant emotion-focused coping as each type may produce a different outcome (Alhurani et al., 2018; Sendra & Farré, 2020; Wright et al., 2012).

Research Question 1: What coping strategies are linked with HRQoL in HF patients: emotion-focused (active); emotion-focused (avoidant); and/or problem-focused?

Problem-focused Coping strategies

Among the RCTs, four were original studies, and one was a secondary analysis from one of the four RCTs (Blumenthal et al., 2019). Sherwood et al (2017), examined the effect of a coping strategies training program for patients with HF (n=179). This program included problem-focused coping strategies, such as relaxation techniques, activity pacing, visualization, and cognitive restructuring. These strategies were significant ($P<0.01$) at improving HF patients' physical and emotional HRQoL. In a secondary data analysis (n=179) from the Sherwood parent study, Blumenthal et al. (2019) found that individuals who received coping skills training and had low social support at baseline demonstrated significant improvement in HRQoL ($P=0.006$) compared to those with higher social support at baseline.

Bose et al. (2016) showed that a nurse-led coping training intervention program reduced anxiety and depressive symptoms for HF patients. However, there were no significant differences between the control group and the intervention group in physical and emotional HRQoL. The authors reported that training on problem-focused coping strategies were effective and helped patients cope with the emotional distress of HF.

In another RCT study involving 825 HF patients, Lynggaard et al. (2017) found problem-focused coping (e.g., problem-solving and planning) improved the participants' overall HRQoL. In contrast, Bose et al. (2016) found no significant differences in HRQoL outcome between the control group who received standard care and the intervention group that used problem-focused coping strategies (e.g., taking action and planning). Three of the four RCTs found problem-focused coping that included cognitive restructuring, problem-solving, planning, activity pacing, and visualization were most effective for HF patients, and resulted in improved HRQoL (Blumenthal et al., 2019; Bose, Persson, et al., 2016; Lynggaard et al., 2017; Sherwood et al., 2017).

Only 6 of the 27 cross-sectional studies explicitly differentiated between types of coping that are typically found in the HF literature, i.e., active emotion-focused, avoidant emotion-focused, and problem-focused coping (Alhurani et al., 2018; Bose, Elfstrom, et al., 2016; Bose et al., 2015; Eisenberg et al., 2012; Hundt et al., 2015; Rong et al., 2018). Problem-focused coping strategies were expressed as problem solving (Hundt et al., 2015; Park CL et al., 2008; Trivedi et al., 2009), seeking social and emotional support (Abshire et al., 2015; Alhurani et al., 2018; Hundt et al., 2015; Kristofferzon et al., 2018; Perez-Garcia et al., 2014; Trivedi et al., 2009), positive reframing (Hundt et al., 2015; Perez-Garcia et al., 2014), and planning (Alhurani et al., 2018; Kristofferzon et al., 2018). Seeking social support as a problem-solving coping strategy was described as being distinct from established social support as addressed with the situational factors in the TSCM (Lazarus & Folkman, 1984). Additionally, Rong et al. (2018) found that spirituality was linked to using problem-focused coping and improved HRQoL outcomes. Two qualitative studies found that problem-focused coping strategies, specifically self-care activities, were found to be effective in enhancing the patients' HRQoL (Moser et al., 2013; Shahrbabaki et al., 2016).

Emotion-focused (Active) Coping Strategies

Active emotion-focused coping was reported in one RCT. In this study, Bose et al. (2016) used active emotion-focused (e.g., acceptance, humor, and spiritual practices) and showed that a nurse-led coping training intervention program reduced anxiety and depressive symptoms for HF patients compared to the control group. The authors reported that training on active emotion-focused coping strategies (e.g., acceptance, humor, and spiritual practices) were effective and helped patients cope with the stressor of HF; however, the findings were not statistically significant (P=0.108). Similarly, a cross sectional study showed that active emotion-focused coping strategies were not significantly associated with HRQoL (P=0.07; Rong et al., 2018).

Emotion-focused (Avoidant) Coping Strategies

Avoidant emotion-focused was only examined in cross-sectional studies. Several studies (n=7) linked avoidant emotional coping, such as denial, to poor health outcomes and lower or worse HRQoL

(Abshire et al., 2015; Alhurani et al., 2018; Bose, Elfstrom, et al., 2016; Eisenberg et al., 2012; Jackson & Emery, 2011; Krzych et al., 2016; Svensson et al., 2016). Five studies reported increased fatigue, depression, and adverse life events including higher mortality rates among HF patients who used avoidant emotional coping (Bose et al., 2015; Doering et al., 2004; Grady et al., 2015; Rong et al., 2018). Bose et al. (2015) and Grady et al. (2015) found that HF patients who experienced poor HRQoL (i.e., a high level of anxiety and depression) were more likely to use more avoidant emotion coping strategies (e.g., denial, behavioral disengagement, and self-blame).

No Distinction between Coping Strategies

In a qualitative study, Shahrbabaki et al. (2017) did not categorize the types of coping; however, Carver (1997) suggested that spirituality be classified as active emotional coping. In a group of 18 individuals (10 men and 8 women; mean age = 65) who were Muslims, the study found that spiritual practices as part of an emotion-focused coping strategy resulted in improvement in both psychological (i.e., depression and anxiety) and physical aspects of HRQoL (Shahrbabaki et al., 2016).

In summary, problem-focused and active emotional coping strategies, such as problem-solving, activity pacing, visualization, seeking social support, relaxation, acceptance, humor, use of spiritual practices, and cognitive restructuring had a positive influence on HRQoL. Whereas, avoidant emotional coping strategies of denial, self-blame, avoidance, and behavioral disengagement were linked to low physical and emotional HRQoL and negative health outcomes in general (Table 2.2; Abshire et al., 2015; An et al., 2022; Bose et al., 2015; Doering et al., 2004; Eisenberg et al., 2012; Hundt et al., 2015; Jackson & Emery, 2011; Kristofferzon et al., 2018; Krzych et al., 2016; Paukert et al., 2009; Perez-Garcia et al., 2014; Trivedi et al., 2009). Lastly and importantly, a lack of consistency regarding the conceptualization and definition of coping strategies among the studies was observed.

Research Question 2: What factors influence HF patients' selection of coping strategies?

Many potential influencing factors were found in the literature, ranging from demographics to social support. It is also noted conceptually that the stressor of HF severity impacts influencing factor in the TSCM, which in turn determine the types of coping strategies used.

Stressors and Coping Strategies

Increased stress related to the severity of HF symptoms (stressor), defined by the NYHA classes, was linked to the selection of emotion-focused (avoidant) coping strategies in two RCTs (Bose, Persson, et al., 2016; Sherwood et al., 2017). Additionally, three cross-sectional studies found that a higher NYHA classification was linked to avoidant emotion-focused coping strategies among HF patients (Carels et al., 2004; Hundt et al., 2015; Rong et al., 2018). This finding was, however, contradicted in a study conducted in Spain (n=60), which found no relationship between NYHA classes and avoidant emotion-focused coping (Perez-Garcia et al., 2014).

Demographic, Influencing Factors, and Coping Strategies Across Study Designs

Randomized Clinical Trials. In an RCT on HF patients (n=825), Lynggaard et al. (2017) did not distinguish between active and avoidant emotion-focused coping; however, based on items assessed the two co-authors, they found that women (n=100; 24%) used more emotion-focused coping than men. Additionally, the use of emotion-focused coping was higher among low-income patients. Further, low-income patients adhered more to the coping intervention than medium and high-income patients. Bose et al. (2016) found that when HF patients had less control over their situation, they were more inclined to adopt a negative (avoidant emotion-focused) coping strategy such as denial. The study found that avoidant emotion-focused coping was dominant among the control group who perceived less control over the disease than the intervention group. In a secondary data analysis of an RCT study, Blumenthal et al. (2019) found that with high established social support, HF patients were more likely to adopt problem-focused and active emotion-focused coping compared to those with low social support. In summary, the factors that affect the selection of coping strategies in the RCT studies were level of stressor, sex, income, sense of control, and established social support (Blumenthal et al., 2019; Bose et al., 2016; Lynggaard et al., 2017; Sherwood et al., 2017).

Cross-sectional studies. A cross-sectional study by Nilsson et al. (2017) found that male HF patients who are older, and have low education and income were more likely to use avoidant emotion-focused coping strategies. Other investigators found that the use of avoidant emotion-focused coping

strategies were higher among women with HF (Grady et al., 2015; Jackson & Emery, 2011; Kristofferzon et al., 2018). Yet, other studies found no gender-related differences in coping strategies (all types) in patients with HF (Heo et al., 2007; Rong et al., 2018). The use of problem-focused coping strategies was common among patients with higher levels of education (An et al., 2022; Baah et al., 2021; Jackson & Emery, 2011; Kristofferzon et al., 2018; Nilsson et al., 2017; Rong et al., 2018). Additionally, Jackson and Emery (2011) found that HF patients with low education and low income were more likely to use avoidant emotion-focused coping strategies. However, a study by Rong et al. (2018) found that education and income had no effect on the selection of avoidant emotion-focused coping strategies (n= 360 HF patients). Additionally, this study found that a shorter duration of HF (i.e., length of time since diagnosis) was related to using avoidant emotion-focused coping (Rong et al., 2018). Patients with a diagnosis of HF for more than 10 years used active emotion-focused and problem-focused coping strategies, such as planning and acceptance.

Established social support was reported in 7 cross-sectional studies (Abshire et al., 2015; Baah et al., 2021; Bose, Elfstrom, et al., 2016; Carels et al., 2004; Fivecoat et al., 2018; Hundt et al., 2015; Kristofferzon et al., 2018). Hundt et al. (2015) found that the use of avoidant emotion-focused coping was significantly more prevalent among those who had inadequate social support.[8] Others suggested that patients with high established social support were more likely to adopt problem-focused coping strategies (Abshire et al., 2015; Bose, Elfstrom, et al., 2016; Carels et al., 2004; Fivecoat et al., 2018; Kristofferzon et al., 2018). Married or partnered participants had higher use of problem-focused coping strategies compared with HF patients who were single (Baah et al., 2021). The key influencing factors evidenced in the 27 RCTs, cross-sectional studies were sex, age, education, income, sense of control, duration of HF, established social support, and HF severity.

Qualitative Studies. There were three qualitative studies that added to the understand of influencing factors (Riegel & Carlson, 2002; Shahrbabaki et al., 2017; Shahrbabaki et al., 2016). In a qualitative study that included 26 HF patients, Riegel and Carlson (2002) found low education to be a barrier to using effective problem-focused and active emotion-focused coping. Additionally, established

social support facilitated adaptive coping (i.e., problem-focused and active emotion-focused). Similarly, in an Iranian study, Shahrbabki et al. (2016) found that established social and family support were major factors that facilitated problem-focused and active emotion-focused coping among HF patients. Finally, in another study conducted by Shahrbabaki et al.(2017) in Iran (n=18), patients who had higher spiritual beliefs used more problem-focused and active emotion-focused coping. These four studies incorporated a variety of influencing factors including education, established social and family support, and spiritual beliefs.

Summary. Of the 35 studies included in this review, 18 studies identified the influencing factors as sex, age, education, income, spiritual beliefs, sense of control, duration of HF, and established family and social support (see Table 2.3). Theoretically, these influencing factors can be directly linked to the selection of problem-focused or emotion-focused (active/avoidant) coping strategies among individuals with HF. However, there is a lack of consensus among studies, specifically on the role of sex, age, education, and income in the selection of coping strategies. A summary table for the results is presented in supplementary material.

Discussion

This scoping review was guided by the TSCM (Lazarus & Folkman, 1984). The two research questions tapped essential components of the model, i.e., stressor of HF severity, influencing factors to coping types, and three types of coping strategies. Research question 1 targeted literature addressing relationships between three specific types of coping and aspects of HRQoL. Research question 2 investigated the stressor of HF severity, personal and situational influencing factors, and their relationship with the selection of one or more of the three types of coping strategies. Literature results from both research questions shed light on the state of the science, including several contradictions.

The use of problem-focused and active emotional coping was linked to better physical and emotional HRQoL, while avoidant emotion-focused coping strategies were linked to poor HRQoL. Two earlier literature reviews reported similar findings, one of which showed that only problem-focused coping was linked to better HRQoL among HF patients (Graven et al., 2014); whereas, the other study

found that patients who use both problem-focused and active emotion-focused coping were more likely to have improved HRQoL and positive health outcomes (Li & Shun, 2016).

Guided by the TSCM, we first examined the relationships between the severity of HF (stressor) and the use of coping strategies were rarely examined in the literature. Only one review study reported a relationship between HF severity (captured by the NYHA classes) and the use of avoidant coping (Allman et al., 2009). In this review, a small number of RCTs (n=2) and cross-sectional studies (n=4) found a relationship between higher HF severity and the use of avoidant emotion-focused coping (e.g., denial; (Bose, Persson, et al., 2016; Hundt et al., 2015; Klein et al., 2007; Nilsson et al., 2017; Rong et al., 2018; Sherwood et al., 2017). This may be explained by the increase of symptom severity hindering the patients' ability to engage in more adaptive forms of coping, such as problem-focused or active emotion-focused.

Conceptually, the influencing factors are impacted by the stressor, and a systematic review in 2016 on self-care coping styles stated that there was no significant relationship between sex and age in the selection of coping strategies (Li & Shun, 2016). However, an integrative review showed coping among patients with multiple chronic conditions was affected by factors such as sex, age, and established social support (Cheng et al., 2020). Further, two previous review studies showed that in addition to established social support, level of education may influence HF patients to use specific coping strategies, such as problem-focused coping (Grant & Graven, 2013; Graven et al., 2014).This review demonstrated similar findings suggesting that sex, age, income, education, and established social support influence the selection of coping strategies among HF patients (An et al., 2022; Fivecoat et al., 2018; Grady et al., 2015; Jackson & Emery, 2011; Lynggaard et al., 2017; Riegel & Carlson, 2002). However, the relationship between level of education and coping strategies was examined only in cross-sectional studies, which makes it difficult to determine a causal relationship.

A shorter duration of HF ($\leq$ 5 years after diagnosis) was also linked to using avoidant emotion-focused coping. However, earlier research showed that greater disease duration resulted in more use of avoidant emotion-focused coping strategies, such as behavioral disengagement (Cheng et al., 2020). Thus, this lack of evidence makes it difficult to determine the effect of disease duration on the selection of

coping strategies. The lack of evidence may be due to different sample sizes and patient populations. Likewise, Li and Shun (2016) and Clark and Hunter (2019) found a lack of evidence on the effect of spirituality on coping strategies among HF patients. Qualitatively, only one study examined the relationship between spiritual beliefs and coping strategies and it to be linked with problem-focused and active emotion-focused coping (Mangolian Shahrbabaki et al., 2017).

The present review reveals the inconsistency and conceptual ambiguity related to types of coping. For example, in a study examining spiritual beliefs, Shahrbabaki et al. (2017) did not make a distinction between different types of coping strategies. To resolve this issue, coping strategies were grouped by other aspects of the study and in accordance with other literature related to grouping types of coping (Carver, 1997; Carver et al., 1989; Cooper et al., 2008). In general, two studies reported active and avoidant emotion-focused coping together as emotion-focused coping strategies. Additionally, some authors depicted both types of emotion-focused coping as maladaptive and therefore linked to negative health behaviors and poor HRQoL (Alhurani et al., 2018; Carver et al., 1989). Yet, other literature suggested that the use of active emotion-focused coping strategies results in improved HRQoL (Bose, Elfstrom, et al., 2016; Eisenberg et al., 2012; Hundt et al., 2015; Rong et al., 2018). This practice of at times combining strategies and other times making a distinction between the two types of emotion-focused coping is a common inconsistency that still exists in the current literature. Therefore, a clear distinction between types of coping is needed. Finally, a lack of theoretical guidance was prevalent in the selected studies. Only 8 studies used a model to guide the literature search, with 3 using the TSCM to investigate the concept of coping in patients with HF (Alhurani et al., 2018; Bose, Persson, et al., 2016; Kristofferzon et al., 2018).

Implications

The findings of this review indicate a need for further investigation on the association between the stressor, influencing factors, types of coping strategies, and HRQoL over time. Incorporating the guidance of a theoretical model with precise definitions and empirical referents can enhance this understanding. Drawing on the adapted TSCM used in this review, future work could consider a more

refined definition of the model stressor. Perhaps other parameters (e.g., specific physical activities and/or HF symptoms) are needed in addition to the NYHA classes in place of this rather broad measure. Further research is needed on the following influencing factors that are conflicting in the literature: sex, age, education, income, marital status, social support, duration, sense of control, and spiritual beliefs to examine their relationship with types of coping used by HF patients. This will provide more clarity on how each factor affects the selection of coping strategies and address under-investigated areas, while also filling current gaps presented in the literature. In turn, using a sound theoretical model to examine the selection of appropriate coping strategies can be a key to improving HRQoL outcomes.

Limitations

In acknowledging the shortcomings of this review, it is noted that the literature on coping among patients with HF is still in its initial stage, with most studies being cross-sectional. There is a lack of RCTs, leading to a heavy reliance on non-experimental designs and often single timepoints as the basis for this review. Finally, this review was limited to publications in English, indicating the possibility that this review may have missed relevant studies published in other languages.

Novelty

- Clinicians can be guided by the knowledge that problem-focused and emotion-focused (active) coping strategies are associated with improved HRQoL.
- Practitioners should be aware that avoidant emotion-focused coping strategies are associated with poor HRQoL.
- In assessing HF patients, nurses should consider HF patients' sex, age, social support, income, education, spiritual beliefs, and illness duration since these may lead to using avoidant emotion-focused coping so they can guide these patients towards problem-focused and active emotion-focused.

Conclusion

Problem-focused coping strategies, such as positive reframing or cognitive restructuring, and seeking social support were most often linked to enhanced HRQoL. The emotion-focused coping

strategies were seldom divided into active and avoidant emotional coping; however, when noted, the avoidant coping was related to poor HRQoL. In some cases, the problem-focused and active emotion-focused coping strategies were reported together. Although the current evidence highlighted the significance of coping related to HRQoL and the impact of different influencing factors on the patients' selection of coping strategies, there remain gaps in the science that can direct future research. Further, the relationship between different types of coping strategies and HRQoL among HF patients remains unclear. By examining both the strengths and limitations of this body of work, this review provides a foundation for developing a program of interventional research promoting healthy coping among HF patients to improve HRQoL.

Citation

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Data Availability Statement

Specific data sources are in the search strings available in supplementary materials.

Tables

Table 2.1 JBI Critical Appraisal Checklist Summary Table (n=35).

Author(s)	Total	Quality
JBI Critical Appraisal Checklist for RCTs		
Lynggaard et al.	9/13	High
Bose et al.	11/13	High
Sherwood et al.	12/13	High
Blumenthal et al.	12/13	High
JBI Critical Appraisal Checklist for Cross-sectional Studies		
Svensson et al.	8/8	High
Park et al.	6/8	Moderate
Fivecoat et al.	5/8	Moderate
Grady et al.	6/8	Moderate
Alhurani et al.	6/8	Moderate
Eisenberg et al.	6/8	Moderate
Deoring et al.	6/8	Moderate
Paukert et al.	6/8	Moderate
Klein et al.	5/8	Moderate
Bose et al.	6/8	Moderate
Trivedi et al.	6/8	Moderate
Pérez-García et al.	6/8	Moderate
Kristofferzon et al.	6/8	Moderate
Carels et al.	5/8	Moderate
Rohrbaugh et al.	5/8	Moderate
Hundt et al.	5/8	Moderate
Bose et al.	6/8	Moderate
Krzych et al.	5/8	Moderate
Ghafoor et al.	6/8	Moderate
Nilsson et al.	6/8	Moderate
Baah et al.	6/8	Moderate
Heo et al.	6/8	Moderate
Obieglo et al.	6/8	Moderate
Abshir et al.	6/8	Moderate
An et al.	8/8	High
Jackson et al	5/8	Moderate
Rong et al.	6/8	Moderate
Moser et al.	6/8	Moderate
JBI Critical Appraisal Checklist for Qualitative Studies		
Riegel et al.	8/10	High
Shahrbabaki et al.	7/10	High
Shahrbabaki et al	6/10	Moderate

Note: Quality level: low (0-3); moderate (4-6); and high (>7); Yes=1; No and Unclear=0. Abbreviations: RCT=Randomized Controlled Trials; JBI= The Joanna Briggs Institute.

Table 2.2 Types of coping strategies.

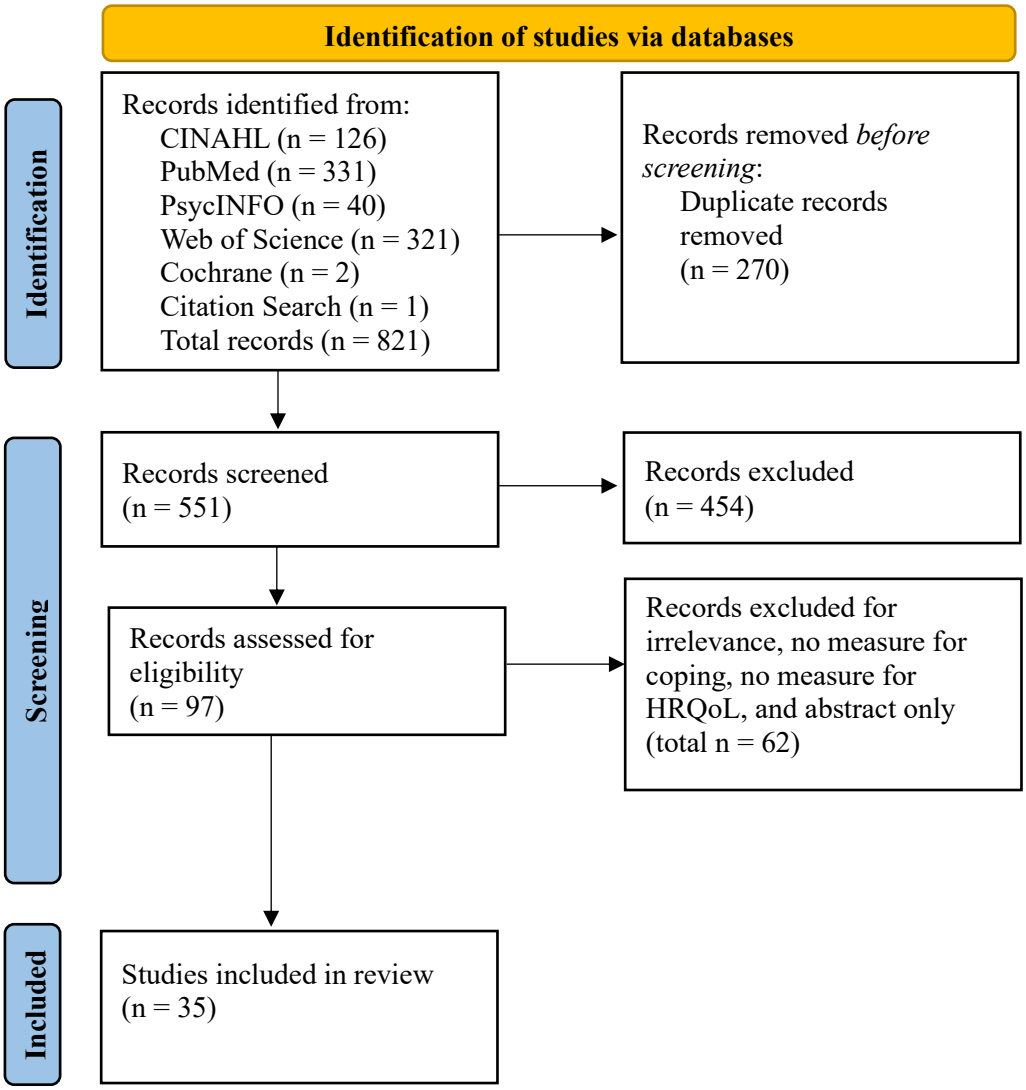
Type of Study	Emotion-focused (Active) coping	Emotion-focused (Avoidant) coping	Problem-focused Coping
Randomized Controlled Trials (n=4)	Relaxation Acceptance Humor Use of spiritual practices	Denial Behavioral disengagement	Cognitive restructuring Problem-solving Activity pacing Visualization Seeking social support
Observational and descriptive studies (n=27)	Acceptance Use of spiritual practices.	Denial Avoidance Behavioral disengagement Self-blame	Problem-solving Seeking social Positive reframing
Qualitative and Mixed Methods (n=4)	Use of spiritual practices	None reported	Problem-solving

Table 2.3 Influencing Factors Identified in the Literature.

Type of Study	**Influencing Factors**
Randomized Controlled Trials (n=4)	Sex Age Income Sense of control Established Social support
Observational and Descriptive (n=27)	Sex Age Income and education Marital status Spiritual beliefs Duration of HF Established social support
Qualitative and Mixed Methods (n=4)	Education Spiritual beliefs Established social support Established family support

Figures

Figure 2.1 PRISMA flow Diagram of Study Selection.



BIBLIOGRAPHY

Abshire, M., Xu, J., Dennison Himmelfarb, C., Davidson, P., Sulmasy, D., Kub, J., Hughes, M., & Nolan, M. (2015). Symptoms and fear in heart failure patients approaching end of life: A mixed methods study. *Journal of Clinical Nursing (John Wiley & Sons, Inc.)*, *24*(21–22), 3215–3223. CINAHL Plus with Full Text. https://doi.org/10.1111/jocn.12973

Alhurani, A. S., Dekker, R., Ahmad, M., Miller, J., Yousef, K. M., Abdulqader, B., Salami, I., Lennie, T. A., Randall, D. C., & Moser, D. K. (2018). Stress, cognitive appraisal, coping, and event free survival in patients with heart failure. *Heart & Lung*, *47*(3), 205–210. https://doi.org/10.1016/j.hrtlng.2018.03.008

Allman, E., Berry, D., & Nasir, L. (2009). Depression and Coping in Heart Failure Patients: A Review of the Literature. *Journal of Cardiovascular Nursing*, *24*(2), 106–117. https://doi.org/10.1097/JCN.0b013e318197a985

An, Y., Zhang, Y., Wang, L., Chen, C., & Fan, X. (2022). The Relationship Between Uncertainty in Illness and Quality of Life in Patients With Heart Failure: Multiple Mediating Effects of Perceived Stress and Coping Strategies. *Journal of Cardiovascular Nursing*, *37*(3), 257. https://doi.org/10.1097/JCN.0000000000000799

Arksey, H., & O'Malley, L. (2005). Scoping studies: Towards a methodological framework. *International Journal of Social Research Methodology*, *8*(1), 19–32. https://doi.org/10.1080/1364557032000119616

Baah, F. O., Chittams, J., Carlson, B., Sethares, K. A., Daus, M., Moser, D. K., & Riegel, B. (2021). Sociodemographic Indictors of Social Position and Self-care Maintenance in Adults with Heart Failure. *Clinical Nursing Research*. Scopus. https://doi.org/10.1177/1054773821995593

Blumenthal, J. A., Zhu, Y., Koch, G. G., Smith, P. J., Watkins, L. L., Hinderliter, A. L., Hoffman, B. M., Rogers, J. G., Chang, P. P., O'Connor, C., Johnson, K. S., & Sherwood, A. (2019). The modifying effects of social support on psychological outcomes in patients with heart failure. *Health Psychology : Official Journal of the Division of Health Psychology, American Psychological Association*, *38*(6), 502–508. https://doi.org/10.1037/hea0000716

Bose, N. C., Bjorling, G., Elfstrom, M. L., Persson, H., & Saboonchi, F. (2015). Assessment of Coping Strategies and Their Associations With Health Related Quality of Life in Patients With Chronic Heart Failure: The Brief COPE Restructured. *Cardiology Research*, *6*(2), 239–248.

Bose, N. C., Elfstrom, M. L., Bjorling, G., Persson, H., & Saboonchi, F. (2016). Patterns and the mediating role of avoidant coping style and illness perception on anxiety and depression in patients with chronic heart failure. *Scandinavian Journal of Caring Sciences*, *30*(4), 704–713. https://doi.org/10.1111/scs.12297

Bose, N. C., Persson, H., Bjorling, G., Ljunggren, G., Elfstrom, M. L., & Saboonchi, F. (2016). Evaluation of a Coping Effectiveness Training intervention in patients with chronic heart failure—A randomized controlled trial. *European Journal of Cardiovascular Nursing : Journal of the Working Group on Cardiovascular Nursing of the European Society of Cardiology*, *15*(7), 537–548.

Bragazzi, N. L., Zhong, W., Shu, J., Abu Much, A., Lotan, D., Grupper, A., Younis, A., & Dai, H. (2021). Burden of heart failure and underlying causes in 195 countries and territories from 1990 to 2017. *European Journal of Preventive Cardiology*, zwaa147. https://doi.org/10.1093/eurjpc/zwaa147

Carels, R. A., Musher-Eizenman, D., Cacciapaglia, H., Pérez-Benítez, C. I., Christie, S., & O'Brien, W. (2004). Psychosocial functioning and physical symptoms in heart failure patients: A within-individual approach. *Journal of Psychosomatic Research, 56*(1), 95–101. https://doi.org/10.1016/S0022-3999(03)00041-2

Carver, C. S. (1997). You want to measure coping but your protocol's too long: Consider the brief cope. *International Journal of Behavioral Medicine*, *4*(1), 92–100.

Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology*, *56*(2), 267.

Cave, D. P., Abbey, K. L., & Capra, S. M. (2020). Can foodservices in aged care homes deliver sustainable food fortification strategies? A review. *International Journal of Food Sciences and Nutrition*, *71*(3), 267–275.

Cheng, C., Inder, K., & Chan, S. W.-C. (2020). Coping with multiple chronic conditions: An integrative review. *Nursing & Health Sciences*, *22*(3), 486–497. https://doi.org/10.1111/nhs.12695

Clark, C. C., & Hunter, J. (2019). Spirituality, Spiritual Well-Being, and Spiritual Coping in Advanced Heart Failure: Review of the Literature. *Journal of Holistic Nursing*, *37*(1), 56–73. CINAHL Plus with Full Text. https://doi.org/10.1177/0898010118761401

Cooper, C., Katona, C., & Livingston, G. (2008). Validity and reliability of the brief COPE in carers of people with dementia: The LASER-AD Study. *The Journal of Nervous and Mental Disease*, *196*(11), 838–843.

critical-appraisal-tools—Critical Appraisal Tools | JBI. (n.d.). Retrieved April 6, 2022, from https://jbi.global/critical-appraisal-tools

Doering, L. V., Dracup, K., Caldwell, M. A., Moser, D. K., Erickson, V. S., Fonarow, G., & Hamilton, M. (2004). Is coping style linked to emotional states in heart failure patients? *Journal of Cardiac Failure*, *10*(4), 344–349. https://doi.org/10.1016/j.cardfail.2003.10.001

Eisenberg, S. A., Shen, B.-J., Schwarz, E. R., & Mallon, S. (2012). Avoidant coping moderates the association between anxiety and patient-rated physical functioning in heart failure patients. *Journal of Behavioral Medicine*, *35*(3), 253–261. https://doi.org/10.1007/s10865-011-9358-0

Fivecoat, H. C., Sayers, S. L., & Riegel, B. (2018). Social support predicts self-care confidence in patients with heart failure. *European Journal of Cardiovascular Nursing*, *17*(7), 598–604.

Ghafoor, H., Ahmad, R. A., Nordbeck, P., Ritter, O., Pauli, P., & Schulz, S. M. (2019). A cross-cultural comparison of the roles of emotional intelligence, metacognition, and negative coping for health-related quality of life in German versus Pakistani patients with chronic heart failure. *British Journal of Health Psychology*, *24*(4), 828–846. CINAHL Plus with Full Text. https://doi.org/10.1111/bjhp.12381

Grady, K. L., Magasi, S., Hahn, E. A., Buono, S., McGee, E. C. J., & Yancy, C. (2015). Health-related quality of life in mechanical circulatory support: Development of a new conceptual model and items for self-administration. *The Journal of Heart and Lung Transplantation : The Official Publication of the International Society for Heart Transplantation*, *34*(10), 1292–1304. https://doi.org/10.1016/j.healun.2015.04.003

Grant, J. S., & Graven, L. J. (2013). Coping and health-related quality of life in individuals with heart failure: An integrative review. *Heart & Lung*, *42*(3), 183–194. DOI: 10.1016/j.hrtlng.2012.12.002

Graven, L., Grant, J. S., Vance, D. E., Pryor, E. R., Grubbs, L., & Karioth, S. (2014). Coping styles associated with heart failure outcomes: A systematic review. *Journal of Nursing Education and Practice*, *4*(2), 227–242.

Heo, S., Moser, D. K., & Widener, J. (2007). Gender differences in the effects of physical and emotional symptoms on health-related quality of life in patients with heart failure. *European Journal of Cardiovascular Nursing*, *6*(2), 146–152.

Hundt, N. E., Bensadon, B. A., Stanley, M. A., Petersen, N. J., Kunik, M. E., Kauth, M. R., & Cully, J. A. (2015). Coping mediates the relationship between disease severity and illness intrusiveness among chronically ill patients. *Journal of Health Psychology*, *20*(9), 1186–1195. https://doi.org/10.1177/1359105313509845

Jackson, J. L., & Emery, C. F. (2011). Illness knowledge moderates the influence of coping style on quality of life among women with congestive heart failure. *Heart & Lung*, *40*(2), 122–129. CINAHL Plus with Full Text. https://doi.org/10.1016/j.hrtlng.2009.12.005

Klein, D. M., Turvey, C. L., & Pies, C. J. (2007). Relationship of coping styles with quality of life and depressive symptoms in older heart failure patients. *Journal of Aging and Health*, *19*(1), 22–38.

Kristofferzon, M.-L., Engström, M., & Nilsson, A. (2018). Coping mediates the relationship between sense of coherence and mental quality of life in patients with chronic illness: A cross-sectional study. *Quality of Life Research*, *27*(7), 1855–1863. CINAHL Plus with Full Text. https://doi.org/10.1007/s11136-018-1845-0

Krzych, L. J., Wybraniec, M. T., Siennicka, A., Lees, B., Goscinska-Bis, K., Wojcik, M., Blaszczyk, R., Szymanski, F. M., Orszulak, M., Michalski, B., Kaminski, K., Kopec, G., Hrynkiewicz-Szymanska, A., & Jankowska, E. A. (2016). A study to evaluate the prevalence and determinants of stress coping strategies in heart failure patients in Poland (CAPS-LOCK-HF sub-study). *Kardiologia Polska*, *74*(11), 1327–1331. https://doi.org/10.5603/KP.a2016.0109

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer Publishing Company.

Li, C.-C., & Shun, S.-C. (2016). Understanding self care coping styles in patients with chronic heart failure: A systematic review. *European Journal of Cardiovascular Nursing*, *15*(1), 12–19. CINAHL Plus with Full Text. https://doi.org/10.1177/1474515115572046

Lynggaard, V., Nielsen, C. V., Zwisler, A.-D., Taylor, R. S., & May, O. (2017). The patient education—Learning and Coping Strategies—Improves adherence in cardiac rehabilitation (LC-REHAB): A randomised controlled trial. *International Journal of Cardiology*, *236*, 65–70. https://doi.org/10.1016/j.ijcard.2017.02.051

Mangolian Shahrbabaki, P. P., Nouhi, E. P., Kazemi, M. P., & Ahmadi, F. P. (2017). Spirituality: A Panacea for Patients Coping with Heart Failure. *International Journal of Community Based Nursing and Midwifery*, *5*(1), 38–48.

McDonagh, T. A., Metra, M., Adamo, M., Gardner, R. S., Baumbach, A., Böhm, M., Burri, H., Butler, J., Čelutkienė, J., & Chioncel, O. (2021). Corrigendum to: 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure: Developed by the Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC) With the special contribution of the Heart Failure Association (HFA) of the ESC. *European Heart Journal*, *42*(48), 4901–4901.

Miller, J. F. (2000). *Coping with chronic illness: Overcoming powerlessness* (Vol. 3). FA Davis Philadelphia, PA.

Moser, D. K., Heo, S., Lee, K. S., Hammash, M., Riegel, B., Lennie, T. A., Arslanian-Engoren, C., Mudd-Martin, G., Albert, N., & Watkins, J. (2013). "It could be worse ... Lot's worse!" Why health-related quality of life is better in older compared with younger individuals with heart failure. *Age and Ageing*, *42*(5), 626–632. https://doi.org/10.1093/ageing/aft078

National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP). (n.d.). *Health-Related Quality of Life (HRQOL)*. https://www.cdc.gov/hrqol/concept.htm

Nilsson, A., Carlsson, M., Lindqvist, R., & Kristofferzon, M.-L. (2017). A comparative correlational study of coping strategies and quality of life in patients with chronic heart failure and the general Swedish population. *Nursing Open*, *4*(3), 157–167.

Obiegło, M., Uchmanowicz, I., Wleklik, M., Jankowska-Polańska, B., & Kuśmierz, M. (2016). The effect of acceptance of illness on the quality of life in patients with chronic heart failure. *European Journal of Cardiovascular Nursing : Journal of the Working Group on Cardiovascular Nursing of the European Society of Cardiology*, *15*(4), 241–247. https://doi.org/10.1177/1474515114564929

Park CL, Malone MR, Suresh DP, Bliss D, Rosen RI, Park, C. L., Malone, M. R., Suresh, D. P., Bliss, D., & Rosen, R. I. (2008). Coping, meaning in life, and quality of life in congestive heart failure patients. *Quality of Life Research*, *17*(1), 21–26. CINAHL Plus with Full Text. https://doi.org/10.1007/s11136-007-9279-0

Paukert, A. L., LeMaire, A., & Cully, J. A. (2009). Predictors of depressive symptoms in older veterans with heart failure. *Aging & Mental Health*, *13*(4), 601–610. https://doi.org/10.1080/13607860802459823

Perez-Garcia, A. M., Olivan, S., & Bover, R. (2014). Subjective Well-being in Heart Failure Patients: Influence of Coping and Depressive Symptoms. *International Journal of Behavioral Medicine*, *21*(2), 258–265. https://doi.org/10.1007/s12529-013-9311-4

Pokharel, Y., Khariton, Y., Tang, Y., Nassif, M. E., Chan, P. S., Arnold, S. V., Jones, P. G., & Spertus, J. A. (2017). Association of serial Kansas City Cardiomyopathy Questionnaire assessments with death and hospitalization in patients with heart failure with preserved and reduced ejection fraction: A secondary analysis of 2 randomized clinical trials. *JAMA Cardiology*, *2*(12), 1315–1321.

Ponikowski, P., Anker, S. D., AlHabib, K. F., Cowie, M. R., Force, T. L., Hu, S., Jaarsma, T., Krum, H., Rastogi, V., & Rohde, L. E. (2014). Heart failure: Preventing disease and death worldwide. *ESC Heart Failure*, *1*(1), 4–25.

Riegel, B., & Carlson, B. (2002). Facilitators and barriers to heart failure self-care. *Patient Education and Counseling*, *46*(4), 287–295. https://doi.org/10.1016/S0738-3991(01)00165-3

Rong, X., Peng, Y., Yu, H., & Li, D. (2018). Factors associated with adoption of coping strategies among Chinese patients with heart failure in ethnic minority regions. *Journal of Clinical Nursing (John Wiley & Sons, Inc.)*, *27*(17–18), 3324–3334. CINAHL Plus with Full Text. https://doi.org/10.1111/jocn.14199

Sendra, A., & Farré, J. (2020). Communicating the experience of chronic pain through social media: Patients' narrative practices on Instagram. *Journal of Communication in Healthcare*, *13*(1), 46–54.

Sepehrvand, N., Savu, A., Spertus, J. A., Dyck, J. R. B., Anderson, T., Howlett, J., Paterson, I., Oudit, G. Y., Kaul, P., McAlister, F. A., Ezekowitz, J. A., & null, null. (2020). Change of Health-Related Quality of Life Over Time and Its Association With Patient Outcomes in Patients With Heart Failure. *Journal of the American Heart Association*, *9*(17), e017278. https://doi.org/10.1161/JAHA.120.017278

Shahrbabaki, P. M., Nouhi, E., Kazemi, M., & Ahmadi, F. (2016). Defective support network: A major obstacle to coping for patients with heart failure: A qualitative study. *Global Health Action*, *9*(1), 1-N.PAG. CINAHL Plus with Full Text. https://doi.org/10.3402/gha.v9.30767

Sherwood, A., Blumenthal, J. A., Koch, G. G., Hoffman, B. M., Watkins, L. L., Smith, P. J., O'Connor, C. M., Adams, K. F. J., Rogers, J. G., Sueta, C., Chang, P. P., Johnson, K. S., Schwartz, J., & Hinderliter, A. L. (2017). Effects of Coping Skills Training on Quality of Life, Disease Biomarkers, and Clinical Outcomes in Patients With Heart Failure: A Randomized Clinical Trial. *Circulation. Heart Failure*, *10*(1). https://doi.org/10.1161/CIRCHEARTFAILURE.116.003410

Svensson, T., Inoue, M., Sawada, N., Yamagishi, K., Charvat, H., Saito, I., Kokubo, Y., Iso, H., Kawamura, N., Shibuya, K., Mimura, M., Tsugane, S., for the JPHC Study Group, Tsugane, S., Tsugane, S., Sawada, N., Iwasaki, M., Sasazuki, S., Shimazu, T., … for the JPHC Study Group. (2016). Coping strategies and risk of cardiovascular disease incidence and mortality: The Japan Public Health Center-based prospective Study. *European Heart Journal*, *37*(11), 890–899. https://doi.org/10.1093/eurheartj/ehv724

Trivedi, R. B., Blumenthal, J. A., O'Connor, C., Adams, K., Hinderliter, A., Dupree, C., Johnson, K., & Sherwood, A. (2009). Coping styles in heart failure patients with depressive symptoms. *Journal of Psychosomatic Research*, *67*(4), 339–346. https://doi.org/10.1016/j.jpsychores.2009.05.014

Virani, S. S., Alonso, A., Aparicio, H. J., Benjamin, E. J., Bittencourt, M. S., Callaway, C. W., Carson, A. P., Chamberlain, A. M., Cheng, S., & Delling, F. N. (2021). Heart disease and stroke statistics—2021 update: A report from the American Heart Association. *Circulation*, *143*(8), e254–e743.

Wright, K. B., Sparks, L., & O'hair, H. D. (2012). *Health communication in the 21st century*. John Wiley & Sons.

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APPENDIX C: DETAILS OF INCLUDED STUDIES

Table S1.1 Publication Characteristics and Key Findings (n=35).

Author(s), Year, Country	Type of study	Populations, sample size, type of HF, inclusion criteria	Design	Measured Outcome	Key Results
Lynggaard et al.[21] 2017 Denmark	Quantitative	N=825 HF (not specified) Mean age 63 (1) Aged above 18, referred to, motivated for cardiac rehab after hospitalization for IHD or HF. (2) Diagnosed with either IHD or HF, they were classified as having HF.	RCT Participants were randomized to either • Control group (received learning and coping training) • Intervention group (received individual clarifying interviews before and after the learning and coping training)	QoL Depression Self-reported lifestyle and risk factors Adherence to coping intervention	Using coping strategies might be expected to lead to further improved reductions in mortality, morbidity and improved HRQL for patients with HF. Patients with heart failure, low levels of education, and household income appear to benefit most in quality of life and adherence from intervention.
Bose et al.[20] 2016 Sweden	Quantitative	N=103 Chronic HF Mean age 69 Classified as New York Heart Association (NYHA) class II–III Aged over 18 years.	RCT • Control group (received standard health care for HF) • Intervention group (received coping effectiveness training in addition to HF standard care)	HRQoL Clinical outcomes (readmission, mortality caused by HF) Coping strategies Emotional well-being Depression	The coping training intervention was found to increase the sense of control over the illness in the short term. No significant differences between the control group and intervention group were detected, either in the mental or in the physical component of HRQoL. No statistically significant differences were found regarding the primary and secondary outcome measures (range of p = 0.108–0.595).

Table S1.1 (cont'd)

Author(s), Year, Country	Type of study	Populations, sample size, type of HF, inclusion criteria	Design	Measured Outcome	Key Results
Sherwood et al.[24] 2017 US	Quantitative	N=180 HF with reduced ejection fraction (HFrEF) Mean age 58 Men and women aged 18 or older With New York Heart Association (NYHA) Class II-IV HF of at least 3-months duration	RCT Participants were randomized to receive either coping skills training or HF education	QoL HF biomarkers Clinical outcomes (readmission and mortality)	Reductions in depressive symptoms that were greater among individuals in CST. The CST intervention was not associated with reduced all-cause hospitalizations or mortality. CST improved QoL in patients with HF.
Blumenthal et al.[25] 2019 US	Quantitative	N=179 HFrEF Mean age 57 With New York Heart Association Class II or III HF for at least 3 months Left ventricular ejection fraction of 40% or less	RCT-secondary data analysis In the original study, participants were randomized to receive either coping skills training or HF education	HRQoL Depression Physical functioning Social support Coping	Coping Skill Training provides better improvements in health-related QoL and greater reductions in depressive symptoms for those with low social support compared with those with high social support.
Svensson et al.[33] 2016 Japan	Quantitative	N=57,017 HF (not specified) Mean age 60 Healthy adults	One-group longitudinal, observational design A total of 5-time points with 5-year intervals (a total 20 years starting from 1990-94)	Cardiovascular outcomes: Stroke, MI, CVD, CVD mortality	The use of avoidant coping was associated with increased risk of stroke, CVD. Problem-focused coping had significantly reduced stroke incidents and CVD mortality Problem-focused coping was the most used coping strategy. Men used planning more than women. Women used more avoidant and mixed coping strategies. The use of problem-focused coping was linked to improved health outcomes.

Table S1.1 (cont'd)

Author(s), Year, Country	Type of study	Populations, sample size, type of HF, inclusion criteria	Design	Measured Outcome	Key Results
Park et al.[38] 2008 US	Quantitative	N=155 Congestive HF Mean age 65 Having had a hospital admission with a diagnosis of left-sided, systolic CHF in the past year, Being 40 years of age or older, Being able to speak English, and Having no obvious psychosis or severe cognitive impairment	One-group longitudinal observational design Two time points (6 months apart)	HRQoL Meaning of Life Coping	Coping efforts were only related to poorer quality of life. Coping (particularly acceptance/positive reinterpretation and spiritual coping) was related to meaning in life. Coping was minimally related to HRQoL, and its effects were not mediated by meaning in life.
Fivecoat et al.[50] 2018 US	Quantitative	N= 280 Chronic HF Mean age 62 Diagnosed with chronic heart failure Previously or currently symptomatic Have adequate sensory abilities and literacy to participate.	A longitudinal, observational design Three time points (baseline, 3 months, and 6 months)	Self-care outcomes: maintenance, management, and confidence Instrumental support Emotional support	Instrumental and emotional support predicted better self-care confidence and better general health outcomes. Social support plays an important role in self-care for heart failure patients,

Table S1.1 (cont'd)

Author(s), Year, Country	Type of study	Populations, sample size, type of HF, inclusion criteria	Design	Measured Outcome	Key Results
Grady et al.[37] 2016 US	Quantitative	N=210 HF (not specified) Mean age 77 Age > 21 years Ability to read and write English Physically able to participate	One-group longitudinal, observational design Total of 10 time points (follow-ups every 6 months for 5 years after heart transplantation)	Survival HRQoL Physical function	Women used significantly more negative coping and had lower health outcomes. Poor psychological health was associated with negative coping and poor adherence. There are gender differences regarding appraisal of stress, coping styles, and coping resources. Gender was significantly associated with psychological adjustment.
Alhurani et al.[14] 2018 US	Quantitative	N=88 Chronic HF Mean age 58 >21 Admitted to the hospital with a primary or secondary diagnosis of exacerbation of chronic HF or any other cardiac diagnosis Able to read and speak English Not obviously cognitively impaired	One-group longitudinal, descriptive design One-group followed for three time points (2 weeks, 3 months, and 6 months after being discharged form hospital)	Event-free survival Mortality Hospitalization	Higher levels of stress and cognitive appraisal were predictors of avoidant emotional coping. Avoidant coping was associated with poor health outcomes and emotional well-being. Older age, NYHA III & IV classes, and female HF patients were more likely to use avoidant coping; however, the association was not significant.

Table S1.1 (cont'd)

Author(s), Year, Country	Type of study	Populations, sample size, type of HF, inclusion criteria	Design	Measured Outcome	Key Results
Eisenberg et al.[25] 2012 US	Quantitative	N= 273 HF (not specified) Mean age 53 >18 years of age Had a primary diagnosis of heart failure.	Cross-sectional	Physical functioning Anxiety Coping strategies	Highly anxious patients who coped with their heart failure symptoms and treatment using avoidant strategies (such as denial, self-distraction, or behavioral disengagement) are more likely to experience poorer physical functioning than those who avoided less frequently. Approach coping, however, was not directly associated with physical functioning, nor did it moderate the association between anxiety and physical functioning.
Doering et al.[36] 2004 US	Quantitative	N=84 HF (not specified) Mean age 54	Cross-sectional.	Psychological well-being Coping strategies Mood status (confusion, vigor, fatigue, anger, depression, and anxiety)	Avoidant coping is a significant predictor of anxiety and depression in HF patients. Disturbed mood status is related to the use of avoidant coping strategies. Implementing interventions that support active coping rather than maladaptive coping may improve the emotional well-being of HF patients.
Paukert et al.[42] 2009 US	Quantitative	N=103 HF (not specified) Mean age 71 At least 60 years of age or older who had a documented diagnosis of HF. Without significant levels of depression and anxiety	Cross-sectional, correlational	Quality of Life Coping Anxiety Depression Social support	Depressive symptoms were related to decreased functional ability, poor coping skills. Maladaptive coping has the strongest association with depressive symptoms.

Table S1.1 (cont'd)

Author(s), Year, Country	Type of study	Populations, sample size, type of HF, inclusion criteria	Design	Measured Outcome	Key Results
Klein et al.[40] 2007 US	Quantitative	N=80 Congestive HF Mean age 69 >60 years of age HF patients in outpatients care Screened for depression and disabilities	Cross-sectional	Quality of Life Coping Depression Social limitation	Maladaptive coping styles were associated with negative outcomes, including lower QOL and depressive symptoms. The use of denial was strongly related to lower scores on all KCCQ domains and more depressive symptoms. Illness severity (NYHA class) was highly significant and related negatively to greater impairment results in lower QOL. The use of maladaptive coping strategies involves efforts that divert attention from the illness and suggests the need to provide heart failure patients the skills to directly address the stress associated with their illness.
Bose et al.[23] 2016 Sweden	Quantitative	N=103 Chronic HF Mean age 71 Patients who are diagnosed with CHF Hospitalized Classified as New York Heart Association (NYHA) class II–III Aged >18 years.	Cross-sectional	Coping strategies Illness perception Anxiety Depression	The avoidant coping style appears to influence not only emotional distress but also a malignant symptom perception and low sense of control over the illness. Adopting an avoidant coping style to a greater extent has a pronounced adverse effect on anxiety and depression which are important outcomes in the context of CHF. The effect of avoidant coping on depression was also to some extent transmitted by the belief about the controllability of the condition by personal efforts.

Table S1.1 (cont'd)

Author(s), Year, Country	Type of study	Populations, sample size, type of HF, inclusion criteria	Design	Measured Outcome	Key Results
Trivedi et al.[35] 2009 US	Quantitative	N=222 HF (not specified) Mean age 57 Had a left ventricular ejection fraction (LVEF) of <40% Had a stable New York Heart Association Class I-IV for at least 3 months.	Cross-sectional	Psychological health (depression) Social support Dispositional optimism Coping	Depressive symptoms were associated with decreased use of problem-focused coping. Increases in depression were associated with decreased use of problem-focused coping strategies (acceptance). Avoidant coping such as denial potentially predisposes a patient to ignore medical recommendations or symptoms that could signify the need for medical attention. Adaptive coping may not only help problem-solve strategies for treatment and monitoring increasingly debilitating symptoms, but it may also help in managing the emotions associated with the illness.
Perez-Garcia et al.[19] 2014 Spain	Quantitative	N=60 HF (not specified) Mean age 67 Diagnosed with HF between 5 and 10 years earlier Age of >40 and <89, NYHA functional classes I–III Absence of clinical depression diagnosis or any other psychopathological disorder To be an outpatient at the time of research	Cross-sectional	HRQoL Subjective well-being Depression Coping strategies	Gender was a significant factor for SWB (men showed higher SWB than women). Acceptance is negatively correlated with depressive symptoms, but not statistically significant. Coping strategies are associated with SWB and depressive symptoms among HF patients. The use of task-focused (problem-focused) coping was associated with less depressive symptoms ($p<0.001$).

Table S1.1 (cont'd)

Author(s), Year, Country	Type of study	Populations, sample size, type of HF, inclusion criteria	Design	Measured Outcome	Key Results
Kristofferzon et al.[18] 2011 Sweden	Quantitative	N=292, (124 patients with HF) Chronic HF Mean age 68 Between 45–80 years old, Main diagnosis of CHF or ESRD Lived in their own homes Read and understood the Swedish language Not in the terminal stage.	Cross-sectional correlation	Mental QoL Coping strategies Sense of Coherence	Lower sense of coherence was associated with higher use of emotion-focused coping in HF patients. Problem-focused coping strategies were related to better QoL. Emotion-focused coping strategies were associated with poorer QoL. Gender differences were found (women used more emotion-focused coping than men). Emotion-focused and problem-focused coping did not mediate the relationship between sense of coherence and mental QoL.
Carels et al.[41] 2004 US	Quantitative	N=58 HF (not specified) Mean age 67 Aged 18 or older with left ventricular ejection fraction (LVEF) < 50%	Cross-sectional correlation	Depressive symptoms Social support Mood (positive and negative) Coping	Negative mood and distraction coping predicted greater physical symptoms; while action/ acceptance coping predicted fewer physical symptoms. Patients who concentrated their efforts on improving their symptoms or tried to accept their illness reported fewer HF physical symptoms. Passive coping was ineffective at reducing HF-related symptoms.. Coping may exacerbate physical symptoms in HF patients' functional status.
Rohrbaugh et al.[43] 2002 US	Quantitative	N=128 Congestive HF Mean age 53 EF <35	Cross-sectional	Psychological health Coping Marital quality	Women coping with CHF bear a greater proportion of the burden than men, regardless of whether they are patients or spouses. Coping is affected by the psychological factors associated with HF. Marital relationship is also an important factor for coping.

Table S1.1 (cont'd)

Author(s), Year, Country	Type of study	Populations, sample size, type of HF, inclusion criteria	Design	Measured Outcome	Key Results
Hundt et al.[8] 2015 US	Quantitative	N=227 Congestive HF 87 HF, 140 COPD Mean age 66 Diagnoses of CHF and/or COPD within the previous 2 years Initially endorsed at least one symptom of anxiety or depression	Cross sectional	QoL Coping Illness intrusiveness Health-related locus of control	Avoidant/emotion-focused coping but not active coping mediated the relationship between illness severity and illness intrusiveness. Without support, patients with more severe diseases are more likely to use avoidant/emotion-focused coping. Greater severity of COPD/CHF symptoms, and more avoidant/ emotion-focused coping.
Bose et al.[28] 2015 Sweden	Quantitative	N=183 Chronic HF Mean age 71 Aged over 18 years Diagnosed with CHF Hospitalized at a heart failure ward or at a nurse-led heart failure outpatient clinic at a hospital in mid-Sweden, were classified in NYHA class II-IV,	Cross-sectional correlation	HRQoL Mental health Coping	Avoidant coping was associated with worse HRQoL in CHF. Problem-focused coping, emotion-focused coping, and socially supported coping, did not show any significant association with HRQoL. Avoidance coping is independent of the other higher-order grouping of coping strategies. This could imply that the patients employ avoidant coping styles regardless of utilizing other coping efforts.

Table S1.1 (cont'd)

Author(s), Year, Country	Type of study	Populations, sample size, type of HF, inclusion criteria	Design	Measured Outcome	Key Results
Krzych et al.[31] 2016 Poland	Quantitative	N=758 HFrEF Mean age 64 > six-month documented history of HFrEF Clinical stability for ≥ three months Left ventricular ejection fraction (LVEF) < 45%.	Cross-sectional	Physical health Coping NYHA class of HF	A positive correlation between higher NYHA class and emotion-oriented coping. Emotion-oriented stress coping is associated with more pronounced depressive tendencies and a sense of lack of control over the disease. Avoidance coping, along with anxiety, was significantly related to impaired physical functioning and thereby more symptomatic disease. The progression to more symptomatic stages of HF corresponds with a shift towards more emotion-oriented coping strategies with a potentially detrimental impact on therapy adherence.
Ghafoor et al.[20] 2019 Germany	Quantitative	N=200 Chronic HF Mean age 54 Age ≥18 years Diagnosis of HF, LVEF ≥ 30% No heart transplants Sufficient language skills, and cognitive abilities	Cross-sectional	HRQoL Anxiety Depression Worry Cognition Coping	There are major cultural differences regarding the application and effect of specific maladaptive coping strategies. Emotional intelligence (EI) supports the use of adaptive coping. A higher psychopathological burden was associated with less use of positive coping and lower HRQoL. EI and low mental component summary (MCS) and physical component summaries (PCS) of HRQoL were fully mediated by negative coping.

Table S1.1 (cont'd)

Author(s), Year, Country	Type of study	Populations, sample size, type of HF, inclusion criteria	Design	Measured Outcome	Key Results
Nilsson et al.[48] 2017 Sweden	Quantitative	N=639 Chronic HF Mean age 70 18–85 years of age HF >3 months Understands the Swedish language. Population group: 18–85 years of age Understands the Swedish language	Cross-sectional comparative correlational design	QoL Coping	Women in the patient group used more problem- and emotion-focused coping than did women in the population group. Men in the patient group used more optimistic and evasive coping than men in the population group did. Women used more problem-focused as well as emotion-focused coping strategies than men did. Higher education, lower age, and an unsatisfactory economic situation were related to increased use of both problem- and emotion-focused coping. Patients with HF used more problem-focused than emotion-focused coping strategies. Problem-focused coping has been shown to be associated with better functioning than emotion-focused coping,
Baah et al.[49] 2021 US	Quantitative	N=543 HF (not specified) Mean age 72 Age > 18 years Diagnosed with heart failure Read and write in English	Cross-sectional observational study	Self-care HF outcomes	Married or partnered participants had significantly higher self-care maintenance scores compared with single participants. Higher education was significantly associated with higher self-care maintenance scores. Social support is an important determinant of self-care and HF outcomes.

Table S1.1 (cont'd)

Author(s), Year, Country	Type of study	Populations, sample size, type of HF, inclusion criteria	Design	Measured Outcome	Key Results
Heo et al.[51] 2007 US	Quantitative	N=98 HF (not specified) Mean age 74 Had a confirmed primary diagnosis of heart failure NYHA functional classification II–IV Discharged home Living within the greater metropolitan area of each site	Cross-sectional	HRQoL Physical symptom status Emotional symptom status Functional status	No significant gender differences for physical and emotional status, NYHA functional class, and HRQOL among heart failure patients. The effects of NYHA functional class on the relationship between symptom status and HRQOL were significantly different in men and women. NYHA functional class only mediated the relationships between emotional symptom status and HRQOL in women. HRQoL was relatively more affected by depression in men HRQoL was more strongly affected by physical symptom status in women.
Obieglo et al.[4] 2016 Poland	Quantitative	N=100 Chronic HF Mean age 63 Age > 18 years Diagnosed with HF for least six-months HF corresponding to New York Heart Association (NYHA) class II, III or IV	Cross-sectional, correlation	Subjective health status (energy, pain, emotional reaction, sleep, social isolation and mobility)	An increase in acceptance of illness levels was associated with better health outcomes and QoL. Sociodemographic (i.e., age, gender, education, marital status, and occupational status) were associated with health outcomes. Low acceptance of illness levels was associated with increase pain, low energy levels, and negative QoL.

Table S1.1 (cont'd)

Author(s), Year, Country	Type of study	Populations, sample size, type of HF, inclusion criteria	Design	Measured Outcome	Key Results
Abshir et al.[32] 2016 US	Quantitative	N=62 HF (not specified) Mean age 56 Had Left Ventricle Assisted Device and treated in outpatient clinic >21 years of age No severe cognitive impairment) Speak and understand English	Cross-sectional	QoL Stress Fatigue Coping	Increase stress levels and low social support were associated with increased use of avoidant coping. No association between demographics, stress levels, and coping strategies. No significant association between coping strategies and QoL.
An et al.[47] 2021 China	Quantitative	N=302 HF (not specified) Mean age 80 >18 years of age Diagnosis of HF NYHA classes II to IV, Ability to understand and complete the questionnaire. No acute HF, mental or cognitive impairments	Cross-sectional	Physical and mental (emotional) QoL	Acceptance was associated with higher stress levels and poor mental (emotional) QoL. NYHA classes, education, avoidance were related to physical QoL, Acceptance was less effective in improving QoL.
Jackson & Emery[34] 2011 US	Quantitative	N=35 Congestive HF Mean age 56 Female sex > 18 years of age Fluency in English Diagnosed with HF by a cardiologist	Cross-sectional	Emotional (depression and anxiety) and physical (general and disease specific) QoL	Knowledge (education) was not associated with QoL Knowledge about HF moderates the relationship between coping strategies and emotional QoL. Denial was associated with depression and anxiety (poor emotional QoL).

Table S1.1 (cont'd)

Author(s), Year, Country	Type of study	Populations, sample size, type of HF, inclusion criteria	Design	Measured Outcome	Key Results
Rong et al.[27] 2018 China	Quantitative	N=360 HF (not specified) Mean age 63 ≥18 years of age Had HF within the NYHA classifications II-IV Had been living in Xinjiang, China more than 10 years Able to interview and comprehend Mandarin language	Cross-sectional, correlation	QoL Symptom management	Spirituality was the factor that affects using avoidant coping strategies. No gender differences in coping strategies. Education was associated with using acceptance. Less education was associated with avoidant coping and poor QoL. Self-care ability was associated with coping strategies. Income was not associated with coping strategies. Short disease duration was associated with using avoidant coping (1-5 years) and longer duration (>10 years) was associated with using acceptance.
Moser et al.[46] 2013 US	Mixed Method	N=603 HF (not specified) Mean age 62 Diagnosed with HF Community dwelling No cognitive impairment No life-threatening comorbidity	Mixed Method	HRQoL Depression and anxiety Functional capacity	Younger HF patients had worse QoL compared with older HF patients. Psychological status is better among older HF patients. Marital status was associated with QoL among older HF patients.

Table S1.1 (cont'd)

Author(s), Year, Country	Type of study	Populations, sample size, type of HF, inclusion criteria	Design	Measured Outcome	Key Results
Riegel & Carlson[52] 2002 US	Qualitative	N=26 HF (not specified) Mean age 74 Had been hospitalized for HF previously Diagnosed with chronic HF able to speak English Not cognitively impaired	Qualitative, descriptive	QoL Self-care	Problem-focused coping was associated with improved self-care. Lack of treatment adherence and loss of control were the main barriers to self-care.
Shahrbabaki et al.[44] 2017 Iran	Qualitative	N=18 Chronic HF Mean age 66 Having at least six-month experience of living with symptomatic heart failure The ability to communicate in Persian	Qualitative content analysis of semi-structured interviews	QoL Health outcomes	Spiritual belief, as a coping strategy, is an important strategy in heart failure patients' compliance with the new situation. Quality of life was associated positively with the use of spiritual practices as a coping strategy.
Shahrbabaki et al.[45] 2016 Iran	Qualitative	N=20 HF (not specified) Mean age 64 NYHA III, IV (11 patients with heart failure, three cardiologists, three nurses, and three family members of heart failure patients)	Qualitative content analysis of open-ended, semi-structured interviews	Physical and psychological health Coping Patient's perception of support	Physical family support was a basic need of patients with heart failure. Inadequate educational, emotional, and physical support, and lack of reassurance from the healthcare team for patients with HF is one of the greatest obstacles highlighted by the participants. Perceived poor emotional and social support from the healthcare team is a serious obstacle to coping for patients with heart failure.

Note: The classification of HF was according to the European Society of Cardiology (ESC), which defined primarily by left ventricular ejection fraction: HF with reduced ejection fraction (HFrEF), HF with mid-range ejection fraction (HFmrEF), and HF with preserved ejection fraction (HFpEF; McDonagh et al. 2021).

CHAPTER 3: COPING STRATEGIES AND HEALTH-RELATED QUALITY OF LIFE IN INDIVIDUALS WITH HEART FAILURE

Abstract

Heart failure (HF) contributes to poor physical and emotional health-related Quality of Life (HRQoL) and poor health outcomes. Coping strategies have been identified as essential in enhancing HRQoL. The study purpose was to examine relationships between factors that influence coping (i.e., age, sex, education, income, HF duration), HF severity, coping strategies (i.e., problem-focused, active emotion-focused, avoidant emotion-focused), and physical and emotional HRQoL. A cross-sectional study used an online questionnaire. Pearson correlations, and one-way ANOVAs were used to analyze variable relationships. A total of 108 participants completed the study with the majority being Black men. The result showed significant negative associations ($p<.05$) between problem-focused and active emotion-focused coping and HF severity (measured by the New York Heart Association [NYHA] classification). Lower age was significantly related to the use of problem-focused and active emotion-focused coping ($p<.05$); females showed higher use of coping strategies (all types) than males ($p<.05$). Higher levels of education correlated with greater use of problem-focused coping, while higher income related to more use of active emotion-focused coping. Better physical HRQoL was significantly associated with active emotion-focused coping ($r=-.283$, $p=.005$), whereas better emotional HRQoL was significantly associated with problem-focused coping ($r=-.265$, $p=.005$) and active emotion-focused coping ($r=-.373$, $p<.001$).

In conclusion, the findings showed that individuals with lower HF severity, younger age, and higher income and education tended to predominantly utilize adaptive coping strategies, particularly problem-focused and active emotion-focused. Individuals with HF who use problem-focused and active emotion-focused coping may experience better physical and emotional HRQoL; whereas, those who use primarily avoidant emotional-focused coping will need interventions to help them use the other two coping strategies. Healthcare professionals may take factors such as HF severity, into account to tailor interventions that promote adaptive coping and enhance HRQoL outcomes.

Background

Heart Failure (HF) is a chronic clinical condition that negatively impacts physical and emotional Health-Related Quality of Life (HRQoL) as the disease progresses (Sherwood et al., 2017). HRQoL among individuals with HF is defined as the impact of the illness on their physical and emotional health (McHugh et al., 2019; National Center for Chronic Disease Prevention and Health Promotion [NCCDPHP], n.d.; Rumsfeld et al., 2013; Zheng et al., 2018). This is mainly attributed to stress related to the severity of HF, e.g., symptoms (dyspnea, fatigue, palpitation, and pain), decline in physical functioning, and the overall impact of HF and treatments on cognitive and emotional function (Grant & Graven, 2013; Johansson et al., 2021; McHugh et al., 2019; Zheng et al., 2018). The severity of HF is commonly measured by the New York Heart Association (NYHA) Classification ranging from I to IV, with IV being the most severe. Classification I is often asymptomatic, so most studies focus on categories II-IV (Bennett et al., 2002). Recent evidence suggested that coping can be an important factor in maintaining and/or improving the HRQoL of individuals with HF (Alanazi et al., 2022). However, a clear understanding of the factors that affect individuals' with HF coping and the relationship between different types of coping strategies and physical and emotional HRQoL is lacking. Thus, the purpose of this study was to examine the factors that affect the stressor of HF and the impact of coping strategies on HRQoL.

Conceptual Underpinning. Lazarus and Folkman's (1984) Transactional Stress and Coping Model (TSCM) defined coping as cognitive and behavioral efforts to regulate, tolerate, and overcome demands that emerge from an interrupted relationship between individuals and their environments. In evaluating HRQoL, this study used an adapted version of the TSCM, which focuses on understanding relationships between stressors, influencing factors, coping strategies, and outcomes among individuals with HF (Lazarus & Folkman, 1984). Some of the original model concepts (i.e., stressor, cognitive appraisal, and transactional process) were modified. For example, the stressor was presumed but not explicitly stated. The stressor, in this case, refers to HF severity is believed to be a key factor in determining coping strategies (Blumenthal et al., 2019). Additionally, cognitive appraisals and transactional process were omitted as these variables were not essential to the study.

This study categorized coping strategies into three types: problem-focused, active emotion-focused, and avoidant coping (Alhurani et al., 2018; C. N. Bose et al., 2020; Sherwood et al., 2017). First, problem-focused coping aims to directly alter or manage the stressor. Second, active coping is defined as self-reflection strategies that attempt to manage and facilitate the emotional consequences of the stressor. Finally, avoidant coping is defined as self-distraction strategies that aim toward isolating the impact of the stressor (Biggs et al., 2017; Vungkhanching et al., 2017).

When evaluating the coping component of the TSCM model among individuals with HF, a systematic review found that problem-focused and active emotion-focused coping strategies were associated with improvement in psychological and physical HRQoL, whereas, avoidant emotion-focused coping was associated with overall poor HRQoL and negative health outcomes (Graven et al., 2014). Conversely, other investigators have found that avoidant emotion-focused coping strategies could also result in positive emotional HRQoL in the short-term, but long-term utilization of these strategies would more likely result in negative physical and emotional HRQoL (Hundt et al., 2015). These contrasting findings for types of coping, especially for avoidant emotion-focused coping, point to the need for further study. The TSCM model also identifies potential characteristics related to coping among individuals with HF, including age, sex, education, income, and HF duration, i.e., referred to as influencing factors (Biggs et al., 2017; Lazarus & Folkman, 1984).

Problem-focused and active emotion-focused coping strategies have been identified as dominant types of coping among HF participants who were younger, male, highly educated, and had a higher-income (Alhurani et al., 2018; Lynggaard et al., 2017; Nilsson et al., 2017; Svensson et al., 2016). Longer HF duration has been associated with problem-focused coping; whereas shorter duration of the illness was associated with avoidant emotion-focused coping (Rong et al., 2018). On the other hand, avoidant emotion-focused coping was dominant among HF participants who were older, female, less educated, and with lower-income (Nilsson et al., 2017; Rong et al., 2018).

Overall, contradictions in evidence related to coping among individuals with HF challenge clarity relative to the contributors to HRQoL. Prominent issues include a lack of sufficient quality evidence

given most studies are descriptive. Further, there are inconsistencies among studies in the conceptualization and definitions of coping types, especially whether or not emotion-focused coping was divided into active and avoidant types (Bose et al., 2015; Nilsson et al., 2017; Rong et al., 2018). Also, the severity of HF stressors have mixed results from various investigators (Carels, 2004; Hundt et al., 2015). Such contradictions have resulted in difficulties in determining effects of HF severity and influencing factors (such as age, sex, education, income, and HF duration) that may impact types of coping strategies used, and how such strategies are or are not related to physical and emotional HRQoL. The present assessment work lays the groundwork for development of interventions to help individuals with HF build coping strategies to maintain HRQoL. The objectives of this study were to:

1. Examine associations between HF severity (i.e., HF classification) and types of coping strategies (i.e., problem-focused, active emotion-focused, and avoidant emotion-focused coping) identified in the TSCM;
2. Examine relationships between influencing factors (i.e., age, sex, education, income, and HF duration) and the three types of coping strategies;
3. Identify associations between coping strategies and physical and emotional HRQoL.

Methods

A cross-sectional design self-reported on-line study. After obtaining the associated University Institutional Review Board (IRB) approval, participants were recruited online using *ResearchMatch.org*, a secure online tool that aims to match researchers with target participants.

Sample and Setting

Potential participants were identified through the ResearchMarch.org database who met the inclusion and exclusion criteria. Using a convenience sample, inclusion criteria were: 1) diagnosed HF, 2) have a NYHA HF classification >I since those with NYHA classification I are often asymptomatic; 3) age ≥18 years; 4) have internet access; and 5) able to speak and read English. Exclusion criteria were: 1) mental or health disorders that prevented ability to provide informed consent; 2) individuals undergoing

active cancer treatment due to potential masking of the associations of HF symptoms on coping strategies and effects on HRQoL. These criteria were all determined by self-report and *ResearchMatch.org* search filters. Using G*Power 3.1, a sample size of 74 was found to be adequate to achieve a power of 90% with an alpha of 0.05 and an effect size of 0.30 (Faul et al., 2009). To account for the anticipated missing or incomplete date, the target sample size was increased to 114. Effect sizes were based on previous studies evaluating coping and HF using the TCSM as a theoretical framework (Alhurani et al., 2018; N. C. Bose et al., 2015).

Measures

The measures included in the study were selected to examine the study objectives capturing information on NYHA classification, influencing factors (age, sex, education, income, and HF duration), coping strategies, and HRQoL. The measures for these variables were selected based on reliability and validity, and relevance to the study design and population. All measures were self-reported. The following is a description of all study measures.

HF Severity

The clinically validated NYHA classification (i.e., II, III, and IV) is a subjective measure that describes severity of the HF severity by examining symptoms, including fatigue, palpitation, dyspnea, and their association with physical activity limitations (Gallagher et al., 2016; Holland et al., 2010).

Influencing Factors

Demographic data were collected via a survey designed by the investigator and administered by Qualtrics. Age was measured in years and sex as male, female, or other, education was measured in five levels, where the lowest is “less than high school” and the highest is “graduate degree,” annual income is measured by five income categories the lowest is “below $10,000-$20,000” and the highest is “$100,001 and above,” and finally, HF duration is measured in months starting from the date when the patient was first diagnosed with HF.

Coping strategies

Coping strategies were measured by the Brief COPE, a widely used measure for coping that has been used among individuals with HF (Alhurani et al., 2018). Brief Cope has 28 items measuring 14 coping strategies, 2 items each coping strategy. Participants' responses are derived on a scale of 1 to 4, where 1 refers to "I usually do not do" and 4 "I usually do." This study classified coping strategies into problem-focused, active emotion-focused, and avoidant emotion-focused coping (Carver, 1997). The reliabilities were 0.84 for problem-focused (3 strategies), 0.79 for active emotion-focused (5 strategies), and 0.68 for avoidant emotion-focused coping (6 strategies; Bose et al., 2015). Interscale correlation showed a weak to high among the three coping strategies, with problem-focused and active emotion-focused showing the highest correlation (r=0.77). However, this result is in line with the theoretical expectation that these coping strategies, which are conceptually related, would demonstrate some degree of correlation. Importantly, the conceptualization of three coping strategies has been empirically supported (Coolidge et al., 2000; Cooper et al., 2008).

Health-related Quality of Life (HRQoL)

The Minnesota Living with Heart Failure Questionnaire (MLHFQ) was used to measure HRQoL (Bilbao et al., 2016). The MLHFQ items were answered on a 6-point rating scale, ranging from 0 (none) to 5 (very much) and higher scores indicate worse HRQoL. The MLHFQ has a physical subscale with 8 items ranging from 0-40 (Cronbach's alpha of 0.86), and an emotional subscale has 5 items ranging from 0-25 (Cronbach's alpha of 0.86).

Procedure

A recruitment e-mail was sent to potential participants from the *ResearchMatch.org* database who met the inclusion and exclusion criteria. The contact information was collected from those who agreed to participate. A second email that was sent to 400 potential participants included study information, a screening tool to determine eligibility and interest in the study, and a link for questionnaires, which included the informed consent, self-reported demographic and health characteristics (i.e., HF severity and duration); coping strategies and HRQoL measures. A brief description of each NYHA HF classification

was provided along with the recruitment email to assist individuals with self-reporting their level of HF. A total of 142 agreed to participate, and 112 successfully completed the survey. Returned surveys were examined for missing data and follow-up phone calls and/or emails were sent to participants who did not complete the surveys. Email follow-ups were sent out for those who did not complete the survey. However, 4 were excluded due to incomplete record (n=3) and double entry (matching contact details [n=1]), yielding 108 participants this study (Figure 3.1). There were no clear differences in demographics and NYHA HF classification between those who responded and those who did not.

Statistical Analysis

Prior to analysis, the missing data were assessed, and only 4 cases with missing data were identified, accounting for less than 5% of the measured variables. The pattern of missing data was missing completely at random (MCAR). MCAR was handled by using a single imputation method (Donders et al., 2006). After checking assumptions, Pearson's correlations and one-way ANOVA's were conducted to examine relationships between influencing factors (i.e., age, sex, income, education, and HF duration) and coping strategies. The associations between coping strategies and physical and emotional HRQoL outcomes were performed using Pearson's correlation coefficient. The Kruskal–Wallis test was used to compare the three NYHA classifications and coping strategies (Guo et al., 2013). If the test results were significant, the Tukey test post hoc analysis was applied in order to identify differences between NYHA classification groups. Finally, Welch's F was used when the homogeneity of variance assumption was violated due to the unequal sample sizes for each NYHA classification subgroup. Statistical analysis was performed using SPSS software (version 25; Pereira et al., 2015).

Results

Participant Characteristics

108 participants completed the study with ages ranging between 20-81 years (37.03±11.77 years). The majority were males (57.4%, n=62) who self-identified as Black or African American (60.2%, n=65). Most participants were married and employed full-time (Table 3.1).

Objective 1: Examine associations between stressor severity (i.e., HF classification) and types of coping strategies (i.e., problem-focused, active emotion-focused, and avoidant emotion-focused coping) identified in the TSCM.

The mean scores for problem-focused, active emotion-focused, and avoidant emotion-focused coping were presented in Table 3.2. However, prior to analysis, all three types of coping strategies scores were centered on their means to reduce multicollinearity and to improve the reliability and interpretation of the test results (Holmbeck, 2002). This was achieved by subtracting the mean of the coping strategy from each participant's score. Figure 3.2 illustrates the utilization of coping strategies across the three NYHA classifications. Individuals with NYHA II used both problem-focused and active emotion-focused coping strategies. Problem-focused coping was mostly used by individuals with NYHA II (M=0.95) and rarely used among those with NYHA IV. However, the most reported coping strategy among individuals with NYHA II was active emotion-focused coping (M=1.89). Participants with NYHA class III showed higher use of problem-focused (M=0.16) whereas those in NYHA IV relied on avoidant emotion-focused coping compared to those in NYHA III (M=-1.72), see Figure 3.2.

Using a One-way ANOVA to explore the relationship between coping strategies and NYHA classification, the results showed significant differences in problem-focused (F[2,65.53]=3.71, p=.030) and active emotion-focused (F[2,68.48]=3.10, p=.051) among the NYHA classifications. To compare the specific differences between the NYHA classifications, the Games-Howell post hoc test was used. The test revealed a statistically significant negative differences in problem-focused coping between NYHA classification II and NYHA IV only (M=-2.67, p=.024) suggesting a significant lower use of problem-focused coping among those with higher HF severity. Active emotion-focused and avoidant emotion-focused coping did not show significant differences between NYHA II and NYHA III (M=3.28, p=.08; M=0.44, p=.95, respectively) or between NYHA II and NYHA IV (M=3.19, p=.073; M=-0.66, p=.90, respectively).

Objective 2: Examine relationships between influencing factors (i.e., age, sex, education, income, and HF duration) and the three types of coping strategies.

The results showed that age has a significant negative correlation with problem-focused (r=-.262, p=.006), active emotion-focused coping (r=-.192, p=.046), indicating that as with increasing age, the use of these types of coping strategies tended to decrease. However, there were no significant correlations between age and avoidant emotion-focused coping (r=-.098, p=.13). The results showed significant differences based on sex in using problem-focused (F(1, 106)=6.72, p=.011), active emotion-focused (F(1, 106)=5.82, p=.018), and avoidant coping (F(1, 106)=4.77, p=.031). Those who self-identified as females tended to use more problem-focused (M=1.21), active emotion-focused (M=1.73), and avoidant emotion-focused (M=1.60) compared to males (M=-0.90, -1.28, and -1.19, respectively). This means that females used more of the three types of coping strategies than HF male patients. Although males had a higher mean age (M=39.13) compared to females (M=34.20), there was no significant differences in the association of age and coping according to sex. In other words, age tended to affect coping similarly for both males and females.

Annual income was significantly and positively associated with problem-focused (F(4,103)=2.679, p=.036), active emotion-focused (F(4,103)=7.067, p<.001), and avoidant emotion-focused coping (F(4,103)=3.290, p=.001). Analyzing the mean scores for the coping strategies within each income range showed that problem-focused coping was predominant by those who had higher annual income (i.e., $100,001 and above; M=1.27). Further, active emotion-focused coping was used mostly by individuals with $60,001-$100,000 annual income (M=2.4). Finally, avoidant emotion-focused coping was the most frequently used coping strategy for individuals with income below $10,000-$20,000 income (M=0.59). The findings suggest that individuals with HF who have lower annual income ranges tend to rely more on avoidant emotion-focused coping strategies, while those who have higher annual income tend to use more problem-focused and active emotion-focused coping strategies.

Level of education was significantly and positively associated with problem-focused coping (F(5,102)=3.4, p=.007), active emotion-focused (F(5,102)=8.58, p<.001), and avoidant emotion-focused coping (F(5,16.88)=15.51, p<.001). Post-hoc analysis showed that those with lowest level education (i.e., completed grade school) were positively associated with all three types of coping (M=4.16±3.73,

8.17±4.69, 9.13±5.10, respectively). Those with a low level of education (i.e., some high school) were associated with lower scores of all coping strategies (*M*=-2.94±4.72, .50±5.85,-3.20±3.05, respectively). When considering the total sample, those with lower education used fewer coping strategies (all types) compared to HF patients with higher levels of education.

Although education and income were correlated (i.e., higher income was associated with higher levels of education), there were no associations found with the higher levels of education (i.e., high school and college) and the use of problem-focused coping. Additionally, when adding income to the model, the effect of education did not change. Finally, HF duration was not significantly related to problem-focused (r=-0.179, *p*=.068); active emotion-focused (r=-.163, *p*=.096); and avoidant emotion-focused coping (r=-.159, *p*=.106) indicating a lack of impact on coping strategies.

Objective 3: Identify associations between coping strategies and physical and emotional HRQoL.

Pearson's correlation analysis was used to explore the associations between three coping strategies and the physical and emotional domains of HRQoL measured by the MLHFQ. A significant negative correlation was found between physical HRQoL and active emotion-focused coping (r=-.283, *p*=.003). However, there were no significant correlations between problem-focused (r=-.147, *p*=.130) and avoidant emotion-focused coping (r=-.108, *p*=.267) with physical HRQoL. Thus, only active emotion-focused coping was shown to have a significant relationship with physical HRQoL suggesting that better physical HRQoL was associated with use of active emotion-focused coping only. Emotional HRQoL showed significant negative correlations with both problem-focused (r=-.265, *p*=.005) and active emotion-focused (r=-.373, *p*<.001). However, there were no significant correlation between emotional HRQoL and avoidant emotion-focused coping (r=.019, *p*=.844).

The confounding effect of NYHA classification, age, sex, education and income between coping strategies and physical and emotional HRQoL was examined separately. Only level of education was shown to have a small confounding effect between active emotion-focused coping and physical HRQoL. The significant negative correlation was reduced from r=-.283 (*p*=.003) to r=-.215 (*p*=.034). However, the correlation remained significant. No significant change was reported on other variables suggesting that

NYHA classification and influencing factors have no effect on the relationship between coping strategies and physical and emotional HRQoL.

Discussion

The present study examined the relationships among the stressor of HF severity and types of coping (problem-focused, active emotional-focused, avoidant emotional-focused) and influencing factors on physical and emotional symptoms of HRQoL outcomes. The findings of this study contribute to an improved understanding of the factors that affect HF individuals' coping and the relationship between different types of coping strategies and physical and emotional HRQoL.

The results showed significant negative associations between the severity of HF and problem-focused and active emotional-focused, and positive association with avoidant emotional-focused coping strategies. The findings aligned with previous research suggesting that the severity of the stressor contributes to the employed coping strategy (Eisenberg et al., 2012). Individuals with NYHA IV were more inclined to use avoidant emotion-focused coping as compared to those with NYHA II and III. However, those with NYHA II used problem-focused and active emotion-focused coping. Such findings suggest that individuals with lower HF severity would have more ability to use more adaptive types of coping, which also has been linked to better HRQoL in the literature (Alanazi et al., 2022; Blumenthal et al., 2019; Sherwood et al., 2017).

The sample was from diverse backgrounds and relatively younger HF individuals with age ranges from 20 to 81 years old and a mean of 37.03. More than a half of the participants were under 40 years of age (n=66). Several studies have reported that older individuals with HF tend to rely more on avoidant coping strategies and less on problem-focused and active emotion-focused coping strategies (Alanazi et al., 2022). However, this study had conflicting findings indicating that age has a significant negative association with problem-focused and active emotion-focused coping strategies. This suggests that younger HF individuals tend to use more problem-focused and active emotion-focused coping strategies. The association between age and avoidant emotion-focused coping was not statistically significant.

The examination of the relationships between sex and coping strategies showed an interesting difference in use of coping strategies. The majority of participants were male and used more problem-focused coping and less active emotion-focused coping whereas females used more active emotion-focused coping and less problem-focused coping. It is important to acknowledge that there were no significant differences between males and females in physical and emotional HRQoL. Contrary to these findings, a study from China that examined the associations between sex and coping strategies among individuals with HF (n=360) identified that there were no sex differences in coping strategies (53.6% female; Rong et al., 2018). The differences found with this study may have been impacted by its' being conducted with ethnic minority regions in China, which affect the generalizability of the results.

The results of this study on sex are consistent with the literature on cardiovascular population. A study conducted on 57,017 individuals with the cardiovascular disease (CVD) in Japan showed that problem-focused coping (e.g., planning) was dominantly used by males. While the majority of women with HF used avoidant coping (Svensson et al., 2016). Similarly, a study on individuals with chronic kidney disease (n=135) found that gender was an independent predictor of the use of avoidant coping, and this use was considerably higher in women compared to men (Vélez-Vélez & Bosch, 2016). Despite differences in patient populations (CVD and chronic kidney disease), they share similar experiences related to the challenges associated with managing their conditions, such as lifestyle adjustments, medication adherence, and emotional distress. Therefore, it is reasonable to consider these findings for HF individuals.

Education and income are correlated, participants with higher educational achievement tend to have higher income. Still, the results showed that a higher level of education was not found to be associated with the use of problem-focused coping, while higher incomes were significantly associated with more use of problem-focused and active emotion-focused coping and less use of avoidant emotion-focused coping. This is inconsistent with prior literature that has demonstrated a relationship between problem-focused coping and higher levels of education (Alanazi et al., 2022; Baah et al., 2021; Nilsson et al., 2017). Additionally, lower level of education (completing high school and less) was associated with

more use of avoidant emotion-focused coping and less problem-focused coping strategies. Low annual income tends to be associated with using more avoidant coping compared to high income, who reported more problem and active emotion-focused coping. This is also consistent with previous studies that showed avoidant emotion-focused coping to be common among HF individuals with a lower level of education. Several studies found similar findings suggesting that income was a significant factor in selecting coping strategies (Alanazi et al., 2022; Jackson & Emery, 2011; Nilsson et al., 2017). Although the duration of HF was reported in the literature to be associated with the types of coping strategies used, this study found that HF duration has no association with the three types of coping. (Rong et al., 2018) Due to these mixed results, HF duration should be considered in future studies.

Physical HRQoL in individuals with HF was significantly and negatively correlated with active emotion-focused coping only. This suggests that individuals with better physical HRQoL were more likely to use active emotion-focused coping strategies. However, Problem-focused and avoidant emotion-focused coping showed no significant correlation with physical HRQoL. These findings align with a previous review that found active emotion-focused coping strategies to be linked with improvement in physical HRQoL (Graven et al., 2014). However, previous research showed that avoidant emotion-focused coping was associated with poor HRQoL, which contradicts the present study findings that showed no relationship. However, it is worth noting that this review reported on a combined concept of active and avoidant emotion-focused coping as 'emotion-focused' coping which could explain the discrepancy in findings (Graven et al., 2014).

Emotional HRQoL was significantly and negatively correlated with problem-focused and active emotion-focused coping strategies, indicating that better emotional HRQoL (i.e., lower MLHFQ scores) was associated with higher reported use of problem-focused and active coping strategies. While this relationship appears to be inverse, it is positive due to the direction of scoring of the instrument used. This also suggests that individuals who are experiencing higher emotional distress secondary to HF (i.e., worse emotional HRQoL) tend to use fewer problem-focused and active emotion-focused coping strategies. Using a theoretically supported classification of coping strategies, this study provided further evidence for

the role of coping strategies in emotional HRQoL in individuals with HF. Further, these findings are consistent with other studies that linked improved emotional HRQoL with the use of problem-focused and active emotion-focused coping strategies (Alanazi et al., 2022; Graven et al., 2014).

Overall, the findings of this study emphasize the importance of coping strategies in individuals with HF. The significant associations between problem-focused and active emotion-focused coping strategies and improved physical and emotional HRQoL suggest that future interventions need to focus on helping those who use the avoidance strategies to consider ways to adapt problem-focused and active emotional to improve HF individuals' HRQoL. Finally, HF duration showed no significant associations with coping strategies and HF severity.

Limitations

There are several limitations of this study that must be considered. The first limitation is the use of a cross-sectional design, which does not allow for testing causal relationships. Second, the measurements used in this study were all self-reported measures, which suggests a mono-method bias. Finally, the sample of HF individuals was unique as more than 61% were less than 40 years old. This may be possibly due to the online recruitment method utilized, which may affect the generalizability of this study. However, the present study represents a substantial step in the process of understanding the factors associated with coping among HF individuals.

Conclusions

In conclusion, the study highlights the importance of considering the severity of HF and influencing factors (i.e., age, sex, education, and income) when examining coping strategies. Further, the findings provide valuable insights into the associations between the three types of coping strategies and the physical and emotional components of HRQoL. Understanding these relationships is essential for healthcare professionals and researchers to develop tailored interventions that aim to address the specific coping needs of HF individuals to support their HRQoL outcomes.

Tables

Table 3.1 Demographic characteristics of the study participants (N = 108).

Demographic Characteristics	Mean (SD)	Frequency	Percentage
Age	37.03±11.77		
Sex			
Male		62	57.4
Female		46	42.6
NYHA Classification			
NYHA II		45	41.7
NYHA III		35	32.4
NYHA IV		28	25.9
Race			
Black or African American		65	60.2
White or Caucasian		42	38.9
Hispanic or Latino		1	.9
Ethnic Background			
Hispanic or Latino		13	12.0
Non-Hispanic or Latino		95	88.0
Living Situation			
Living Alone		15	13.9
Living with Spouse		67	62.0
Living with Friend		6	5.6
Living with Relatives		20	18.5
Marital Status			
Never Married		23	21.3
Married or Living with Partner		65	60.2
Divorced or separated		9	8.3
Widowed		11	10.2
Level of Education			
Some grade school		9	8.3
Completed grade school		38	35.2
Completed high school		16	14.8
Some high school		3	2.8
Some college		16	14.8
Completed college		26	24.1
Income			
Below $10,000-$20,000		17	15.7
$20,001-$30,000		13	12.0
$30,001-$60,000		12	11.1
$60,001-$100,000		49	45.4
$100,001 and above		17	15.7
Employment Status			
Employed Full Time		60	55.6
Employed Part Time		19	17.6
Unemployed		10	9.3
Retired		15	13.9
Full time homemaker		4	3.7

Table 3.2 Descriptive Statistics of Coping Strategies and Health-related Quality of Life (n = 108).

Characteristics	Mean (SD)	Minimum	Maximum	Range
Coping Strategies				
Problem-focused	17.61±4.31	11	24	6-24
Active Emotion-focused	27.16±6.58	14	40	10-40
Avoidant Emotion-focused	25.868±6.68	14	43	12-48
HRQoL				
Physical HRQoL	21.52±6.35	8	38	0-40
Emotional HRQoL	13.32±4.85	5	25	0-25
HRQoL total	34.84±10.17	13	62	0-65
HF Duration (years)	2.95±4.55	0	26	

Figures

Figure 3.1 Recruitment Flow Diagram using *ResearchMatch.org.*

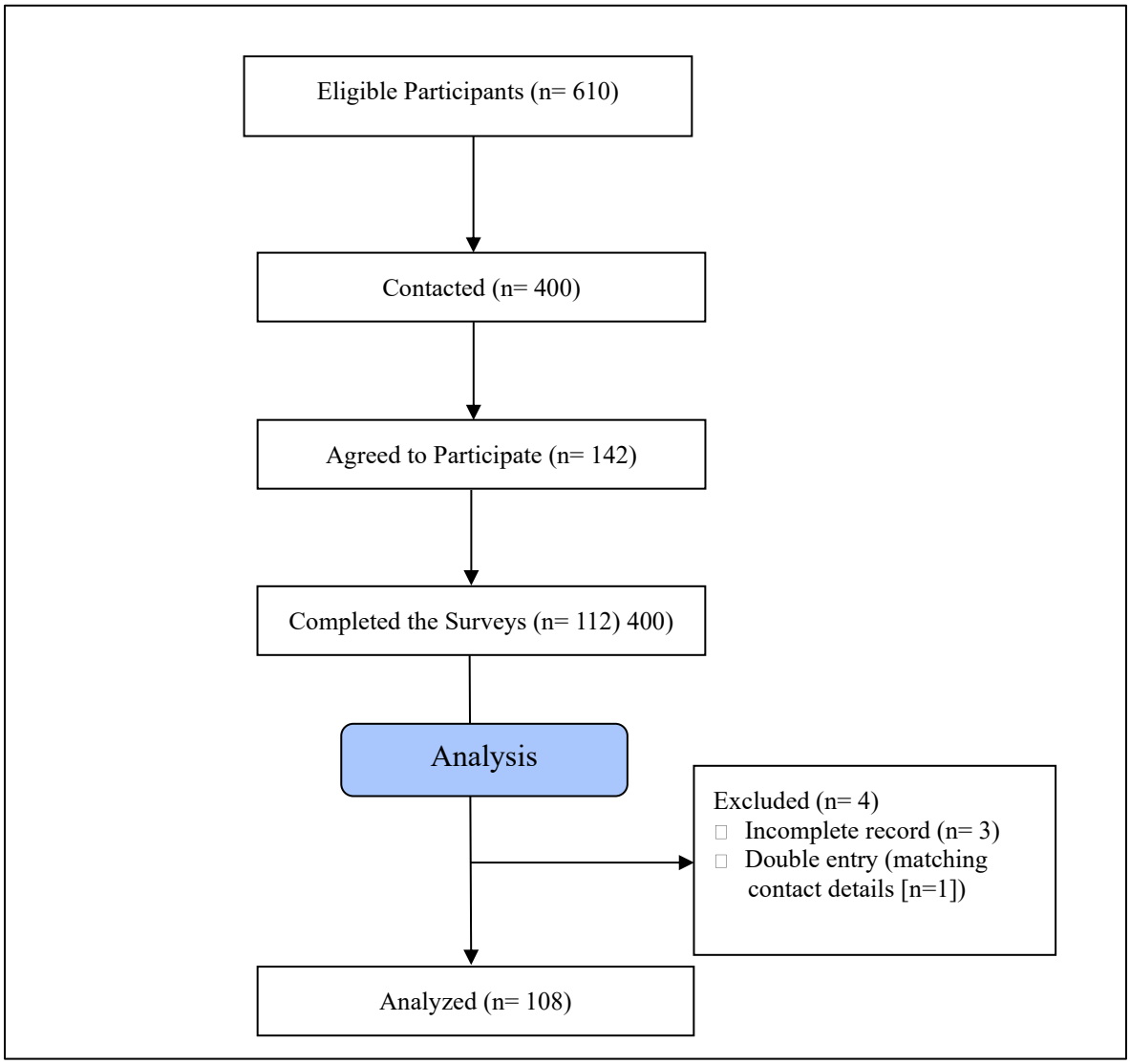
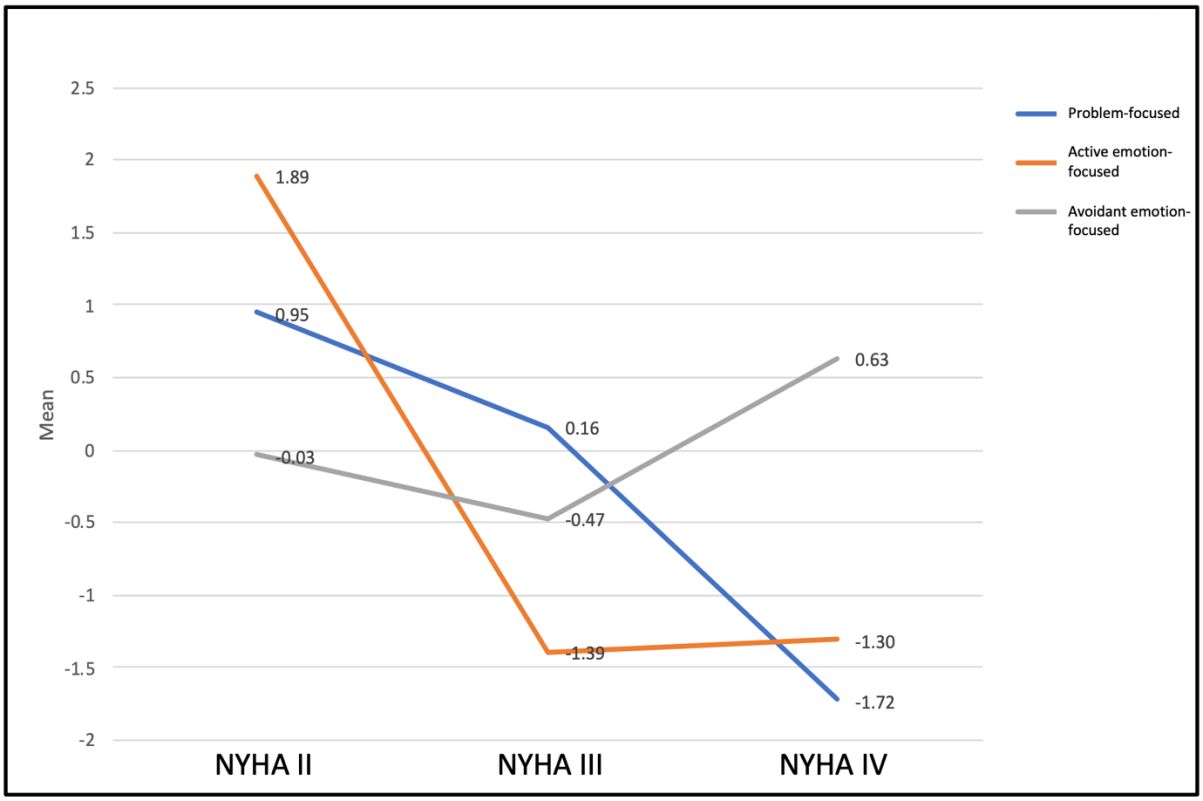


Figure 3.2 Association between Coping Strategies and HF Severity (NYHA Classification).



BIBLIOGRAPHY

Alanazi, M. O., Given, C. W., Deka, P., Lehto, R., & Wyatt, G. (2022). A literature review of coping strategies and health-related quality of life among patients with heart failure. *European Journal of Cardiovascular Nursing*, *22*(3), 236–244. https://doi.org/10.1093/eurjcn/zvac042

Alhurani, A. S., Dekker, R., Ahmad, M., Miller, J., Yousef, K. M., Abdulqader, B., Salami, I., Lennie, T. A., Randall, D. C., & Moser, D. K. (2018). Stress, cognitive appraisal, coping, and event free survival in patients with heart failure. *Heart & Lung*, *47*(3), 205–210. https://doi.org/10.1016/j.hrtlng.2018.03.008

Baah, F. O., Chittams, J., Carlson, B., Sethares, K. A., Daus, M., Moser, D. K., & Riegel, B. (2021). Sociodemographic Indictors of Social Position and Self-care Maintenance in Adults with Heart Failure. *Clinical Nursing Research*. Scopus. https://doi.org/10.1177/1054773821995593

Bennett, J. A., Riegel, B., Bittner, V., & Nichols, J. (2002). Validity and reliability of the NYHA classes for measuring research outcomes in patients with cardiac disease. *Heart & Lung*, *31*(4), 262–270.

Biggs, A., Brough, P., & Drummond, S. (2017). Lazarus and Folkman's psychological stress and coping theory. *The Handbook of Stress and Health: A Guide to Research and Practice*, 351–364.

Bilbao, A., Escobar, A., García-Perez, L., Navarro, G., & Quirós, R. (2016). The Minnesota living with heart failure questionnaire: Comparison of different factor structures. *Health and Quality of Life Outcomes*, *14*(1), 1–11.

Blumenthal, J. A., Zhu, Y., Koch, G. G., Smith, P. J., Watkins, L. L., Hinderliter, A. L., Hoffman, B. M., Rogers, J. G., Chang, P. P., O'Connor, C., Johnson, K. S., & Sherwood, A. (2019). The modifying effects of social support on psychological outcomes in patients with heart failure. *Health Psychology : Official Journal of the Division of Health Psychology, American Psychological Association*, *38*(6), 502–508.

Bose, C. N., Saboonchi, F., Persson, H., Björling, G., & Elfström, M. L. (2020). Adaptation of Coping Effectiveness Training for Patients With Heart Failure and Patient-Reported Experience of the Intervention. *Journal of Patient Experience*, *7*(6), 1054–1061.

Bose, N. C., Bjorling, G., Elfstrom, M. L., Persson, H., & Saboonchi, F. (2015). Assessment of Coping Strategies and Their Associations With Health Related Quality of Life in Patients With Chronic Heart Failure: The Brief COPE Restructured. *Cardiology Research*, *6*(2), 239–248.

Carels, R. A. (2004). The association between disease severity, functional status, depression and daily quality of life in congestive heart failure patients. *Quality of Life Research : An International Journal of Quality of Life Aspects of Treatment, Care and Rehabilitation*, *13*(1), 63–72. https://doi.org/10.1023/B:QURE.0000015301.58054.51

Carver, C. S. (1997). You want to measure coping but your protocol'too long: Consider the brief cope. *International Journal of Behavioral Medicine*, *4*(1), 92–100.

Coolidge, F. L., Segal, D. L., Hook, J. N., & Stewart, S. (2000). Personality disorders and coping among anxious older adults. *Journal of Anxiety Disorders*, *14*(2), 157–172.

Cooper, C., Katona, C., & Livingston, G. (2008). Validity and reliability of the brief COPE in carers of people with dementia: The LASER-AD Study. *The Journal of Nervous and Mental Disease*, *196*(11), 838–843.

Donders, A. R. T., Van Der Heijden, G. J., Stijnen, T., & Moons, K. G. (2006). A gentle introduction to imputation of missing values. *Journal of Clinical Epidemiology*, *59*(10), 1087–1091.

Eisenberg, S. A., Shen, B.-J., Schwarz, E. R., & Mallon, S. (2012). Avoidant coping moderates the association between anxiety and patient-rated physical functioning in heart failure patients. *Journal of Behavioral Medicine*, *35*(3), 253–261. https://doi.org/10.1007/s10865-011-9358-0

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G* Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*(4), 1149–1160.

Gallagher, R., Sullivan, A., Burke, R., Hales, S., Sharpe, P., & Tofler, G. (2016). Quality of life, social support and cognitive impairment in heart failure patients without diagnosed dementia. *International Journal of Nursing Practice*, *22*(2), 179–188.

Grant, J. S., & Graven, L. J. (2013). Coping and health-related quality of life in individuals with heart failure: An integrative review. *Heart & Lung*, *42*(3), 183–194. http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=104286462&site=ehost-live

Graven, L. J., Grant, J. S., Vance, D. E., Pryor, E. R., Grubbs, L., & Karioth, S. (2014). Coping styles associated with heart failure outcomes: A systematic review. *Journal of Nursing Education and Practice*, *4*(2), 227–242.

Guo, S., Zhong, S., & Zhang, A. (2013). Privacy-preserving Kruskal–Wallis test. *Computer Methods and Programs in Biomedicine*, *112*(1), 135–145. https://doi.org/10.1016/j.cmpb.2013.05.023

Holland, R., Rechel, B., Stepien, K., Harvey, I., & Brooksby, I. (2010). Patients' self-assessed functional status in heart failure by New York Heart Association class: A prognostic predictor of hospitalizations, quality of life and death. *Journal of Cardiac Failure*, *16*(2), 150–156. PubMed. https://doi.org/10.1016/j.cardfail.2009.08.010

Holmbeck, G. N. (2002). Post-hoc probing of significant moderational and mediational effects in studies of pediatric populations. *Journal of Pediatric Psychology*, *27*(1), 87–96.

Hundt, N. E., Bensadon, B. A., Stanley, M. A., Petersen, N. J., Kunik, M. E., Kauth, M. R., & Cully, J. A. (2015). Coping mediates the relationship between disease severity and illness intrusiveness among chronically ill patients. *Journal of Health Psychology*, *20*(9), 1186–1195.

Jackson, J. L., & Emery, C. F. (2011). Illness knowledge moderates the influence of coping style on quality of life among women with congestive heart failure. *Heart & Lung*, *40*(2), 122–129. https://doi.org/10.1016/j.hrtlng.2009.12.005

Johansson, I., Joseph, P., Balasubramanian, K., McMurray, J. J. V., Lund, L. H., Ezekowitz, J. A., Kamath, D., Alhabib, K., Bayes-Genis, A., Budaj, A., Dans, A. L. L., Dzudie, A., Probstfield, J. L., Fox, K. A. A., Karaye, K. M., Makubi, A., Fukakusa, B., Teo, K., Temizhan, A., … null, null. (2021). Health-Related Quality of Life and Mortality in Heart Failure: The Global

Congestive Heart Failure Study of 23 000 Patients From 40 Countries. *Circulation*, *143*(22), 2129–2142. https://doi.org/10.1161/CIRCULATIONAHA.120.050850

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer Publishing Company.

Lynggaard, V., Nielsen, C. V., Zwisler, A.-D., Taylor, R. S., & May, O. (2017). The patient education—Learning and Coping Strategies—Improves adherence in cardiac rehabilitation (LC-REHAB): A randomised controlled trial. *International Journal of Cardiology*, *236*, 65–70. https://doi.org/10.1016/j.ijcard.2017.02.051

McHugh, K., DeVore, A. D., Wu, J., Matsouaka, R. A., Fonarow, G. C., Heidenreich, P. A., Yancy, C. W., Green, J. B., Altman, N., & Hernandez, A. F. (2019). Heart failure with preserved ejection fraction and diabetes: JACC state-of-the-art review. *Journal of the American College of Cardiology*, *73*(5), 602–611.

National Center for Chronic Disease Prevention and Health Promotion, Division of Population Health. (n.d.). *Defining Health-Related Quality of Life (HRQOL)*. Retrieved July 16, 2021, from https://www.cdc.gov/hrqol/index.htm

Nilsson, A., Carlsson, M., Lindqvist, R., & Kristofferzon, M.-L. (2017). A comparative correlational study of coping strategies and quality of life in patients with chronic heart failure and the general Swedish population. *Nursing Open*, *4*(3), 157–167.

Pereira, D. G., Afonso, A., & Medeiros, F. M. (2015). Overview of Friedman's test and post-hoc analysis. *Communications in Statistics-Simulation and Computation*, *44*(10), 2636–2653.

Rong, X., Peng, Y., Yu, H., & Li, D. (2018). Factors associated with adoption of coping strategies among Chinese patients with heart failure in ethnic minority regions. *Journal of Clinical Nursing*, *27*(17–18), 3324–3334. https://doi.org/10.1111/jocn.14199

Rumsfeld, J. S., Alexander, K. P., Goff, D. C., Graham, M. M., Ho, P. M., Masoudi, F. A., Moser, D. K., Roger, V. L., Slaughter, M. S., Smolderen, K. G., Spertus, J. A., Sullivan, M. D., Treat-Jacobson, D., & Zerwic, J. J. (2013). Cardiovascular Health: The Importance of Measuring Patient-Reported Health Status: A Scientific Statement From the American Heart Association. *Circulation*, *127*(22), 2233–2249. https://doi.org/10.1161/CIR.0b013e3182949a2e

Sherwood, A., Blumenthal, J. A., Koch, G. G., Hoffman, B. M., Watkins, L. L., Smith, P. J., O'Connor, C. M., Adams, K. F., Rogers, J. G., Sueta, C., Chang, P. P., Johnson, K. S., Schwartz, J., & Hinderliter, A. L. (2017). Effects of Coping Skills Training on Quality of Life, Disease Biomarkers, and Clinical Outcomes in Patients With Heart Failure: A Randomized Clinical Trial. *Circulation. Heart Failure*, *10*(1).

Svensson, T., Inoue, M., Sawada, N., Yamagishi, K., Charvat, H., Saito, I., Kokubo, Y., Iso, H., Kawamura, N., & Shibuya, K. (2016). Coping strategies and risk of cardiovascular disease incidence and mortality: The Japan Public Health Center-based prospective Study. *European Heart Journal*, *37*(11), 890–899.

Vélez-Vélez, E., & Bosch, R. J. (2016). Illness perception, coping and adherence to treatment among patients with chronic kidney disease. *Journal of Advanced Nursing*, *72*(4), 849–863. https://doi.org/10.1111/jan.12873

Vungkhanching, M., Tonsing, J. C., & Tonsing, K. N. (2017). Psychological Distress, Coping and Perceived Social Support in Social Work Students. *The British Journal of Social Work*, *47*(7), 1999–2013. https://doi.org/10.1093/bjsw/bcw145

Zheng, S. L., Chan, F. T., Nabeebaccus, A. A., Shah, A. M., McDonagh, T., Okonko, D. O., & Ayis, S. (2018). Drug treatment effects on outcomes in heart failure with preserved ejection fraction: A systematic review and meta-analysis. *Heart*, *104*(5), 407–415. https://doi.org/10.1136/heartjnl-2017-311652

CHAPTER 4: COPING STRATEGIES, HEART FAILURE SEVERITY, AND HEALTH-RELATED QUALITY OF LIFE: A MULTIPLE MEDIATION ANALYSIS

Abstract

Heart failure (HF) is recognized to challenge the capacity to cope and to contribute to decrements in quality of life. The study purpose was to examine the mediating role of coping strategies (problem-focused, active emotion-focused, avoidant emotion-focused) between Heart Failure (HF) severity using the New York Heart Association (NYHA) HF classification and physical and emotional Health-related Quality of Life (HRQoL). A cross-sectional survey design guided by the Transactional Stress and Coping Model (TSCM) was used. A convenience sample of individuals with HF were recruited online using *Researchmatch.org.* Using PROCESS macro for SPSS, a multiple mediation model was applied to evaluate if one or more coping strategy type served as a mediator between HF severity and emotional and/or physical HRQoL. One hundred and eight participants completed the study with an age range of 20-81 years (37.03±11.77 years). Most participants were male (57.4%, n=62) and self-identified as Black or African American (60.2%, n=65). The mediation analysis results showed that only active emotion-focused coping mediated the relationship between all three NYHA classification (II, III, and IV) and emotional, but not physical HRQoL. These findings suggest that clinicians may consider incorporating interventions that promote the use of active emotion-focused coping strategies to help improve emotional HRQoL among HF patients with NYHA Classification of II and higher. Further, this study highlighted the need to modify the coping measurement tool to account for the impact on physical symptoms of HF.

Introduction

Heart Failure (HF) is a condition that contributes to high mortality and morbidity (Virani et al., 2021). As of 2022, the worldwide prevalence of HF was estimated at approximately 56 million (Lawson et al., 2023). Despite advances in HF healthcare, the Health-related Quality of Life (HRQoL) for those patients is still poor (Lawson et al., 2023; Moradi et al., 2020). Evidence showed that HRQoL is considered a key predictor of mortality and hospitalization among individuals with HF (Lawson et al., 2023). The HRQoL of individuals with HF is significantly reduced by the severity of HF-associated

symptoms, including but not limited to shortness of breath, fatigue, pain, limited physical function, and palpitations (Virani et al., 2021). Improving the HRQoL is a vital aspect of the treatment and management of HF (Briatore et al., 2019). Studies showed that the coping strategies used by individuals with HF to deal with their symptoms may play a major mediating role in impacting their HRQoL (Alhurani et al., 2018; Sherwood et al., 2017). Although some studies examined the mediating role of coping strategies between physical symptoms and depressive symptoms (Chen et al., 2020) and between HF severity and illness intrusiveness (Hundt et al., 2015), no studies have examined coping as a mediator between HF severity and HRQoL. Thus, the current study purpose was to fill this research gap by evaluating whether or which coping strategies serve as potential mediators between HF severity and HRQoL.

Studies showed that coping strategies are significantly linked with HRQoL in individuals with HF. Both problem-focused and active emotion-focused coping were positively associated with improved HRQoL, involving emotional expression and support-seeking. On the contrary, avoidant coping is associated with poorer overall HRQoL (Alanazi et al., 2022). Additionally, demographic factors (i.e., influencing factors), such as age, sex, education, and income, were also shown to influence this relationship. A recent review of literature showed that these factors were shown to be associated with the selection of coping strategies (Alanazi et al., 2022). Coping strategies are defined as cognitive and behavioral actions individuals use to deal with stressors (i.e., the severity of HF; Lazarus & Folkman, 1984). There are three types of coping strategies found in the literature: problem-focused, active emotion-focused, and avoidant emotion-focused (Alhurani et al., 2018; Carver, 1997). Problem-focused coping strategies are actions that aim to directly alter the stressor. While active emotion-focused coping attempts to facilitate the emotional consequences of the stressor by using self-reflection strategies. Contrary, avoidant emotion-focused coping uses self-distraction strategies which work toward isolating the impact of the stressor (Biggs et al., 2017; Vungkhanching et al., 2017).

There is remarkable variability across studies in the conceptualization of coping and the measures used for coping strategies (Alhurani et al., 2018; Kristofferzon et al., 2018; Saban et al., 2021). Coping is cognitive and behavioral actions aimed to overcome the challenges that arise due to a disrupted

connection between individuals and their surroundings. Some investigators classified coping into two categories (problem-focused and emotion-focused; whereas, others used three categories (problem-focused, active emotion-focused, and avoidant emotion-focused; Carver et al., 1989; Cooper et al., 2008; Lazarus & Folkman, 1984; Tang et al., 2021). The present study uses the three categories of coping strategies since this approach adds more specificity to the differentiation among types of coping strategies and is empirically supported (Alhurani et al., 2018; Bose et al., 2016). This study's significant aspect lies with its unique approach in examining the mediating role of the three coping strategies between HF severity and physical and emotional HRQoL while employing a well-defined classification of coping strategies (Carver, 1997; Cooper et al., 2008).

This study incorporated a modified version of the Transactional Stress and Coping Model (TSCM) which focuses on understanding relationships between stressors, influencing factors, coping strategies, and outcomes among patients with HF (Lazarus & Folkman, 1984). The TSCM model, when applied to HF, illustrates the stressor of HF severity, influencing factors, coping strategies, and physical and emotional HRQoL. The stressor (referred to as HF severity in this study) is considered a crucial factor that influences the health outcomes of patients with HF. The severity of HF is commonly measured by the New York Heart Association (NYHA) classification. The NYHA has classified HF into 4 classes (I, II, III, and IV) where higher classes indicate worse symptoms and physical function (Alhurani et al., 2018; Sendra & Farré, 2020). These symptoms can include shortness of breath, fatigue, chest pain, palpitations, and emotional distress.

The TSCM helps examining the mediating role of coping, i.e., how the severity HF affects HRQoL through coping strategies. The mediation model of this study indicates that coping strategies mediate the relationship between HF severity HRQoL (physical and emotional). In other words, coping strategies act as an intermediary process that helps explain how HF severity impact physical and emotional HRQoL. According to the TSCM, coping strategies are influenced by HF severity (i.e., stressor) and, therefore, influence HRQoL (i.e., outcome). For example, individuals experiencing increased HF severity may utilize different coping strategies. Active emotion-focused coping, for

instance, might help them manage emotional distress associated with HF severity to improve their emotional HRQoL. On the contrary, using problem-focused coping might lead to better physical HRQoL by addressing the physical aspects of their HF symptoms.

Problem/Purpose Statement. There is a lack of evidence on the mediation effect of coping on the relationship between HF severity and health outcomes (HRQoL). The purpose of this study therefore was to explore the potential mediation of three types of coping strategies between HF severity and two types of HRQoL (physical and emotional) among individuals with HF.

The research questions were:

RQ1: Do one or more of the three types of coping strategies mediate the relationship between HF severity and *physical* components of HRQoL?

RQ2: Do one or more of the three types of coping strategies mediate the relationship between HF severity and *emotional* components of HRQoL?

Methods

Design, sample, and setting.

This study used a cross-sectional design to examine the mediating role of coping strategies between HF severity and HRQoL. The sample of this study were recruited for this study through an online recruitment website (*ResearchMatch.org*). Initially, a total of 610 potential participants were identified, 400 were contacted, and 112 have completed the survey. The final analysis included 108 individuals. Criteria: Individuals were included if they: 1) had been diagnosed with HF; 2) had NYHA HF classifications of II or more; 3) were age 18 or older; 4) had internet access; 5) could speak and read English. Exclusion Criteria: Individuals were excluded if they: 1) had mental health disorders that prevent them from giving informed consent; 2) were actively undergoing cancer treatment (e.g., surgery, hormone therapy, radiation therapy, chemotherapy); or 3) had NYHA HF classification I because patients at this stage rarely experience HF symptoms. This study was approved by the Institutional Review Board.

Measures

All measures in this study were investigator-developed (Demographics) or selected for their validity and reliability, internal consistency, and relevance to the study each presented below.

Demographics

An investigator-designed questionnaire was used to collect demographic data. Age was measured in years, and sex as male, female, intersexual, or other. Education was measured via five levels of education (less than high school, high school, some college, but not a degree, Bachelor's or associate degree, and graduate-level education). Annual incomes consisted of five income categories (less than $30,000, $30,001-$60,000, $60,001-$100,000, and $100,001 and above).

HF severity (Stressor)

In this study, HF severity was measured using the NYHA classification of HF. This tool has four classifications of HF (I-IV); however, in this study, only II-IV were used since NYHA classification I is asymptomatic. The NYHA Classes were introduced in 1928 and updated in 1994 by the American Heart Association (Bennett et al., 2002; Gallagher et al., 2016). The NYHA classification has been previously validated for the assessment of HF severity by examining symptoms of fatigue, palpitation, dyspnea, and physical activity limitations. The use of a self-assessed NYHA classification version has demonstrated predictive significance for HF patients' health outcomes and HF severity and has compared favorably with clinician assessment.(Holland et al., 2010) Therefore, this study used a self-assessed NYHA classification to measure HF severity.

Health-related Quality of Life (Primary Outcome)

The Minnesota Living with Heart Failure Questionnaire (MLHFQ) was used to measure HRQoL. The MLHFQ is a 21-item scale that measures the total score of health status outcomes with responses on the MLHFQ ranging from 0 (none) to 5 (very much) and a total score of 105, higher scores indicate worse HRQoL. The MLHFQ has two subscales physical and emotional, the physical subscale has 8 items, and the emotional subscale has 5 items. The MLHFQ internal consistency was examined using Cronbach's alpha. The Cronbach's alpha for the physical subscale was 0.86 and 0.89 for the emotional subscale.

Coping strategies (Mediators)

Coping strategies were measured using the Brief Coping Orientation to Problems Experienced inventory (Brief COPE). The Brief COPE is a 28-item scale that measures 14 different coping strategies. The reliability and validity of the Brief Cope have been demonstrated in the HF population (Bose et al., 2016; Carver, 1997). Participants' responses to items on the Brief COPE range from 1 to 4, where 1 refers to "I usually do not do" and 4 "I usually do," where higher scores indicate that the participant used that coping strategy (Alhurani et al., 2018). Items were divided into 3 categories: problem-focused (3 coping strategies), active emotion-focused (5 coping strategies), and avoidant emotion-focused coping (6 coping strategies). The division of the 28-item scale into three categories was based on previous factor analyses (Carver et al., 1989; Cooper et al., 2008; Paukert et al., 2009). These studies showed that the items in the Brief COPE were grouped into three distinct categories (problem-focused, active emotion-focused, and avoidant emotion-focused), each representing a different aspect of the construct. The items that anchored each of the three scales were determined by the highest factor loadings and the content of the items themselves, ensuring that each scale captured a unique dimension of the construct. Then scores were summed with the following ranges for problem-focused coping 6 to 24, active emotion-focused coping from 10 to 40, and avoidant emotion-focused coping was 12 to 48, see Table 4.1 (Alhurani et al., 2018; Carver, 1997; Cooper et al., 2008). The magnitude of the difference between coping strategies was not measured because it was believed to be irrelevant due to the coping strategies being unique and not comparable. However, mean and standard deviation (SD) were provided to illustrate the three types of coping strategies. The correlation between these categories was measured in this study and it showed moderate to large range ($r = 0.36$ to 0.77), indicating that there is a noticeable degree of correlation between the coping subscales. However, the measure showed moderate to high internal consistency and reliability for problem-focused coping, active emotion-focused coping, and avoidant emotion-focused coping strategies (0.84, 0.79, and 0.68 respectively).

Statistical Analysis

Demographics were examined via descriptive statistics such as mean, median, mode, percentages, and standard deviation. A multiple mediation model was used to test which one of the three types of coping strategies served as a powerful mediator between HF severity and HRQoL, see Figure 4.1. Furthermore, demographics were subsequently tested for potential confounding effects within the multiple mediation model. The sample size was calculated based on a power of 90% at the 5% significance level using G*Power® software. The 90% power level in sample size calculation was chosen to ensure the research's robustness and reliability by minimizing the risk of Type II errors and enhancing the study's credibility and replicability. The statistically significant level was determined by the values $p < 0.05$ and using an effect size of .30 as reported in the literature (Alhurani et al., 2018).

Mediation Analysis

Pearson's correlation analyses were used to evaluate the correlation between HF severity, coping strategies, and HRQoL. The Preacher and Hayes (2008) PROCESS Macro Model 4 was applied to test the mediating role of the three types of coping strategies (simultaneously) in the relationship between NYHA classes of severity and physical and emotional HRQoL outcomes. This method of mediation analysis allows for testing multiple meditators in a statistically robust manner (Brosowski et al., 2021; Preacher & Hayes, 2008). Since the independent variable (NYHA classification) is a multicategorical variable with three categories, PROCESS macro created two dummy variables (X1 and X2), when considered together, serve as a representation of the NYHA classification variable. Therefore, NYHA severity group II serves as the reference group in this mediation analysis (Hayes & Preacher, 2014). Variable X1 represents the difference between NYHA II and NYHA III while variable X2 represents the difference between group NYHA II and NYHA IV. Bootstrapping with 5000 bootstrap samples was used to detect the direct and indirect effects of the mediating pathway (i.e., the independent variable (HF severity [NYHA classes]) and the dependent variables (physical and emotional HRQoL) via the mediators (three types of coping strategies). The bootstrapping technique allows for the assessment of the indirect effects of multiple mediators simultaneously and provides a robust and comprehensive test of the complex relationships

between variables while accounting for any potential interactions among mediators. These effects are significant if the 95% confidence interval (CI) does not include zero. The influencing factors were tested in a multiple regression model to test their significance to the stressor. In case of significance, they were treated as covariates in the mediation model. If no significance, they were excluded.

Results

Participant Characteristics

Of the 108 participants who completed the study, the age range was of 20-81 years (mean age 37.03±11.77 years). The majority of participants were male (57.4%, n=62) and self-identified as Black or African American (60.2%, n=65). Around 45 participants self-reported as having NYHA classification II (41.7%), 35 with NYHA III (32.4%), and 28 with NYHA IV (25.9%). The majority of the participants reported being married (n=65) or living with a partner (n=23). Regarding education level, the number reported was 43.5% of participants had completed at least some grade school (n=47). In terms of annual income, the majority of participants (45.4%, n=49) reported an income between $60,001 and $100,000. Additionally, 55.6% reported being employed full-time (n=60), demographic results are presented in Table 4.2.

Coping Strategies and HRQoL

Active emotion-focused was the most commonly used coping strategy, as evidenced by its highest mean score of 27.16±6.58 (range: 10-40). Problem-focused was the second most commonly used with a mean score of 17.61±4.31 (range: 6-24). Lastly, avoidant emotion-focused coping was third most used with a mean score of 25.86±6.68 (range: 12-48). The total MLFHQ mean score was 34.85±10.17 (range 0-105), which indicates moderate HRQoL among the participants (Behlouli et al., 2009). The physical HRQoL has a mean score of 21.528±6.35 (range: 0-40) while emotional HRQoL has a mean score of 13.32± 4.86 (range: 0-25); however, both physical and emotional HRQoL scores were relatively similar when standardizing their mean scores, results are presented in Table 4.3.

To address the first research question, the total effect of X1 (i.e., the difference between NYHA II and NYHA III) was 5.50 ($p<.001$), while X2 (i.e., the difference between group NYHA II and NYHA

IV) was 4.15 (p=.004). The direct effects of X1 and X2 on physical HRQoL were also statistically significant (β=4.67, p<.001; β=3.77, p=.01, respectively). However, neither X1 nor X2 had a significant indirect effect on the physical HRQoL through the three mediators (problem-focused, active emotion-focused, and avoidant emotion-focused coping) as evidenced by the presence of zero in the 95% confidence interval (CI), see Table 4.4 (Hayes & Preacher, 2014). The findings showed that HF severity had a significant influence on physical HRQoL, only directly. In other words, while the severity of HF had a substantial effect on physical HRQoL, coping strategies did not mediate these effects.

To address the second research question, a statistically significant total indirect effect has been found between the X1 and X2 and emotional HRQoL. For X1, the estimated indirect effect was approximately 0.74 (95% CI: 0.01 to 1.97), while for X2, the estimated indirect effect was approximately 0.73 (95% CI: 0.01 to 1.91). These results indicates that both X1 and X2 had a significant indirect effect on the emotional HRQoL through only active emotion-focused coping, which suggests that active emotion-focused coping served as a mediator between HF severity (all three NYHA classifications) and emotional HRQoL. However, problem-focused and avoidant emotion-focused coping strategies did not appear to be mediators between severity and emotional HRQoL.

Discussion

A multiple mediation model examined the mediation role of coping strategies in the relationship between HF severity and physical and emotional HRQoL. The HF sample was recruited from *Researchmatch.org,* an online recruitment platform. A majority of the participants were Black or African American. The present study showed that HF patients had an overall moderate HRQoL. For the relationship between HF severity and physical HRQoL, none of the three coping strategies served as a mediator. However, active emotion-focused coping was shown to play a mediation role in the relationship between HF severity (NYHA II, III, and IV) and emotional HRQoL as indicated by the significant indirect effect of X1 and X2 with emotional HRQoL. The results showed significant findings that help enhance the understanding of these relationships.

There was a non-significant mediation effect of coping strategies between HF severity (i.e., NYHA classification) and physical HRQoL. Although the results were not significant, the comparison between coping strategies showed that active emotion-focused had a higher mediation effect between HF severity and physical HRQoL compared to problem-focused and avoidant coping. Based on an extensive literature review, no study has been conducted to evaluate the potential mediation role of coping strategies between severity and HRQoL among HF patients. However, there are a few studies that explored the mediating role of coping between illness perception and HRQoL in HF patients (An et al., 2022).

Although the current study did not find coping as a mediator in the relationship between HF severity and physical HRQoL, it is possible that the impact coping strategies on physical HRQoL may be relatively small, likely due to the prominent influence of physical symptoms of HF, such as dyspnea, fatigue, palpitation, pain, and physical function limitations on the patients' physical HRQoL (Virani et al., 2021). Another plausible explanation for this results could originate from the use of the Brief COPE measurement tool. It is possible that the Brief COPE may not have comprehensively captured coping strategies that directly aimed toward to addressing the physical symptoms or challenges caused by HF (Alanazi et al., 2022; Carver, 1997; Cooper et al., 2008). This may result in incomplete understanding of the HF patients' coping due to the established significance of physical symptoms in this population.

Regarding the emotional HRQoL, problem-focused and avoidant coping did not mediate the relationship between HF severity (all three NYHA classifications) and HRQoL. Active emotion-focused was the only type of coping that was shown to have a mediation effect. This finding suggests that using active emotion-focused coping strategies, such as acceptance, use of emotional support, use of humor, positive reframing, and turning to religion, might be crucial in mitigating the impact of HF severity on the emotional HRQoL. In other words, when using active emotion-focused coping, HF patients experienced better emotional HRQoL. A possible explanation for this is that active emotion-focused coping strategies may play a role in facilitating emotional consequences associated with HF severity and, therefore, enhancing the emotional HRQoL(Bose et al., 2016). Due to the relatively similar indirect effect between X1 and X2 on emotional HRQoL mediated by active emotion-focused coping, it may not be feasible to

suggest that with lower HF severity, active emotion-focused coping would play a more prominent mediating role due to insufficient evidence to support this claim. A previous study (n=292) that examined the mediation effect of coping showed that coping strategies significantly mediated the relationship between a sense of coherence and emotional Quality of Life in HF patients (Kristofferzon et al., 2018). Another study showed that coping mediated the relationship between illness perception and emotional outcomes (anxiety and depression; Bose et al., 2016).

Potential confounders such as age, sex, education, and HF duration were examined without significant change to the model. This indicates that these variables did not confound the relationship between HF severity (NYHA II, III, and IV), mediators, and physical and emotional HRQoL. When controlling income, the mediation effect was not significant, but the magnitude of the change was still substantial. This trend may have clinical implications for those with a lower income needing more emotional support.

Limitations

Several limitations need to be noted in this study. First, it is the cross-sectional design that does not allow for identifying causality. Secondly, in this study, an online recruitment tool was used which may potentially introduce a biased sample. Such a method requires participants to have internet access and be familiar with technology resulting in a sample that may not be representative of the general HF population and therefore affect the generalizability of the study findings. However, the sample of the study was shown to be demographically diverse and enroll participants from multiple states. Given the self-report nature of the data collection, participants were reporting information based on perceptions that could be biased by social desirability and recall issues. In addition, incorporating a HF symptom survey could have shed more light on the physical aspect HRQoL.

Conclusions

The findings of the present study shed light on the role of coping strategies in mediating the relationship between HF severity and physical and emotional HRQoL. This suggests that active emotion-focused coping mediates the relationship between HF severity and emotional HRQoL among HF patients.

The results underscore the importance of using active emotion-focused coping to help reduce the negative impact of HF severity (NYHA II, III, and IV) and enhance emotional HRQoL. Additionally, the findings of the present study showed a crucial implication for healthcare professionals, emphasizing the importance of incorporating components related to active emotion-focused coping strategies into future interventions aimed at enhancing the emotional HRQoL of HF patients. However, more investigation is needed to examine the impact of coping strategies on physical HRQoL. Finally, this finding of this study will help inform future measurement development research for coping to include a broader range of items that target physical symptoms, specifically in HF patients.

Tables

Table 4.1 Classification of coping strategies in Brief COPE inventory.

Type of Coping	Coping Strategies	Items
Problem-focused Coping Strategies	Planning	- I've been trying to come up with strategy about what to do. - I've been thinking hard about what steps to take.
	Active Coping	- I've been concentrating my efforts on doing something about the situation I'm in - I've been taking action to try to make the situation better.
	Use of Instrumental Support	- I've been getting help and advice from other people. - I've been trying to get advice or help from other people about what to do
Active emotion-focused Coping Strategies	Acceptance	- I've been accepting the reality of the fact that it has happened - I've been learning to live with it
	Use of Emotional Support	- I've been getting emotional support from others. - I've been getting comfort from someone.
	Humor	- I've been making jokes about it. - I've been making fun of the situation.
	Positive Reframing	- I've been trying to see it in a different light, to make it seem more positive. - Very
	Religion	- I've been trying to find comfort in my religion or spiritual beliefs. - I've been praying or meditating.
Avoidant Emotion-focused Coping Strategies	Behavioral Disengagement	- I've been giving up trying to deal with it. - I've been giving up the attempt to cope.
	Denial	- I've been saying to myself "this isn't real". - I've been refusing to believe that it has happened.
	Self-distraction	- I've been turning to other activities to take my mind off things - I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping.
	Venting	- I've been saying things to let my unpleasant feeling escape. - I've been expressing my negative feelings.
	Self-blaming	- I've been criticizing myself. - I've been blaming myself for things that happened.
	Substance Use	- I've been using alcohol or other drugs to myself feel better. - I've been using alcohol or other drugs to help me get through it.

Table 4.2 Demographic characteristics of the study participants (N=108).

Demographic Characteristics	Mean (SD)	Frequency	Percentage %
Age	37.03±11.77		
Sex			
Male		62	57.4
Female		46	42.6
NYHA Classification			
NYHA II		45	41.7
NYHA III		35	32.4
NYHA IV		28	25.9
Race			
Black or African American		65	60.2
White or Caucasian		42	38.9
Hispanic or Latino		1	.9
Ethnic Background			
Hispanic or Latino		13	12.0
Non-Hispanic or Latino		95	88.0
Marital Status			
Level of Education			
Some grade school		9	8.3
Completed grade school		38	35.2
Completed high school		16	14.8
Some high school		3	2.8
Some college		16	14.8
Completed college		26	24.1
Income			
Below $10,000-$20,000		17	15.7
$20,001-$30,000		13	12.0
$30,001-$60,000		12	11.1
$60,001-$100,000		49	45.4
$100,001 and above		17	15.7

Table 4.3 Coping Strategies and Physical and Emotional HRQoL.

Characteristics	Mean (SD)	Minimum	Maximum	Range
Coping Strategies				
Problem-focused	17.61±4.31	11	24	6-24
Active Emotion-focused	27.16±6.58	14	40	10-40
Avoidant Emotion-focused	25.868±6.68	14	43	12-48
HRQoL				
Physical HRQoL	21.52±6.35	8	38	0-40
Emotional HRQoL	13.32±4.85	5	25	0-25
HRQoL total	34.84±10.17	13	62	0-105

Note: SD: Standard Deviation; HRQoL: Health-related Quality of Life.

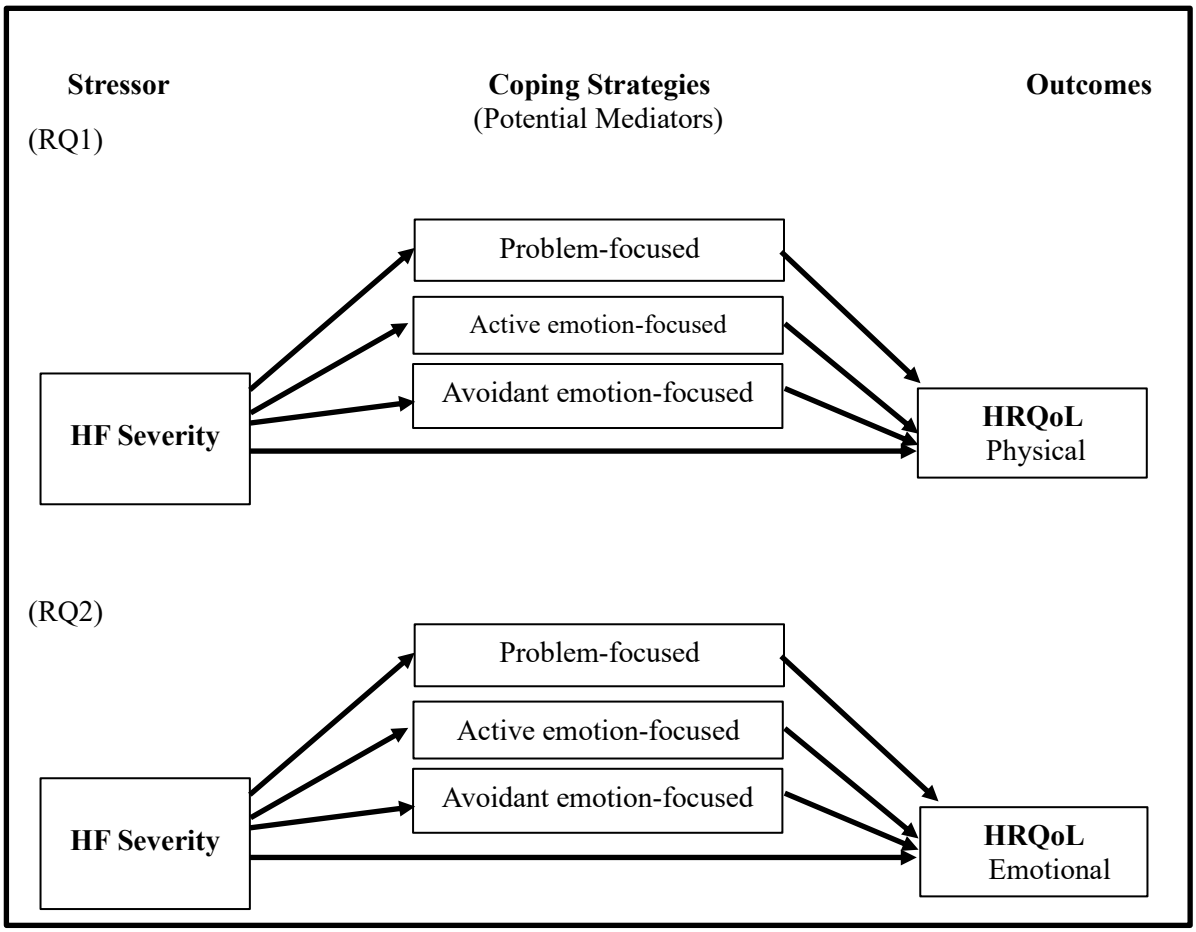
Table 4.4 Results of Multiple Mediation Analyses Examining the Effects of HF Severity on Physical and Emotional HRQoL Through Coping Strategies.

		Indirect Effect			
Independent Variable	Mediator	Coeff.	Boot SE	BCa 95% CI Upper	Lower
	Physical HRQoL				
X1	Problem-focused	-.18	.34	-1.03	.37
	Active Emotion-Focused	1.01	.74	-.54	2.78
	Avoidant Emotion-focused	.001	.19	-.35	.47
X2	Problem-focused	-.60	.67	-2.20	.53
	Active Emotion-Focused	.98	.70	-.02	2.66
	Avoidant Emotion-focused	-.001	.20	-.33	.52
	Emotional HRQoL				
X1	Problem-focused	-.01	.20	-.46	.38
	Active Emotion-Focused	1.04	.65	.05	2.55
	Avoidant Emotion-focused	-.07	.28	-.63	.53
X2	Problem-focused	-.06	.45	-1.05	.81
	Active Emotion-Focused	1.02	.62	.07	2.48
	Avoidant Emotion-focused	.11	.23	-.31	.86

Note: X1=difference between group 1 (NYHA II) and group 2 (NYHA III); X2=difference between group 1 (NYHA II) and group 3 (NYHA IV); When zero is not included in the 95% confidence interval, the indirect effects are considered significant at $p<.05$; SE=standard error; BCa=bias corrected and accelerated; CI=confidence interval.

Figures

Figure 4.1 A multiple mediation model for the mediating effect of coping strategies in the relationship between HF Severity (stressor) and HRQoL outcomes (Preacher & Hayes, 2008).



BIBLIOGRAPHY

Alanazi, M. O., Given, C. W., Deka, P., Lehto, R., & Wyatt, G. (2022). A literature review of coping strategies and health-related quality of life among patients with heart failure. *European Journal of Cardiovascular Nursing*, *22*(3), 236–244. https://doi.org/10.1093/eurjcn/zvac042

Alhurani, A. S., Dekker, R., Ahmad, M., Miller, J., Yousef, K. M., Abdulqader, B., Salami, I., Lennie, T. A., Randall, D. C., & Moser, D. K. (2018). Stress, cognitive appraisal, coping, and event free survival in patients with heart failure. *Heart & Lung*, *47*(3), 205–210. https://doi.org/10.1016/j.hrtlng.2018.03.008

An, Y., Zhang, Y., Wang, L., Chen, C., & Fan, X. (2022). The Relationship Between Uncertainty in Illness and Quality of Life in Patients With Heart Failure: Multiple Mediating Effects of Perceived Stress and Coping Strategies. *Journal of Cardiovascular Nursing*, *37*(3), 257. https://doi.org/10.1097/JCN.0000000000000799

Behlouli, H., Feldman, D. E., Ducharme, A., Frenette, M., Giannetti, N., Grondin, F., Michel, C., Sheppard, R., & Pilote, L. (2009). Identifying relative cut-off scores with neural networks for interpretation of the Minnesota Living with Heart Failure questionnaire. *Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Annual International Conference*, *2009*, 6242–6246. https://doi.org/10.1109/IEMBS.2009.5334659

Bennett, J. A., Riegel, B., Bittner, V., & Nichols, J. (2002). Validity and reliability of the NYHA classes for measuring research outcomes in patients with cardiac disease. *Heart & Lung*, *31*(4), 262–270.

Biggs, A., Brough, P., & Drummond, S. (2017). Lazarus and Folkman's psychological stress and coping theory. *The Handbook of Stress and Health: A Guide to Research and Practice*, 351–364.

Bose, N. C., Persson, H., Bjorling, G., Ljunggren, G., Elfstrom, M. L., & Saboonchi, F. (2016). Evaluation of a Coping Effectiveness Training intervention in patients with chronic heart failure—A randomized controlled trial. *European Journal of Cardiovascular Nursing : Journal of the Working Group on Cardiovascular Nursing of the European Society of Cardiology*, *15*(7), 537–548.

Briatore, A., Tormo, J. P., Ventura, B., Dominguez, E., Bellver, A., Chorro, F. J., Santas, E., Minana, G., Ramon, J. M., Nunez, J., & Palau Sampio, P. (2019). Peak VO2 as a main determinant of health related quality of life in symptomatic patients with heart failure with preserved ejection fraction. *European Journal of Heart Failure*, *21*, 389–389.

Brosowski, T., Olason, D. T., Turowski, T., & Hayer, T. (2021). The Gambling Consumption Mediation Model (GCMM): A multiple mediation approach to estimate the association of particular game types with problem gambling. *Journal of Gambling Studies*, *37*(1), 107–140.

Carver, C. S. (1997). You want to measure coping but your protocol's too long: Consider the brief cope. *International Journal of Behavioral Medicine*, *4*(1), 92–100.

Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology*, *56*(2), 267.

Chen, C., Fang, W., An, Y., Wang, L., & Fan, X. (2020). The multiple mediating effects of illness perceptions and coping strategies on the relationship between physical symptoms and depressive symptoms in patients with heart failure. *European Journal of Cardiovascular Nursing: Journal of the Working Group on Cardiovascular Nursing of the European Society of Cardiology*, *19*(2), 125–133. https://doi.org/10.1177/1474515119864759

Cooper, C., Katona, C., & Livingston, G. (2008). Validity and reliability of the brief COPE in carers of people with dementia: The LASER-AD Study. *The Journal of Nervous and Mental Disease*, *196*(11), 838–843.

Gallagher, R., Sullivan, A., Burke, R., Hales, S., Sharpe, P., & Tofler, G. (2016). Quality of life, social support and cognitive impairment in heart failure patients without diagnosed dementia. *International Journal of Nursing Practice*, *22*(2), 179–188.

Hayes, A. F., & Preacher, K. J. (2014). Statistical mediation analysis with a multicategorical independent variable. *British Journal of Mathematical and Statistical Psychology*, *67*(3), 451–470. https://doi.org/10.1111/bmsp.12028

Holland, R., Rechel, B., Stepien, K., Harvey, I., & Brooksby, I. (2010). Patients' self-assessed functional status in heart failure by New York Heart Association class: A prognostic predictor of hospitalizations, quality of life and death. *Journal of Cardiac Failure*, *16*(2), 150–156. https://doi.org/10.1016/j.cardfail.2009.08.010

Hundt, N. E., Bensadon, B. A., Stanley, M. A., Petersen, N. J., Kunik, M. E., Kauth, M. R., & Cully, J. A. (2015). Coping mediates the relationship between disease severity and illness intrusiveness among chronically ill patients. *Journal of Health Psychology*, *20*(9), 1186–1195. https://doi.org/10.1177/1359105313509845

Kristofferzon, M.-L., Engström, M., & Nilsson, A. (2018). Coping mediates the relationship between sense of coherence and mental quality of life in patients with chronic illness: A cross-sectional study. *Quality of Life Research*, *27*(7), 1855–1863. CINAHL Plus with Full Text. https://doi.org/10.1007/s11136-018-1845-0

Lawson, C. A., Benson, L., Squire, I., Zaccardi, F., Ali, M., Hand, S., Kadam, U., Tay, W. T., Dahlstrom, U., & Lund, L. H. (2023). Changing health related quality of life and outcomes in heart failure by age, sex and subtype. *eClinicalMedicine*, *64*.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer Publishing Company.

Moradi, M., Daneshi, F., Behzadmehr, R., Rafiemanesh, H., Bouya, S., & Raeisi, M. (2020). Quality of life of chronic heart failure patients: A systematic review and meta-analysis. *Heart Failure Reviews*, *25*(6), 993–1006. https://doi.org/10.1007/s10741-019-09890-2

Nahlén Bose, C., Elfström, M. L., Björling, G., Persson, H., & Saboonchi, F. (2016). Patterns and the mediating role of avoidant coping style and illness perception on anxiety and depression in patients with chronic heart failure. *Scandinavian Journal of Caring Sciences*, *30*(4), 704–713. CINAHL Plus with Full Text. https://doi.org/10.1111/scs.12297

Paukert, A. L., LeMaire, A., & Cully, J. A. (2009). Predictors of depressive symptoms in older veterans with heart failure. *Aging & Mental Health*, *13*(4), 601–610. https://doi.org/10.1080/13607860802459823

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, *40*(3), 879–891. https://doi.org/10.3758/BRM.40.3.879

Saban, K. L., Motley, D., Shawahin, L., Mathews, H. L., Tell, D., De La Pena, P., & Janusek, L. W. (2021). Preliminary evidence for a race-based stress reduction intervention for Black women at risk for cardiovascular disease. *Complementary Therapies in Medicine*, *58*, 102710. https://doi.org/10.1016/j.ctim.2021.102710

Sendra, A., & Farré, J. (2020). Communicating the experience of chronic pain through social media: Patients' narrative practices on Instagram. *Journal of Communication in Healthcare*, *13*(1), 46–54.

Sherwood, A., Blumenthal, J. A., Koch, G. G., Hoffman, B. M., Watkins, L. L., Smith, P. J., O'Connor, C. M., Adams, K. F. J., Rogers, J. G., Sueta, C., Chang, P. P., Johnson, K. S., Schwartz, J., & Hinderliter, A. L. (2017). Effects of Coping Skills Training on Quality of Life, Disease Biomarkers, and Clinical Outcomes in Patients With Heart Failure: A Randomized Clinical Trial. *Circulation. Heart Failure*, *10*(1). https://doi.org/10.1161/CIRCHEARTFAILURE.116.003410

Tang, W. P. Y., Chan, C. W. H., & Choi, K. C. (2021). Factor structure of the Brief Coping Orientation to Problems Experienced Inventory in Chinese (Brief-COPE-C) in caregivers of children with chronic illnesses. *Journal of Pediatric Nursing*, *59*, 63–69. https://doi.org/10.1016/j.pedn.2021.01.002

Virani, S. S., Alonso, A., Aparicio, H. J., Benjamin, E. J., Bittencourt, M. S., Callaway, C. W., Carson, A. P., Chamberlain, A. M., Cheng, S., & Delling, F. N. (2021). Heart disease and stroke statistics—2021 update: A report from the American Heart Association. *Circulation*, *143*(8), e254–e743.

Vungkhanching, M., Tonsing, J. C., & Tonsing, K. N. (2017). Psychological Distress, Coping and Perceived Social Support in Social Work Students. *The British Journal of Social Work*, *47*(7), 1999–2013. https://doi.org/10.1093/bjsw/bcw145

CHAPTER 5: DISCUSSION AND CONCLUSION

This dissertation examined coping strategies among individuals with heart failure (HF). A modified version of Lazarus and Folkman's (1984) Transactional Stress and Coping Model (TSCM) was used to guide this work. A three-manuscript approach was used to address the dissertation aims. Chapter 1 was an introduction to the research project including its' conceptual underpinnings. Chapter 2 was a scoping literature review that described the relationship between coping strategies and physical and emotional Health-related Quality of Life (HRQoL) among individuals with HF, and the factors that influence coping (manuscript 1, published in *European Journal of Cardiovascular Nursing*). Chapter 3 was a cross-sectional investigation of associations between the three types of coping strategies (i.e., problem-focused, active emotion-focused, and avoidant emotion-focused) and physical and emotional HRQoL among individuals with HF (manuscript 2, to be submitted to a leading cardiology journal). Finally, chapter 4 is a multiple mediation analysis aimed to examine the role of the three types of coping strategies in the relationship between the stressor (i.e., HF severity) and physical and emotional HRQoL (manuscript 3, to be submitted to a leading quality of life journal). In general, this scholarly work highlights the relationship between coping and HRQoL, as well as the factors that contribute to determining appropriate coping strategies for individuals with HF. The findings are of importance in advancing the discipline's understanding of coping strategies used by patients with HF while also providing valuable insights for shaping future interventions that enhance their HRQoL.

Summary of Dissertation Aims

Building on previous research, this dissertation aimed to examine the relationships among HF severity, influencing factors, and coping strategies, as well as associations between types of coping strategies and physical and emotional HRQoL. Three main aims were proposed for this dissertation. **Dissertation Aim 1** was focused on identifying the factors that influence coping and type of coping strategies used by patients with HF to improve their HRQoL. A scooping literature review was carried out to explore the existing literature and identify knowledge gaps. **Dissertation Aim 2.1**, building on the findings of the literature review, this aim emphasized how the stressor of HF severity and influencing

factors impact patients' adoption of various coping strategies. **Dissertation Aim 2.2** was centered on describing the relationship between coping strategies and physical and emotional HRQoL outcomes. **Dissertation Aim 3** was geared toward exploring the potential mediation role of coping strategies between the stressor of HF severity and physical and emotional HRQoL outcomes.

Dissertation Aim 1. identify the factors that influence coping and type of coping strategies used by patients with HF to improve HRQoL.

Previous studies showed that coping strategies are related to HRQoL and can be adaptive or maladaptive. Further, the selection of coping strategies may be affected by HF severity and influencing factors, such as age, sex, education, income, and HF duration (Bose et al., 2016; Eisenberg et al., 2012; Nilsson et al., 2017; Sherwood et al., 2017). However, several concerns were identified by a review of the literature, including inconsistency in the measurement and conceptualization of coping strategies, lack of experimental studies, and a limited number of publications. This inconsistency not only applies to the variety of tools and measures used to assess coping but also includes variations in the interpretation and categorization of different coping strategies across studies. The findings highlight the need for a more standardized and consistent approach to understanding coping strategies in the context of HF. Thus, a scoping literature review was carried out (Manuscript 1) to describe the relationships between coping strategies and HRQoL and the factors that influence coping strategies. This review was published in *European Journal of Cardiovascular Nursing* (Alanazi et al., 2022).

Thirty-five studies were included in the review. The results showed that problem-focused and active emotion-focused coping were associated with better overall HRQoL, while avoidant emotional coping was linked to worse overall HRQoL. Furthermore, the severity of HF and influencing factors, such age, sex, social support, income, education, spiritual beliefs, and illness duration were linked to the type of coping strategies used (Alanazi et al., 2022). However, the evidence in this area is inconsistent and inconclusive due to unclear conceptualization of coping strategies and the lack of experimental studies. Additional investigation is warranted to further understand the conflicting factors found in the literature. More specifically, there is a need to analyze the role of age, sex, education, income, duration, and HF

severity, with the selection of coping strategies, and the association between the coping strategies and HRQoL among patients with HF. The exploration will offer a clearer understanding of the influence of these factors on coping strategies used, and will assist in bridging gaps in the current literature.

Dissertation Aim 2.1. Examine how the stressor of HF severity and influencing factors impact patients' adoption of various coping strategies.

Dissertation Aim 2.2 Describe the impact of coping strategies on physical and emotional HRQoL outcomes.

In chapter 3, a modified TSCM was used to conceptually unpin the study. According to Lazarus and Folkman's(Lazarus & Folkman, 1984) coping is a cognitive and behavioral effort to regulate or overcome demands that emerge from an interrupted relationship between individuals and their environments. A cross-sectional study was conducted to explore the association between HF severity, influencing factors (i.e., age, sex, education, income, and HF duration), coping strategies (problem-focused, active emotion-focused, and avoidant emotion-focused), and physical and emotional HRQoL (manuscript 2). The severity of HF is commonly measured by the NYHA classification ranging from I to IV, with IV being the most severe. Furthermore, the NYHA classification of HF severity assesses HF symptoms (such as dyspnea, fatigue, palpitations, and pain) and physical functioning to determine the appropriate NYHA classification for the patient (Bennett et al., 2002; Holland et al., 2010). This study was aimed to address the current gaps in the literature and build a foundation for future work aiming toward improving the HRQoL among patients with HF by implementing interventions that assist patients in adopting adaptive coping strategies while reducing their reliance on avoidant coping strategies.

Using an online database (ResearchMatch.org), 108 HF patients with New York Heart Association (NYHA) classification II-IV HF were included in this study. One-way ANOVA and Pearson's correlation were used to analyze association among variables. Study results showed that problem-focused and active emotion-focused coping had significant negative associations with NYHA classifications of HF ($p<0.05$). Influencing factors i.e., age, sex, education, income were significantly associated with all three types of coping strategies ($p<0.05$). Individuals with high income and education,

and who were young females with HF were more likely to use problem-focused coping strategies, while avoidant coping was linked to those with lower income, less education and older age.

Only active emotion-focused coping was found to be significantly negatively correlated with physical HRQoL ($r = -.189$, $p = .005$). However, emotional HRQoL was significantly negatively correlated with both problem-focused coping ($r = -.168$, $p = .016$) and active emotion-focused coping ($r = -.244$, $p<.001$). The findings provided empirical support for the use of three types of coping strategies.

To summarize, the findings suggest that age, sex, education, and income have a significant relationship with coping strategies. Further, patients with HF who use problem-focused and active emotion-focused coping may experience better physical and emotional HRQoL whereas those using avoidant emotion-focused coping may experience worse physical and emotional HRQoL. Healthcare providers may consider these factors when determining interventions aimed at supporting effective coping to improve HRQoL outcomes among patients with HF.

Dissertation Aim 3. Explore the potential mediation role of coping strategies between the stressor of HF severity and physical and emotional HRQoL outcomes.

In this chapter, a cross-sectional, multiple mediation design was used to test the role of coping strategies (problem-focused, active emotion-focused, and avoidant emotion-focused) between HF severity and physical and emotional HRQoL. The data of this study used the Preacher and Haye's multiple mediation method, the multiple mediation analysis was tested by PROCESS Macro (Model 4) for SPSS. This study found that active emotion-focused coping mediated the relationship between the severity of HF (NYHA classifications II, III, and IV) and emotional HRQoL. No mediation effect was detected of problem-focused and avoidant emotion-focused coping strategies between HF severity and physical HRQoL.

These findings suggest that the use of active emotion-focused coping strategies can relieve the impact of HF severity (dyspnea, fatigue, palpitation, pain, and limited physical function) and support emotional HRQoL outcomes. Although further research is needed, future interventions that aim to improve the emotional HRQoL may use these findings to promote the use of active emotion-focused

coping strategies among HF patients with NYHA Classification of II and higher. Further, those with lower emotional HRQoL can benefit from this by implementing interventions that incorporate elements of active emotion-focused coping strategies. Although avoidant coping was not associated with HRQoL, those who employ avoidant coping are most in need of interventional work to help them shift to more constructive coping strategies to improve their HRQoL.

Limitations of the Overall Dissertation

Several limitations were noted in this dissertation work. In chapter 2 (manuscript 1), it was noted that the literature on coping among patients with HF is still in its initial stage, with most studies being cross-sectional. There are a lack of RCTs, leading to a heavy reliance on non-experimental designs and often single timepoints as the basis for this review. Also, this scoping review was limited to publications in English language only, indicating the possibility that this review may have missed relevant studies published in other languages. In this chapter, the lack of clarity on types of emotion-focused coping (active and avoidant) was a major limitation.

Several limitations were identified in chapter 3 (manuscript 2). First, a major limitation was the use of a cross-sectional design, which restricted the capacity to establish causal relationships. Second, the measurements used in this study were all self-reported measures, which suggested the potential for mono-method or single-method bias. This can introduce bias in the study due its reliance on the participants' subjective responses only, potentially resulting in a limited understanding of the research topic. Third, the national convenience sample obtained for this study were relatively younger compared to a general HF population. Because of the technology mediated recruitment strategy, individuals with HF who had lower computer literacy were likely omitted. Thus, the study findings may not be generalizable to the wider HF population. Finally, most of the sample consisted of Black men, which could potentially limit the generalizability of the results to the broader HF population.

Similar to chapter 3 (manuscript 2), the study design and recruitment method were the main limitations of chapter 4 (manuscript 3). Future work should utilize other study designs (e.g., experimental, longitudinal, and mixed methods) to ensure robust findings. Despite these limitations, this dissertation

provided empirical evidence on the relationship between coping strategies, HF severity, influencing factors, and HRQoL, which can be utilized to advance the science and to improve the nursing care of individuals with HF.

In this dissertation, the researcher aimed to comprehensively investigate the intricate relationships between HF severity, influencing factors, coping strategies, and HRQoL through two studies (chapter 3 and chapter 4) to capture the main effects and mediation effects, respectively. In chapter 3, HF severity, influencing factors, coping strategies, and physical and emotional HRQoL were examined to identify their associations to understand how they shape the experience of HF patients. The mediation role of coping strategies was then examined in chapter 4, and were found as key mediators in the relationship between HF severity and physical and emotional HRQoL. Expanding this work offered valuable insights into how these factors might guide future interventions.

Another issue in the coping related research, relative to Lazarus and Folkman's perspectives, relates to more recent research identifying the impact of implicit processing of emotion on adaptation and behavior. In this regard, coping strategies are not always consciously and rationally chosen, thus impacting health-promoting behaviors in chronic conditions such as HF. For example, the experience of intense shortness of breath can propel an immediate, automatic response, which may not per se align with conscious cognitive processing and the 'selection' of coping strategies (Keech & Hamilton, 2022).

Implications of Overall Dissertation

Even with the advancements in HF treatment, the HRQoL of individuals with HF remain severely impaired and compromised in general (Dellafiore et al., 2021). This dissertation work aimed to address this gap by examining the literature on coping and HF using a scoping review, a cross-sectional correlational approach, and a multiple mediation study. This dissertation has implications for nursing research, nursing education, nursing practice, and policy. Below is a discussion of each contribution.

This work adds to our body of knowledge by providing new insights and empirical data on the impact of coping strategies on the HRQoL outcomes among HF patients. The findings include evidence-based recommendations, resources, and knowledge on how patients cope with their symptoms and factors

that affect selection of coping strategies. The findings were disseminated through manuscript publications and local/regional/national conference presentations. Further, the findings will have important applications to nursing education, practice, research, policy, and society.

Nursing Research

This dissertation study contributes to nursing research through its' use of an empirically supported conceptualization of the three coping strategies, an issue contributing to reduced clarity in the previous literature (Alanazi et al., 2022). The research adds to our scientific knowledge by offering evidence on the associations between influencing factors, coping strategies, and physical and emotional HRQoL. Further, this work informs future research regarding the validity and reliability of the coping measure to consistently categorize coping into three distinct coping strategies. The use of the Brief COPE measure that addresses 3 types of coping adds rigor to the science of HF coping and consistency across the literature (Alhurani et al., 2018; Carver, 1997; Coolidge et al., 2000; Cooper et al., 2008).

The study provides insight on the significant mediating role of active emotion-focused coping strategies have between HF severity and physical and emotional HRQoL. These findings can propel future research to further explore the effect of active emotion-focused coping on physical and emotional HRQoL and towards developing interventions that promote this type of coping. Furthermore, this work has highlighted a potential limitation in the Brief COPE measure. The measure appears to overlook coping strategies specifically designed to address physical symptoms, which hold significant importance within the context of HF. The Brief COPE is predominantly focused on the emotional aspect of HF symptoms (i.e., stressor), leaving room for future improvements.

Overall, this work has the potential to significantly contribute to advancing nursing science on this topic by expanding the knowledge of the relationships between HF severity, influencing factors, coping strategies, and HRQoL. The findings of this study serve as a foundation for future interventions. This work also enables researchers to examine individualized interventions aimed towards HF patients who are more inclined to adopt avoidant coping strategies. Specifically, the findings showed that older males with lower levels of education and income were more susceptible to these avoidant coping

strategies. By identifying and acknowledging such factors that contribute to vulnerability, researchers can design interventions that target their specific needs and support more effective coping strategies. This expanded understanding not only has implications for improving patient care but also highlights the need for additional funding and resources from agencies such as the National Institutes of Health (NIH) or American Heart Association (AHA) to continue exploring and enhancing the care of HF, thus helping reduce the suffering for patients with HF.

Nursing Education

The findings of this dissertation can enhance clinical training of nurses across all levels of nursing programs by providing educators and students with scientific knowledge regarding the relationship between coping strategies and HRQoL among HF patients. Nursing students can recognize the importance of coping strategies and identify ways to support the adaptive use of coping strategies. The current nursing curriculum often overlooks the importance of coping in relation to HF patients' well-being. This work will advance nursing education by bringing focus to the association between styles of coping with better and worse physical and emotional HRQoL. This carries potential to inform nursing curricula to promote the use of adaptive coping strategies and address the needs of HF patients.

Nursing Practice

Currently, there is a lack of evidence-based coping interventions for HF patients to support their HRQoL (Bose et al., 2016). This work highlights the importance of problem-focused and active emotion-focused coping strategies in supporting better physical and emotional HRQoL for individuals with HF and the need to use alternatives to avoidant emotion-focus coping. Clinicians will benefit from this work by enhancing their understanding of how HF severity and influencing factors (i.e., age, sex, education, and income) are related to specific types of coping strategies. Coping strategies could be incorporated into the assessment of HF patients to aid in targeting those who are more likely to adopt avoidant coping, i.e., worse NYHA classifications (II-IV), older, male, and low level of education and income which would ease the burden of HF. This assessment of HF patients' coping would also help identifying those who might be using avoidant coping strategies, such as denial, self-blame, and behavioral disengagement.

These coping strategies were associated with worse health outcomes as they contribute to poor adherence to the treatment protocol and a lack of awareness about seeking medical treatment during critical situations (Alanazi et al., 2022; Schneider et al., 2023). This will help enable clinicians to develop and implement unique, patient-focused coping interventions that address specific areas of need, thereby promoting coping strategies and enhancing physical and emotional HRQoL.

Policy Implications

As the leading cause of mortality and morbidity globally, this work highlights the need for more focus on mental health and coping as a promising approach for healthcare reform in HF management. The contribution to policy includes informing policymakers on the significance of coping in enhancing physical and emotional HRQoL for HF patients. Policy attention can also be accomplished through broad dissemination and discussion of the findings in media or public forums. Such efforts will serve to increase public awareness of this crucial topic, subsequently compelling policymakers to take action and address this pressing issue. Effective coping and associated interventions that support coping could lead to lower utilization and to cost reductions in the long-term management of HF. Organizations such as the American Heart Association can lobby for more intervention work in the area of HF coping and potential symptom reduction. Such efforts could potentially lead to lower mortality and morbidity rates, resulting in reduced cost of HF healthcare and burden on healthcare systems.

Conclusion

This work aimed to address the current gap in the understanding of how HF patients commonly employ coping strategies to manage the stressors associated with disease severity and its relation to their physical and emotional HRQoL. The work aims to bridge this knowledge deficit by enriching the knowledge in this research area and better understanding how HF patients' cope and the factors that influence their coping. This dissertation contributes to the science by recommending a consistent definition of types of coping and a better understanding of the influence of age, sex, education, income, and HF duration on coping strategies. This dissertation found that problem-focused and active emotion-focused coping were linked with improved physical and emotional HRQoL. Factors such as older age,

male, and having a low level of education and lower level of income were showed as significantly associated with using more avoidant emotion-focused coping strategies, which can direct future interventional work. Finally, this dissertation advances the science by demonstrating that active emotion-focused coping plays an important role in mediating the effects between HF severity and emotional HRQoL. These findings may help drive new intervention directions for nursing research, broadening the scope of education to enhance symptom management and QoL through nursing programs, and provide empirical evidence for clinicians for practice integration. These contributions are thus expected to advance the field of HF science and care.

BIBLIOGRAPHY

Alanazi, M. O., Given, C. W., Deka, P., Lehto, R., & Wyatt, G. (2022). A literature review of coping strategies and health-related quality of life among patients with heart failure. *European Journal of Cardiovascular Nursing*, *22*(3), 236–244. https://doi.org/10.1093/eurjcn/zvac042

Alhurani, A. S., Dekker, R., Ahmad, M., Miller, J., Yousef, K. M., Abdulqader, B., Salami, I., Lennie, T. A., Randall, D. C., & Moser, D. K. (2018). Stress, cognitive appraisal, coping, and event free survival in patients with heart failure. *Heart & Lung*, *47*(3), 205–210. https://doi.org/10.1016/j.hrtlng.2018.03.008

Bennett, J. A., Riegel, B., Bittner, V., & Nichols, J. (2002). Validity and reliability of the NYHA classes for measuring research outcomes in patients with cardiac disease. *Heart & Lung*, *31*(4), 262–270.

Bose, N. C., Persson, H., Bjorling, G., Ljunggren, G., Elfstrom, M. L., & Saboonchi, F. (2016). Evaluation of a Coping Effectiveness Training intervention in patients with chronic heart failure—A randomized controlled trial. *European Journal of Cardiovascular Nursing : Journal of the Working Group on Cardiovascular Nursing of the European Society of Cardiology*, *15*(7), 537–548.

Carver, C. S. (1997). You want to measure coping but your protocol's too long: Consider the brief cope. *International Journal of Behavioral Medicine*, *4*(1), 92–100.

Coolidge, F. L., Segal, D. L., Hook, J. N., & Stewart, S. (2000). Personality disorders and coping among anxious older adults. *Journal of Anxiety Disorders*, *14*(2), 157–172.

Cooper, C., Katona, C., & Livingston, G. (2008). Validity and reliability of the brief COPE in carers of people with dementia: The LASER-AD Study. *The Journal of Nervous and Mental Disease*, *196*(11), 838–843.

Dellafiore, F., Chung, M. L., Alvaro, R., Zeffiro, V., Ercole, V., & Pucciarelli, G. (2021). Influence of mutuality on quality of life in heart failure patient with inadequate self-care and caregiver dyads: An actor–partner interdependence model analysis. *European Journal of Cardiovascular Nursing*.

Eisenberg, S. A., Shen, B.-J., Schwarz, E. R., & Mallon, S. (2012). Avoidant coping moderates the association between anxiety and patient-rated physical functioning in heart failure patients. *Journal of Behavioral Medicine*, *35*(3), 253–261. https://doi.org/10.1007/s10865-011-9358-0

Holland, R., Rechel, B., Stepien, K., Harvey, I., & Brooksby, I. (2010). Patients' self-assessed functional status in heart failure by New York Heart Association class: A prognostic predictor of hospitalizations, quality of life and death. *Journal of Cardiac Failure*, *16*(2), 150–156. PubMed. https://doi.org/10.1016/j.cardfail.2009.08.010

Keech, J. J., & Hamilton, K. (2022). An integrated dual-process model for coping behaviour. *Stress & Health: Journal of the International Society for the Investigation of Stress*, *38*(3), 591–601. DOI: 10.1002/smi.3121

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer Publishing Company.

Nilsson, A., Carlsson, M., Lindqvist, R., & Kristofferzon, M.-L. (2017). A comparative correlational study of coping strategies and quality of life in patients with chronic heart failure and the general Swedish population. *Nursing Open*, *4*(3), 157–167.

Schneider, A., Hartman, M. H. T., Nolte, K., Werhahn, S. M., Wachter, R., & Herrmann-Lingen, C. (2023). Coping styles as predictors for quality of life and prognosis in patients at risk for or with a diagnosis of heart failure: Results from the observational DIAST-CHF study. *Journal of Psychosomatic Research*, *170*, 111384. https://doi.org/10.1016/j.jpsychores.2023.111384

Sherwood, A., Blumenthal, J. A., Koch, G. G., Hoffman, B. M., Watkins, L. L., Smith, P. J., O'Connor, C. M., Adams, K. F., Rogers, J. G., Sueta, C., Chang, P. P., Johnson, K. S., Schwartz, J., & Hinderliter, A. L. (2017). Effects of Coping Skills Training on Quality of Life, Disease Biomarkers, and Clinical Outcomes in Patients With Heart Failure: A Randomized Clinical Trial. *Circulation. Heart Failure*, *10*(1).