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## Stress, cognitive appraisal, coping, and event free survival in patients with heart failure

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## ABSTRACT

**Objectives:** To describe self-reported stress level, cognitive appraisal and coping among patients with heart failure (HF), and to examine the association of cognitive appraisal and coping strategies with event-free survival.

**Methods:** This was a prospective, longitudinal, descriptive study of patients with chronic HF. Assessment of stress, cognitive appraisal, and coping was performed using Perceived Stress Scale, Cognitive Appraisal Health Scale, and Brief COPE scale, respectively. The event-free survival was defined as cardiac rehospitalization and all-cause death.

**Results:** A total of 88 HF patients (mean age  $58 \pm 13$  years and 53.4% male) participated. Linear and Cox regression showed that harm/loss cognitive appraisal was associated with avoidant emotional coping ( $\beta = -0.28$ ; 95% CI:  $-0.21 - 0.02$ ;  $p = 0.02$ ) and event free survival (HR = 0.53; 95% CI:  $0.28 - 1.02$ ;  $p = 0.05$ ). **Conclusions:** The cognitive appraisal of the stressors related to HF may lead to negative coping strategies that are associated with worse event-free survival.

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### Introduction

Heart failure (HF) is a costly condition with high mortality and morbidity rates.<sup>1,2</sup> In 2012, the total costs for HF in the United States were approximately \$31 billion, and this amount will rise to approximately \$70 billion by 2030.<sup>3</sup> Although biological factors contribute to the high morbidity and mortality in HF, there are many unexplored psychosocial factors that potentially contribute to poor prognosis.<sup>4,5</sup>

**Abbreviations:** HF, Heart failure; NYHA, New York Heart Association.

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Heart failure is commonly perceived with considerable psychological distress.<sup>6-10</sup> Based on the work Lazarus and Folkman as well as others' in the literature,<sup>4,6-22</sup> we developed a model of HF patients' response to stressors (Figure 1). In this model, HF is the stressor. Stressors have been defined as environmental circumstances or chronic conditions that are appraised in a primary appraisal process, and then are seen as either benign or a threat to physical and/or psychological health or well-being.<sup>23</sup> In those with HF, cognitive appraisal is the patient's perception of an event or situation, their assessment of the degree to which the event is stressful, and their perception of the potential impact of the event on personal goals and resources.<sup>22,24</sup> People have considerable differences in their appraisal of and response to stressors.<sup>25</sup> Thus, cognitive appraisal is a core component of this as well as other stress models.<sup>22,26</sup> Stressors can be appraised primarily as: (1) irrelevant when the situation has no effect on the individual, (2) benign positive when the situation is evaluated as positive, or (3) or stressful.<sup>22</sup> When appraised as stressful, the stressor can be further appraised (secondary appraisal) as: (1) harm/loss resulting in damage to self or social esteem; (2) threat, which refers to a suspected pain; or (3) challenge, which allows for the opportunity for gain and growth.<sup>22</sup>

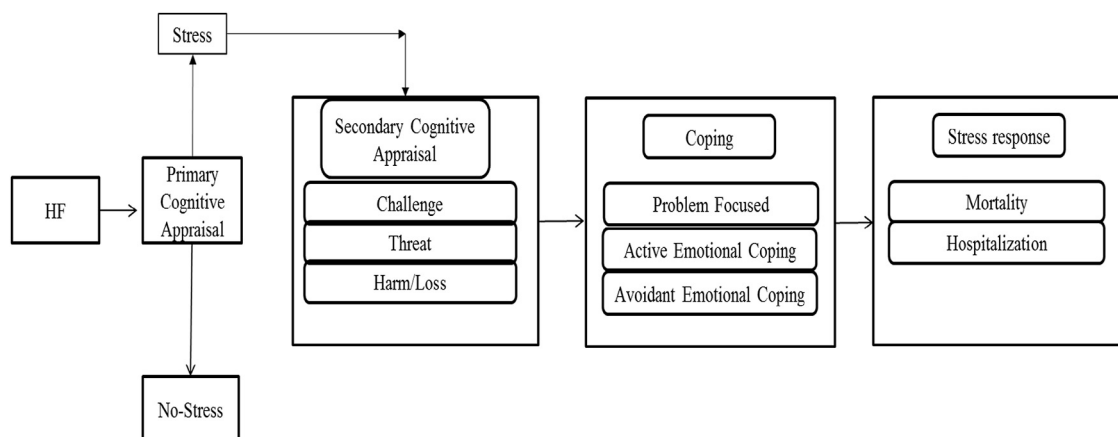


Fig. 1. Heart Failure Patients' Response to stressors.

Cognitive appraisal has been shown to play an important role in determining the impact of the stress response.<sup>15</sup> Specifically, appraisal of a stressor in the harm/loss or threat categories result in poor health outcomes, impaired performance and lower quality of life.<sup>14,16</sup> In contrast, appraisal as a challenge has been associated with positive effects on cardiovascular reactivity and task engagement.<sup>14,16</sup>

Cognitive appraisal of HF can predict psychological and physical coping responses.<sup>27</sup> Lazarus and Folkman (1984) defined coping as "Constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" while attempting to manage, master, or alter the stressful situation by reducing or tolerating it.<sup>21,28</sup> The following two major types of coping have been suggested: emotion-focused and problem focused.<sup>22</sup>

Emotion-focused coping is an attempt to control emotional response to a stressful situation when individuals believe they cannot change the situation.<sup>29</sup> These strategies can be divided into active emotional coping and avoidant emotional coping.<sup>17,18</sup> Active emotional coping includes venting, positive reframing, humor, acceptance, and emotional support strategies. Avoidant emotional coping includes self-distraction, denial, behavioral disengagement, self-blame, and substance use.<sup>19,20</sup> The predominant view of emotion-focused coping is that it is a maladaptive form of coping associated with impaired health outcomes. Emotion-focused coping is associated with unhealthy lifestyle practices such as smoking, lack of exercise, drinking, non-compliance with medical regimen, and drug use that may lead to frequent hospitalization and even higher mortality rate.<sup>30,31</sup> In contrast, problem-focused coping consists of cognitive and behavioral strategies to alter or manage the stressor, such as planning, reaching out for instrumental support, and religion.<sup>19,20</sup> These are positively associated with better adjustment and health outcomes such as longer survival and fewer hospitalization compared to those with emotion-focused coping.<sup>31</sup>

Understanding factors that affect survival in patients with HF is important to design future interventions to reduce the stress from HF and change how HF patients appraise their condition and cope with it. The purposes of this study were to describe self-reported stress level, cognitive appraisal and coping among patients with HF, and to examine the association of cognitive appraisal and coping strategies with event-free survival.

## Methods

### Design, sample, and setting

A prospective, longitudinal, descriptive design was used in which patients' follow up were performed for 6 months to determine the

occurrence of the endpoint of time to re-hospitalization for cardiac causes or death from any cause. The study was approved by the local Institutional Review Board. A convenience sample of 88 patients with HF who were hospitalized for cardiac reasons at an academic health care center and a level 1 trauma medical center in Kentucky, USA was used in this study.

Patients with a diagnosis of chronic HF were eligible for participation in the study if they were: 1) admitted to the hospital with a primary or secondary diagnosis of exacerbation of chronic HF or any other cardiac diagnosis; 2) 21 years or older; 3) able to read and speak English; and 4) not obviously cognitively impaired. Cognitive impairment was defined as the presence of a diagnosis of dementia or cognitive impairment, the inability of the patient to provide informed consent, or to provide an accurate description of what was expected in the study after the study was explained by research staff. Chronic HF was defined as an existing and confirmed diagnosis of HF from a cardiologist. Only patients with existing HF (versus new onset) were considered to have chronic HF. Patients were excluded from the study for: 1) co-existing terminal illness likely to be fatal within 6 months; 2) presence of a left ventricular assist device, continuous inotropic infusion, or hospice care; 3) active suicidality (defined as choosing option 2 or 3 on item 9 of the Beck Depression Inventory-II); 4) history of the death of a spouse or child within the past month; 5) history of psychotic illness or bipolar illness; or 6) current alcohol dependence or other substance abuse.

Power analysis was performed using G-Power 3.1 with power level of 0.80, level of significance of 0.05, the medium effect size of 0.15, and seven predictors. A minimum sample size of 103 was recommended based on the G-Power analysis.

## Variables and measures

### Stress

Stress was measured using the brief version of the Perceived Stress Scale.<sup>32</sup> This version consists of a four-item scale that has been demonstrated to be reliable and valid,<sup>32</sup> in a variety of countries and in multiple populations including those with chronic illness.<sup>33,34</sup> Each item was rated by patients on a scale ranging from 0 (never) to 5 (very often). Higher scores indicate greater levels of stress. Cronbach's alpha for this instrument in the current study was 0.71. The four items were: (1) how often have you felt that you were unable to control the important things in your life?, (2) how often have you felt confident about your ability to handle your personal problems?, (3) how often have you felt that things were going your way?,

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