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The Psychometric Properties of the Brief Symptom Inventory Depression and Anxiety Subscales in Patients With Heart Failure and With or Without Renal Dysfunction

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More than 5 million Americans have heart failure (HF); approximately one third have concomitant renal dysfunction. Anxiety and depressive symptoms are the most common psychological responses of these individuals and may influences outcomes; thus a reliable valid instrument to measure these is needed. This article reports a psychometric evaluation of the Brief Symptom Inventory (BSI) depression and anxiety subscales in patients with HF and with or without renal dysfunction, as these scales are commonly used in this population for research studies. This rigorous psychometric analysis used existing data from 590 patients with HF with an average ejection fraction of 35% ± 15% and average age of 63 ± 13 years. Patients were categorized as normal renal function (n = 495) or renal dysfunction (n = 95), and groups were compared and analyzed separately. Cronbach's alpha for the BSI subscales was .82 for those with normal renal function and .88 for those with renal dysfunction. Factor analysis determined that the subscales evaluated one dimension, psychological distress, in both groups. Construct validity was examined using hypothesis testing, and construct validity was supported in patients with HF and with normal renal function by significant associations of the BSI subscales with another measure of depression and a measure of perceived control. Construct validity in patients with HF and renal dysfunction was not strongly supported. Only the BSI depression subscale predicted poorer outcomes in patients with HF and with normal renal function; neither subscale was associated with event-free survival at 12 months in those with renal dysfunction. The BSI anxiety and depression subscales provide reliable and valid data in patients HF and normal renal

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function. Although reliability is excellent, construct validity was weak in those patients with HF and with concomitant renal dysfunction, which may reduce the validity of those data.

MORE THAN 5.3 million Americans have heart failure (HF; Jiang et al., 2001; Lloyd-Jones et al., 2009; Tsuyuki et al., 2001), and approximately 30% of patients with HF develop renal dysfunction (Forman et al., 2004; Logeart et al., 2008). Renal dysfunction interacts with cardiac dysfunction to increase the risk of cardiovascular events and mortality by 30-fold, as compared with the general population (Rennenberg et al., 2009; Verma et al., 2007). The coexistence of HF and renal dysfunction is also associated with a decrease in physical ability (Stack & Murthy, 2008), high comorbidity burden, accelerated atherosclerosis (Ezekowitz et al., 2004), a greater number of hospital readmissions (Collins, Chen, Gilbertson, & Foley, 2009), and an increase in psychological problems (Hedayati et al., 2004).

More than 30% of patients with HF and end-stage renal disease (ESRD) have symptoms of depression and/or anxiety (Kimmel & Peterson, 2005; Konstam, Moser, & De Jong, 2005). Depressive symptoms and anxiety are independent risk factors for poorer outcomes and are associated with double the use of health services in this population (Azevedo et al., 2008; Carels, 2004; Kimmel et al., 1998; Pelle, Gidron, Szabo, & Denollet, 2008). It is unclear whether renal dysfunction in patients with HF increases the risk of depressive symptoms and anxiety or whether emotional disturbances augment poorer outcomes in patients with comorbid HF and renal dysfunction (Hedayati et al., 2004).

Psychometrically sound instruments that measure depressive symptoms and anxiety are needed for use in patients who have HF and variable renal function because of the high prevalence of these symptoms in this population. Some of the most common instruments that measure anxiety and depressive symptoms are quite long (e.g., Beck Depression Inventory [BDI]) and include physical symptoms that may be associated with HF and renal dysfunction and influence the scores obtained (Hedayati et al., 2004). Although screening and clinical interview methods such as those found in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* offer stringent criteria for the diagnosis of depression and anxiety disorders, routine assessment requires trained interviewers, may burden patients, and currently has untested reliability in patients with acute and chronic medical illnesses (Davidson et al., 2006).

The depression and anxiety subscales of the Brief Symptom Inventory (BSI) are short, easy to understand, and do not include physical symptoms that might affect the validity of the measure, as both HF and renal dysfunction produce symptoms that may be similar to those found with anxiety and depression (Derogatis & Melisaratos, 1983). This instrument is a feasible alternative for this population. To our knowledge, there is no existing study of the psychometric properties of the depression and anxiety subscales of the BSI in patients with HF and variable renal dysfunction. Thus, the purpose of this study was to examine the psychometric properties of the depression and anxiety subscales of the BSI (Derogatis & Melisaratos, 1983) in patients with HF and normal renal function and in those with renal dysfunction.

The specific aims of this study were to (a) examine the internal consistency reliability of the BSI depression and anxiety subscales in patients with HF and normal renal function and those with renal dysfunction; (b) investigate the dimensionality of the BSI depression and anxiety subscales in both groups; and (c) evaluate the construct validity of the BSI depression and anxiety subscales in both groups. The hypotheses tested to examine construct validity were the following: H_1—the BSI depression and anxiety subscales will be positively associated with the BDI and negatively with perceived control measured by the Control Attitude Scale Revised (CAS-R) in patients with HF and normal renal function and those with renal dysfunction; and H_2—the BSI depression and anxiety subscales will be positively associated with event-free survival in both groups of patients