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Traumatic stress and cardiopulmonary disease burden among low-income, urban heart failure patients

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ABSTRACT

Background: Traumatic events and posttraumatic stress disorder (PTSD) are associated with increased risk for cardiopulmonary disease (CPD) in veterans, men, and primarily White populations. Less is known about trauma, PTSD, and CPD burden among low-income, racial minority residents who are at elevated risk for trauma and PTSD. It was hypothesized that traumatic events and PTSD would be significantly associated with CPD burden among low-income, racial minority residents.

Methods: We evaluated cross-sectional relationships between traumatic events, PTSD, depression, and CPD burden in 251 low-income, urban, primarily Black adults diagnosed with heart failure. Data were analyzed using bivariate analyses, logistic and linear regression.

Results: Forty-three percent endorsed at least one traumatic event. Twenty-one percent endorsed two or more traumatic events. In logistic regression analyses, traumatic events were associated with increased prevalence of coronary artery disease (adjusted odds = 1.33, $p < .05$), hypertension (adjusted odds = 1.28, $p < .05$), chronic obstructive pulmonary disease (adjusted odds = 1.52, $p < .01$), and cardiac arrest (adjusted odds = 1.27, $p < .05$). PTSD was also related to increased risk for chronic obstructive pulmonary disease (adjusted odds = 1.22, $p < .05$) and was associated with earlier onset of heart failure ($\beta = -.13$, $p < .05$).

Limitations: The study utilizes cross-sectional, self-report data.

Conclusions: Findings support the link between traumatic events, PTSD, and CPD burden in low-income, primarily Black patients with heart failure. Depression appears to be less closely linked to CPD burden, despite receiving significant attention in the literature. The accumulation of traumatic events may exacerbate CPD burden among urban, low-income, racial minority residents with heart failure; findings highlight the importance of PTSD screening.

1. Background[2]

The association between non-traumatic stress, depression, and cardiopulmonary disease (CPD) is well documented, whereas exposure to traumatic, life-threatening events and subsequent posttraumatic stress disorder's (PTSD) relationship to cardiopulmonary disease is less well studied. PTSD is a common psychiatric disorder that represents a dysregulation in the adaptive stress response to traumatic events. Lifetime prevalence of PTSD among U.S. residents is approximately 7–8% (Kessler et al., 2005), with prevalence rates ranging from 22% to 43% among low-income, inner-city residents (Alim et al., 2006; Davis et al., 2008; Liebschutz et al., 2007; Schwartz et al., 2005). Because urban, low-income communities in the U.S. are plagued with neighborhood disorder, violence, and high rates of sexual assault and intimate partner violence (Alim et al., 2006; Gapen et al., 2011; Gillespie et al., 2009), lifetime rates of traumatic events and PTSD are higher among their residents (Asnaani et al., 2010; Breslau, 2009; Hien and Ruglass, 2009; Schwartz et al., 2005). In the current study, we explore how traumatic events and PTSD are related to CPD burden (defined as a count of cardiopulmonary conditions known to precede, complicate, or result from heart failure (e.g., Taylor-Clift et al., 2015)) among a low-income, primarily Black, urban population, and whether the relationships of traumatic events and

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[2] Mandatory First Page Abbreviations Footnote: CPD: Cardiopulmonary disease.

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PTSD with CPD burden are independent of the known relationship of depression with CPD burden (e.g., Barrick, 1999; Brown et al., 2009; Kupper et al., 2012; Shanmugam et al., 2007). Such findings could contribute to an understanding of health disparities in CPD for urban Blacks.

Past research has primarily examined the association between PTSD and CPD in large samples of higher income, White men. In a sample of primarily White, World War II prisoners of war, those with PTSD were at an increased risk of hypertension, circulatory diseases, and chronic ischemic heart disease (Kang et al., 2006). O'Toole and Catts (2008) also found male, primarily White veterans with PTSD to be at increased risk for hypertension. Other studies have found, among similar samples of primarily White, male veterans with PSTD symptoms, increased risk for chronic heart disease (Kubzansky et al., 2007), atrioventricular conduction deficits and infarctions (Boscarino and Chang, 1999), pulmonary diseases (Boscarino, 1997; Pacella et al., 2013) and cardiopulmonary-related mortality, even after controlling for risk factors (Ahmadi et al., 2011; Boscarino, 2008; Flood et al., 2010). A large study of White men and women found that those with PTSD were at increased risk for angina and heart failure (Spitzer et al., 2009).

A limited number of studies have found PTSD to be related to CPD in racially diverse samples. PTSD was associated with risk for coronary heart disease among women (Kubzansky et al., 2007) and Native Americans (Sawchuk et al., 2005). In the nationally representative National Comorbidity Survey, which included a substantial portion of racial minority respondents, researchers found an association between PTSD and cardiovascular disease (CVD; Lauterbach et al., 2005), a subset of cardiopulmonary disease. Additionally, studying a large Michigan state Medicaid database, Seng and colleagues found that, as compared to women without PTSD, those with PTSD were more likely to report cardiopulmonary symptoms (Seng et al., 2006). Alternatively, there is also some evidence that Blacks, as compared to Whites, may not experience the same cardiopulmonary risk outcomes as a result of PTSD (Dedert et al., 2013).

Race may be an important contextual factor for understanding the association of traumatic events and CPD because the rates and burden of both traumatic events and CPD are high for Black, low-income, urban residents. Rates of traumatic events are significantly higher in these residents compared to their White, higher-socioeconomic status (SES) counterparts, and Black patients are less likely to seek or receive treatment for trauma-related disorders (Alim et al., 2006; Asnaani et al., 2010; Davis et al., 2008; Liebschutz et al., 2007; Schwartz et al., 2005).

The involvement of traumatic events and PTSD in CPD would have significant implications for CPD disparity in the U.S., and especially in the metropolitan Chicago area. Blacks in America carry a greater CPD disease burden than do Whites; for example, they have higher rates of hypertension (Burt et al., 1995), lose more years of life to stroke (Centers of Disease Control and Prevention, 2005), and die at higher rates from chronic obstructive pulmonary disease (Keppel et al., 2010). CPD disease burden is further compounded by low SES for Blacks; in particular, Black, low-income individuals in the Chicago metro area from which our sample was drawn have greater heart disease and lung cancer mortality than do their White, higher-SES counterparts (Orsi et al., 2010). Furthermore, this disparity has widened significantly, despite targeted efforts at decreasing CPD rates among Black Chicago residents (Orsi et al., 2010). Although SES and its associated variables (such as education and access to health care) have been suggested as additional contributory influences in racial minority CPD disparity, income alone does not appear to account for the differences. For instance, even within each income or educational bracket, Blacks have higher rates of CPD than do their White counterparts (Lillie-Blanton et al., 1996). The role of trauma exposure as an indirect indicator of Black–White health disparities has been under-explored but has been referred to by others (Geronimus, 2000).

The current study examined the associations between traumatic events, PTSD, depression, and CPD burden among a low-income, primarily Black population of inner-city residents from the metropolitan Chicago area who had previously been diagnosed with congestive heart failure. Data were from baseline assessment of participants in the Congestive Heart Failure Adherence Redesign Trial (CHART), an ongoing, prospective, multi-hospital study in the Chicago metropolitan area aimed at reducing repeated hospitalizations in low-income congestive heart failure patients. We examined CPD burden, consisting of a count of conditions known to precede, complicate, or result from heart failure. This measure of burden is important because specific cardiopulmonary risk factors, complications, and comorbidities among patients with heart failure serve as indications of increased disease severity, vulnerability to repeated hospitalizations, and higher rates of mortality (Pistelli et al., 2003; Sidney et al., 2005). The current study specifically examines the presence of chronic obstructive pulmonary disease, coronary artery disease, hypertension, and history of myocardial infarction (heart attack) at baseline, prior to study intervention. Age at heart failure diagnosis and age when a myocardial infarction occurred were also collected. We predicted that lifetime exposure to traumatic events, not including health-related events, and current PTSD symptoms would predict earlier onset of heart failure above depression symptoms. We also predicted that traumatic events and PTSD symptoms would be related to increased CPD burden, as defined by higher numbers of CPD risk factors, comorbidities, and complications, independent of depression.

2. Method

2.1. Participants and procedure

Data were from baseline assessment of participants in the CHART study, designed to reduce hospitalizations in patients with heart failure. The study recruited and intervened with physicians and their patients, with patients recruited first in most cases and physicians contacted and consented subsequently. Patients were recruited in three ways; specifically, they were screened as medical inpatients or outpatients at five Chicago hospitals or were referred by physicians at those hospitals who had already been enrolled in the study themselves. Patients were therefore recruited on the basis of medical, not mental health, treatment seeking. A subset of CHART participants (consisting of the first 251 enrolled) were examined for this study. In total, the current sample represents recruiting at a stage with 61 physicians recruited, 1874 patients screened, 1132 patients excluded for failure to meet inclusion criteria or for meeting exclusion criteria (see below), and a final 251 patients enrolled following screening.

Eligibility included being 18 years or older, English or Spanish speaking, diagnosis of heart failure, earning less than $30,000 per year, having at least one hospitalization for heart failure during the prior 6 months, and physical evidence of systolic dysfunction, defined by an ejection of less than 50 according to an echocardiography, radiographic contrast ventriculography, or nuclear vetriculography, within the past 12 months. Patients were not eligible if they were listed for imminent cardiac transplant, had an advanced directive of “do not resuscitate,” or otherwise had an uncertain 12-month prognosis according to the study cardiologist (author J.C.). Symptom measures were interviewer-administered in order to reduce patient burden.

The institutional review board at the treatment facility approved this study. Prior to consenting, potential participants were