Depression, social support, and long-term risk for coronary heart disease in a 13-year longitudinal epidemiological study

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ABSTRACT

Depression has been linked with long-term risk for a variety of physical health ailments, including coronary heart disease (CHD). Little is known about resilience factors that may attenuate this relationship. The current study assessed whether social support moderates the long-term risk for CHD associated with this disorder. Data were drawn from the Americans' Changing Lives study, a nationally representative longitudinal survey of adults in the United States. Participants (unweighted $n=1636$) completed initial assessments of functional social support, body mass index, recent history of major depression, CHD, hypertension, and diabetes. Participants were again assessed for CHD at a follow-up assessment 13 years later. Social support was found to moderate the relationship between depression and the occurrence of CHD 13 years later. Specifically, among individuals with low social support, depression was prospectively associated with CHD. In contrast, depression was not prospectively associated with CHD among individuals with high social support. The results indicate that social support may function as a resilience factor against the long-term cardiovascular risk associated with depression. Clinical interventions focusing on the development of social support systems are important not only for addressing depression itself, but also for associated long-term physical health outcomes.

1. Introduction

Among psychiatric disorders, depression ranks highest in terms of its burden to society. Out of all physical and mental health conditions, depression is the second leading cause of disability in the U.S. and worldwide (Ferrari et al., 2013; US Burden of Disease Collaborators, 2013). This disorder accounts for approximately 9.6% of years lived with disability (YLDs) and 3.0% of global disability adjusted life years (DALYs; Ferrari et al., 2013). The global burden of this disorder increases substantially when considering its association with coronary heart disease (CHD). Indeed, after accounting for the approximately 4 million CHD DALYs (as well as 16 million suicide DALYs) attributed to depression, the overall burden of this disorder increases to 3.8% of global DALYs (Ferrari et al., 2013).

This link between depression and CHD has been empirically well established (Goldston and Baillie, 2008; Lett et al., 2004; Whooley and Wong, 2013). Specifically, depression is associated with a relative risk of 1.5–2.0 for developing CHD, as well as a worsening course in

individuals with CHD, with an estimated relative risk of 1.5–2.0 for eventual cardiac morbidity and mortality (Lett et al., 2004). The strength of this association between depression and CHD has led the American Heart Association Science Advisory to recommend routine screening of depression in all patients with CHD (Lichtman et al., 2008).

Given that individuals with depression are at greater risk for developing CHD and tend to have a more negative prognosis once this condition develops, it remains imperative to identify resilience factors that may moderate the relation between depression and CHD, particularly ones that may exert a long-term effect, thereby potentially altering the risk trajectory of this physical health condition in these individuals. Resilience has been defined as a reduction in vulnerability to risk experiences, overcoming adversity, and the experience of a positive outcome in spite of the presence of a risk factor (Rutter, 2006). It is therefore a necessarily interactive, or moderating, construct (Rutter, 2012). Elucidating resilience factors relevant to the relation between depression and CHD has the potential to inform intervention

efforts for at-risk individuals with depression.

One resilience factor of potential relevance is social support. Particularly influencing the concept of social support as a resilience factor relevant to physical health conditions are the observations of Cassel (1976) and Cobb (1976) that more socially integrated patients tended to exhibit a better prognosis in recovering from somatic illness and in maintaining symptom remission. Elaborating on this view, the buffering hypothesis proposes that social relationships provide resources that facilitate adaptive coping in response to a stressful experience, or illness in the case of stress-related disorders such as depression (Cohen et al., 2001). These resources essentially buffer against the detrimental effect of the stressor or illness.

There has been previous criticism about the lack of clarity with which social support has often been measured and defined (Coyne and Bolger, 1990). Although social support has been widely studied in the context of depression and CHD, past research has tended to focus on structural support (i.e., the size and frequency of contact within the individual's social network) rather than functional support (Compare et al., 2013). The concept of functional support relates to the quality, as opposed to the size, of the individual's social network (Lett et al., 2005). Specifically, it refers to the support received from the individual's social structure, and can include emotional support and support in the form of advice or appraisal. Importantly, there is some evidence that functional is more important than structural support in understanding risk for CHD (Lett et al., 2005).

Many of the studies in this area assessed for main effects in the relation between social support and CHD (Compare et al., 2013), leaving relatively unexamined the important concept of social support as a resilience factor buffering against the risk for CHD associated with depression. In fact, one review of the literature specifically identified the need for research on potential moderating relations between social support and depression on this physical health condition (Lett et al., 2005). One of the few studies in this area did not find functional support to be a resilience factor moderating the relation between depression and mortality or recurrence of acute myocardial infarction (AMI) in a sample of patients with recent AMI (Lett et al., 2007). As moderation was determined by visual inspection rather than tests of simple slopes, however, these findings must be interpreted with a degree of caution. In contrast, another study found functional support to buffer the effects of depression on one-year mortality in a sample of patients with AMI, such that when social support was high, depression was no longer associated with increased mortality risk (Frasure-Smith et al., 2000).

The current study aims to extend the existing literature in several ways in testing functional social support as a long-term resilience factor against the risk of CHD associated with depression. In contrast to prior studies that focused exclusively on AMI patient samples, we examined the interaction between functional support and depression on long-term risk for CHD in a more generalizable context, an epidemiological sample of middle-aged to older adults. To provide perhaps the most conservative evaluation of this relation, well-established risk factors for CHD were covaried, including hypertension, diabetes, body mass index (BMI), and pre-existing CHD at baseline. Additionally, whereas prior tests of this interaction have compared only minimal relative to mild depressive symptom severity (i.e., Beck Depression Inventory scores ≥10), the current investigation evaluated the relevance of this relation to clinically significant depression (i.e., major depression). To provide an especially rigorous assessment of functional support, the current study examined the long-term buffering effect of this resilience factor on CHD status over a 13-year follow-up period.

2. Methods

2.1. Participants and procedures

Data were drawn from the Americans' Changing Lives (ACL) study, a nationally representative longitudinal survey of adults in the United States conducted by the Survey Research Center of the University of Michigan. Further information about the ACL study is provided elsewhere (House et al., 1990). For the purpose of this study, we used data collected in Wave 2 and 13 years later at Wave 4, as major depression was not assessed at Wave 1. At Wave 2, participants (unweighted n =2,846; 55.90% female; $M_{age\ at\ Wave\ 2}$ =44.97, SE =0.35; $M_{years\ in\ school}$ =13.05, SE =0.08) completed assessments of depression, social support, pre-existing CHD, hypertension, diabetes, and BMI. They were assessed again for past-year CHD at Wave 4. In terms of racial composition, 86.6% of participants at Wave 2 were White, 9.0% were Black, 3.9% were American Indian and 2.1% were Asian.[1] A total of 1,642 participants (unweighted) completed the 13-year follow-up assessment, 397 (unweighted) attrited, and 807 (unweighted) were deceased. The weighted racial composition at follow-up was: 86.6% White, 9.0% were Black, 3.9% were American Indian and 2.1% were Asian (percentages exceed 100% due to rounding).

2.2. Measures

2.2.1. Major depression

At Wave 2, major depressive episodes over the past three years were determined using a diagnostic interview following DSM-IV criteria. This diagnostic interview included 10 symptom questions reflecting the nine symptoms of major depression. Respondents were asked about the presence of these symptoms during their most recent onset of depressed mood within this three-year span (for more information on the assessment of major depression in the ACL study, see Maciejewski et al., 2001).

2.2.2. Social support

Friend/relative functional social support was assessed with two questions: (1) "On the whole, how much do your friends and other relatives make you feel loved and cared for?" and (2) "How much are these friends and relatives willing to listen when you need to talk about your worries or problems?" Responses for each item were measured on a 5-point scale ranging from 1 ("not at all") to 5 ("a great deal"). The internal consistency of this measure was adequate (Cronbach's alpha =0.73; for additional information on the creation and use of this measure, see Harvey and Alexander, 2012; House and Kahn, 1985; Lynch, 1998).

2.2.3. Physical health

BMI, and past-year experiences of hypertension, diabetes, and heart attacks and other heart troubles were each assessed by self-report (for another example of epidemiological research employing self-report measures of physical health, see McWilliams and Bailey, 2010). CHD was assessed at Wave 2 and Wave 4 with the question: *"Have you had a heart attack or other heart trouble during the last 12 months?"* Self-reports of physical illnesses have been shown to be reliable and valid (Iacovino et al., 2016; Idler et al., 1999), particularly when compared to medical records (Barr et al., 2002; Colditz et al., 1986, 1987). BMI was calculated by dividing respondents' self-reported weight by height, with a BMI greater than or equal to 25 kg/m^2 defined as overweight. Supporting the validity of this self-report measure, Little to no racial or sex differences have been found between Wave 2 BMI and BMI derived by measuring height and weight in the Third National Health and Nutrition Examination Survey (NHANES III; Kuczmarski et al., 1994). Furthermore, in a systematic review of assessments of BMI, self-reports were considered to be reliable estimates of BMI in adults (Connor Gorber et al., 2007).

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[1] Percentages add up to more than 100% because of rounding.