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Coping Strategies and Self-Reported Cardiovascular Disease in the Jackson Heart Study Cohort

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Abstract

Objective: To examine the association of four coping strategies [Problem-Focused Engagement (PFE), Problem-Focused Disengagement (PFD), Emotion-Focused Engagement (EFE), and Emotion-Focused Disengagement (EFD)] with CVD related outcomes (heart attack, diabetes, high blood pressure, cholesterol problems, kidney problems and stroke). Methods: We used data collected during the Jackson Heart Study (JHS) Exam 1 (2000-2004), using questionnaires administered to 5301 African-Americans to examine participants' self-reported their CVD status, and collected coping strategies from the Coping Skills Inventory (CSI-SF). We conducted six regression analyses, one for every self-reported outcome. Results: PFD, EFD, and PFE were significant predictors; participants who displayed these characteristics and behaviors were more likely to have one of the self-reported diseases. The coping variables PFD, EFD, and PFE were associated with heart attack, high blood pressure, and kidney problems in the JHS participants. Conclusions: Coping strategies representing coping responses to daily stressors, especially those that are immersed in disengagement practices, are associated with the development of high blood pressure and heart attack.

Keywords

Coping, Cardiovascular Disease, Jackson Heart Study, African American

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1. Introduction

Coping is a psychosocial adaptation that can serve as a stabilizing factor for individuals experiencing stress. Coping includes specific thoughts and actions, and behavioral and psychological efforts that people employ to adjust to difficult life circumstances and stressful events [1-3]. Stress is believed to be associated with cardiovascular disease [4-7]. Stressful events can change normal feelings of safety into fear and uncertainty [8]. The coping strategies one adopts depend on the type of stressor experienced as well as individual characteristics [9-10]. Depending on one's coping behavior, stressful experiences can lead to cardiovascular disturbance and neurohormonal secretion [1, 12]. Stressful

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experiences also lead to behaviors, such as alcohol consumption and smoking [13-14]. Smoking and alcohol consumption, when used to manage stress, are inadequate coping strategies because they provide only short-term relief [15]. Effective coping strategies have a beneficial and positive effect on psychological distress and the quality of life in patients with a chronic disease [16-25].

Two general coping strategies are: (1) problem-focused strategies which represent efforts to do something active to alleviate stressful circumstances, and (2) emotion-focused coping strategies that involve efforts to regulate the emotional consequences of stressful or potentially stressful events [1, 26, 27]. Coping strategies have been further categorized into an engagement or disengagement strategy. An engagement coping strategy involves actions designed to confront stressors that can reduce long-term psychological and physiological instability and discomforts. A disengagement (avoidance) coping strategy helps to control exposure to the unpleasant experience. This strategy, though it may produce short-term relief, often leads to long term negative outcomes [1]. Coping has a significant impact on health outcomes [28, 29]. People who exhibit emotional coping behavior (disengagement coping) can experience depression, anxiety, and somatic and social dysfunction symptoms, and rational coping behavior is linked to less social dysfunction [30-33].

One study conducted on coping strategies and CVD in African-American populations found that certain coping strategies can result in higher resting blood pressure [34]. Others believed that emotion-focused coping is associated with managing the effect of illness and limiting the physiological worsening of health status [35]. For African Americans who suffer disproportionately with severe complications associated with hypertension and cardiovascular disease, religious coping and blood pressure are related, and coping-based CVD prevention strategies could facilitate intervention [36]. Passive coping (avoidance) can predict higher blood pressure levels and (b) active coping (trying to change things) is related to lower blood pressure levels [37].

Many African Americans have been exposed to stressful life circumstances and negative experiences in their daily lives, ranging from demanding work environments to social and socioeconomic hardships that could have an impact on CVD health [34]. It is not very well understood how cognitive and behavioral coping strategies employed by African-Americans can be applied to reduce the effects of stressful experiences.

An assessment of the coping strategies of the JHS cohort can provide support and guidance for the development of effective prevention and treatment strategies. This study sought to determine which of the coping strategies was most useful in differentiating between targeted CVD related outcomes in the JHS cohort. We hypothesized that coping strategies would be independent predictors of heart attack, diabetes, high blood pressure, cholesterol problems, kidney problems, and stroke.

2. Methods

The data examined in this study were collected during the Jackson Heart Study (JHS) first clinical examination (2001-2004), using questionnaires administered to 5301 African-Americans, aged 21-95. The JHS is an epidemiological study of biological and psychosocial correlates of cardiovascular disease (CVD) risk of African Americans living in Hinds, Madison, and Rankin counties around Jackson, Mississippi, comprising 3360 women and 1941 men. The mean age for women was 55.3 years of age, and for men, it was 54 years of age. Further details of the JHS sample were provided in previous studies [1, 38-40].

The instrument used to gather the coping strategies of the JHS cohort was the Coping Skills Inventory-Short Form (*CSI-SF)*, with 15 survey items measuring four coping dimensions {Problem-Focused Engagement (PFE), Problem-Focused Disengagement (PFD), Emotion-Focused Engagement (EFE), and Emotion-Focused Disengagement (EFD)}. As was previously reported [1], 81.4% of the 5301 JHS participants completed the *CSI-SF* (n = 4315) and 18.6% did not respond (n = 986). Participants who did not complete the CSI-SF were excluded from this study.

Participants were asked to rate the general frequency with which they utilize each coping behavior on a Likert scale and to select from the following choices: 1 = “Never”, 2 = “Seldom”, 3 = “Sometimes”, 4 = “Often”, and 5 = “Almost Always” for measuring engagement and disengagement. Details of the instrument are provided in a previous publication. The CSI-SF was coded in such a way that higher numeric values were associated with more positive coping skills on 8 items, and lower numeric values were associated with more positive coping skills on 7 items [1].

To determine CVD-related disease status, the JHS participants provided self-reported data, responding “yes” or “no” to the question that asked if they had been told by a doctor that they had the disease of interest. Demographic parameters, such as age, gender, marital status, educational level, and income were examined. BMI, smoking habits, and alcohol consumption were also examined. Participants were classified into one of three BMI groups, *<25; 25≤BMI<30; ≥30*. Participants were classified into three smoking groups, *never smoked, former smoker, or current smoker* based on their responses to the smoking survey. Participants were

classified into one of four alcohol use groups, *abstainer or less than one drink per week, 1-7 drinks per week, 8-14 drinks per week, or more than 14 drinks per week.*

Coping means were calculated using the participants' coping strategies represented by their scores on the four subscales of the *CSI-SF, EFE, PFE, EFD*, and *PFD*. The scores on the subscales represented the predictors (independent variables) Descriptive statistics were used to present the independent variables and demographic characteristics using means and percentages. The outcome variables were self-reported heart attack, diabetes, high blood pressure, cholesterol problems, kidney problems, and stroke.

We conducted six logistic regression analyses, one for every self-reported outcome to determine the contribution of participants' characteristics, lifestyles, and coping strategies to predictions of baseline CVD self-reported diagnosis after adjustment for the effects of standard clinical predictors, BMI, age, and gender. Participants' age, gender, income, education level, smoking habits, alcohol consumption, marital status, BMI level, PFE, PFD, EFE, and EFD were entered one at a time using the forward likelihood ratio procedure to discover relationships. Statistical significance was defined as $p < .05$.

3. Results

There was a total of 5301 African-Americans who participated in the Jackson Heart Study in baseline exams that spanned the years 2000-2004 (Table 1). Of this number, 3360 were female and 1941 were male. The mean age for women was 55.3 years of age, and for men, it was 54 years of age ($p < .05$). More than 60.0% of both men and women had academic training and qualifications beyond high school. Only 18.5% of women and 10.6% of men were classified in the low income category. Less than half of the women (47.1%) were married compared to 66.9% among the men. About 71.4% of the women were "never smokers" compared to 61.9% of the men. About 62% of the women and over 41.0% of the men indicated that they drank little to no alcohol per week.

BMI levels were significantly higher in women than in men ($p < .05$). The male participants practiced problem-focused engagement coping to address daily stressors more than women ($p < .05$). Women practiced emotion-focused engagement coping more than men ($p < .05$). Women practiced problem-focused disengagement coping more than men ($p < .05$). Women practiced emotion-focused disengagement coping more than men ($p < .05$).

Table 1. Characteristics and Behaviors of JHS Participants.

Characteristics and Behaviors	Women (n =3360) Men (n 1941)				
	Mean	%	Mean	%	Sig.
Age	55.3	-	54.1	-	.001
Education					
Less than High School	-	18.0	--	19.1	.000
High School/GED	-	20.5	-	19.5	.000
Beyond High School	-	28.6	-	29.4	.000
Bachelors Degree or Higher	-	32.9	-	32.0	.000
Income					
Lower Income	-	18.5	-	10.6	.000
Lower-Middle Income	-	27.0	-	22.2	.000
Upper-Middle Income	-	29.4	-	30.0	.000
Affluent		25.0	-	37.2	-003
BMI Level	32.5	-	30.46	-	.000
Marital Status					
Divorced	-	16.8	-	12.1	.000
Married	-	47.6	-	66.9	.000
Never Married	-	13.7	-	10.5	.000
Separated	-	4.8	-	3.1	.000
Widowed	-	17.0	-	7.4	.000
Smoking					
Never Smoked	-	71.4	-	61.9	.000
Former Smoker	-	16.8	-	22.6	.000
Current Smoker	-	11.8	-	15.5	.000
Alcohol					
>14 Drinks Per Week	-	3.9	-	8.4	.009
8-14 Drinks per Week	-	28.3	-	39.2	.719
1-7 Drinks per Week	-	6.2	-	11.0	.053
Abstainer/< 1 Drink per Week	-	61.6	-	41.4	.000
Problem Focused Engagement	14.9	-	15.4	-	.000
Problem Focused Disengagement	11.9	-	11.1	-	.000
Emotion Focused Engagement	13.4	-	12.5	-	.000
Emotion Focused Disengagement	8.5	-	8.1	-	.000

At baseline, more than half (55.1%) of the JHS participants self-reported that they had high blood pressure; 27.5% self-reported that they had cholesterol problems; 4.9% self-reported that they had heart attack; 3.9% self-reported they had a stroke; 17.2% self-reported they had diabetes; and 5.1% self-reported that they had kidney problems (Figure 1).

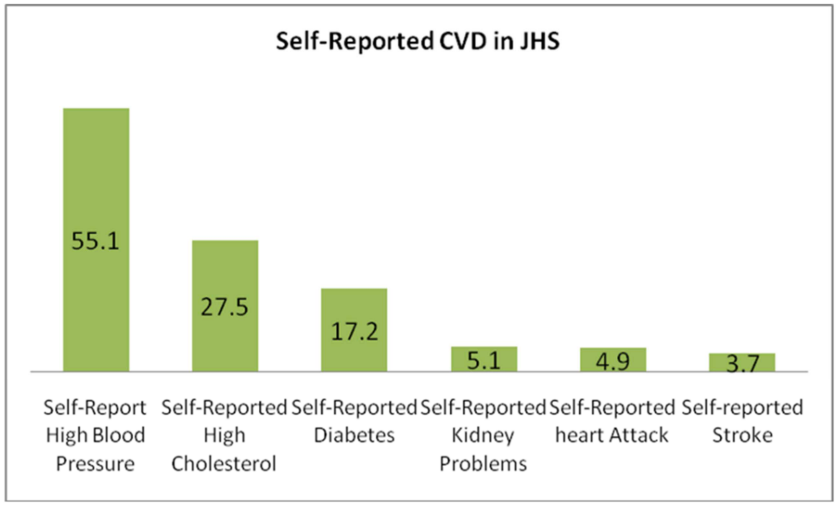

Figure 1. Cardiovascular Disease Status in JHS.

n=5301

About 47.5% of the JHS participants described themselves as practicing PFE to address daily stressors; 23.7% of them practiced EFE (Figure 2). Engagement coping (positive coping) refers to the adoption of a positive attitude and deployment of active behavioral strategies designed to address specific problems and is believed to be related to a person's well-being. On the disengagement subscale, 11.6% PFD, and 12.0% practiced EFD. Disengagement (negative coping) refers to the absence of the desire and ability to take care of one self when confronted with life's stressors and is generally believed to be associated with negative consequences.

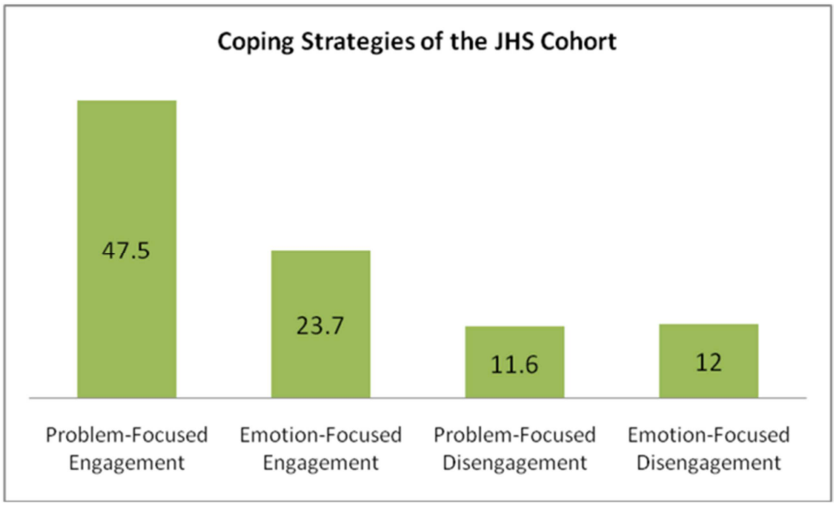

Figure 2. Coping Strategies in the JHS.

n = 4 219 (PFE), n = 4190 (PFD), n = 4221 (EFE), n = 4218 (EFD)

Overall, low income, smoking status, alcohol consumption, PFD, and EFD were significant predictors (Table 2). African American participants in the JHS who displayed these characteristics and behaviors have an increased risk of getting the CVD. Regression results indicated that the predictors were statistically reliable in distinguishing between high blood pressure, diabetes, heart attack, and stroke ($p < .05$). Also low income was significantly associated with diabetes and stroke. Smoking, alcohol consumption, and PFD were associated with heart attack, and EFD is associated with high blood pressure. A one unit increase in EFD

increased the odds that JHS participants would have high blood pressure by 7.0%. A one unit increase in PFD increased the odds that JHS participants would have a heart attack by 14.1%.

Table 2. Socioeconomic Status, Life-style, and Coping Behavior Predictors of CVD (adjusted for age, BMI, and gender).

Characteristic and Behaviors	High Blood Pressure			Diabetes			Heart Attack			Stroke		
	Odds ratio	S.E.	Sig.	Odds ratio	S.E.	Sig.	Odds ratio	S.E.	Sig.	Odds ratio	S.E.	Sig.
Low Income	-	-	-	.888	.056	.033	-	-	-	.706-	.111	.002
Smoking	-	-	-	-	-	-	1.754	.184	.002	-	-	-
8-14 Drinks per Week	-	-	-	-	-	-	1.432	.136	.008	-	-	-
PFD*	-	-	-	-	-	-	1.141	.050	.008	-	-	-
EFD*	1.070	.028	.015	-	-	-	-	-	-	-	-	-

PFD = Problem Focused Disengagement
EFD =Emotion Focused Disengagement

4. Discussion

Investigating coping behavior in the Jackson Heart Study was important because individual predispositions could interact with other variables in predicting CVD development. Understanding the coping strategies and the relationship to CVD can provide a preview into potential health outcomes, especially with individuals who possess a physiological susceptibility. The findings suggest that disengagement coping strategies, are associated with elevated blood pressure, reaffirming previous research findings [34]. PFD was associated with increased risk of getting a heart attack, and EFD was associated with increased risk of high blood pressure. The association between PFD and high blood pressure also supports previous research [37] that found that passive coping (avoidance) predicted higher blood pressure levels. Similarly, the finding that EFD was associated with getting a heart attack supports previous results that confirmed that emotion-focused coping was associated with managing the effect of illness and limiting the physiological worsening of health status [35].

African American women practiced EFE more than men. Even though the analyses in this study did not result in conclusive evidence that EFE was related to the targeted CVD-related outcomes, this practice by the African American women is consistent with previous findings that the major preferred coping strategies among African-American women was praying [41]. EFE practiced by the African American women in the JHS are reminiscent of the Common Sense Model (CSM) that focuses on understanding beliefs about illness and postulates that individuals have common sense beliefs about illnesses relating to the identity, cause, timeline, consequences, and control of the impact the disease that elicit coping responses and guide how they cope with health threats. Use of the CSM was encouraged to reduce the impact of hypertension, cancer, Alzheimer's disease, chronic fatigue syndrome, diabetes, and asthma [42-43].

Limitations to generalizability include the following: (1) This study did not use clinical data to identify the CVD health status of the participants; (2) this study used cross-sectional associations only; (3) the study used self-reported information to classify the participants' CVD disease status; (4) there may be other non-controlled predictors of disease that could interact with the variables of interest; (5) survivor bias could significantly affect the accurate evaluation of the health outcomes under investigation since benefits experienced by the cohort could be attributed to other factors to which they are exposed. This could be an unrecognized source of error in analysis interpretation.

Questions have been raised about the true impact of some of the risk factors examined on cardiovascular disease outcomes, whether they are primary factors, secondary factors, or act in tandem with others, especially since smoking and alcohol use are also coping strategies used to handle daily stressors [13-14]. For example, employment status and marital status can be risk factors for increased alcohol drinking among men, even though African-Americans are less likely to consume five or more drinks a day or drink to intoxication [44]. In addition, there are inherent dangers of stroke risk when individuals combine smoking and moderate drinking [45].

5. Conclusion

The results of this study have demonstrated that coping strategies and coping responses to daily stressors, especially those that are immersed in disengagement practices, are associated with the development of high blood pressure and heart attack. As individuals encounter chronic or stressful exposures that elicit cognitive or emotional processes, the coping responses adopted could lead to the expression of cardiovascular disease signals. Participants reporting high blood pressure were characterized by a high EFD coping response and participants reporting heart attack were characterized with a high PFD coping response. The results

suggest that individuals with high EFD and PFD may have an increased risk of developing high blood pressure and heart attack. Since this study shows that coping strategy is associated with blood pressure and heart attack, this is an indication of the need to explore causal pathways using clinical confirmation of self-reported CVDs. The measures of coping strategies, PFD, EFD, and PFE may also be themselves markers of other underlying causal factors. One important question that surfaces, however, is: "Can PFD, EFD, and PFE be considered a cause, rather than simply a marker, of high blood pressure, heart attack, and kidney problems respectively?" This certainly requires further exploration utilizing clinical CVD measures.

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