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The Role of Stress and Social Support in Predicting Depression Among a Hypertensive African American Sample

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Abstract

Objective—To examine social support, stress and selected demographic variables as predictors of depression among African Americans with hypertension.

Methods—Archival data collected on 194 hypertensive African Americans ranging in age from 30 to 88 years (mean age = 58.3, SD = 12.2; 63% female) were analyzed in the present study. Hierarchical regression analyses were conducted using two models of depression. The first model included basic demographic characteristics of the sample, including age, sex, educational attainment, income, and employment status. In the second model, the psychosocial variables of stress and social support were added to determine their predictive value.

Results—The first model accounted for 14% of the variance in depression and identified sex and age as significant predictors. The second model, in which two psychosocial variables were added, accounted for 45.2% of the total variance, with age, stress, and social support as significant predictors.

Conclusions—Stress and social support are significant predictors of depression in a hypertensive African American population, beyond the influence of various demographic variables. These results have implications for prevention and intervention strategies with the target population.

Keywords

Hypertension; Blood Pressure; Depression; Stress; Social Support

Keywords

BP = blood pressure; SBP = systolic blood pressure; DBP = diastolic blood pressure; CES-D = Center for Epidemiological Studies Depression Scale

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Among adults living in the U.S., nearly one in three has high blood pressure (1), with 30% unaware of their condition (2). High blood pressure has been identified as a major risk factor for stroke, congestive heart failure, myocardial infarction, and chronic kidney disease (3), as well as a number of psychological problems including depression and various anxiety disorders (4–6). Early detection of those at risk for developing high blood pressure enables individuals to learn of the risks associated with this condition and the steps that they can take to prevent and/or treat it. Discovery of factors that increase the likelihood that individuals with high blood pressure will develop more serious health and/or psychological problems will promote the development of more effective interventions to prevent and treat these conditions. Therefore, identification of potential risk factors associated with the development of high blood pressure and its relationship with psychological distress should become a priority.

Empirical work shows a significant relationship between hypertension and depression. Jonas and Lando (7) identified negative affect as a significant risk factor for hypertension among a sample of African Americans and Caucasians drawn from the first National Health and Nutrition Examination Survey, even after controlling for the age, sex, race, education, smoking status, alcohol use, and body mass index of participants. In the study, the impact of negative affect on the development of hypertension was most pronounced among African American women. Davidson, Jonas, Dixon, and Markovitz (8) examined a large sample ($N = 5,115$) of young (baseline age = 23–35) urban-dwelling African American and Caucasian adults and found that the overall incidence of hypertension was significantly higher for African Americans (6%) than for Caucasians (2%). Furthermore, younger African Americans with high or intermediate depressive symptoms¹ were more than twice as likely to develop hypertension as those with fewer depressive symptoms.

Demographic Factors

The prevalence and severity of hypertension among African Americans is greater than that of other minorities and of Caucasians (1,3,9). Studies suggest that this population experiences a risk for developing hypertension that is two to three times higher than experienced by Caucasians (10,11). Furthermore, in the United States, African American women between the ages of 25 and 34 have the highest incidence of hypertension (12), and by the age of 25, both African American men and women have a hypertension prevalence rate that is more than twice as high as similarly aged Caucasian men and women (1).

Several demographic variables appear to have an impact on the development of depression and hypertension, including sex, age, income, and employment status. Regarding the variable of sex, not only do African American women in the United States have a particularly high prevalence rate of hypertension (12), but when compared to Caucasian females, they also have earlier onset of hypertension, longer duration, and higher hypertension-related mortality and morbidity (11). With regard to gender and depression, results from the National Comorbidity Survey (13) have indicated that women are approximately 1.7 times more likely than men to report both a one year and/or lifetime prevalence of major depression.

Age has also been found to have an impact on the development of hypertension. Davidson et al. (8) found that individuals were significantly more likely to develop hypertension later in life if they experienced depressive symptoms as young adults. Additionally, Brown, Ahmed, Gary, and Milburn (14) examined familial background, health status, and demographic and sociocultural characteristics as potential predictors of major depression among African

¹Participants were considered to have high or intermediate depressive symptoms if they obtained a score of 16 or higher on the Center for Epidemiological Studies Depression (CES-D) Scale.

Americans. Their findings indicated significant associations between major depression and young age, changing residences in the past year, experiencing stressful life events in the past year, and having fair or poor health. Of these factors, the most significant predictors of major depression were being 20 to 29 years in age and having poor health, with hypertension being one of the major health problems reported.

Much research has investigated the impact of employment status and income on the development of hypertension and depression. Levenstein, Smith, and Kaplan (15) found that low occupational status and performance, as well as the threat or reality of unemployment, increased the risk for developing hypertension. Berkman and Breslow (16) has found results indicating that the psychosocial stressors of low-status work, unemployment, and concern about possible job loss were most predictive of the development of hypertension after adjusting for various behavioral and sociodemographic risk factors. Additionally, research has indicated that lower income level may moderate the relationship between psychosocial factors and depression (17).

Shared Psychosocial Risk Factors for Hypertension and Depression

Previous research has indicated that certain psychosocial variables are associated with an increased risk for the development of both depression and hypertension. Stress and social support are two such variables that are thought to have a particularly strong impact on the relationship between depression and hypertension (18). The occurrence of significant life event stress prior to the onset of an episode of depression has been well established (19–21). Additionally, support for a significant association between life event stress and hypertension also appears in the literature (22). Reiff, Schwartz, and Northridge (18) conducted interviews with a sample of 695 adults drawn from a predominantly African American community in Harlem, New York and found preliminary support for life event stress as a potential moderator of the relationship between depression and hypertension within this population.

Social support is another psychosocial variable found to have a significant association with both hypertension and depression. Individuals with social support are significantly less likely to develop depression than those without social support (23–25). Furthermore, individuals with higher levels of social support are at reduced risk for developing cardiovascular disease, a disease frequently resulting from a history of hypertension (26,27). Glynn, Christenfeld, and Gerin (28) further supported this finding by demonstrating that male and female subjects who received supportive feedback, versus no feedback, when giving an impromptu speech experienced significantly lower increases in their BP. This significant reduction in BP, however, only occurred when women provided the supportive feedback.

Study Rationale

The goal of this study was to expand on the current literature on the relationship between depression and hypertension by exploring the roles of stress and social support as possible predictors of depression in a population of African American adults with high blood pressure. It was predicted that depression in this sample would be better explained by examining the predictive contributions of level of social support and stress among the participants. Specifically, it was hypothesized that stress and social support would explain significantly more variance in the level of depression among the target population than examining demographic variables alone.

Method

Participants

Archival data, collected on 194 hypertensive African Americans ranging in age from 30 to 88 years (mean age = 58.3, SD = 12.2; 128 women and 66 men), were analyzed in the present study. The participants from the archival study² were recruited through free blood pressure screenings at community centers or retail stores in the city of Detroit. To meet the requirements for participation in the parent study and to be included in the present archival analysis, volunteers had to be 18 years of age or older, English speaking, and have systolic blood pressure (SBP) greater than or equal to 140 and diastolic blood pressure (DBP) greater than or equal to 90. If individuals identified themselves as having a history of diabetes or chronic kidney disease, they were required to have SBP greater than or equal to 130 and DBP greater than or equal to 80. Individuals were excluded from participation if they were receiving hemodialysis, had difficulty orienting to time, person or place, presented with certain compliance risks (such as the presence of alcoholism or self-admitted illicit drug use), or were experiencing other major health problems such as terminal stages of cancer or advanced liver disease. Volunteers meeting the study requirements were compensated for their participation. The Wayne State University Human Investigation Committee approved the study protocol.

Measures

For the present study, demographic data including the sex, age, education level, income level, and employment status of participants were analyzed. Additional data included participants' levels of stress, social support, and depressive symptomatology.

Stress was measured by a four-item scale that was drawn from the Perceived Stress Scale (PSS) (29). The items measured the degree to which situations in one's life are appraised as stressful as well as assessed the extent of control that participants perceived they had over challenging stressful situations. Item content related to how often participants felt: (a) nervous or stressed, (b) that problems were piling up so high they could not overcome them, (c) that based on the things they did to cope, they had control over their stress, and (d) that based on the actions they took to deal with their stress, they could decrease their stress. The two perceived stress items were scored on a scale from 1 (never) to 5 (very often). One of the perceived control items was scored on a scale of 0 (complete control) to 6 (no control), while the other was score on a scale of 0 (can decrease completely) to 6 (can't decrease). An additive composite score was developed from principal component factor analysis and reported on a standard normal z scale. Cronbach's alpha reliability for the scale in this sample was .84.

Social support was measured by the ENRICHD Social Support Instrument (ESSI), a 6-item scale constructed for the ENRICHD trial as a screening tool to identify patients with low levels of social support (30). The ESSI assesses the availability of functional and emotional support. Six items, rated on a scale from 1 (none of the time) to 5 (all of the time) ask participants to report how often they felt there was someone available that they could count on: to listen to them, to give good advice about a problem, to show love and affection, to help with daily chores, to provide emotional support, and in whom they could trust and confide. The total score is a summative score. Cronbach's alpha reliability of the ESSI in this sample was .87.

To obtain a measure of depression in the sample, participants completed a modified version of the Center for Epidemiological Studies Depression Scale (CES-D) (31). The CES-D is a self-

²The archival data set used for the present research comes from a project begun in 2000 and sponsored by the National Institute of Nursing Research/National Institutes of Health. The title of the project is "Nurse-Managed Blood Pressure Telemonitoring with African Americans" and the principal investigator is Nancy T. Artinian. Those wishing to learn more about this project should contact John P. Dennis at Saint Louis University via e-mail at dennisjp@slu.edu.

report measure and is composed of 20 symptoms of depression. Components of depression represented on the scale include depressed mood, feelings of guilt and worthlessness, feelings of helplessness and hopelessness, psychomotor retardation, loss of appetite, and sleep disturbance. All symptoms of depression on the original CES-D scale were included in this study. In order to further differentiate between higher levels of depression, the “most or all of the time” response option was divided into two response options: “most of the time” and “all of the time”. Therefore each item was scored on a scale of 1 to 5 rather than 0 to 3 as in the original instrument. Participants were asked to score each symptom of depression by noting the frequency with which they experienced it during the preceding week on a scale from 1 (none of the time) to 5 (all of the time). Individual scores were summed to produce a possible total score ranging from 20 to 100. A score of 42 was determined to be mathematically equivalent to the cut-off score of 16 on the original instrument, which is suggestive of clinical depression. Reliability of the CES-D in this sample was .83.

Design and Procedure

Archival data from a study of hypertensive African Americans were analyzed in the present study. All statistical analyses were conducted using SPSS version 10.0. To examine factors that predict depressive symptomatology, a hierarchical regression analysis was conducted using two models. The demographic characteristics of participants (sex, age, education level, income level, and employment status) were included in Model 1, while Model 2 included these demographic characteristics and added the psychosocial variables of social support and stress.

Results

Means, standard deviations, and correlation coefficients for depression and the demographic and psychosocial variables are listed in Table 1. Sixty-six percent of respondents were female and the mean level of completed education was 12th grade. The mean age was 59 years, with one-quarter of the participants over the age of 67. Over half of the sample reported an annual household income of less than \$20,000, and 72% reported that they were not currently employed.

The correlations listed in Table 1 indicate that among the demographic variables that were examined, sex, age, and income level were significantly related to depression, indicating that being female, younger, and having a lower income were associated with greater depression scores. The strongest correlation was the association between age and depression ($r = -.30$, $p < .001$). Among the psychosocial variables that were investigated, both level of stress ($r = .62$, $p < .001$) and amount of social support ($r = -.39$, $p < .001$) were highly correlated with the expression of depressive symptomatology.

Two models of depression that were tested in the regression analyses are presented in Table 2. The demographic variables were entered in the first model, and were followed by the addition of the psychosocial variables in the second model. The first model assessed the differential impact of five demographic variables (sex, age, highest education level attained, annual household income, and employment status) on depression. Of these variables, significant effects were found for sex ($\beta = -4.571$, $p < .01$) and age ($\beta = -.330$, $p < .001$), while the effects of education, income, and employment status were non-significant. This indicates that women and younger participants had higher depression scores than men and older participants. The demographic variable set as a whole was significant, $F(5,193) = 7.274$, $p < .001$, accounting for 14% of the variance in depression among the study sample.

The second model assessed the explanatory power of seven variables, including the five demographic variables entered in the first model with the addition of two psychosocial variables (stress and social support), on depression. Age was the only demographic variable

that continued to be significant ($\beta = -.181, p < .01$), indicating that sex was no longer a significant predictor when stress and social support were added in the second model. Both of the psychosocial variables, stress ($\beta = 1.617, p < .001$) and social support ($\beta = -.460, p < .001$), were significant in the second model, indicating that participants who endorsed higher levels of stress and lower levels of social support had higher levels of depression. As a group, this variable set was significant, $F(7, 193) = 23.712, p < .001$, accounting for 45.2% of the variance in depression. Thus, though the demographic variables reported in model one created a variable set that significantly predicted depression, the addition of the psychosocial variables in model two accounted for an additional 30 percent of the variance, supporting the study hypotheses.

Discussion

This study examined the role of two psychosocial variables, stress level and social support, on depressive symptomatology, specifically the amount of variance explained by these variables beyond that of certain demographic variables including sex, age, education, income, and employment status. The results supported the primary study hypotheses, suggesting that stress level and amount of social support significantly predict the level of depression among urban living hypertensive African Americans. The demographic variables of age and sex were also found to be predictive of depressive symptoms in the sample.

In the final model, stress had a positive correlation and social support had a negative correlation with the depression. These results replicate earlier findings that suggest that higher levels of stress and lower levels of social support are predictors of depression (32,33). The associations between the demographic variables and depression each decreased from model one to model two, indicating that the role of sex, age, education, income, and employment status in predicting depression is decreased when stress level and amount of social support are taken into account. In the second model, of the demographic predictors, age was the only significant predictor, and the negative correlation coefficient of this variable indicates that older participants reported lower levels of depression.

Overall, the results support a model in which psychosocial variables have a significant relationship with depression in an urban-living population with a chronic health issue. The lifetime risk for major depression varies from 10–25% for women and from 5–12% for men (34), and the rate among individuals with hypertension is even higher than that of the general population (35). Some studies have suggested that depression may increase vascular causes of death among individuals with hypertension (36), indicating that screening for and treating depression in hypertensive individuals are clinically important procedures. Wells (37) suggested that recognizing the contributions of depression to major causes of death, such as cardiovascular disease, stresses the social importance of depression. Additional research, suggests that the increased prevalence of depression among individuals with hypertension may contribute to a less healthy lifestyle, through the influence of habits commonly associated with depression (alcohol consumption, decreased exercise, poor food choices), or mismanagement of hypertension, such as reduced compliance rates and cooperation with treatment regimens (38).

The identification of stress (18) and social support (17) as significant correlates of depression among hypertensive individuals supports previous findings and suggests that these psychosocial variables may be important areas of focus in prevention and intervention with depressed individuals with hypertension. As high blood pressure has been identified as a risk factor for a variety of serious medical conditions such as stroke, congestive heart failure, and myocardial infarction (39), and depression may increase mortality among these individuals (36), identifying factors associated with depression in this population becomes an important focus of research.

The current study was not without limitations. A potential limitation concerns measurement; the variables of social support and stress were measured by 6 and 4 items respectively, which may have restricted the range of possible responses. Using a brief format to measure these constructs, despite the potential limitation, may offer clinical utility as it could provide clinicians with a time efficient manner of screening for signs of stress and level of social support in their clients. Additionally, rates of unemployment may have been skewed due to the proportion of the sample who were at or approaching the typical age of retirement. Also, studies have identified the young cohort of persons in their twenties as being at risk for hypertension. Our sample ranged in age from 30 to 88 years, eliminating the possibility of including this age group in our analyses. Future work in this area may focus on the development of prevention and intervention programs that screen for depression and take into account levels of stress and social support. At present, longitudinal research is being conducted as part of the original grant supporting this research to investigate what happens to BP and related lifestyle behaviors over time in relation to a telemonitoring intervention. Studying the roles of psychosocial variables on depression among hypertensive samples of differing ethnicities would be of further benefit.

The current study adds to the knowledge base involving the factors that contribute to the wellbeing of African Americans with hypertension. Specifically, depression is associated with hypertension at a rate that warrants concern (8), and each illness can have negative reciprocal effects on the other. Therefore, learning more about this relationship is imperative to attempts aimed at improving the mental and physical health of hypertensive African Americans. Findings from the first regression model that included only demographic variables provide evidence supporting past research (12) showing that being female and being younger in age are predictive of the development of depression among hypertensive African Americans. The second model adds to the existing literature on the influence of demographic factors by examining the psychosocial factors of stress and social support. Results suggest that being younger remains a significant predictor, and that both stress and level of social support are significant predictors of depression in the current sample. Interestingly, the impact of social support and stress reduced the predictive value of being female to non-significance, perhaps because women may be particularly vulnerable to stress and responsive to social support.

The current findings indicate that prevention and intervention programs should include strategies for stress management and increasing levels of social support. For example, a potential outreach program could target the negative impact of stress by teaching coping strategies for effectively managing stress such as training in relaxation techniques or organizational skills for managing daily hassles. In order to enhance a sense of social support, such an intervention program could be delivered in a group format and could be offered in a community setting such as a church or recreational center.

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TABLE 1
Means, Standard Deviations, and Zero-order Correlations for Variables Included in Regression Analyses (N = 194)

Variable	Mean	SD	1	2	3	4	5	6	7
<i>Dependent variable</i>									
1. Depression	8.68	11.47							
<i>Demographic variables</i>									
2. Sex (female = 1, male = 2)	1.34	0.48	-.13*						
3. Age	58.28	12.17	-.30***	-.11					
4. Education	15.74	16.35	.06	.15*	.02				
5. Income (1–8)	3.36	1.84	-.20**	-.06	.17**	-.05			
6. Employment Status (1 = employed, 2 = unemployed)	1.72	0.45	.04	.01	.35***	.09	-.20**		
<i>Psychosocial variables</i>									
7. Stress	8.08	3.47	.62***	-.18**	-.27***	.06	-.23**	.00	
8. Social Support	24.23	5.88	-.39***	.01	.07	.03	.13*	-.04	-.27***

* $p < .05$,

** $p < .01$,

*** $p < .001$ (two-tailed tests)

TABLE 2

Hierarchical OLS Regression Models of the Effects of Psychosocial Factors on Reported Depression Symptomatology in a Hypertensive Population of African

Americans (N = 194) (Note: Numbers in parentheses represent standardized coefficients)		
	Model 1	Model 2
<i>Demographics variables</i>		
Sex (female = 1, male = 2)	-4.57 (1.64) **	-1.71 (1.35)
Age	-0.33 (0.07) ***	-0.18 (0.06) **
Education	0.05 (0.05)	0.03 (0.04)
Income	-0.73 (0.44)	-0.03 (0.36)
Employment Status (1 = employed, 2 = unemployed)	3.38 (1.90)	2.29 (1.52)
Change in R ² (step 1)	0.16	
F-change	7.27 ***	
<i>Psychosocial variables</i>		
Stress		1.62 (.20) ***
Social Support		-0.46 ***
(0.11)		
Change in R ² (step 2)		.47
F-change		23.71 ***
Constant	29.81 (5.04) ***	15.30 (5.89) *
Adjusted R ²	.14	.45

*
p < .05,

**
p < .01,

p < .001