Resilience in African American Women at Risk for Cardiovascular Disease: an Exploratory Study

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Abstract African Americans (AAs) have a higher risk for cardiovascular disease (CVD) which is not fully explained by traditional CVD risk factors such as smoking, obesity, hypertension, and diabetes. Evidence demonstrates that chronic stress, low subjective status, and lack of social support play important roles in increasing the risk for CVD, particularly in minority women. Increasing evidence demonstrates that resilience may ameliorate the effect of social stressors on the development of CVD. However, little is known about the social context that may influence resilience in AA women. Therefore, the purpose of this exploratory study was to examine the predictors of resilience in AA women at risk for CVD. A cross-sectional sample of AA women ($N = 104$) participated in the study. Participants completed measures of resilience, subjective social status, social support, and general stress. Findings revealed that participants had low levels of resilience as measured by the Connor–Davidson Resilience Scale (mean = 50.3 ± 11.4) compared to norms. Results of the multiple linear regression analysis demonstrated that both subjective social status in relation to others in the USA ($p = 0.021$) and perceived social support ($p < 0.001$) predicted greater level of resilience. The model, controlling for age, marital status, income, level of education, and general stress, accounted for a significant proportion of variance ($F[8,75] = 6.6, p < .001$),

explaining 41.7% of the variation in resilience. Results suggest that subjective social status and social support contribute to perceived resilience in AA women. Additional research is needed to assess the association of subjective social status and social support in longitudinal studies.

Keywords Resilience · Subjective social status · African American · Women · Cardiovascular disease · Social support

Background

Cardiovascular disease (CVD) is the leading cause of mortality in the USA [1] and exacts a disproportionate toll on minorities [2]. For example, the death rate for African Americans (AAs) is 37% higher than that for Whites and the risk for having a first-time stroke is almost two times greater for AAs than for Whites [2]. Cardiovascular health disparities emerge by middle age, exist across all socioeconomic levels, and are not fully explained by traditional risk factors such as smoking, obesity, hypertension, and diabetes [3, 4]. Evidence demonstrates that chronic stress [5, 6], low subjective social status [7, 8], and lack of social support [9] play important roles in increasing risk for inflammatory-related diseases, such as CVD, particularly among minorities. Yet, a substantial number of individuals, exposed to chronic stress and adverse social conditions do not develop CVD, and are considered resilient. Resilience is the ability to adapt successfully or thrive in

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the face of stress and adversity [10]. The American Psychological Association (APA), *Road to Resilience*, conceptualizes resilience as “the process of adapting well to adversity, trauma, tragedy, threats or significant sources of stress” [11]. In contrast to focusing on the adaptive process to life circumstances, others conceptualize resilience in terms of individual characteristics or qualities that contribute to resilience. In that vein, Connor and Davidson state, “resilience embodies the personal qualities that enable one to thrive in the face of adversity” [10]. Although resilience can be a function of objective factors, such as one’s income and level of education, it also has subjective dimensions, which include a person’s perception and self-confidence in their capacity to handle events in their lives.

Increasing evidence suggests that resilience can ameliorate the effect of social stressors on the development of CVD [12]. For example, a recent study of both men and women demonstrated that higher levels of resilience were associated with lower total cholesterol to high-density lipoprotein (HDL) ratios, a well-recognized risk factor for CVD [12]. Despite evidence that resilience is important in reducing the risk for CVD, little is known about factors that foster resilience, particularly in AA women. Contextual factors may moderate resilience, influencing the response to social adversity and disease risk. It is possible that social support may buffer the negative impact of social stress and adversity related to low economic status by cultivating resilience. Therefore, the purpose of this exploratory study was to examine the predictors of resilience in AA women at risk for CVD. Understanding the contexts that enhance or weaken resilience in AA women will advance understanding of individual differences in the relationship between social adversity and CVD risk. This understanding can guide novel interventions to enhance resilience, promote adaptation to stress, and, ultimately, reduce disparities in CVD [13].

Methods

Participants and Procedures

This was a cross-sectional, correlational study, which utilized baseline data from 104 participants from two studies: one study examining response to an acute laboratory stressor [14] and another study evaluating the feasibility of an intervention to reduce stress in AA women. Participants were recruited from a Midwestern community via

recruitment flyers, media announcements, and letters. Eligibility included being an AA female between the ages of 50 and 75 with at least two risk factors for CVD (i.e., body mass index > 25, total cholesterol > 240, diabetes mellitus diagnosis, systolic blood pressure > 120 and/or diagnosis of hypertension or taking antihypertensive medication, atrial fibrillation diagnosis, and parental history of myocardial infarction (MI) prior to the age of 60). Women were excluded from the study if they reported a history of MI, heart disease, left ventricular hypertrophy, or ischemic stroke, or currently had a systolic blood pressure ≥ 175 mmHg, and/or resting heart rate ≥ 120 beats per minute. The study was approved by the sponsoring institution Institutional Review Board (IRB) and all participants provided informed consent prior to beginning the study. Following informed consent, participants completed a written questionnaire booklet. Gift cards were provided at the completion of data collection.

Measures

Resilience The Connor–Davidson Resilience Scale 25 (CD-RISC-25) [10] was used to measure resilience. The CD-RISC-25 is a 25-item questionnaire that examines the extent to which statements representing resilience, such as “I am able to adapt when changes occur,” are true for the subject [10]. Scores range from 0 to 100 with higher scores representing greater levels of resilience. The CD-RISC-25 has good reliability with a reported Cronbach’s alpha of 0.89 in a sample of women [15]. Internal consistency was strong in the present sample (alpha = 0.91).

Subjective Social Status The MacArthur Scale of Subjective Social Status was used to measure subjective socioeconomic status (SSS) [16]. This scale consists of two drawings of 10-rung ladders: one representing social status or standing in one’s community (SSS-community) and the other representing social standing in the United States (US) (SSS-US). Subjects were asked to place an “X” on the rung of the ladder on which they feel they stand in relationship to other people in their community. Scores range from 1 to 10, with 1 being the lowest and 10 being the highest perceived status. Researchers have used this instrument in a variety of populations, including AA women, and it has demonstrated acceptable construct validity and test–retest reliability [17].

Perceived Social Support The Social Provisions Scale is a 24-item instrument that measures attachment, social

integration, reassurance of worth, reliable alliance, guidance, and opportunity for nurturance [18]. Respondents rate the degree to which their social relationships support their social needs on a 4-point scale with 1 being strongly disagree to 4 being strongly agree. Total score ranges from 24 to 96 with higher scores indicating higher level of social support. Reliability was excellent in the present sample with a Cronbach alpha = 0.93.

General Stress General stress was measured using the general stress subscale of the Chronic Stress Questionnaire (CSQ) [19]. The subscale includes three items in which respondents rated the extent to which they experience stressful experiences. Scores range from 3 to 9 with higher scores indicating greater levels of general stress.

Demographics and Socioeconomic Status Demographic and socioeconomic status, such as age, education level, and household income, were collected using a form developed by the investigator.

Data Analysis

Data were analyzed with SPSS 24.0 (SPSS Inc., Chicago, IL) software package. Prior to the statistical analysis, the descriptive summary statistics for all outcome and predictor variables were evaluated for normality, linearity, homoscedasticity, homogeneity, and multicollinearity. No transformations were necessary and raw values were used in statistical analysis. Pearson's correlation coefficient (r) and Kendall's Tau-b (T_b) were computed to explore associations between variables. Multiple linear regression analysis was used to determine the effects of subjective social status (community and US) and perceived social support on resilience. All analyses controlled for age, education (yes/no at least high school), marital status (yes/no), household income (greater/lower than \$50K/per year), and general stress. Sample size was appropriate for the analysis with post hoc power analysis demonstrating 75% power.

Results

Descriptive Characteristics of Participants

Demographic characteristics of the sample are presented in Table 1. One hundred and four participants completed the written questionnaires and were on average

Table 1 Demographic characteristics ($N = 104$) and descriptive summary statistics

Variable	Mean (SD)/or percent
Age	59.8 (6.3)
Household Income	
$\leq \$50,000$	56%
$> \$50,000$	39%
Education	
HS or less	12%
More than HS	88%
Marital status	
Married/partnered	33.7%
Not married or partnered	66.3%
Connor–Davidson Resilience Scale	50.33 (11.37)
Mac Arthur SSS-US	5.50 (2.04)
Mac Arthur SSS-community	6.72 (1.90)
Social Provisions Scale	78.74 (12.36)
General stress	5.19 (1.57)

59.3 years of age ($SD = 6.3$) with approximately half reporting an annual household income of less than \$50,000. The majority (88%) of participants had completed at least some college or trade school and 33.7% were married or in a significant relationship.

Overall, participants reported low levels of resilience ($mean = 50.3 \pm 11.4$) as compared to a US population mean of 80.7 [10]. Participants rated themselves in the middle of the MacArthur Subjective Social Status ladders (ranging from 0 to 10 with 10 representing the highest level of subjective social status) in comparing their social status with others in the US ($mean = 5.5 \pm 2.0$) and their community ($mean = 6.7 \pm 1.9$). Furthermore, participants reported a mean of 78.7 ± 12.4 for social support which is similar to published norms for AAs ($mean = 75.9 \pm 9.7$) [18]. Level of general stress was considered average with a mean of 5.2 ± 1.6 .

Associations among Study Variables

Controlling for age and general stress, resilience was associated with subjective social status as compared to other individuals in the US ($r = 0.36$, $p = .000$) and social support ($r = 0.47$, $p = 0.000$). In addition, the SSS-US score was associated with social support ($r = 0.27$, $p = 0.012$). The SSS-US score and SSS-community score were correlated with one another ($r = 0.44$, $p = 0.000$).

Initial correlation analysis revealed that higher level of education was associated with more household

income ($\tau_b = 0.33$, $p = 0.000$), greater subjective social status in relation to others in the US ($\tau_b = 0.21$, $p = 0.010$), and greater resilience ($\tau_b = 0.24$, $p = 0.003$). In addition, greater income was significantly associated with higher perceived social support ($\tau_b = 0.28$, $p = 0.020$). Income was not related to age, subjective social status, or resilience. Older age was associated with less perceived social support ($r = -0.27$, $p = 0.011$). The two subscales of the subjective social status were significantly associated ($r = .44$, $p = 0.000$) and greater perceived social support was associated with greater subjective social status in relation to others in the US ($r = 0.23$, $p = 0.034$), but not in relation to others in the community. General stress was not associated with any variables.

Predictors of Subjective Social Status and Perceived Social Support on Resilience

As shown in Table 2, results of the multiple linear regression analysis revealed that both subjective social status in relation to others in the US ($p = 0.021$) and perceived social support ($p < 0.001$) predicted greater level of resilience. That is, those reporting higher subjective social status and higher perceived social support had higher resilience. However, subjective social status in relation to the community that participants live in was not a significant predictor ($p = 0.529$) of resilience. The model accounted for a significant proportion of variance ($p < 0.001$), explaining 41.7% of the variation in resilience. The regression model controlled for age, marital status, income and level of education, and general stress.

Greater level of education was significantly ($p = 0.003$) associated with higher resilience, but neither age nor marital status was associated with resilience.

Discussion

Results revealed that greater subjective social status with respect to US and greater social support were associated with greater level of resilience in the sample of AA women. In contrast, perception of social status within the community was not a predictor of resilience.

Participants in this study rated their subjective social status in relation to others within their community and the US as lower than reported by AAs in other studies [20, 21]. For example, in a study of AA women, participants reported a mean SSS-community score of 7.9 ± 2.0 vs. 6.7 ± 1.9 [20]. Differences in household income and educational level may account for the lower SSS-community and SSS-US scores found in the current study. Notably, the SSS-US score but not the SSS-community score predicted resilience, although the scores were correlated with one another. Although no studies were found that considered both the SSS-community and SSS-US scores in relation to resilience, this finding is consistent with other studies in which the SSS-US score but not the SSS-community score is associated with health behaviors [21, 22]. It has been suggested that the differences between the SSS-community scores and SSS-US scores are because respondents tend to consider more objective factors, such as socioeconomic status and income, when considering

Table 2 Summary of the results of the regression analysis for variables predicting resilience

Predictor variables	Unstandardized coefficients	SE	Standardized coefficient	<i>t</i> -value	<i>p</i> value
Mac Arthur SSS-US	1.479	0.628	0.248	2.353	<i>0.021</i>
Mac Arthur SSS-community	0.371	0.616	0.060	0.602	0.549
Social Provisions Scale Total Score	0.399	0.103	0.406	3.885	<i>0.000</i>
Age (years)	-0.023	0.199	-0.012	-0.116	0.908
Marital status (married or partnered)	1.685	2.543	0.065	0.663	0.510
Income (> \$50 K)	0.007	0.005	0.136	1.425	0.158
Education (more than HS)	11.173	3.654	0.284	3.058	<i>0.003</i>
General stress	0.206	0.744	0.026	0.277	0.783
<i>F</i> -value	6.606 (8.75)				<i>0.000</i>
<i>R</i> ²	0.417				

MacArthur SSS-US, subjective social status relative to US population; *MacArthur SSS-community*, subjective social status relative to community population
Significant *p* values (<.05) are in italics

their social status in comparison to others in the US. In contrast, an individual's roles in the community may be more important when considering the SSS-community ladder [21].

Participants in this study reported similar levels of social support as compared to other studies of AA women [23]. Furthermore, women with higher levels of social support reported greater levels of resilience. Greater social support may reflect greater resources to provide economic and emotional support, and hence, enhance a person's perception of their resilience. Our findings are consistent with other studies that show greater perception of social support can positively impact resilience [24]. For example, Brown [25] found that the perception of social support predicts resilience in AAs, accounting for the largest amount of variance in resiliency scores.

Psychological stress was not a predictor of resilience. Previous research has demonstrated that cumulative stressors may deplete one's capacity to effectively cope with stress [26]. However, researchers have suggested that moderate levels of stress may strengthen resilience, particularly if associated with self-reflection practices [27]. That is, individuals who are able to reflect on their stressful experiences, may be able to cope more effectively and ultimately build resilience to future stressors [27]. It is suggested that future research consider the coping mechanism of self-reflection as a moderator of resilience.

Implications

Resilience is multidimensional in that it is characterized by not only psychological characteristics but also biological characteristics, which together contribute to a resilient profile versus a stress vulnerable profile [28]. It is possible, therefore, that enhancing resilience may modify those biological factors that mediate disease linked to stress and adversity, such as CVD [29]. Of note, evidence demonstrates higher resilience associates with reduced activation of stress response systems, reducing the production of stress hormones, which can predispose to CVD [30]. There is also evidence for a bidirectional pathway linking resilience to immune function, with higher resilience associating with lower production of inflammatory mediators from immune cells [31]. Moreover, characteristics of resilient individuals associate with greater parasympathetic drive, as compared to sympathetic drive, and evidence links resilience to more effective physiological responses during stress exposure [28]. Collectively, the biologic

profile characteristic of resilient individuals would lower stress reactivity and, in turn, reduce risk for CVD.

Resilience is not a trait. Rather, it involves behaviors, thoughts, and actions that can be learned and developed [11]. This has important implications in that understanding factors that promote resilience can inform clinicians how to better assess resilience and design effective strategies to build resilience and improve health. This is particularly important for individuals burdened by social stressors, increasing their risk for CVD. Furthermore, our findings suggest that AA women with lower educational levels had lower levels of resilience suggesting that it may be important to target these women for interventions to strengthen resilience.

Our study has several important limitations. The present study measured resilience at one point in time, limiting understanding of the dynamical nature of resilience over time and context [32]. Longitudinal studies are needed to provide knowledge of factors that predict resilience over time and varying circumstances. It is also important to note that resilience is a complex construct, in that it encompasses a number of interacting biological, psychological, social, and cultural factors, which together determine one's ability to respond to stressful circumstances [33], emphasizing the need for more comprehensive assessment of predictors. Lastly, this study used a correlational design, precluding inferences as to the direction of causality. Despite these limitations, findings from this study contribute to a better understanding of the factors associated with resilience in AA women and may support not only comprehensive assessment of risk factors, such as subjective social status, but also the development of novel interventions to enhance resilience in this population, thereby decreasing the risk of CVD.

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