High-Effort Coping and Cardiovascular Disease among Women: A Systematic Review of the John Henryism Hypothesis

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Abstract African-American women living in the United States experience higher cardiovascular disease risk (CVD) mortality compared to White women. Unique mechanisms, including prolonged high-effort coping in the face of discriminatory stressors might contribute to these racial disparities. The John Henryism hypothesis is a conceptual framework used to explain poor health outcomes observed among individuals with low resources who repeatedly utilize active coping to overcome barriers. The aims of our study were to summarize the literature related to John Henryism and CVD-related factors with a particular focus on women and to identify gaps for areas of future inquiry. We searched MEDLINE, EMBASE, Scopus, and CINAHL to identify literature that used the John Henryism Active Coping scale. Reviewers independently reviewed eligible full-text study articles and conducted data extraction.

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We qualitatively summarized the literature related to John Henryism and cardiovascular disease (CVD)-related health behaviors (e.g., smoking or physical activity) and risk factors (e.g., hypertension) with a focus on study populations inclusive of women. Our review included 21 studies that used the John Henryism Active Coping scale, of which 10 explicitly reported on the interaction between John Henryism and socioeconomic status (SES) and CVD-related factors. With respect to the original hypothesis, three studies reported results in line with the hypothesis, four were null, and three reported findings in opposition to the hypothesis. The remaining studies included in the review examined the main effects of John Henryism, with similarly mixed results. The literature related to the interaction between John Henryism and SES on CVD-related factors among women is mixed. Additional studies of John Henryism that incorporate biological measures, varied indicators of resources, and larger study populations may illuminate the relationship between coping and deleterious health outcomes among women.

Keywords Stress · Coping · Discrimination · Socioeconomic status · Cardiovascular disease

Introduction

Despite overall declines in cardiovascular disease (CVD) mortality in the United States (U.S.), the burden is unequally distributed according to sex and race/ethnicity [1]. In particular, declines in CVD mortality

among U.S. women have lagged behind men [2]. Biological sex differences, including differences in gene expression of the sex chromosomes combined with the influence of sex hormones, certainly contribute to these patterns; however, gender differences in psychosocial risk factors, including stress, depression, anxiety, and social integration also contribute to sex-specific CVD disparities [2]. Further, wide disparities in the CVD burden exist among women of different racial/ethnic groups. Of particular concern is the rapid increase in CVD incidence among U.S. African-American women. In 2015, the age-adjusted CVD mortality was 239.9 per 100,000 among African-American women compared to 185.1 per 100,000 among White women [3]. Differences in the prevalence of traditional CVD risk factors, including hypertension, diabetes, and overweight and obesity, certainly contribute to these mortality differences [4]. However, the role of non-traditional factors, such as discrimination and racism, and the mechanisms used to cope with these threats are also hypothesized to contribute to racial differences in CVD mortality [5]. As discussed by Woods-Giscombe and Lobel [6], African-American women face multiple dimensions of stress because of their dual minority status. In response, African-American women have developed mechanisms to cope with these stressors; however, these coping mechanisms may act both as an asset or vulnerability.

One such coping mechanism, John Henryism, posits that there are adverse health consequences for individuals with inadequate resources, who engage in repeated, high-effort coping to overcome stressors and obstacles. This hypothesis, partly inspired by the fabled steel-driver John Henry, was developed and operationalized into a scale in 1983 by James, Hartnett, and Kalsbeek [7]. Known for his strength in steel-driving, John Henry challenged a railroad owner to a competition of man vs. a newly invented steam-powered drill in order to protect the jobs of African-American men that would surely be replaced by this machine. Shortly after defeating the steam-powered drill, Henry died of exhaustion. This fable represents a powerful allegory for low-resourced individuals, like many African-Americans, living in the U.S. Namely, high-effort coping to confront obstacles to upward mobility could accelerate the aging process and result in poor health outcomes. At the crux of the John Henryism hypothesis is the interaction of chronic high-effort coping in the setting of inadequate resources, typically quantified by socioeconomic status (SES).

Although recent studies have begun to examine the John Henryism hypothesis in relation to a number of health outcomes, the initial work conducted by James and colleagues centered on hypertension, an important CVD risk factor that is more prevalent among African-American Americans than Whites [8]. The extent to which John Henryism active coping contributes to poor CVD outcomes among African-American women is an understudied area of research.

We conducted this literature review to summarize the literature on John Henryism as it relates to CVD-related health behaviors (e.g., smoking, physical activity) and risk factors (e.g., hypertension or metabolic syndrome) among female populations. Our purposes were three-fold: first, we sought to better understand the relationship between high-effort coping and CVD-related factors among women and how these associations differ by race. Second, when study populations were inclusive of men and women, we compared sex-specific John Henryism associations to illuminate shared and disparate patterns. Third, we strove to highlight gaps that should be addressed in future research among African-American women. A deeper exploration of non-traditional factors that contribute to disparate health outcomes could allow for the development of more personalized interventions that identify coping strategies associated with the most favorable outcomes.

Methods

Search Strategy and Selection Criteria

Using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines [9], we conducted a systematic review of studies that implemented the John Henryism Active Coping scale. We conducted searches within MEDLINE, EMBASE, Scopus, and CINAHL databases. Our primary search employed the keywords “John Henryism.” We intentionally kept our search strategy broad to capture all relevant literature that examined this construct. We also inspected bibliographies of relevant papers to identify publications. Of note, we identified a literature review published in 2004 that focused on: (1) the conceptual basis of John Henryism and (2) all studies examining John Henryism published up until 2004 [10]. Our review is unique in that we specifically focused on populations that included women and considered

relationships between John Henryism, hypertension, and CVD-related factors, with inclusion of studies published up until July 31, 2018.

John Henryism Active Coping Scale

The John Henryism Active Coping scale is a 12-item scale that measures the behavioral predisposition to cope actively and persistently with difficult psychosocial stressors and barriers [11]. Participants rate each of the 12 items using a Likert scale ranging from 1 (completely false) to 5 (completely true) and a summary score is calculated by summing-up the 12 items. The scale ranges between 12 and 60, with higher scores corresponding to higher levels of John Henryism, i.e., a greater proclivity to engage in high-effort coping. Typically, the John Henryism Active Coping score is dichotomized as low vs. high based on the median of the distribution in the study populations [7, 12, 13].

Study Selection, Data Extraction, and Quality Assessment

Two reviewers (RS and ASF) screened each study independently by title and abstract based on the predefined eligibility criteria. Full texts of eligible studies were reviewed independently by two reviewers (RS and JR) for data extraction. Extracted information included author, year of publication, study population (i.e., mean age or age range, sex, and ethnicity), sample size, geographical location, health outcome(s) examined, the measure of SES, and primary findings among women and men. Disagreements in study eligibility, data extraction, and quality assessment were resolved by consensus between the reviewers. Finally, two team members (ASF and KPW) reviewed all data to ensure accuracy before analysis.

Results

We identified 254 references (62 in Medline, 82 in Scopus, 71 in EMBASE, and 39 in CINAHL). Following removal of 156 duplicates, we screened titles and abstracts of 98 unique studies. After reviewing titles and abstracts, 76 articles were retrieved in full (eight studies only had abstracts available). In this phase, we excluded studies that

did not utilize the John Henryism Active Coping Scale ($n = 2$); commentaries, review papers, and book chapters ($n = 10$); studies that did not focus on hypertension, blood pressure, or CVD-related health outcomes or behaviors ($n = 19$); and studies that did not include women ($n = 2$) or did not report estimates separately for men and women ($n = 22$). Ultimately, 21 studies were eligible and included in this review [14–34] (Fig. 1). All included studies were cross-sectional, measuring John Henryism, health behaviors, and health outcomes at one point in time [35].

Tables 1 and 2 summarize the 21 studies that fit the eligibility criteria for this review. These 21 studies were published over the span of 25 years and included study populations ranging between the ages of 17 and 95. Seventeen studies were conducted in various geographical areas of the U.S. [15–17, 19–25, 27, 29–34], while four international study populations were included [one Nigerian [18] and three Dutch [14, 26, 28] studies]. Seven studies included multiracial samples of women [16, 17, 21, 24, 29, 32, 34], three of which presented sex-specific results according to race [17, 24, 32]. Eight studies were conducted among women only [21, 24, 26, 29–33].

As previously discussed, the central tenant of the John Henryism hypothesis is the interaction between high-effort coping and SES, as variously defined by participant education, income, occupation, parental education or income, or childhood SES. Among the included studies, 10 explicitly examined the interaction between SES and John Henryism on blood pressure/hypertension prevalence [14–19, 22, 30], nicotine dependence [20], cardiorespiratory fitness [21], or metabolic syndrome [23] in study populations inclusive of women (Table 1). Of these, three reported associations in the direction predicted by the John Henryism hypothesis [19, 21, 23]. Fernander et al. [19] measured education, income, and John Henryism among 55 middle-aged African-American women and 69 African-American men living in an urban Florida area and reported that the combination of high John Henryism and low education was associated with higher blood pressure among African-American women. Interestingly, among African-American men, higher mean blood pressure was observed when John Henryism and education were both high, in contrast with the John Henryism hypothesis. Merritt and colleagues [21] examined estimated functional aerobic capacity

Fig. 1 Identification, review, and selection of studies included in the systematic review.

(i.e., cardiorespiratory fitness) among 201 mostly White female college students and reported lower cardiorespiratory fitness among women with high John Henryism and low SES, the latter denoted by father's education. Finally, in a study of 391 African-American children 11 years of age at study entry, Brody and colleagues [23] assessed John Henryism and metabolic syndrome status approximately 14 years later, when the youths reached aged 25. Using a measure of family socioeconomic disadvantage as the indicator of SES, the authors reported a three times higher odds of metabolic syndrome among women with high John Henryism and high family socioeconomic disadvantage compared to individuals with similar levels of John

Henryism living in low disadvantaged families. Results were similar for men.

The other seven studies that explicitly tested the John Henryism by SES interaction reported observations that deviated from the original hypothesis. Four studies reported null associations among women, including a Dutch study of 100 women, in which Duijkers and colleagues [14] reported no difference in mean blood pressure for the subgroups of women categorized by John Henryism and education; however, the hypothesis was supported among 100 Dutch men. In their cross-sectional study of 431 African-American women and 222 African-American men, Wiist and Flack [15] reported no association between SES as measured by education or job status and hypertension prevalence

Table 1 Summary of studies that explicitly examined the John Henryism by socioeconomic status hypothesis in relation to cardiovascular-related behaviors or outcomes ($n = 10$).

Study	Study population	Location	SES measure	Finding among women	Finding among men
Duijkers et al. (1988) [13]	100 white women (20–59 years), 100 white men (20–59 years)	Netherlands	Education	No association between John Henryism*SES and blood pressure (deviate)	High John Henryism and low SES associated with higher blood pressure (expected)
Wiist and Flack (1992) [14]	431 African-American women, 222 African-American men (mean age = 47)	Oklahoma city	Education and job status	No association between John Henryism*SES and hypertension prevalence (deviate)	No association between John Henryism*SES and hypertension prevalence (deviate)
Light et al. (1995) [15]	36 African-American women, 35 white women, 32 African-American men, 40 white men	North Carolina	Job status	High John Henryism and high SES associated with higher blood pressure (deviate)	No association between John Henryism*SES and blood pressure (deviate)
McKetney and Ragland (1996) [16]	1480 African-American women (18–30 years), 1307 white women (18–30 years), 1156 African-American men (18–30 years), 1171 white men (18–30 years)	Various US cities	Education	No association between John Henryism*SES and blood pressure among African-American or white women (deviate)	No association between John Henryism*SES and blood pressure among African-American or white men (deviate)
Markovic et al. (1997) [17]	403 Nigerian men and 255 women, 20–65 years	Nigeria	Civil servant job grades and education	No association between John Henryism*SES and blood pressure (deviate)	High John Henryism and high SES associated with higher blood pressure (deviate)
Femander et al. (2004) [18]	55 African-American women (mean age 36.6), 69 African-American men (mean age 34.8)	Florida	Education, income	High John Henryism and low SES associated with higher blood pressure (expected)	High John Henryism and high SES associated with higher blood pressure (deviate)
Femander et al. (2005) [19]	72 African-American women and 74 African-American men (mean age = 47.6)	Minnesota	Education	Low John Henryism and low education associated with higher nicotine dependence (deviate)	Low John Henryism and low SES associated with higher nicotine dependence (deviate)
Merritt et al. (2012) [20]	168 white women, 13 African-American women, 7 Hispanic women, 2 Asian women, and 11 women with other ethnicity (mean age overall = 21.6)	Midwestern US university	Father's education	High John Henryism and low SES associated with worse cardiorespiratory fitness (expected)	–
Subramanyam et al. (2013) [21]	1516 African-American men and 2462 African-American women, 21–95 years	Mississippi	Education, income, occupation, childhood SES	Low John Henryism and low SES associated with higher prevalence of hypertension (deviate)	High John Henryism and low SES associated with higher prevalence of hypertension (expected)
Brody et al. (2018) [22]	391 African-American children (mean age at entry = 11.2) followed until mean age = 25	U.S.	Income, caregiver employment, caregiver education, caregiver relationship status, +others	High John Henryism and low SES was associated with metabolic syndrome (expected)	High John Henryism and low SES was associated with metabolic syndrome (expected)

Table 2 Summary of studies that examined the main effect of John Henryism in relation to cardiovascular-related behaviors or outcomes ($n = 11$).

Study	Study population	Location	SES measure	Finding among women	Finding among men
Bild et al. (1993) [23]	1409 African-American women (mean age = 24), 1250 white women (mean age = 25)	Various US cities	Economic status	High John Henryism was associated with higher physical activity levels among white but not African-American women	–
Jackson et al. (1994) [24]	421 African-American men and women, mean age 18 years	Pennsylvania, Massachusetts, Georgia	None	The main effect of John Henryism was not associated with blood pressure	The main effect of John Henryism was not associated with blood pressure
Nordby et al. (1995) [25]	47 women (29 hypertensive and 18 normotensive), mean age ~44 years	Oslo, Norway	None	John Henryism was not significantly different between hypertensive and normotensive women	–
Dressler et al. (1998) [26]	366 African-American women (mean age 45.8), 234 African-American men (mean age 43.1)	Southern US community	Education	The main effect of John Henryism was inversely associated with blood pressure	The main effect of John Henryism associated with increased blood pressure
Van Loon et al. (2001) [27]	1431 women (mean age 41.5), 1083 men (mean age 42.6)	The Netherlands	None	John Henryism was associated with higher odds of smoking cessation	No association between John Henryism and CVD-related health behaviors
Williams and Lawler (2001) [28]	50 white women and 50 African-American women (mean age = 34.1)	U.S.	Income	No association between John Henryism and illness	–
Clark et al. (2001) [29]	39 African-American women (18–33 years)	Southeastern US university	Income	During a speech task, the greatest change in mean arterial blood pressure occurred among low anger-out/high John Henryism individuals	–
Clark et al. (2004) [30]	117 African-American women (17–56 years)	Midwestern US university	Income	The main effect of John Henryism was inversely associated with blood pressure	–
Merritt et al. (2011) [31]	30 African-American caregivers (mean = 58.17), 24 white caregivers (mean = 67.22), 48 African-American non-caregivers, 15 white non-caregivers	Cleveland	Education, income, employment	Higher John Henryism scores associated with flatter cortisol slopes among African-American but not white Alzheimer's caregivers	–
Barksdale et al. (2013) [32]	30 African-American women (26–51 years)	North Carolina	Income, education	No association between John Henryism, cortisol, or blood pressure	–
LeBron et al. (2015) [33]	351 men and 351 women (multi-ethnic) age 25+	Michigan	Education, income	The main effect of John Henryism was positively associated with blood pressure	The main effect of John Henryism was positively associated with blood pressure

according to John Henryism among men or women. However, in analyses adjusted for age, sex, and body mass index, those in the high John Henryism and low SES group had the highest prevalence of hypercholesterolemia (≥ 240 mg/dl) [15]. In the Coronary Artery Risk Development in Young Adults (CARDIA) study of adults aged 21–45 at study entry, McKetney and Ragland [17] reported null associations for the interaction between John Henryism and SES on blood pressure in all subgroups of participants. Similarly, in a study of 658 Nigerian civil servants, null associations were noted among the 255 women included; however, among 403 men, John Henryism was linked with higher blood pressure only among senior staff while blood pressure among junior staff men did not differ by John Henryism [18].

In addition to null observations, others have reported divergent findings from the original hypothesis. Fernander and colleagues [20] and Subramanyam et al. [22] reported a higher prevalence of nicotine dependence and hypertension, respectively, among individuals in the low John Henryism and low SES groups compared to other categories of John Henryism and SES. In a study of African-American and White women and men, Light et al. [16] reported higher blood pressure when John Henryism and job status were both high.

Table 2 shows the remaining 11 studies included in this review that did not examine the modifying effect of John Henryism. Rather, these studies examined the main effect of John Henryism on blood pressure/hypertension prevalence, cortisol levels, and illness among women in models adjusted for measure of SES. Of eight studies that examined the association between John Henryism and blood pressure, two reported an inverse association among women [27, 31], one reported higher mean arterial blood pressure changes after a speech task among women in the high John Henryism group [30], one reported a positive association between John Henryism and blood pressure [34], while four reported null associations [25, 26, 33].

John Henryism has been linked with positive health behaviors inversely associated with CVD. In the CARDIA study, Bild and colleagues [24] reported a positive association between John Henryism and physical activity among the 1250 White women but no association among the 1409 African-American women. Moreover, Van Loon et al. [28] reported an association between John Henryism and higher odds of smoking cessation among 1431 Dutch women but not among men. No

significant association between John Henryism and cortisol, a glucocorticoid responsible for maintenance of normal body function during stressful and non-stressful events, was observed in a small study of 30 African-American women [33].

Discussion

We undertook the current review to assess the extent to which the John Henryism active coping style contributes to the disparate CVD outcomes experienced by African-American as compared with U.S. White women. Overall, the literature related to John Henryism, SES, and CVD-related factors among women is mixed. In opposition to work conducted by the architects of the hypothesis [7, 12, 13], most studies suggest that among women, the combination of high John Henryism and low SES does not result in higher blood pressure levels or worse CVD-related factors compared to those with high John Henryism and high SES. In addition, few studies explicitly reported on John Henryism associations according to sex and race; among those that did, there was no consensus on whether the health effects of this coping pattern vary for women of different races. As such, additional research is needed to understand how African-American women experience and respond to the stressful environments in which they live and the potential health consequences.

The John Henryism hypothesis asserts that individuals with lower economic resources who strongly endorse the idea that anything can be achieved with hard work are at a higher risk of adverse health compared to individuals with similar beliefs who possess the resources to buffer active coping effects [7]. Although evocative of working class men, James, Hartnett and Kalsbeek [7] emphasize that John Henryism can apply to individuals of any race or sex. Apart from three studies that reported results in agreement with the hypothesis [19, 21, 23], the bulk of the literature reported null relationships or observations that diverged from the original hypothesis. With the exception of studies conducted in CARDIA [17, 24] and the Jackson Heart Study [22], the literature thus far has included small sample sizes of women, which may contribute to the null associations that have been observed. Further, although some studies included women of different racial groups, stratification by race was not typically conducted. The extent to which John Henryism coping and

availability of resources impacts health among women may differ by race. As such, the analysis of active coping among women as one homogenous group may obscure race-specific relationships and contribute to the pattern of null observations.

In study populations that were inclusive of men and women, associations of the John Henryism and SES interaction were also inconsistent among men. For example, in the Jackson Heart Study, support for a relationship between high John Henryism/low SES and greater hypertension prevalence was observed when income was the measure of SES used; however, no other SES indicator produced similar results [22]. On the other hand, analyses conducted in CARDIA [17] revealed no association of the combination of John Henryism and SES on blood pressure levels. Similarly, studies including smaller numbers of male participants reported findings that digress from the original hypothesis [15, 16, 18–20].

A large portion of the literature included in this review did not evaluate the combination of John Henryism and SES as intended by the original framework; instead, associations between the main effect of John Henryism and health were examined. This literature also presents a mixed picture of the role of John Henryism on health. Some demonstrate that high-effort coping in and of itself is related to positive health behaviors among women, including smoking cessation and physical activity. However, a majority of studies revealed no link between high-effort coping and blood pressure levels. The independent relationship between John Henryism and health effects, although intriguing, does not inform the conceptual framework of high-effort coping mechanisms in light of resources to buffer the negative effects of coping as intended by James, Hartnett, and Kalsbeek [7].

Of note, we did not include the original work of James and colleagues in this review as women were not included [7] or sex-specific estimates were not explicitly reported [12, 13]. In these latter two studies, race and sex-specific analyses were initially conducted, but similar results between men and women led the authors to present pooled results [11]. These early studies provided empirical support for the hypothesized relationship between higher blood pressure levels among individuals with high John Henryism and low education compared with other groups. Several factors may underlie the inconsistent evidence we summarized here and the pioneering work of James and colleagues. First,

the initial studies were conducted among African-Americans living in poor, rural North Carolina communities, while the study populations included in this review were from diverse areas in the U.S. and non-U.S. populations. Further, there was a range in the age distributions of the study populations included, which could influence blood pressure variation. In fact, McKetney and Ragland [17] hypothesized that the younger CARDIA study population, with relatively lower adult blood pressures, may be an unsuitable setting to test the effect of John Henryism on the SES-blood pressure relationship. Moreover, a variety of SES indicators have been employed and the health-related outcomes have also varied.

We also suspect there could be important generational effects that may underlie differences observed between the studies of James and colleagues and the more recent literature we reviewed here. Many of the participants in the studies by James and colleagues were born pre-Civil Rights era in the rural South. Therefore, it is likely that this population experienced explicit racial discrimination (for example, Jim Crow laws that mandated racial segregation in public facilities) in their lifetime. These experiences may have shaped how these individuals cope with stress and overall how they score on the John Henryism active coping scale.

Stress is a ubiquitous human experience; however, types of stressors and responses to stress vary according to race/ethnicity and sex [36, 37]. Literature indicates that African-American women of all socioeconomic levels experience higher levels of stress due to the co-occurring presence of racial and gender discrimination [38]. Moreover, there is evidence to suggest that race-related stress is associated with cardiovascular health [5]. Therefore, it is vital for researchers to understand issues of cultural perspectives and use cultural frameworks in relation to development of studies on stress and coping mechanisms used by African-American women.

An important consideration for coping, particularly among African-American women, is social support. Social support has been linked to a number of physiological processes that affect cardiovascular health, including responses to stress [39, 40]. Culturally, African-American women tend to thrive when supported by friends, family, congregation members, and others living under similar circumstances [41, 42]. In a study of 110 African-American college students, social support moderated perceived racism and vascular reactivity [43]. Thus, when pressures continue to increase,

African-American women may be more susceptible to the development of hypertension and other physical consequences associated with it as well as a weakening in the resilience of the women. Given the known link between social support as a culturally-appropriate coping mechanism and physiological effects, further investigation of its role in resilience and allostatic load may help us to better inform interventions to promote mental and physical health of African-American women across all socioeconomic levels.

The John Henryism active coping framework is complementary to other research frameworks centered on deleterious health outcomes as a consequence of stress appraisal and coping. For example, the concept of allostatic load, developed by McEwen and colleagues [44, 45], models the body's maladaptation to stress, which over time causes "wear and tear." Neuroendocrine, autonomic, metabolic, and inflammatory responses (e.g., secretion of stress hormones and activation of "fight or flight" reflexes) lead to turbulent coronary and cerebral artery blood flow, high blood pressure, atherogenesis, cognitive dysfunction, depressed mood, and even death [45, 46]. Importantly, stressors may be biological, psychological, environmental, and/or social in nature [47]. Similarly, Geronimus' concept of "weathering" articulates environmental and social contexts that affect allostatic load, requiring the use of prolonged high-effort coping which results in premature aging and health deterioration [48, 49].

Rather than driving metal like John Henry, African-American women strongly identify with taking on a "Superwoman" or "Strong Black Woman" role encompassing the care for themselves and others, maintenance of their households, and simultaneously working [50, 51]. The superwoman schema posits that one must cope with stress as a means of survival rather than a means of achieving a goal [50]. African-American women thus exert high effort to survive and thrive, predisposing them to increased allostatic load, CVD, and premature death.

Our final goal in conducting this review was to highlight areas for future research among African-American women as it relates to coping and CVD risk. First, larger studies are clearly needed to examine the interactive effects of John Henryism and SES on health outcomes. Related, diverse populations of women are needed to assess how these relationships operate within relevant subgroups (e.g., characterized by geographic location). Second, researchers should move beyond

individual-level assessments of income and education to more fully describe the context in which African-American women live. For example, neighborhood characteristics, environmental hazards, and social support should be characterized in studies seeking to evaluate stressors, coping, and health outcomes among African-American women. Multilevel modeling will be required to make full use of such rich data. Third, longitudinal assessments of the relationship between John Henryism, SES and other resources, and subsequent outcomes should be undertaken in order to draw causal links and inform future interventions. All studies in this review, including the prospective cohorts of CARDIA and the Jackson Heart Study, assessed John Henryism and CVD-related factors at the same time, limiting our ability to draw causal links. Moreover, the extent to which John Henryism active coping changes over time, and the conditions that contribute to these changes will be important to understand in the context of intervention development to improve health outcomes. Finally, incorporation of biological measures of stress and coping, coupled with self-reports of these experiences, could provide a more complete picture of the biological mechanisms that drive stress-related health patterns among African-American women.

The major strengths of this systematic review include a rigorous approach guided by the PRISMA criteria, explicit inclusion criteria, a comprehensive search of several databases, and duplicate reviews of titles/abstracts, full-text, and data to ensure accuracy before qualitative analysis. As with most systematic reviews, the major limitations centered on the shortcomings of the reviewed literature. In our assessment, we view the lack of stratification of results according to sex and race as a major limitation of the literature. Further, although we searched several databases, there is potential that we missed relevant studies that should have been included.

In conclusion, the reasons underlying the continued disparity in CVD outcomes between African-American and White women need to be understood and addressed. Although the impact of traditional CVD risk factors cannot be overlooked, the unique context in which African-American women live should be further explored as a contributory mechanism. The mixed evidence we presented here suggests that associations between coping mechanisms and CVD among African-American women are complex and require research across a variety of contexts.

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