



Coping, Discrimination, and Physical Health Conditions Among Predominantly Poor, Urban African Americans: Implications for Community-Level Health Services

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Abstract

African Americans and ethnic minorities experience racial discrimination in a variety of settings. Racial discrimination is a potent stressor that has been linked to psychosocial stress and poor physical health. To cope with discriminatory experiences and daily life event stressors, African Americans frequently use the concept of John Henryism (a high effort coping strategy with prolonged exposure to stress). This cross-sectional analysis explored the relationship between racism/discrimination, John Henryism, and health problems in a predominately African American sample. Data were collected through health care screenings for hypertension, diabetes, and obesity and a self-report survey to assess experiences of discrimination and use of John Henryism. Logistic and linear regression models were used to assess the relationship between the John Henryism score, racism/discrimination score, and health problems among 352 participants. John Henryism was associated with a decrease in systolic blood pressure ($b = -12.50$, 95% $CI = -23.05, -1.95$) among men, after adjusting for experiences of racism/discrimination and demographic characteristics. Experiences of racism/discrimination were associated with an increase in systolic blood pressure ($b = 11.23$, 95% $CI = 0.38, 22.09$) among men, after adjusting for John Henryism and demographic characteristics. Among women, there was no association found between John Henryism and experiences of racism/discrimination with systolic blood pressure. No association was found between John Henryism and experiences of racism/discrimination with being overweight/obese in women nor men. The study found that John Henryism was positively associated with the health of men, while experiences of racism/discrimination were negatively associated with their health. Limitations of the study are discussed, and recommendations are made to guide future research exploring the concept of John Henryism as a relevant factor between stress, racial discrimination and poor health.

Keywords Coping · Racism · Discrimination · Chronic disease

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Introduction

Recent data suggest that racial discrimination is a common experience for African Americans and other people of color in the US, with 93% of African Americans, 78% of Latino Americans, and 61% of Asian Americans reporting that their racial/ethnic group experience negative and differential treatment [1]. Indeed, racial discrimination impacts African Americans throughout their daily life, including the workplace, schools, financial institutions and other settings [2, 3]. Racial discrimination is recognized as an “uncontrollable or unpredictable” stressor [3] and has been associated with poorer physical health [4–6]. Dealing with prolonged stress can often lead to poor health outcomes such as cardiovascular disease and upper respiratory disease [7].

McEwen explains that in response to a sudden event, the body naturally releases chemical mediators, such as cortisol, that increase heart rate and blood pressure; when this occurs chronically, it can lead to a stroke or heart attack [8]. Steptoe and Kivimaki examined the association between stress and cardiovascular disease and found that in observational studies, chronic work and private life-related stress was associated with a 40–50% increase in the occurrence of coronary heart disease [9].

The deleterious impact of racial discrimination on health has been noted to operate through negative emotional states, behavioral coping responses, and psychological and behavioral responses to acute and chronic stressors [10, 11]. With regard to coping responses, there are several ways to cope with stressful situations. Coping is often considered active/approach or passive/avoidant [12], where active refers to being aware of the stressor and attempting to reduce the negative impact, and avoidant involves ignoring the stressor, often leading to poor health behaviors [13]. Common active coping strategies include seeking support from family and friends and activism, while common avoidant coping strategies include using humor to reframe the situation, self-blame, venting, relaxing and sometimes adjusting expectations [13]. Notably, coping may have a different impact depending on the individual and their circumstances: some coping strategies lead to improved health [14] while others may worsen health over time [15].

One coping strategy often used by African Americans to navigate general life event stressors and racial discrimination is John Henryism [16, 17]. Named for a fabled Black steelworker, John Henryism is a strategy for coping with prolonged exposure to stress [17] and is often described by three themes: “efficacious mental and physical vigor; a strong commitment to hard work; and a single-minded determination to succeed” ([18], p. 371). John Henryism is deemed high-effort coping where “one must persevere in demanding times and be resolved and efficacious in achieving goals” ([19], p. 3). Although John Henryism can produce short-term benefits by helping individuals handle daily stressors, sustained high-effort coping in response to repeated and prolonged exposure to stress can have detrimental effects on an individual’s mental and physical health, especially among minorities who are at increased risk for major hardships such as crime, violence, unemployment and underemployment [20]. Studies have found that high John Henryism among low SES individuals is associated with various negative health outcomes, such as cardiovascular complications and higher rates of hypertension [18]. Possibly, using John Henryism as a coping strategy alone (in the absence of other coping mechanisms e.g. therapy, meditation), may increase the long-term odds of poorer physical health, as repeated adaptation to stress can lead to wear and tear on the body’s systems (i.e., weathering) [21]. Studies indicate that when

John Henryism is actively used without additional resources such as being employed, having sufficient income, and other support mechanisms, there may be increased risk for mental illness and chronic disease or worsening of existing health risks [19].

Individuals may participate in unhealthy behaviors as an alternative coping mechanism [3]. It has been demonstrated that discrimination as a stressor can increase the risk for substance use [22]. In fact, studies have found that higher exposure to discrimination can be a predictor of smoking [23]. Smoking is known to increase the risk for death, and cause lung cancer and obstructive pulmonary disease [24]. Some individuals may discontinue healthy behaviors such as getting enough sleep or exercising [11]. Studies have also found that food intake is frequently used to cope with stress [25]. Stress eating usually includes foods with higher fat and sugar content [26]. It is widely known that poor diet and physical inactivity are contributing factors for obesity [27]. According to the U.S. Department of Health and Human Services Office of Minority Health, four out of five African American women are overweight or obese [28] and over one-third of African American men are obese [29]. Research has also revealed that African Americans are at greater risk for hypertension and other cardiovascular issues [18]. When compared to White Americans, African Americans have a higher propensity in disease morbidity and mortality [30]. The onset, progress, and severity of illnesses may be partially due to stressors such as those caused by discrimination [11, 31, 32].

This study seeks to understand the relationship between racial discrimination, John Henryism and health problems. The findings of this study will help develop more informed strategies to address these modifiable risk factors for poor health outcomes.

Methods

This cross-sectional analysis explored the relationship between coping, discrimination, and health problems in a poor, predominantly African American sample. A local community behavioral health center (herein referred to as The Center) in Baltimore, Maryland that specializes in comprehensive health care for individuals with substance use disorders participated in a community health fair in August 2014 in East Baltimore, Maryland. The Center, which at the time was still in its planning stages, sought to understand the basic physical and behavioral health needs in this high-risk community. They provided a staff of six health care workers and one physician to conduct assessments and provide health referrals. The team conducted health care screenings for hypertension, diabetes, and obesity for individuals in the community. Health care workers took at least one blood

pressure reading, and up to two additional readings were taken if the blood pressure was elevated (i.e., greater than 120/80). In addition, height, weight, and waist circumference were measured. The physician was on-site to provide referral to health care services, interact with participants, and answer questions and concerns they had about their health and health care needs. Self-reported experiences of racism and discrimination, John Henryism, an active opioid or heroin problem, and need for mental health services was also included in the assessment.

A total of 369 respondents participated in the screenings. Eligibility included being a resident of Baltimore City, at least 18 years of age, and the ability to speak and understand English. Two respondents were excluded; one was 17 and the other did not speak English. Each respondent read and signed a HIPAA release form, agreeing to have their data released for medical or research purposes. All respondents received a \$20 gift card for participating in the screening and answering additional items about their past and current use of behavioral health services, their need for behavioral or health care services, their experiences of racism and discrimination, John Henryism, and demographic questions (age, gender, race, and education). The survey took approximately 7 min to complete.

Investigators from the Johns Hopkins University Bloomberg School of Public Health provided consultation to the health care team on the design and administration of the survey but did not participate in the data collection. Data were collected, and physiologic measures were recorded using paper and pencil. Data were entered by staff of the community health center. A de-identified data set was created that included physiologic measures and self-report items, but no identifying information such as address, or date of birth were included. As participants did provide their residential address to the primary data collection team, we were able to confirm that 93% of respondents lived within 3 miles of the location of the health fair in East Baltimore. The data were deemed exempt from human subjects review by the Johns Hopkins Institutional Review Board in June 2015 and deemed exempt by the Michigan State Institutional Review Board in July 2018.

Measures

Demographic variables such as age (age at time of survey completion), gender (male or female), race (Black, White, or Other) and highest education attained (college graduate, some college, high school graduate/GED, and less than high school) were self-reported. Participants were also asked if they were Hispanic (yes or no).

The *John Henryism Scale for Active Coping* measures includes 12 items that measure high effort or high-energy coping. The scale measures three themes: efficacious mental

and physical vigor, a strong commitment to hard work, and a single-minded determination to succeed [17]. The scale includes 12 items answered on a 4-point Likert Scale with responses ranging from completely false to completely true (1 to 5). Total scores for the John Henryism scale range from a low value of 12 to a high value of 60. The scale has demonstrated acceptable validity as a measure of active coping and has been associated with conditions such as substance use [32], cardiovascular health [33], and depression [2]. Reliability for John Henryism has been confirmed [34] for both low-SES [35] and high-SES Blacks [36]. The full scale is available upon request from the developers [37]. Sample items from the scale include: (1) hard work has really helped me to get ahead, (2) it's not always easy, but I manage to find a way to do the things I really need to get done, (3) once I make up my mind to do something, I stay with it until the job is completely done. A median split on the summary score was used to create a binary variable for John Henryism. Those above the median, were considered strongly predisposed to cope actively with psychosocial stressors, while those at or below the median were considered less predisposed to cope actively with psychosocial stressors. The Cronbach's alpha for scale in the current sample was 0.96.

The *Experience of Discrimination* scale was used to assess participants' experiences of discrimination in a variety of the settings (e.g. at school, at the bank, etc.) [38, 39]. The participants were asked the following question: "How often have you experienced discrimination, been prevented from doing something or been hassled or made to feel inferior in any of the following situations because of your race, ethnicity or color?" for eight different settings. The responses included 0, 1, 2, 3, or 4 or more lifetime experiences. This scale also has acceptable metric properties [39, 40] and has been used widely in other published reports examining mood, anxiety and substance use disorders [41], discrimination in the medical setting [42], and child and youth health [43]. The total scores for the Experiences of Discrimination scale used range from 0 to 32. A median split on the summary score was used to create a binary variable for Discrimination. Those above the median, were considered strongly predisposed discrimination experiences, while those at or below the median were considered less predisposed discrimination experiences. The discrimination scale for this sample had a Cronbach's alpha of 0.93 for the eight items.

The outcome measures of physical health were overweight/obesity and systolic blood pressure. The World Health Organization defines overweight and obesity as excessive fat accumulation [44]. Overweight and obesity are derived by calculating body mass index (BMI), where weight in kilograms is divided by height squared [45]. Health care workers recorded weight, height and waist measurements of the participants. Participants with a BMI 25 or

greater were reported as overweight/obese. Systolic blood pressure refers to pressure in arteries during contraction and measures the blood vessels as the heart beats [46]. Systolic blood pressure was measured by health care workers on-site. A systolic blood pressure of 140 mmHg or higher was considered high.

Statistical Analysis

Missing data for the variables of interest ranged from 1 to 11.1%. To determine the patterns of missingness we compared demographics and the variables of interest among participants with complete data to the participants with any missing data. There were no statically significant differences in demographics (e.g. gender, race, employment status, Medicaid status) nor the discrimination scale or John Henryism ($p > 0.05$). Based on the patterns of missingness we classified the data as missing at random. Instead of excluding cases with missing values, we used multiple imputation methods to maximize power. We only included participants with data for gender and age in the imputation ($n = 352$; 95.4% of the total sample). To maximize the efficiency of the estimates, we created 20 data sets using the imputation by chained equations (ice) method in STATA Version 13 (StataCorp LP, College Station, TX). We did not impute values for having a primary care physician or Medicaid status (however, these variables were used in the imputation model). Twenty imputations obtained 99% efficiency, even when the missing data proportion was as high as 30% [47].

Student's *t* test and chi square test were used to examine mean and proportional differences by gender. Analysis by gender was important due to controversial findings in past studies regarding the differing impact of John Henryism on health by gender [18], some indicating significant differences [48], while others reporting no differences [49]. Linear regression models were used to assess the relationship between the John Henryism score, racism/discrimination score, and systolic blood pressure. Generalized linear models (GLMs) with logit link function were used to assess the relationship between the John Henryism score, racism/discrimination score, and being overweight/obese. GLM better approximates relative risk compared to logistic regression models when the outcome variable is common [50]. The semi-adjusted regression models included John Henryism and Experiences of Discrimination. The fully-adjusted regression models controlled for age, gender, if the participant was receiving Medicaid insurance (a proxy for socioeconomic status), and if the participant had a primary care physician. Odds ratios and betas were used to assess the strength of the association. Statistical significance was set at a two-sided alpha level of 0.05 and 95% confidence intervals were used to assess precision of the estimates. A total of 369 participants were initially screened, however,

after undergoing the exclusion criteria, the analytic sample included a total of 352 participants.

Results

Descriptive Analysis

Among the analytic sample, the majority were women ($n = 234$, 66.4%) (Table 1). The majority of both genders were African American (93% women, and 92% men). In addition, there were significant differences between education ($p = 0.012$) and unemployment ($p = 0.01$) across the participants. However, the majority of both genders had a high school or GED level of education (46.0% women vs. 53.9% men) and were unemployed (59.6% women vs. 76.6% men). When assessed by health care workers, most women were found to be overweight or obese (56.1% women vs. 26.6% men) and the majority of both genders had a high blood pressure reading (55% women vs. 63.4% men). There were no significant gender differences in experiences of racism/discrimination experiences nor John Henryism. The mean John Henryism score was 37.3 for women and 34.4 for men. For racism/discrimination, the mean score was 9.0 for women and 9.6 for men.

Regression Models

Overweight/Obesity

In the unadjusted regression analysis (Table 2), age was found to decrease the odds of being overweight/obese by 1% for women (OR = 0.99, 95% CI 0.98, 1.00). Medicaid status, having a primary care physician, John Henryism, and experiences of racism/discrimination showed no significant association with being overweight/obese in men nor women. In the fully adjusted model (controlled for age, gender, if the participant was receiving Medicaid insurance), John Henryism nor experiences of racism/discrimination were associated with being overweight/obese among women or men (Tables 3, 4; logistic regression models were used for the fully adjusted model for females as GLM did not converge).

Systolic Blood Pressure

In the unadjusted regression analysis (Table 2), for every 1-year increase among women, there was a positive association between age and systolic blood pressure ($b = 0.43$, 95% CI = 0.23, 0.63). Medicaid status, having a primary care physician, John Henryism, and experiences of racism/discrimination showed no statistically significant association with systolic blood pressure among men nor women. After adjusting for risk (i.e., racism/discrimination) and a

Table 1 Distribution of characteristics of 352 participants in Baltimore, MD by gender

	Women (n=234) n (%)	Men (n=118) n (%)	<i>p</i>
Mean age (SD)	43.5 (13.9)	46.4 (13.0)	0.053
African American	215 (93.5)	104 (92.0)	0.192
Education			0.012
Less than high school	32 (17.1)	25 (27.5)	
High school/GED	86 (46.0)	49 (53.9)	
Some college	51 (27.3)	14 (15.4)	
College graduate	18 (9.6)	3 (3.3)	
Employment			0.01
Unemployed	127 (59.6)	82 (76.6)	
Part-time	31 (14.6)	7 (6.5)	
Full-time	35 (16.4)	8 (7.5)	
Retired	20 (9.4)	10 (9.4)	
Have you ever been diagnosed with high blood pressure? ^a (%)	44.7	38.0	0.205
Substance use ^a			
Opioid problem (%)	9.3	20.1	0.006
Do you have need for substance abuse treatment? (%)	9.3	21.5	0.007
Ever in treatment? (%)	27.8	49.2	<0.001
Need mental health treatment ^a (%)	20.8	21.9	0.772
Ever receive mental health treatment? ^a (%)	30.9	24.2	0.209
Assessment by healthcare workers			
Overweight/Obese	124 (56.1)	30 (26.6)	<0.001
High blood pressure reading	122 (55.0)	71 (63.4)	0.141
Mean John Henryism score (SE) ^a	37.3 (0.69)	35.4 (0.91)	0.081
Mean racism/discrimination score (SE) ^a	9.0 (0.51)	9.6 (0.68)	0.450

^aImputed data presented; unable to provide n (sample size), percentages presented

Table 2 Unadjusted and semi-adjusted generalized linear models of women in Baltimore, MD

	Overweight/obese		Systolic blood pressure	
	OR	95% CI	<i>b</i>	95% CI
Age	0.99	0.98, 1.00**	0.43**	0.23, 0.63
Has Medicaid	0.82	0.65, 1.45	-1.29	-7.01, 4.44
Primary care physician	0.87	0.65, 1.16	-0.19	-8.16, 7.77
John Henryism	0.92	0.73, 1.16	2.44	-3.41, 8.29
Racism/discrimination	0.84	0.66, 1.09	2.63	-3.39, 8.65
Semi-adjusted regression model ^a				
John Henryism	0.92	0.73, 1.16	2.56	-3.29, 8.42
Racism/discrimination	0.85	0.66, 1.09	2.75	-3.26, 8.76

**p-value < 0.05

^aSemi-adjusted model only includes John Henryism and racism/discrimination

Table 3 Fully adjusted regression models of women in Baltimore, MD

	Overweight/obese ^a		Systolic blood pressure	
	OR	95% CI	<i>b</i>	95% CI
Age	0.98	0.96, 1.00	0.45**	0.24, 0.67
Has Medicaid	0.64	0.37, 1.11	-2.31	-8.01, 3.39
Primary care physician	0.85	0.38, 1.91	-3.91	-11.98, 4.15
John Henryism	0.84	0.48, 1.47	3.19	-2.55, 8.92
Racism/discrimination	0.82	0.46, 1.48	0.78	-5.27, 6.84

**p-value < 0.05

^aLogistic regression models were used; generalized linear model did not converge

potential protective (i.e., John Henryism) factor, neither was associated with systolic blood pressure among men (see Table 5). However, in the fully adjusted model that

controlled for demographics, significant relationships with systolic blood pressure emerged. Specifically, controlling

Table 4 Fully adjusted regression models of men in Baltimore, MD

	Overweight/ obese ^a		Systolic blood pressure	
	OR	95% CI	<i>b</i>	95% CI
Age	0.99	0.97, 1.01	0.19	-0.19, 0.57
Has Medicaid	0.77	0.38, 1.56	3.99	-6.30, 14.27
Primary care physician	0.65	0.34, 1.22	0.02	-11.28, 11.31
John Henryism	1.27	0.67, 2.39	-12.50**	-23.05, -1.95
Racism/discrimination	1.13	0.58, 2.19	11.23**	0.38, 22.09

**p-value < 0.05

^aGeneralized linear model with logit link function**Table 5** Unadjusted and semi-adjusted generalized linear models of men in Baltimore, MD

	Overweight/ obese ^b		Systolic blood pressure	
	OR	95% CI	<i>b</i>	95% CI
Age	0.99	0.97, 1.01	0.26	-0.11, 0.64
Has Medicaid	0.61	0.31, 1.18	6.35	-3.71, 16.42
Has primary care physician	0.58	0.31, 1.07	0.96	-10.15, 12.06
John Henryism	1.38	0.74, 2.61	-8.86	-19.19, 1.48
Racism/discrimination	1.19	0.63, 2.23	6.48	-4.12, 17.08
Semi-adjusted regression model ^a				
John Henryism	1.35	0.71, 2.60	-10.44	-20.88, 0.00
Racism/discrimination	1.13	0.60, 2.13	8.43	-2.25, 19.09

^aSemi-adjusted model only includes John Henryism and racism/discrimination^bGeneralized linear model with logit link function

for John Henryism scores, there was a significant relationship between racism/discrimination and systolic blood pressure ($b = 11.23$, 95% $CI = 0.38, 22.09$), such that greater experiences with racism/discrimination were associated with higher blood pressure. In contrast, when we controlled for racism/discrimination, there was a significant *inverse* relationship between John Henryism and systolic blood pressure among men (Table 4; $b = -12.50$, 95% $CI = -23.05, -1.95$). There was no relationship between John Henryism nor experiences of racism/discrimination with systolic blood pressure among women. There were no significant differences in the magnitude, direction or significance of the findings when the analysis was restricted to African Americans in either outcome. Due to the low sample size, the entire sample was used for analysis.

Discussion

Our study found that men are positively affected by John Henryism and negatively affected by racism/discrimination experiences. Among men only, John Henryism was significantly associated with a decrease in systolic blood pressure after adjusting for experiences of racism/discrimination and other demographics. Although modest decreases in systolic blood pressure may not be clinically significant, continuous decrease over time can be important and lead to fatigue, blurred vision, dizziness, pale skin and even depression [51].

A similar study to ours, conducted by Clark and Adams [52], examined the relationship between John Henryism and perceived racism to blood pressure reactivity. Interestingly, they found that John Henryism was inversely associated with systolic blood pressure reactivity, while perceived racism was not directly related to reactivity. They also noted that among participants high in perceived racism, John Henryism was not positively associated with reactivity [52]. However, their study sample only included Black female college students ($n = 117$), as opposed to this study, where most of the participants had a high school or GED level of education. It is plausible that educational attainment and additional resources available to college students may play a role in how John Henryism impacts health. The study of Bonham et al. [36], examined the relationship between John Henryism and self-reported physical health status among high-SES African American men ($n = 399$), and found that participants who reported higher levels of John Henryism also reported better physical health. The results of Bonham et al. [36], suggest John Henryism can be beneficial to health in high-SES African American men, especially by applying the John Henryism “determination to succeed” mentality to their own health. However, it’s important to note the study of Bonham et al. [36] used self-reported income from all sources, while this study used Medicaid-status as a proxy for SES and the majority of the participants in this study were unemployed. Perhaps, individuals who are employed and have higher-SES, have access to and use additional quality coping resources along with John Henryism (i.e., quality health care, recreational activities, family support, etc.). In both of these cases, the positive benefit of John Henryism was seen among higher-SES samples. Although, the John Henryism Hypothesis has mainly seen negative effects of John Henryism among the lower-SES population [18], our study indicated a positive association of John Henryism with health (systolic blood pressure) in a low SES-depressed sample.

The study revealed gender differences: only among men, John Henryism was associated with a decrease in

systolic blood pressure and experiences of racism/discrimination were associated with an increase in systolic blood pressure. Previous studies have explored gender-related stress and found women's stress is often a combination of "burdens faced through racial and gender identity as well as burdens not directly related to race or gender" ([53], p. 179). Women tend to have more daily stress with chronic problems and be more impacted by life events and changes [54]. The study of Kim et al., examined gender differences in occupational stress and concluded that job characteristics and demographic features can have different implications on stress symptoms and women and men respond differently to stress [55]. Further research is needed to understand gender differences regarding how men and women cope with stress. Lastly, although this study was initially interested in the relationship between racism/discrimination and health, there were no significant associations between these variables among women. One possible explanation for this lack of association is the relatively low endorsement of racism among this sample, with little variability. Given the SES-profile of our sample, it is possible that the discrimination questions were less salient. Future research should use varied approaches to assess the relationship between racism/discrimination and health.

The study has several limitations that should be discussed. First, it is a cross sectional study which only considers population characteristics at a given point in time. Since population characteristics were only examined during a specific timeframe, the effects overtime are unknown, and the lack of repeated measurements fails to fully evaluate the temporal association of John Henryism within this population. Second, the study consisted of a convenience sample of 352 participants, that voluntarily signed up to engage in the study and may have significantly differed than a random sample of the population. The sample size in this study is commensurate with other studies of John Henryism using primary data (e.g., [36, 52]). Third, part of the data collection came from a self-report survey, which can have respondent bias. Finally, there was missing data for the variables of interest; however, multiple imputation methods were used to maximize power. Notwithstanding these limitations, the population studied was unique, as the participants resided in the City of Baltimore and were predominately African American (a high-risk group for diseases such as obesity and hypertension). Future research examining mediating factors among stress and health should continue to explore differences by gender, age and SES. It is also important to take in account the social and physical environment, and place special emphasis on the availability and utility of resources.

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Compliance with Ethical Standards

Conflict of interest The authors of this paper do not have any conflicts of interest to disclose.

Research involving Human Participants The data were deemed exempt from human subjects review by our Institutional Review Board.

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