



Racial Disparities in Avoidant Coping and Hypertension Among Midlife Adults

Brian Batayeh¹ · Rachel Shelton² · Pam Factor-Litvak³ · Bruce G. Link⁴ · Shakira F. Suglia¹

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Abstract

While associations between stress and hypertension have been documented, little research has examined the association between coping and hypertension, especially in the context of understanding racial disparities. Utilizing data from the CHDS-DISPAR study, we examine the association between avoidant coping and hypertension among adults age 50 while assessing for potential differences across (1) coping in response to the general stress and discrimination and (2) African American and White racial groups. Coping was measured using a 9-item scale with an avoidant coping subscale (e.g., drinking alcohol). Mean avoidance coping scores were calculated for both general stress and discrimination. No racial differences in avoidant coping were found. Within our sample ($n = 414$), there was a high burden of hypertension among African American respondents compared to White respondents (50.3% vs. 22.6%). Models assessed associations between avoidant coping and hypertension adjusted for sociodemographic factors, obesity, and either experience of stress or discrimination depending on the coping domain examined. Avoidant coping in response to the general stress and discrimination was associated with increased hypertension among White respondents (PR: 1.63 [95%CI 1.01, 2.24]; PR: 1.69 [95%CI 1.12, 2.26], respectively) and no associations among African American respondents (PR: 0.83 [95%CI 0.57, 1.09]; PR: 0.82 [95%CI 0.52, 1.12], respectively). This research suggests that racial disparities in hypertension may not be attributable to individual-level coping behaviors.

Keywords Avoidant coping · Hypertension · Health disparities

✉ Shakira F. Suglia
Shakira.suglia@emory.edu

Brian Batayeh
bbataye@emory.edu

Rachel Shelton
rs3108@cumc.columbia.edu

Pam Factor-Litvak
prf1@cumc.columbia.edu

Bruce G. Link
brucel@ucr.edu

¹ Department of Epidemiology, Rollins School of Public Health, Emory University, 1518 Clifton Road, NE, Atlanta, GA 30322, USA

² Department of Sociomedical Sciences, Mailman School of Public Health, Columbia University, New York, NY 10032, USA

³ Department of Epidemiology, Mailman School of Public Health, Columbia University Medical Center, 722 West 168th Street, New York, NY 10032, USA

⁴ Department of Sociology, University of California Riverside, Riverside, CA, USA

Introduction

In the United States (U.S.), roughly one in three adults has hypertension, and the burden of hypertension is particularly high among African American populations (African American: 40.3%; White: 27.8%) [37]. Existing literature has demonstrated that experiencing stress is positively associated with hypertension [13, 14, 30, 46]. Associations between stress and hypertension have also been shown to differ by race, suggesting that African American populations are more strongly (and negatively) impacted [13, 46]. This may be attributable to increased exposure to a range of psychosocial stressors among African Americans [47], as well as elevated exposure to stressors in comparison to Whites [47], most strikingly with respect to experiences of discrimination [41]. Some research also suggests that exposure to discrimination (on the basis of race or other factors) is associated with hypertension, although findings have been mixed and inconclusive [6, 8, 13, 15, 35, 46, 47, 50].

In addition to possible differential exposure to stressors, differences in coping strategies have been hypothesized to

explain disparate associations between stress and hypertension [23, 24, 34, 48]. While stress can be defined as exposures to one's environment that are perceived as burdensome [26], coping has been defined as responses to stressors and to the resulting emotional burden [9]. An individual can respond to stress in many ways, and numerous frameworks have been put forth to conceptualize coping [12, 18, 45]. Adding to this complexity, researchers have conceptualized that while people may have relatively stable coping responses, people also respond to stress based on the specific stressors they encounter [36]. For example, prior literature has suggested that African American women employ unique coping strategies in relation to racial discrimination specifically as compared to other forms of stress [38]. To account for this possibility within a multi-racial sample, we focus on coping with respect to two different domains of stress: (1) general stress and (2) discrimination stress ("discrimination" is used here to reflect experiences of unfair treatment regardless of attribution). We center our paper on one of the more prominent coping frameworks, which focuses on avoidant coping [19, 43, 53]. Here, avoidant coping strategies are characterized as "maladaptive" in the sense that they are directed at escaping the stressor or related emotions (i.e., smoking, drinking) rather than directly approaching the stressor and related emotions [42].

Whether directly stated or implied, public health has historically tended to focus on behavioral and individual-level explanations for understanding patterns in racial/ethnic or class health inequities. Research has demonstrated that attributing health disparities to poorer health behaviors (e.g., not following recommended guidelines) and individual-level factors without accounting for the broader social context in which they arise is insufficient and inaccurate in seeking to understand and address disparities [27, 44, 49]. An alternative explanation is the important role of structural disadvantage (e.g., systemic racism) and broader social context in shaping and reinforcing racial health inequities [2, 28]. For example, structural factors and social context may determine the nature and intensity of stressors that different racial groups may encounter in society. These factors may also determine the resources and opportunities available to cope with stress, including potential social and economic barriers (i.e. access to healthy foods). Thus, stress, coping, structural disadvantage, and social context are all inextricably linked. An examination of coping should acknowledge the broader structural and social conditions that advantage some groups and disadvantage others. Aligned with this framing, this paper investigates the role of avoidant coping as a behavioral explanation for racial inequities in hypertension while accounting for the broader social context in which these behavioral responses are formed.

While it is possible that there are racial differences in coping given disparities in stress exposures [47] and the

added burden of exposure to discrimination among non-White populations [41], only a few studies have examined these relationships. Studies among younger individuals have found that African American respondents are more likely to utilize avoidant coping, compared to White respondents [1, 51]. Additionally, a study examining substance use patterns within the sample used for this present study found cigarette use for stress reduction more prevalent among African American respondents than White respondents, but no racial differences in alcohol use for stress reduction [39].

Some studies have assessed the association between avoidant coping and hypertension, although research in this area has been limited with mixed findings. Within a study of African Americans, avoidant coping was found to be associated with increased systolic blood pressure [17]. Another study of racially heterogeneous college-aged students found avoidant coping to be associated with decreased systolic blood pressure [31]. Findings from a study based in Italy noted that among people with hypertension, avoidant coping has been associated with uncontrolled hypertension [10]. In addition to mixed and limited findings on this topic, there is a paucity of research assessing racial differences in this association, particularly with regard to generalizability to the U.S. population.

The proposed research seeks to address gaps in the coping and hypertension literature by examining associations between avoidant coping and hypertension while assessing potential differences by race within the domains of general stress and discrimination stress. We hypothesize that African Americans, who experience greater exposures to various stressors as a minoritized population in the U.S. [41, 47], will have stronger positive associations between avoidant coping and hypertension. We do not have any hypotheses regarding differences in associations between varying domains of stress (e.g., general stress vs. discrimination stress).

Methods

Sample

The sample was drawn from the Child Health and Development Studies (CHDS) Disparities Study (DISPAR), which was designed to evaluate life course predictors of health disparities [29]. The adult participants in DISPAR were originally recruited as the offspring of women who participated in the CHDS, a pregnancy cohort that recruited pregnant women between 1959 and 1967. These women received prenatal care from the Kaiser Family Foundation Health Care Plan at its clinics in Alameda County, California.

The current DISPAR sample includes a subsample ($n = 605$) of these children interviewed as adults between

44.9 and 51.9 years of age (mean age of 50 years). Data were collected using a 40-min computer-assisted telephone interview (including measures of socioeconomic circumstances, physical activity, and health behaviors), followed by a home visit (capturing height, weight, and blood pressure as well as obtaining biological specimens) and a self-administered questionnaire (assessing psychosocial measures not included in the telephone interview). Written informed consent was obtained during the home visit before the interview and assessment. The study team assessed the representativeness of this California-based sample by comparing it to the nationally representative NHANES (2011–2012). Results for several indicators, including hypertension, showed similar racial disparities and no significant differences between the CHDS DISPAR sample and the NHANES samples in those disparities (for a detailed description of CHDS and DISPAR samples, see [29]). This suggests that while our sample is California-based, findings from this study may be more broadly generalizable to a national scale. Of the 605 adults in DISPAR, 84.3% ($n=510$) agreed to participate in a home visit while 77.4% ($n=468$) participated in the self-administered survey. Complete data were available on 449 out of the 468 participants who completed the home visit and self-administered survey, we furthermore excluded 37 participants who did not identify as White or African American (see details below). Multiple regression imputation techniques were used to address missing data within this sample (see details below).

Outcome: Hypertension

At the home visit, diastolic and systolic blood pressure was measured using a calibrated Dinamap Pro 100 automated vital signs monitoring using a standard protocol. Measurement occurred three separate times during the home visit with hypertension being defined based on the average of the second and third measurements as systolic blood pressure (SBP) of 140 mmHg or greater or diastolic blood pressure of 90 mmHg or greater. Additionally, all respondents who used antihypertensive medications were also defined as individuals with high blood pressure. Antihypertensive medication use was determined through a research-staff lead inventory of medications at the time of the in-home visit. Antihypertensive medications included beta-adrenergic blockers, calcium-channel blockers, angiotensin-converting enzymes, and diuretics.

Exposure: Avoidant Coping, by Type of Stressor

To measure avoidant coping across domains of general stress and stress resulting from discrimination, participants were first asked “How do you cope with general stress?” and then asked, “How do you cope with unfair treatment?”

While the questionnaire used the term “unfair treatment”, we utilize the term “discrimination” moving forward. When responding to these questions, participants were asked to indicate how frequently they engaged with different coping strategies ranging on a scale from 1 to 4, corresponding to never, rarely, some of the time, and most of the time. Coping strategies included the following: exercising, eating sweets/fatty foods, drinking alcohol, smoking cigarettes, talking about the problem with someone you trust, praying, avoiding the situation in the future, trying to do something about it, accepting it as a fact of life. This scale was developed within the Uterine Fibroid Study [52].

Based on Roth and Cohen’s definition of avoidant coping being oriented away from the stressor or related emotions [42], we classified each item accordingly. We determined that exercising, eating sweets/fatty foods, drinking alcohol, smoking cigarettes, and avoiding the situation in the future were considered to be avoidant coping strategies. The remaining 4 items were determined to be non-avoidant strategies and were not included in the primary analysis, but sensitivity analyses were used to examine the robustness of our characterization. A mean avoidant coping score was calculated and ranged from 1 to 4 for general stress, and a separate avoidant coping score for discrimination was also calculated, also ranging from 1 to 4.

Covariates

Gender and Race

Respondent’s race/ethnicity was based on the self-identified race/ethnicity of the participants in their adult life. Among study participants, 37 identified as Asian, Hispanic, or other race/ethnicity, given small sample sizes, these participants were excluded from the analyses. Thus, in these analyses, the race is characterized as White ($n=239$) or African American ($n=175$). To attain a measure of gender, we asked respondents, “It says here that you are [male/female], is this correct?” We fully understand that this is not an accurate measure of gender, given that it is posed as binary and does not allow for distinction from sex. However, in this study, we are focusing mainly on social roles and psychological orientation, so we use the term gender in this paper.

Socioeconomic Status

Our assessment of socioeconomic status (SES) included three components: occupational standing, annual household income, and educational attainment. Each component was standardized on a scale ranging from 0 to 3. These three components were then averaged to create a continuous composite measure for SES ranging from a scale of 0–3. This approach is an extension of methods used to assess SES at

earlier time points in prior DISPAR work and methodology for creating composite SES [29].

Stressors

Stressor measurements reflect the different domains in which coping was assessed: general stress and discrimination stress. Coping responses were not asked in direct relation to a specific stressor but instead queried respondents as to their usual responses when encountering stressors within each of these two domains. In order to account for stressor exposure within our analyses, we chose measures that might reflect the stressors framed in the coping questions. For the domain of general stress, exposure to a chronic stressor was characterized as issues occurring in the lives of participants for a time period of at least 12 months (i.e., housing problems, health problems, financial strain) [5]. This measure is a summary of 8 items that describe different life stressors and asks respondents to endorse whether they experienced the stressor and to rate the level of distress it has caused them. All items were dichotomized to characterize exposure vs. non-exposure to the stressor. A mean chronic stressor exposure score was calculated and ranged from 0 to 1 and was used to adjust for stressor exposure within the domain of general stress.

A measure of daily discrimination experiences from the Everyday Discrimination Scale was utilized within the domain of discrimination stress [54]. This commonly used scale describes 10 different instances of daily discrimination (e.g., followed in stores, treated with less respect) and asks respondents to rate their frequency on a scale from 1 to 5, corresponding to never, almost never, sometimes, fairly often, and very often. We characterize discrimination regardless of attribution to a specific factor of respondents' identity and only consider their exposure to the discriminatory experience. Items were summed and divided by the number of items present resulting in a mean score ranging from 1 to 5. This score was used to adjust for stress exposure within the domain of discrimination stress.

Obesity Status

Obesity was designated as having a body mass index of at least 30. This was calculated using height and weight measurements collected during the home visit. Height was measured with a portable stadiometer (shoes off) to the nearest 0.1 mm. Weight was measured on a Tanita 350 scale in light clothing, shoes off. Body mass index was calculated as weight in kilograms/height in meters squared. Height and weight measurements were performed three times and the average was taken.

Statistical Analyses

All analyses were conducted using SAS 9.4. Our primary independent variables were avoidant coping with general stress and avoidant coping with discrimination. Descriptive analyses were conducted to assess the distribution of outcomes, exposures, and covariates. All descriptive analyses were stratified by race.

Multivariate log-binomial regression models, stratified by race, were utilized to test the association between avoidant coping and hypertension. Models were conducted first to assess the relation between avoidant coping with general stress and hypertension, and the second set of models assessed the relation between avoidant coping with discrimination stress. Four models for each avoidant coping score were conducted: (1) unadjusted; (2) adjusted for adult SES and gender, (3) further adjusted for stressor exposure (chronic stressor exposure for general stress domain; daily discrimination exposure for discrimination stress domain), and (4) additionally adjusted for obesity.

To account for missing responses within the avoidant coping and stressor scales, a prorating method was utilized. Specifically, mean scores for scales were calculated by summing responses to items that were present and then dividing by the number of valid responses provided by each participant. Scores were set to missing if at least half of the items of the scale were missing. In the analytical sample, 4 respondents were missing data on one or more components of the general stress coping scale (< 1%), 7 respondents on one or more components of the discrimination coping scale (1.5%), 19 respondents on the current stress scale (4%), and 6 respondents on daily discrimination scale (1.3%). One respondent was missing blood pressure measurements (< 1%), and 3 were missing measures on BMI (< 1%). No participants were missing information on the composite adult socioeconomic status. Complete data on the exposures, outcome and covariates were available for 414 of the 431 participants (96%).

We used multiple regression imputation techniques (30 imputations) (SAS version 9.4) to predict missing values using all independent and dependent variables from our analysis and several auxiliary variables. Auxiliary variables included: self-report of hypertension, age, waist circumference, BMI at age 40, alcohol consumption, smoking behavior, physical activity, and depression symptomatology. Results from our multiple imputation approach ($n = 431$) are consistent with results from our complete case analysis ($n = 414$).

To explore the robustness of our avoidant coping scale, we conducted sensitivity analyses. In addition, we examined whether individual coping strategies (i.e., eating sweets/fatty foods and smoking cigarettes) captured in our avoidant coping score differed by race.

Table 1 Descriptive statistics of complete case sample (race stratified)

	White	African American	P-value
<i>N</i>	239	175	
Age (mean, SD)	49.53, 1.04	49.08, 1.49	0.001
Female	50.63%	46.86%	0.45
Highest quartile for avoidant coping			
General stress	28.45%	32.57%	0.37
Discrimination	27.62%	22.86%	0.27
Health measures			
Obesity prevalence	32.22%	56.00%	<0.0001
Hypertension prevalence	22.59%	50.29%	<0.0001
Highest quartile of stressor exposure			
Chronic stress	19.67%	35.43%	0.0003
Daily discrimination	11.30%	54.86%	<0.0001
Lowest quartile of SES	18.83%	38.29%	<0.0001

Results

Table 1 provides a description of our complete case sample stratified by race. Compared to White respondents, African American respondents had a significantly greater prevalence of hypertension (50.3% vs. 22.6%), obesity (56.0% vs. 32.2%), chronic stressor exposure (35.4% in highest quartile vs. 19.7% in highest quartile), everyday discrimination (54.9% in highest quartile vs. 11.3% in highest quartile), and a higher proportion of individuals in the lowest quartile of SES (38.3% vs. 18.8%). Avoidant coping scores did not significantly differ by race. Additionally, no meaningful racial differences in individual avoidant coping strategies were found.

Avoidant Coping and Hypertension

Table 2 provides all modeling estimates for analyses stratified by race. Prevalence of hypertension was higher among White respondents who had higher avoidant coping scores with general stress (fully adjusted model PR = 1.63 [1.01, 2.24]) and discrimination stress (fully adjusted model PR: 1.69 [95%CI 1.12, 2.26]). There were no associations noted among African American respondents (fully adjusted model PR: 0.83 [95%CI 0.57, 1.09]; fully adjusted model PR: 0.82 [95%CI 0.52, 1.12], avoidant coping with general stress and discrimination stress, respectively). Sensitivity analyses with complete case analyses resulted in consistent findings (Supplemental Table A).

Sensitivity analyses were conducted to examine associations between different characterizations of avoidant coping with regard to hypertension. An alternative characterization of avoidant coping further included an additional

Table 2 Bivariate and multivariate regressions of avoidant coping to general stress and discrimination on hypertension stratified by race

Model	White	African American
Avoidant coping in response to general stress		
Model 1 ^a	1.57 [0.95, 2.18]	0.91 [0.62, 1.19]
Model 2 ^b	1.61 [0.98, 2.24]	0.85 [0.55, 1.14]
Model 3 ^c	1.64 [1.01, 2.27]	0.81 [0.53, 1.08]
Model 4 ^d	1.63 [1.01, 2.24]	0.83 [0.57, 1.09]
Avoidant coping in response to discrimination		
Model 5 ^e	1.85 [1.31, 2.39]	0.86 [0.55, 1.16]
Model 6 ^f	1.96 [1.39, 2.54]	0.81 [0.49, 1.13]
Model 7 ^g	1.74 [1.17, 2.30]	0.81 [0.48, 1.13]
Model 8 ^h	1.69 [1.12, 2.26]	0.82 [0.52, 1.12]

^aModel 1 is unadjusted; ^bmodel 2 is adjusted for adult SES and gender; ^cmodel 3 is adjusted for adult SES, gender, and chronic stressor exposure; ^dmodel 4 is adjusted for adult SES, gender, chronic stressor exposure, and obesity status; ^emodel 5 is unadjusted; ^fmodel 6 is adjusted for adult SES and gender; ^gmodel 7 is adjusted for adult SES, gender, and daily discrimination; ^hmodel 8 is adjusted for adult SES, gender, daily discrimination, and obesity status

item (praying), while a second alternative characterization removed an item (accepting it as a fact of life). Results utilizing both alternative characterizations were consistent with previous findings.

Discussion

The purpose of our research was to examine whether avoidant coping was associated with hypertension and whether associations differed by race. We had hypothesized that associations between avoidant coping and hypertension would be stronger for African Americans, who experience greater exposures to various stressors as a minoritized population in the U.S. [41, 47]. However, in racially-stratified regression analyses, we found positive associations between avoidant coping and hypertension within the domains of general stress and discrimination stress for White respondents. These associations were not present among African Americans.

While there were no meaningful associations between avoidant coping and hypertension present for African Americans, it was evident that they faced greater structural disadvantage and poor health outcomes. In our sample, race-stratified analyses reveal that African Americans experience poorer health outcomes (i.e., obesity and hypertension) and more stressful social contexts (i.e. SES, daily discrimination, and chronic stressors), compared to their White counterparts. Our findings regarding racial disparities in disadvantage and poor health are consistent with the literature surrounding the racial distribution of stress, [47], discrimination [41], and health disparities [21, 37].

Contrary to our hypothesis and prior literature [53], greater experience of disadvantage and stress does not necessarily translate to increased avoidant coping. Race-stratified descriptive analyses showed no meaningful differences in avoidant coping. This research contributes meaningful information regarding coping among racially diverse adult populations, particularly since much of the coping research has been conducted among racially homogenous samples or within the context of schools [1, 7, 25, 31–33, 40].

While White respondents experienced less strenuous social contexts (i.e., greater SES, less discrimination, and less exposure to chronic stressors) and had a lower prevalence of hypertension, their avoidant coping with general stress and discrimination stress was associated with increased hypertension. These findings contradict research that has posited behavioral explanations to characterize racial health inequities [23, 34]. These findings are consistent with studies assessing relationships between discrimination and abdominal obesity [22] and relationships between avoidant coping style and substance use disorder [51], both finding associations for White, but not African American respondents. Within our sample, there are clearly racial health disparities with regard to hypertension, with African American respondents having significantly increased prevalence compared to White respondents. However, our findings do not support the attribution of this to avoidant coping. As this paper examined coping in relation to hypertension, we are not suggesting that general stress and discrimination do not impact the cardiovascular health of African Americans. The impacts of stress and discrimination on cardiovascular health are well supported by the literature [11, 16], which we suggest be a continued area of research.

Limitations

Given these findings, we would like to highlight the limitations of our study. Our sample is drawn from a longitudinal birth cohort based in California, which brings generalizability to the U.S. population into question. The study team assessed the representativeness of this California-based sample by comparing it to the nationally-representative NHANES (2011–2012). Results for several indicators, including hypertension, showed similar racial disparities and no significant differences between the CHDS DISPAR sample and the NHANES samples in those disparities (for a detailed description of CHDS and DISPAR samples see [29]). This suggests that while our sample is California-based, findings from this study may be more broadly generalizable to a national scale.

Our sample size was relatively small and was reduced further upon racial stratification. Additionally, there was some missing data within our sample. To mitigate the possible impact of these two limitations, we conducted multiple

imputations using a robust model that included outcomes, exposures, covariates, and correlates. Given the cross-sectional nature of our analyses, temporality cannot be established. However, given that coping responses are often established earlier in the life course, we believe that our coping measure may serve as a proxy variable for coping responses before the onset of hypertension [53].

While we were limited in doing so due to sampling size, further nuanced findings may be revealed with greater consideration to notions of intersectionality within research analyses, given that race and gender and other socially constructed categories are important markers that indicate varying social or structural disadvantages and/or resources, with implications for health and disease. For example, research has suggested that gender may also moderate associations between avoidant coping and increased blood pressure, although findings have been mixed [17, 31]. Previous work in public health has called for the application of intersectional frameworks in order to better understand and address health inequities [3, 4, 20].

The prior literature has proposed many frameworks to conceptualize coping [12, 18, 45]. We chose one of the more prominent framework-avoidant coping. Fortunately, we were able to measure coping instead of using general health behaviors as coping proxies, as such has been done in other studies [23]. However, within this framework, there may be potential for measurement error. Studies have categorized the same coping strategies to fall within different categories. For example, Casagrande et al. 2019 consider social support as avoidant, while Martin et al. 2013 do not consider social support to be avoidant [10, 31]. Given that we do not have extensive information about the coping strategies, we had to assume the intent of behavior and consequent classification as avoidant coping. Our team consensus-building process to inform the assignment of coping strategies aimed to mitigate this. Additionally, given the complexity and fluidity of coping, we understand coping strategies may be situational based on stressors encountered [7]. While our study was not able to capture the specificity by unique stressor events, we were able to capture coping or general approaches to coping when encountering specific types of stress.

We recognize that our measure of gender was binary, not reflective of the full spectrum on which gender can be experienced and expressed. We believe that had our measurement of gender been non-binary, we would have captured further nuanced findings. Overall, given the limitations of this study, we believe that we have taken significant measures to maintain scientific rigor.

Conclusion

Our findings suggest that avoidant coping to general stress and discrimination is associated with increased hypertension among White respondents. Conversely,

these associations were not found among African American respondents, who faced increased hypertension and more strenuous social contexts (i.e., lower SES, greater exposures to chronic stressors, and discrimination). Our findings do not support behavioral attributions to racial disparities in hypertension. To mitigate the impacts of stress on hypertension, we recommend health interventions not only address individual-level behavior change but also address policies that reinforce health disparities at the structural level [44].

We recommend further research build on examinations of stress and social context as determinants of hypertension. Our findings call for a nuanced analytic approach that situates findings within broader social contexts that shape both stressors and coping responses when studying relationships between coping and health. We believe that such research will provide empirical evidence that can further strengthen theoretical work in this area of study.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s40615-022-01232-7>.

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Author Contribution Brian Batayeh: conceptualization, methodology, software, formal Analysis, and writing—original draft; Rachel Shelton: writing—review and editing and funding acquisition; Bruce Link: investigation, resources, data curation, project administration, and funding acquisition; Pam Factor-Litvak: writing- review and editing; Shakira F. Suglia: conceptualization, methodology, resources, supervision, project administration, and funding acquisition.

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Data Availability Data and materials relevant to this study can be made available upon contacting the corresponding author.

Code Availability Any code relevant to this study can be made available upon contacting the corresponding author.

Declarations

Ethics Approval The methodology for this study was approved by the Human Research Ethics committee of Emory University (IRB00100708).

Consent to Participate Written informed consent was obtained from all individual participants included in the study.

Consent for Publication All participants provided written informed consent for the dissemination of study findings, including research publications.

Conflict of Interest The authors declare no competing interests.

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