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Minority Men's Health

Racial Composition Over the Life Course: Examining Separate and Unequal Environments and the Risk for Heart Disease for African American Men

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Purpose: Studies have demonstrated the effects of segregated social and physical environments on the development of chronic diseases for African Americans. Studies have not delineated the effects of segregated environments specifically on the health of African American men over their lifetime. This study examines the relationship between life course measures of racial composition of social environments and diagnosis of hypertension among African American men.

Design: We analyzed cross-sectional data from a convenience sample of African American men seeking health care services in an outpatient primary care clinic serving a medically underserved patient population (N=118). Multivariable logistic regression analyses were used to examine associations between racial composition of multiple environments across the life course (eg, junior high school, high school, neighborhood growing up, current neighborhood, place of employment, place of worship) and hypertension diagnosis.

Results: The majority (86%) of participants were not currently in the workforce (retired, unemployed, or disabled) and more than half (54%) reported an annual household income of <$9,999; median age was 53. Results suggest that African American men who grew up in mostly Black neighborhoods (OR=4.3; P=.008), and worked in mostly Black environments (OR=3.1; P=.041) were more likely to be diagnosed with hypertension than those who did not.

Conclusion: We found associations between mostly Black residential and workplace settings and hypertension diagnoses among African American men. Findings suggest exposure to segregated environments during childhood and later adulthood may impact hypertension risk among African American men over the life course. *Ethn Dis.* 2015;25(3):295-304.

Key Words: Racial Composition, Segregation, African American Men's Health, Hypertension, Health Disparities

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Introduction

The experiences of many African American (AA) men are associated with several health risk factors, poverty, distrust of institutions, discrimination, and isolation, which place them at greater risk for health problems.[1,2] AA men are plagued with health issues earlier in life, disproportionately suffer from preventable conditions, and suffer disproportionately higher mortality, compared with White men.[3,4] As overall mortality and morbidity has improved in the Unites States, AA men remain more likely to die from chronic diseases such as cardiovascular disease, diabetes, and cancers compared with their White counterparts.[5] As concerning, AA men have a life expectancy five years less than White men.[6] All of the aforementioned speak to a life course of disparities for AA men, with roots in the cumulative disadvantage perspective and the weathering hypothesis.[7–9] However, Thorpe and Kelley-Moore suggest health disparities that include a life course approach use more biological, psychosocial, and environmental measures across the life course, which also captures an ecological perspective.[8] There has been some exploration about the influence of the environment on racial differences in predisposition to hypertension and stroke, by examining different exposure time points and duration across the life course for AAs and Whites. AAs have a higher risk for developing hypertension and stroke when exposed to segregated environments earlier in life.[10] These factors are often unaccounted for in the study of AA men's health.

However, these factors need to be explored to better explain the complexity of AA men's health profile as well determining how this profile is structured by social and physical environments[11-13] and policies that negatively shape health outcomes and health behaviors (eg, access and use of health care services),[14,15] especially related to cardiovascular disease.[16]

The epidemiological profile of AA men is the result of several intersecting factors[13] that begin to reveal a more complex and concerning story of racialized and gendered experiences for this population.[14,15,17,18] Specifically, the percentage of AA men with hypertension has increased since 1988 from 37.5% to 42.5% in 2012 and hypertension is uncontrolled in almost 70% of these men.[19] This is quite concerning as hypertension is a determinant of stroke and cardiovascular mortality, which are more than 50% higher in AA men compared with White men.[20] Nationally, AA men develop hypertension at an earlier age, have higher rates of advanced (stage 3) hypertension, and are more likely to experience hypertension complications compared with non-Hispanic White men.[21] The South has higher cardiovascular mortality than other regions of the United States; however, other regions struggle with determinants of cardiovascular mortality, such as hypertension.[22]

Hypertension is a significant health issue for AAs in Missouri. Statewide, 40% of AAs have hypertension compared with 34% of Whites.[23] Furthermore, in Missouri, compared with Whites, AAs are 3 times more likely to be hospitalized due to hypertension, 5 times more likely to have an emergency room visit related to hypertension, and 2.5 times more likely to die with essential hypertension as the underlying cause.[23] Also of note, the two-year average hypertension mortality rate in Missouri from 2007 to 2009 for AA men was more than twice that of White men (229.8 vs 102 per 100,000), quadruple the rate of Hispanic men (62 per 100,000), and more than four times greater than the rate of Asian men (49.8 per 100,000) men. In St. Louis County, the most populous county in Missouri, the five-year total mortality rate for hypertension was 19.9 per 100,000 for AA men and 4.1 per 100,000 for White men between 2005 and 2009. The aforementioned hypertension mortality rates of AA men in Missouri compared with White men are more than 100% higher, which illustrates how grave this matter is.

In order to understand the racial/ethnic and gender differences in hypertension, it is necessary to examine the connection between the biological, psychological, social and economic factors that contribute to chronic diseases,[8,24-26] such as hypertension, since it is a major risk factor for other leading causes of death (eg, stroke, heart disease) for AA men.[27-29] According to Safford et al, patient complexity is a function of the interactions between biological, cultural, environmental, socioeconomic, and behavioral forces.[30] Thus, understanding only the biology of hypertension in AA men will produce less than optimal health outcomes.

For AA men, the challenge of a healthful change in lifestyle or behavior is compounded by long-standing social and historical conditions of inequality that begin in early childhood and may continue into adulthood.[31,32] These social and environmental conditions are a byproduct of the legacy of racial residential segregation, and remain an understudied determinant of disparities[33] for AA men's health. This isolation places greater reliance on AA men to be able to solve their own problems and not share or seek information from others.[2] An increased recognition of these social conditions may uncover important insights into the unique health profile of AA men based on the contexts of where they live, are educated, work and worship. Our study sought to understand the interplay between race, social contexts, and social economic status as contributors to clinical diagnosis of hypertension.

Methods

Setting

Our study was conducted in the primary care clinic of a large urban hospital. The clinic serves as the site

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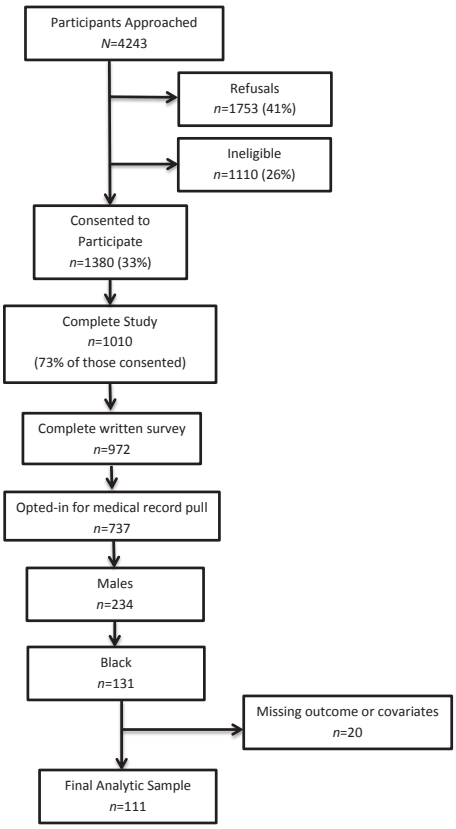

Figure 1. Description of the analytic sample

for ambulatory care training for a large internal medicine residency program with about 150 residents. During their three years of training, these residents provide primary care to the patients and have a continuous relationship with them during training. The clinic provides a broad range of services for patient care including social work, pharmacy, nutrition, and foot care. Physicians who hold appointments at Washington University School of Medicine supervise clinic residents. In 2014, the Primary Care Clinic in the Center for Outpatient Health (COH) at Barnes-Jewish Hospital saw 16,907 unique patients; 64% African American, 30% White, and 6% other. The majority of patients were female (67%), between aged 35-64 years (59%) and lived in St. Louis City (46%) or St. Louis County (31%). About 40% of patients were covered by Medicare; 40% covered by Medicaid; and 3% were uninsured.

Sample

The analytic sample consisted of 111 respondents that self-identified as non-Hispanic AA men who consented to the use of medical record data, with non-missing responses to hypertension status (outcome), racial composition (primary predictor), age, and body mass index; Figure 1 provides a description of the analytic sample. Respondent's race and ethnicity were determined by their response to two questions: 1) What is your ethnicity? (ie, Hispanic, non-Hispanic); and 2) What is your race? (ie, African American or Black, White, Asian/Pacific Islander, Native American, or Other). Sex (male/female) was also self-reported on the survey. Age was calculated from self-reported birth year and modeled continuously.

Data Collection

Participants in this study were recruited between July 2013 and April 2014. Patients in the waiting rooms of the COH were approached by trained data collectors and asked to complete a survey in English. Surveys were administered on different days of the week and at different times of day; data collectors approached all patients in the waiting room during their shift. Inclusion criteria were: aged >18 years; a patient at the COH; English-speaking. Participants were asked to complete a self-administered written questionnaire and a verbally administered survey component. All participants completed a verbal consent process and signed a written consent form before completing the survey. As part of the consent process, participants could opt-in to have information abstracted from their medical record and merged with questionnaire data. The Human Research Protection Office at Washington University School of Medicine approved this study.

Data collectors approached 4,243 people for participation in the study; 1,753 (41%) refused participation and approximately 26% (n=1,110) of those approached were ineligible to participate in the study because they were not patients, did not speak Eng-

lish, or had previously taken the survey. Among eligible participants, 43% (*n*=1,380) agreed to participate in the study and were consented by trained data collectors. Of the 1,380 patients who were consented, 972 (70%) completed the written questionnaire. Among those with complete written questionnaires, 737 (76%) opted-in to have data abstracted from their electronic medical record. Among those with complete information, 234 were males and 131 Black. Several (*n*=20) participants were missing outcomes, primary predictors or covariates and were excluded from analysis; the resulting analytic sample consisted of 111 Black men.

Participants completed the questionnaires while waiting for their appointment with clinic staff and physician. The primary reason for incomplete surveys was inadequate time between the start of the survey and when the clinic was ready to begin the patient evaluation. There were no significant differences in sex between individuals with complete surveys and those with incomplete surveys. African Americans made up the majority (75%) of non-completers, a statistically higher proportion than those completing the survey (63%; *P*=.003). Survey respondents were generally similar to the underlying COH primary care clinic patient population with respect to sex, age, race, and location of residence (St. Louis City, St. Louis County, Other).

Racial Composition Measure

In the questionnaire, participants were asked to identify the approximate racial composition of six environments from their past and present lives using an item adapted from the Behavioral Risk Factor Surveillance System[34] and the National Survey of Black Americans.[33] Environments included neighborhood (childhood and current), schools (junior high and high school), workplace and place of worship. For each environment, respondents indicated the racial composition (eg, mostly Blacks, some Blacks, mostly Whites, about half Whites) from among 8 response options, selecting all options that applied. To identify ethnic enclaves, indicator variables for the selection of the "mostly Blacks" option in each environment were used in analysis.

Medical Record

Trained data collectors abstracted the following information from the medical record of each participant: diagnosed hypertension (Yes or No); number of comorbidities; and body mass index (BMI). The number of comorbidities for this sample was dichotomized as none compared with one or more (0, 1+) and reflected the number of recorded diagnoses of heart disease and diabetes. BMI was dichotomized at obese (BMI ≥ 30).

Data Analysis

For each environment, bivariate associations between the dichotomous indicator for "mostly Black" (or not) and an indicator for personal history of hypertension (yes/no) were assessed using chi-squared test. Other potential confounders in the relationship between racial composition of environments and hypertension status were tested using chi-squared test. If a covariate was significant at the *P*≤ .10 level, it was considered for entry into the final multivariable model. Multivariable logistic regression models were built using personal history of hypertension as the outcome and the significant racial composition environments (neighborhood growing up and workplace) from the bivariate associations. Covariates from the bivariate analyses were added into the model; the final model controlled for BMI, number of comorbidities, and age. Data were analyzed using SAS/STAT software Version 9.4 for Windows.[35] Statistical significance was assessed at *P*≤.05 for multivariable logistic regression analysis.

Results

Table 1 displays demographic characteristics of the overall analytic sample, as well as stratified by hypertension status (hypertension, no hypertension). The majority (86%) of participants were not currently in the workforce (retired, unemployed, or disabled) and more than half (54%) reported an annual household income of <$9,999. Almost half (46%) of participants were obese and BMI is associated *(P*=.001) with hypertension status; there is higher proportion of non-obese participants (77%) in the non-hypertensive group and obese participants (55%) in the hypertensive group. Most participants (51%) have at least one comorbidity (diabetes or heart disease) *(P*=.001). The prevalence of diabetes in our sample was 39% and 23% were diagnosed with heart disease. The mean age for the overall sample was 52, standard deviation (SD=10); among hypertensives mean age was

Table 1. Sample characteristics overall and stratified by hypertension status

	Total sample (*N*=111)		Hypertension (*n*=80)	No hypertension (*n*=31)	*P*[a]
Continuous					
Age, years, mean ± SD	51.87 ± 10.27		52.88 ± 9.08	49.29 ± 12.66	.102
Categorical	n	%	n (%)	n (%)	
Body mass index					.002
Non-obese (BMI< 30)	60	54.05	36 (45.00)	24 (77.42)	
Obese (BMI≥30)	51	45.95	44 (55.00)	7 (22.58)	
Number of Comorbidities[b]					.001
0	54	48.65	31 (38.75)	23 (74.19)	
≥1	57	51.35	49 (61.25)	8 (25.81)	
Income					.938
<$9,999	52	53.61	37 (52.86)	15 (55.56)	
$10,000 - $19,999	24	24.74	18 (25.71)	6 (22.22)	
≥$20,000	21	21.65	15 (21.43)	6 (22.22)	
Education					.535
Less than high school	17	15.74	14 (17.95)	3 (10.00)	
High school diploma/GED	54	50.00	37 (47.44)	17 (56.67)	
Some college or above	37	34.26	27 (34.62)	10 (33.33)	
Employment status[c]					.946
Currently in workforce	15	14.43	11 (14.29)	4 (14.81)	
Not in workforce	89	85.57	66 (85.71)	23 (85.19)	
Racial composition of environment					
Junior high school (*n*=109)					.963
Mostly Black	77	70.64	55 (70.51)	22 (70.97)	
Other	32	29.36	23 (29.49)	9 (29.03)	
High school (*n*=108)					.589
Mostly Black	67	62.04	49 (63.64)	18 (58.06)	
Other	41	37.96	28 (36.36)	13 (41.94)	
Neighborhood growing up (*n*=107)					.059
Mostly Black	82	76.64	62 (81.58)	20 (63.52)	
Other	25	23.36	14 (18.42)	11 (35.48)	
Current neighborhood (*n*=110)					.840
Mostly Black	62	56.36	45 (56.96)	17 (54.84)	
Other	48	43.64	34 (43.04)	14 (45.16)	
Workplace (*n*=108)					.088
Mostly Black	32	32.41	29 (37.18)	6 (20.00)	
Other	73	67.59	49 (62.82)	24 (80.00)	
Worship (*n*=106)					.136
Mostly Black	63	59.43	48 (64.00)	15 (48.39)	
Other	43	40.57	27 (36.00)	16 (51.61)	
Cumulative racial composition of neighborhood growing up and workplace (*N*=111)					.086
Neither mostly Black	25	22.52	16 (20.00)	9 (29.03)	
One mostly Black	55	49.55	37 (46.25)	18 (58.06)	
Both mostly Black	31	27.93	27 (33.75)	4 (12.90)	

a. Chi-square test for the association between hypertension status and sample characteristic.
b. Comorbidities include diagnoses of heart disease and diabetes.
c. Currently in the workforce includes part-time and full-time workers, Not currently in the workforce includes unemployed, retired, disabled, maintaining the home.

Table 2. Logistic regression models predicting hypertension

	OR	95% CI	P	OR	95% CI	P
Racial composition	Neighborhood growing up (n=107)			Workplace (n=108)		
Mostly Black	3.37	1.12 – 10.17	.031	3.03	1.00 – 9.16	.049
Other	Ref	--	--	Ref	--	--
Body mass index						
Non-obese (BMI<30)	Ref	--	--	Ref	--	--
Obese (BMI≥30)	3.73	1.33 – 10.47	.012	3.95	1.37 – 11.39	.011
Number of comorbiditiesa						
0	Ref	--	--	Ref	--	--
≥1	3.51	1.27 – 9.69	.016	4.31	1.53 – 12.12	.006
Age	1.04	.99 – 1.09	.114	1.03	.98 – 1.08	.225

a. Comorbidities include diagnoses of heart disease and diabetes.

53 (SD=9) and non-hypertensives had a mean age of 49 (SD=13).

Approximately 77% of the participants grew up in a mostly Black neighborhood. Among those with hypertension, 82% reported growing up in a mostly Black neighborhood; of those who are not hypertensive, 64% reported growing up in a mostly Black neighborhood. Neighborhood growing up and workplace were associated with hypertension status *(P*<.1) in bivariate analysis; there were no associations between hypertension and racial composition of junior high school, high school, current neighborhood, and place of worship. Less than a third (32%) of participants reported working in a mostly Black environment; 37% among those with hypertension reported mostly Black work environments compared with 20% of those without hypertension

We developed multivariable logistic regression models to examine the association between hypertension status and racial composition of the two environments (neighborhood growing up and workplace) significant at *P*<.10 in bivariate analyses controlling for age, BMI, and number of comorbidities. We selected covariates for our final model based on Akaike Information Criterion (Table 2).[36,37]

We did find life course effects of segregation on hypertension as both past (neighborhood growing up) and current (workplace) environments were associated with hypertension. Those who reported living in a mostly Black neighborhood while growing up were 3.4 times more likely to have hypertension than those who lived in a neighborhood that was not predominantly Black *(P*=.031), controlling for BMI (OR=3.7; *P*=.012), comorbidities (OR=3.5 *P*=.016) and age (OR=1.0; *P*=.114). Controlling for obesity (OR=4.0; *P*=.011), number of comorbidities (OR=4.3; *P*=.006) and age (OR=1.0; *P*=.225), those who reported a mostly Black workplace were 3 times more likely to have hypertension than those who reported a workplace that was not mostly Black *(P*=.049).

To examine the cumulative burden of segregated environments across the life course, we summed the indicators for those environments that showed to be associated with hypertension, which were: "mostly Black" composition of neighborhood growing up and "mostly Black" composition of workplace (Table 3). Less than a quarter (23%) of participants reported no mostly Black environments, half (50%) reported mostly Black in one of the two environments and 28% reported mostly Black in both environments (neighborhood growing up, workplace). There was no association *(P*=.084) between number of mostly Black environments and hypertension status in bivariate analysis; however, with 34% of hypertensive AA men reporting mostly Black in both

Our study shows that exposure to segregated neighborhoods growing up and occupational segregation in adulthood increases the risk for hypertension by four and three times, respectively.

environments compared with 13% of non-hypertensive men, we observed significance in adjusted models. When controlling for BMI (OR=4.3; *P*=.007), number of comorbidities (OR=4.0; *P*=.009) and age (OR=1.0; *P*=.175) for each additional mostly Black environment, a Black man is exposed to his odds of hypertension increases 250% (OR=2.5; p=.013).

Discussion

Advancements in AA men's health will be made as research begins to elucidate not only individual-level factors that contribute to chronic disease risk profiles, but also the contributions of the social contexts of AA men such as where they live and where they work. Specifically, our study sought to examine the relationship between the racial composition of social and physical environments of AA men and their risk for hypertension. Our study shows that exposure to segregated neighborhoods growing up and occupational segregation in adulthood increases the risk for hypertension by four and three times, respectively. It is critical to understand the measures and patterns of segregation to explicate their impact on the elevated risk for hypertension for Black men.

Our study used self-reported subjective measures of racial/ethnic composition across multiple life course environments with a dyadic Black/White comparison. This is an appropriate measure given the racial composition of the St. Louis City metropolitan area. Many health services research studies use subjective vs objective measures[38] that examine the five dimensions of racial and ethnic segregation: evenness, isolation, concentration, centralization, and clustering.[39] Objective measures were not used in this study so that we could capture a more dynamic, experiential, and fluid sense of racial composition across the life course and in different social and environmental contexts. Early exposure to segregation as measured here by neighborhood growing up leads to higher risks for hypertension and, later-in-life workplace segregation also increases the risk for hypertension for AA men. These two time points are important contributions to the AA men's health literature by helping to understand risk profiles for hypertension over the life course using subjective measures of segregation.

There are several conceptual models that characterize life course socioeconomic position (SEP) and early vs late emergence of cardiovascular disease (CVD) and other chronic diseases in adulthood.[31,32] Our study explored the cumulative burden model[32] or accumulation of effects risk model,[31] which suggests that the health-damaging effects of socioeconomic deprivation in both childhood and adulthood are additive or aggregate over the lifespan and undermine health status in middle adulthood. AA men in this sample are either retired, disabled or unemployed and have low incomes. Low SEP in this later phase of life, added to growing up and working in segregated contexts, suggests that the cumulative burden model may be in operation with this sample of men, given the increased risk for hypertension the more exposure AA men have to mostly Black environments. These findings may therefore add to the evidence from a study using data from the National Survey of Black Americans to examine the associations between self-reported hypertension, childhood SEP, adulthood SEP, and downward intergenerational social mobility.[40] The cumulative burden model, which illustrates the lack of mobility into more integrated spaces of the men in this sample, is supported by our results. The racial composition of Black men in our sample in junior high school, high school, current neighborhood, and where they worship remained predominantly Black. Our

Table 3. Logistic regression model predicting hypertension cumulative burden: Cumulative racial composition of neighborhood growing up and workplace (*N*=111)

	OR	95% CI	*P*
Racial composition	2.52	1.21 – 5.23	.013
Body mass index			
Non-obese (BMI< 30)	Ref	--	--
Obese (BMI≥30)	4.25	1.48 – 12.19	.007
Number of comorbidities[a]			
0	Ref	--	--
≥ 1	4.02	1.42 – 11.34	.009
Age	1.03	0.99 – 1.08	.175

a. Comorbidities include diagnoses of heart disease and diabetes.

study was unable to look at variations in SEP over the life course due to the small sample size of AA men. Additional studies that use racial composition measures should include a large enough sample size of AA men to test the plausibility of the three conceptual models. Because AA men are underrepresented in research studies,[41,42] researchers need to be mindful of employing culturally and gender-targeted strategies that engage AA men by using trusted individuals, ensuring a safe and caring environment, accommodating times, and ensuring that participants understand the benefits of their participation.[43] Also, it will be important to identify community-based approaches to reach this vulnerable population to systematically engage them in the research process.[44]

Our sample of AA men was less socially mobile in the sense that they did not interact often in more integrated spaces. This could be a result of their socioeconomic status that does not provide them with the economic capital to escape inequitable environments.[16,45–47] A second explanation could be that their social capital may not include enough bridging linkages that can expose them to social networks that can help them to gain more economic capital.[48] And a third explanation suggests that, as a result of the enduring presence of racial discrimination, which stems from psychosocial perceptions of AA enacted in policy, AA men are discriminated against within the labor market and are relegated to lower paying jobs without job security, less perks and benefits, and higher occupational stressors and hazards.[49] Following the cumulative burden model of risk suggests that the aggregate effect of institutional or systematic discrimination[50] as exhibited by patterns of racial residential segregation can have the potential to prevent AA men from escaping the deleterious effects of environments that may provide less access to health promoting resources.[11,12,13] Factors such as psychosocial factors, stress, coping strategies, measures of discrimination and personality characteristics were not measured in this study, but are important factors to assess when considering the effects of specific social contexts, as well as events, in the lives of AA men and their contribution to risk for hypertension.

Study Limitations

Findings from our study should be interpreted in context of several important limitations. The majority (72%) of the sample was hypertensive leaving a small (n=31) comparison group. We did not define the response option of "neighborhood growing up" for participants, leaving the potential that some may have interpreted this differently. In addition, given the range of ages (min=26, max=71); participants' perceptions of racial composition of past environments is subject to recall bias. Respondents' reports of racial composition of workplace is also subject to recall bias as participants were asked the racial composition of the their current or most recent workplace and the majority (86%) of our sample were not currently in the workforce. Given all participants were adults, each is required to recall >10 years, with some participants having to recall more than 50 years for past environments. We did not ask participants if they grew up in St. Louis and there is the potential that mostly Black environments in other places are different from those in St. Louis.

This analysis is exploratory in nature and given the small sample size it is important to develop a parsimonious model that fits the data well. As such, many important confounding factors are not adjusted for in these models (eg, health behaviors, job type). In future research it is important to corroborate our findings in a larger sample that will allow for adjustment of additional confounding factors to fully elucidate the relationship between segregation experience and hypertension among AA men. Despite these limitations, this exploratory study shows interesting associations and develops future research questions about the association between segregation experience and adult hypertension outcomes among AA men.

We cannot generalize the findings from this sample of AA men to other urban areas or outpatient clinics; however, we do have examples of studies that examined hypertension in samples of low income AA men, namely, the extant literature that explains the John Henryism hypothesis.[51–53] Many AA men in our sample experienced social stressors, associated with unemployment, lower SEP, work environments that are predominantly Black, and job stressors that include chronic financial strain and job insecurity. These factors could potentially make managing psychological stress difficult; however, this study did not measure those factors. It is not clear if our results would differ with a wider socioeconomic sample of AA men, or

men who had more integrated experiences in the social contexts examined in this study. Additionally, it may be valuable to examine effects of racial composition of these environments and their influence on hypertension risk, as well as other chronic conditions for AA women and AA men who live under similar social and environmental conditions using both subjective and objective measures.

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