Neighborhood Conditions and Psychosocial Outcomes Among Middle-Aged African Americans: A Cross-sectional Analysis

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Abstract

Objective: We examined associations between observed neighborhood conditions (good/adverse) and psychosocial outcomes (stress, depressive symptoms, resilience, and sense of control) among middle-aged and older African Americans. **Methods:** The sample included 455 middle-aged and older African Americans examined in Wave 10 of the African American Health (AAH) study. Linear regression was adjusted for attrition, self-selection into neighborhoods, and potential confounders, and stratified by the duration at current address (<5 vs ≥5 years) because of its hypothesized role as an effect modifier. **Results:** Among individuals who lived at their current address for ≥5 years, residing in neighborhoods with adverse versus good conditions was associated with significantly less stress (standardized β = −0.18; P = .002) and depressive symptoms (standardized β = −0.12; P = .048). Among those who lived at their current address for <5 years, residing in neighborhoods with adverse versus good conditions was not significantly associated with stress (standardized β = 0.18; P = .305) or depressive symptoms (standardized β = 0.36; P = .080). **Conclusion:** Neighborhood conditions appear to have significant, complex associations with psychosocial factors among middle-aged and older African Americans. This holds important policy implications, especially since adverse neighborhood conditions may still result in adverse physical health outcomes in individuals with >5 years at current residence despite being associated with better psychosocial outcomes.

Keywords

African American, community health, managerial epidemiology, neighborhood, psychosocial factors

Background

A considerable body of research links built environmental neighborhood conditions, including neighborhood land use, structure, and layout (eg, presence and conditions of green spaces, sidewalks, public spaces, and traffic flow), to health and well-being.[1,2] Examining the pathways behind these links can help guide social policy, intervention development, and implementation of successful interventions.[2] One pathway suggests that psychosocial factors may mediate, in part, the effects of neighborhoods on health outcomes.[3,4] Psychosocial factors (eg, stress, depressive symptoms, resilience, and sense of control) have been associated with adverse physical health outcomes.[5-9] However, studies examining associations between neighborhood conditions and psychosocial factors have yielded mixed findings.[10-16] Thus, whether psychosocial factors serve as a mediating

pathway between neighborhood conditions and health outcomes remains unanswered. This is a particularly important question for middle-aged and older African Americans given the role of built environmental neighborhood conditions in shaping the aging experience of middle-aged adults,[17-20] and since eliminating health disparities, including those caused

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by racial and geographic inequalities, is a primary overarching goal of Healthy People 2020.[21]

This study examined associations between built environmental neighborhood conditions (assessed by trained examiners and hereafter denoted "observer-rated" neighborhood conditions) and respondent-reported psychosocial factors including stress, depressive symptoms, resilience, and sense of control in late middle-aged African Americans interviewed in Wave 10 of the African American Health (AAH) study. We examined these associations stratified by the duration of living at the current address (<5 years vs ≥5 years), because we hypothesized that the effects of adverse neighborhood conditions would be less detrimental to those who resided in their neighborhood longer.[20,22] According to the social stress model, residential mobility makes it hard to maintain social ties, thus increasing an individual's susceptibility to neighborhood stressors,[18] whereas a longer duration of residence in one's neighborhood may give residents a sense of belonging and may alter an individual's perception of their environment.[10,20,22,23]

Data and Methods

Description of the Study Sample

AAH is a population-based prospective cohort study of 998 urban-dwelling African Americans 49 to 65 years at baseline, as described elsewhere.[24,25] Recruitment occurred between September 2000 and July 2001, with a baseline response rate of 76% (998 out of 1320). In brief, participants either lived in a very poor area in the city of Saint Louis, Missouri, or in less impoverished suburban areas northwest of the city. Block groups with at least 10% African Americans based on the 1990 Census were identified using a geographic information system (GIS). A multistage cluster design was used to randomly select area segments within each block group and, subsequently, housing units within each area segment. If more than one household member met eligibility criteria, only one was selected (using random allocation tables) to be invited for study participation.

Eligibility criteria included self-identification as Black or African American, birth date between January 1, 1936 and December 31, 1950 (inclusive), and willingness to complete written informed consent. The standardized Mini-Mental State Examination (MMSE) was also administered to assess respondents' cognitive status,[26] and those who scored <16 were deemed noneligible for study participation because such scores question the validity and reliability of self-reported data.[25] The study was approved by the Saint Louis University Institutional Review Board.

This study used a cross-sectional design based on Wave 10 of AAH conducted in spring-summer of 2010, and involved assessments of 582 surviving participants (59-74 years in Wave 10). A total of 483 neighborhood blocks were rated by trained examiners (as described below), with 15.1% of blocks including 2 or more participants' addresses. Raters received 6 hours of classroom training and 3 hours of field training prior to conducting the neighborhood assessments. Participants were interviewed during the weeks preceding the neighborhood assessment (mean 10 ± 3 weeks) using a detailed in-home protocol that included assessments of participants' demographic and behavioral characteristics, mental and physical health, functional limitations, stress level, social support, and executive functioning.[24] The final analytic sample included 455 individuals (78.2% of Wave 10 participants) with complete data on variables under study.

Exposure Variable

We defined neighborhood as the block where individuals resided, because for older adults' health and well-being, the immediate environment may be most relevant since they typically spend a large amount of time at home and within the confines of their neighborhood.[18-20] Neighborhood conditions were evaluated using the Neighborhood Assessment Scale (NAS), an observer-rated scale previously tested and validated during Wave 10 of the AAH study.[24] NAS evaluates 7 items, including traffic volume; street condition; amount of noise; the presence of beer or liquor bottles; the presence of cigarette or tobacco litter; the presence of garbage, litter, or broken glass; and the external condition of residential units.[24] NAS scores range from 0 to 17, with higher scores reflecting worse conditions.[24]

In this study, NAS was dichotomized into "good" (NAS ≤ 6) versus "adverse" (NAS > 6) conditions based on results of graphical and other analytical procedures indicating a quadratic association between neighborhood conditions and most of our outcomes. To estimate the cutoff for the NAS variable, we used $-b_1 / (2 \times b_2)$, where b_1 is the linear NAS coefficient and b_2 is the quadratic NAS coefficient.[27]

Psychosocial Outcome Variables

Stress was measured by the National Opinion Research Center (NORC) National Health Survey[28] that includes 2 questions using a 5-point Likert-type response relating to the amount of daily stress experienced in the past 4 weeks and the extent to which stress may have affected participants' health.[28] *Depressive symptoms* were assessed using the 11-item Center for Epidemiologic Studies Depression (CES-D) scale, a well-validated scale that produces results of comparable accuracy to the original 20-item scale.[29] It is measured using 4-point Likert-type response sets, with higher values indicating greater depressive symptomatology.[29]

Resilience was assessed using the self-rated 10-item Connor-Davidson Resilience Scale (CD-RISC).[30] The scale assessed whether participants were able to adjust to change, deal with unforeseen circumstances, overcome obstacles,

and bounce back from illness or hardship.[30] It is measured using a 5-point Likert-type response set, with the scale score ranging between 10 (minimal resilience) and 50 (maximal resilience).[30] *Sense of control* was assessed using the 8-item Mirowsky-Ross 2×2 Index,[31,32] which assesses whether participants claimed or denied control over event occurrences, and balances good with bad outcomes and internal (instrumental) with external (fatalistic) statements; thus, its results are not biased by self-defense, self-blame, or agreement bias.[31] The scale is measured using 4-point Likert-type response sets, with scores ranging from −16 (maximally denying control) to +16 (maximally claiming control).

Potential Confounders

We considered potential confounders from Wave 10 that were previously associated with neighborhood conditions and psychosocial factors, including sociodemographic characteristics, social support,[25,33] health care access and utilization, health behaviors, current medical conditions, and health status.[34,35]

Stratifying Variable

The duration of living at the current address was assessed using the question "How long have you lived at your current address" and was dichotomized into <5 versus ≥5 years. We chose a cutoff point of 5 years for the duration of living at the current address to reflect relative newness in one's neighborhood, similar to the cutoff point used for residential mobility versus stability in previous research.[17,22,36,37] We also reran our analyses using different cut points for the duration of living at the current address to assess the robustness of our findings.

Statistical Analysis

Baseline Characteristics by NAS Group. Differences in sample characteristics by NAS were assessed using the Pearson chi-square (χ^2) test for categorical variables and *t* test for continuous variables. Linear regression was used to evaluate associations between neighborhood conditions and each psychosocial outcome stratified by years at current address. Stratification was performed despite nonsignificant interactions between NAS and years at current address, given the hypothesized associations and because effect modification can be present without a statistically significant interaction.[38]

Management of Potential Biases From Attrition and Self-Selection Into Place of Residence. We used 2 propensity scores to control for potential confounding to conserve power and adjust for potential biases from (*a*) attrition and (*b*) residential

self-selection into neighborhoods.[39] The first propensity score was estimated as the probability for participation in Wave 10 conditional on confounders in Wave 1. The second propensity score modeled the probability of living in neighborhoods with adverse versus good conditions based on Wave 10 variables, and included the first propensity score in the model to obtain an unbiased estimate. Our final linear regression model included the second propensity score as a single variable that included the first propensity score and the aforementioned confounders. Analyses were also weighted by the probability of selection into the study and sample nonresponse to obtain a representative sample of the population. Since our outcomes were not normally distributed (using Kolmogorov-Smirnov and Shapiro-Wilk tests), we used the robust regression feature, which produces more accurate standard errors.[27]

Sensitivity Analyses to Examine the Robustness of Our Findings. First, while we dichotomized NAS for easier interpretation, we also ran a piecewise regression analysis with the spline function with 1 knot at NAS = 6 for comparison purposes. Second, we included all participants with nonmissing values for each outcome separately (n = 513 for stress, n = 500 for depressive symptoms, n = 505 for resilience, n = 519 for sense of control). Third, as we did not adjust for visual problems, hearing problems, obesity, income, and kidney disease in our main analysis due to the large number of missing values for these variables, we conducted another sensitivity analysis including the latter variables (n = 388). Fourth, we removed education, employment, and perceived income adequacy from propensity scores to reduce potential overadjustment. Fifth, we dichotomized years at current address at the first quartile (<10 vs ≥10 years) and at the median (<23 vs ≥23 years). Analyses were performed using STATA (release 13.0; StataCorp LP, College Station, TX) and α < .05.

Results

Participants who lived in neighborhoods with adverse versus good conditions had significantly different marital status, area of residence, perceived income adequacy, home ownership, social support, self-rated health, and duration of living at the current address (Table 1).

Among individuals who lived at their current address for <5 years, residing in neighborhoods with adverse versus good conditions was associated with non–statistically significant greater stress and depressive symptoms, and lower sense of control in crude analyses (Table 2) and adjusted analyses (Table 3). In contrast, among those who lived at their current address for ≥5 years, residing in neighborhoods with adverse versus good conditions was associated with lower stress and depressive symptoms, nonsignificantly in crude analyses (Table 2) and significantly in the

Table 1. Characteristics of the African American Health Study Sample by Neighborhood Conditions[a] (n = 455).

	Neighborhood Conditions		
	Good (n = 362)	Adverse (n = 93)	*P*[b]
Age (years), mean (SD)	65.56 (4.53)	65.69 (4.66)	.805
Sex (male), n (%)	142 (39.2)	44 (47.6)	.277
Area of residence (city), n (%)	56 (15.6)	28 (30.2)	.001
Marital status (married), n (%)	176 (48.8)	27 (29.0)	.010
Education (<12 years), n (%)	67 (18.5)	26 (27.7)	.095
Perceived income adequacy, n (%)			.007
Comfortable	225 (62.2)	39 (42.2)	
Just enough	101 (28.0)	47 (50.7)	
Not enough	35 (9.8)	7 (7.2)	
Employed, n (%)	123 (34.0)	28 (30.3)	.640
Owns home, n (%)	299 (82.8)	57 (61.0)	<.001
Years at current address (<5), n (%)	42 (11.5)	23 (24.4)	.028
Has insurance, n (%)	319 (88.1)	85 (90.9)	.623
Social support, mean (SD)	19.60 (4.37)	17.96 (5.56)	.002
Self-rated health (fair/poor), n (%)	100 (27.7)	46 (49.5)	.003
Hospitalized in past year, n (%)	55 (15.2)	24 (25.2)	.063
Smoking, n (%)	81 (22.5)	28.7 (30.7)	.257
Regular exercise, n (%)	165 (45.7)	30 (32.5)	.071
High blood pressure, n (%)	290 (80.3)	81 (87.1)	.174
Diabetes, n (%)	145 (40.2)	35 (37.6)	.726
Cancer, n (%)	54 (15.0)	14 (14.8)	.976
Chronic obstructive pulmonary disease, n (%)	25 (7.0)	5 (4.9)	.522
Heart attack, n (%)	54 (15.0)	14 (14.8)	.961
Congestive heart failure, n (%)	19 (5.1)	7 (7.9)	.390
Angina, n (%)	40 (11.2)	14 (15.0)	.423
Asthma, n (%)	37 (10.2)	7 (7.6)	.482
Arthritis, n (%)	202 (55.7)	58 (61.9)	.441
Activities of daily living, mean (SD)	0.54 (1.41)	0.72 (1.48)	.267
Stress, mean (SD)	4.28 (2.10)	4.22 (1.94)	.793
Depressive symptoms, mean (SD)	4.65 (4.85)	5.42 (5.09)	.178
Resilience, mean (SD)	41.05 (5.96)	41.11 (6.61)	.933
Sense of control, mean (SD)	4.70 (4.17)	3.43 (3.33)	.007

[a]Neighborhood assessment scale ≤6 indicate good neighborhood conditions, neighborhood assessment scale >6 indicate adverse neighborhood conditions.

[b]*P* value for a chi-squared test for categorical variables and for a *t* test for continuous variables.

adjusted analyses (Table 3). Residing in neighborhoods with adverse versus good conditions for ≥5 years was significantly associated with lower sense of control in crude analyses (Table 2); however, this relationship became non–statistically significant in the adjusted analyses (Table 3). Our sensitivity analyses demonstrated results that were largely identical to our primary analyses (results available on request).

Discussion

Our results show that neighborhood conditions were associated with stress and depressive symptoms, but the direction of association depended on the duration of living at the current address. While poorly rated neighborhood conditions were associated with nonsignificantly *greater* stress and depressive symptoms among individuals living at their current address for <5 years, they were associated with significantly *less* stress and depressive symptoms among individuals living at their current address for ≥5 years. Results from sensitivity analyses using the 10-year and median splits were consistent with our main findings.

Explanations for these findings include at least 2 possibilities: (*a*) the effect of adverse neighborhood conditions on psychosocial outcomes decreases over time and/or (*b*) people who were affected most by those conditions are more likely to have attrited. Based on the cross-sectional nature of this study, we cannot definitively differentiate

Table 2. Crude Linear Regression Analyses for Neighborhood Conditions (Adverse vs Good)[a] in Association With Psychosocial Outcomes.[b]

	<5 Years at Current Address (n = 72)				≥5 Years at Current Address (n = 383)			
	β	b	SE	P	β	b	SE	P
Stress	0.27	1.24	0.93	.185	−0.10	−0.51	0.28	.066
Depressive Symptoms	0.34	3.96	2.63	.136	−0.03	−0.34	0.72	.634
Resilience	−0.11	−1.33	2.07	.525	0.02	0.35	1.03	.734
Sense of Control	−0.07	−0.46	1.02	.652	−0.14	−1.50	0.57	.009

Abbreviations: β, standardized beta; b, unstandardized regression coefficient; SE, standard error.
[a]Neighborhood assessment scale ≤6 indicate good neighborhood conditions. Neighborhood assessment scale >6 indicate adverse neighborhood conditions.
[b]For stress and depressive symptoms, higher values reflect worse function, while for resilience and sense of control, higher values indicate better function.

Table 3. Adjusted[a] Linear Regression Analyses for Neighborhood Conditions (Adverse vs Good)[b] in Association With Psychosocial Outcomes.[c]

	<5 Years at Current Address (n = 72)				≥5 Years at Current Address (n = 383)			
	β	b	SE	P	β	b	SE	P
Stress	0.18	0.82	0.79	.305	−0.18	−0.95	0.31	.002
Depressive symptoms	0.36	4.25	2.39	.080	−0.12	−1.44	0.73	.048
Resilience	−0.18	−2.16	2.09	.306	0.05	0.87	1.13	.446
Sense of control	−0.07	−0.49	0.92	.595	−0.09	−0.93	0.61	.128

Abbreviations: β, standardized beta; b, unstandardized regression coefficient; SE, standard error.
[a]Adjustment was made through propensity scores which included the following confounders: area of residence (inner-city vs suburbs), age, gender, education, perceived income adequacy, marital status, employment, home ownership, social support, hospitalization in past year, insurance, current smoking, regular exercise, self-rated health, activities of daily living, high blood pressure, diabetes, cancer, chronic obstructive pulmonary disease, heart attack, chronic heart failure, angina, asthma, and arthritis.
[b]Neighborhood assessment scale ≤6 indicate good neighborhood conditions. Neighborhood assessment scale >6 indicate adverse neighborhood conditions.
[c]For stress and depressive symptoms, higher values reflect worse function, while for resilience and sense of control, higher values indicate better function.

among these possibilities. However, considerations from other literature can help elucidate these issues.

In support of the first possibility, the social stress model[18,40,41] posits that residential mobility hinders social integration, increasing one's susceptibility to the detrimental effects of built environmental neighborhood stressors. A longer duration of living at the current address may conversely help residents foster social relationships that may help them cope with these neighborhood stressors.[18] Furthermore, the cohesiveness perspective theorizes that social relationships encourage neighbors to watch out for one another, thereby reducing the sense of threat and mistrust, and that this may be particularly the case in physically disadvantaged neighborhoods.[23,42] Consistent with these hypotheses, our participants who lived at their current address for ≥5 years reported more social support on average (19.44 vs 18.20, P < .049) compared with those who lived at their current address for <5 years (results based on different splits of duration of living at the current address did not substantially change this finding; available on request).

A longer duration of living at the current address may also help residents become psychologically habituated to their environment over time and thus may perceive adverse neighborhood conditions as less threatening.[10,20,22,23,43] Another mechanism to consider is that of *John Henryism* or *intensive coping* in the face of prolonged exposure to environmental insults.[44] This theory suggests that African Americans are particularly faced with a chronic exposure to adverse conditions, including racism and economic burden, and must develop rigorous, highly effective coping strategies in order to tolerate such adversity. Intensive coping may reduce perceived psychological distress but may still cause wear and tear on the body and result in deleterious physical health consequences.[44-46] Our results indicate that individuals living in neighborhoods with adverse conditions who stayed at their current address for ≥5 years experienced a non-significant increase in resilience, a finding suggestive of coping in the face of adversity.

Supporting the second possibility (selective attrition), studies demonstrated that adverse neighborhood conditions

increase the risk of death among African Americans.[47,48] Thus, it may be that people who were affected by adverse neighborhood conditions were more likely to die or to attrit for other reasons and that those who remained and participated in Wave 10 data collection of AAH were those who were less affected by these conditions (ie, selective survival).[20] Our propensity score adjustments for attrition may not have completely eliminated this possibility.

Limitations include potential selection bias due to sample attrition over time; the amount of missing data in the relevant Wave 10 variables; the small sample size in one of the strata; the restricted age, racial and geographic ranges; unmeasured confounders; and the potential for reverse causation, though unlikely, due to the cross-sectional nature of the study. We attempted to address sample attrition and missing data limitations via our propensity score methods and sensitivity analyses, respectively. Because only 72 participants were included in the <5 years at the current address stratum, some of our results were not statistically significant even though the point estimates were in some cases larger than those for the other stratum, possibly due to low statistical power in this stratum, particularly for depressive symptoms (18.2%), resilience (13.7%), and sense of control (32.6%). However, sensitivity analyses yielded largely similar findings, thereby confirming the robustness of our findings. Our investigation of a single race is both a limitation and a strength; our findings may not generalize to other races, but the focus on a single race helps unravel the complex relationships between race, socioeconomic status, and neighborhood residence confounding.[49]

Strengths include (a) a relatively large sample of late middle-aged urban-dwelling African Americans, a population that has been significantly understudied heretofore and can be particularly helpful in addressing racial disparities; (b) a well-validated *observer-based* neighborhood assessment scale to avoid same-source bias[50]; (c) the wide array of potential confounding factors in the AAH data set; (d) the use of propensity scores to adjust for potential biases and multiple confounders, thereby minimizing sample selection bias, low power, and overfitting the data; and (e) various sensitivity analyses that produced essentially equivalent results.

In conclusion, neighborhood conditions were associated with stress and depressive symptoms, but the direction of association depended on the duration of living at the current address. This may be due to (a) coping strategies or social relationships that improve psychosocial reactions to stressors over time and/or (b) selective neighborhood mortality and migration based on ability to tolerate adverse neighborhood conditions. Future research should investigate the mechanisms by which neighborhood conditions affect psychosocial outcomes (particularly among those residing in their neighborhood for a prolonged duration of time) and examine whether similar associations to those reported in

our study are observed among whites, blacks, and other races/ethnicities from other metropolitan areas. Such information could be of great value for policy makers and the development of effective public health strategies, especially since adverse neighborhood conditions may still result in poor physical health outcomes in individuals with ≥5 years at current residence despite being associated with better psychosocial outcomes.

Authors' Note

The analysis, interpretations, and conclusions in the present study are those of the authors and not the National Institutes of Health.

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