Relation Between Neighborhood Median Housing Value and Hypertension Risk Among Black Women in the United States

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Objectives. We examined the relation between median housing value and hypertension risk among US Black women.

Methods. We gathered data from the Black Women's Health Study, a prospective follow-up of 59000 Black women aged 21 to 69 years in 1995. Median housing value from US census data was used to measure neighborhood socioeconomic status. Cases of hypertension were identified through postal questionnaires mailed in 1997, 1999, and 2001. Clustered survival regression models were used to estimate incidence rate ratios.

Results. During 180294 person-years of observation, 3780 cases of hypertension were reported. A significant inverse, graded association was found between median housing value and hypertension. The incidence rate ratio for women living in low median housing value neighborhoods relative to high was 1.29 (95% confidence interval=1.14, 1.45) after adjustment for individual risk factors. The association was evident even at higher individual levels of income and education.

Conclusions. Median housing value is inversely associated with hypertension in Black women, independent of individual risk factors. Lowering hypertension risk in Black women will require a greater understanding of the underlying social inequalities that adversely affect health. (*Am J Public Health.* 2007;97:718–724. doi:10.2105/AJPH.2005.074740)

Hypertension, one of the most important modifiable risk factors for cardiovascular disease, affects an estimated 24% of the adult population of the United States.[1–3] The incidence among Black women is 2 to 3 times that among White women, and Black women have appreciably higher rates of hypertension-related illness such as cardiovascular disease and end-stage renal disease.[4]

The neighborhoods in which people live may affect individual health by shaping the social, service, and physical environments.[5–8] Neighborhood safety and the availability of recreational spaces may promote social cohesion[6,7] and encourage physical activity.[9,10] The quality and quantity of municipal services such as police, fire, and sanitation influence the risk of bodily harm and exposure to pests and infectious agents,[7,11] and the availability of full-service grocery stores (large supermarkets that offer quality produce, fresh meat, and dairy items, in addition to on-site pharmacies, fish markets, delicatessens, bank branches and automated teller machines) offering affordable and healthy foods may influence individual dietary choices and nutritional intake.[12–14] The age and condition of housing and the proximity to industrial facilities may increase exposure to toxic contaminants such as lead paint and pollution.[5,7] Furthermore, neighborhoods influence individual access to education, quality housing, and employment opportunities.[15,16]

Several studies have found that persons living in poorer residential neighborhoods have an increased prevalence of risk factors for coronary heart disease (CHD) and an increased risk for all-cause and CHD mortality.[17–24] Three studies assessed hypertension in Black women.[25–27] In a study in Detroit, Mich, blood pressure levels among Black women residing in "high-stress" neighborhoods were higher than blood pressure levels among those residing in "low-stress" areas.[25] In the Atherosclerosis Risk in Communities study, neighborhoods marked by low income and low education levels were associated with higher rates of hypertension and other risk factors for CHD among Black women.[26] In the Third National Health and Nutrition Examination Survey (NHANES III; 1988–1994), living in deprived neighborhoods was found to increase the probability of having a poor cardiovascular disease risk profile, including hypertension, regardless of race and individual socioeconomic status (SES).[27]

The Detroit study drew on equal numbers of predominately Black census tracts that were defined as either low income or upper-middle income, but only 246 Black women were included in the analysis.[25] Most of the Black participants in the Atherosclerosis Risk in Communities study were drawn from Jackson, Miss, a poor, southern, racially homogeneous, urban community.[26] In the NHANES III sample, more than 75% of the Black men and women lived in communities with higher rates of deprivation than those living in the average US neighborhood.[27] Thus, virtually no data are available on the relation between neighborhood and hypertension in middle-class Black women.

Evidence indicates that higher education and income do not translate into the same level of financial and housing opportunity for Blacks as for Whites[5,6,16,28–30]; that is, middle-class Black persons are more likely to live in poorer-quality neighborhoods than are their White counterparts and, as a result, remain exposed to the deleterious conditions associated with those neighborhoods. Furthermore, Black women report poorer health, including higher rates of hypertension, than do White women at all levels of income.[25–27,31] Therefore, to better understand racial disparities in hypertension and other illnesses, it is important to study the effects of socioeconomic characteristics of the neighborhoods in which these women live.

This study extended the existing literature on neighborhood of residence and individual risk of hypertension. We used data from the

Black Women's Health Study (BWHS), a large national study of Black women, to examine prospectively the influence of neighborhood socioeconomic context, measured as median housing value, on the risk for hypertension in a cohort of Black women that included numerous women of middle and higher SES.

METHODS

Cohort and Follow-Up

The BWHS is a follow-up study of US Black women that began in 1995 by enrolling women using mailed health questionnaires. The questionnaires were sent to subscribers of *Essence* magazine, a popular women's magazine targeted to Black women; members of selected Black women's professional organizations; and friends and relatives of early respondents. The 59000 women whose addresses were considered to be valid a year after entry constituted the cohort that was then followed. Participants indicated their informed consent by completing the questionnaires. At baseline in 1995, respondents were 21 to 69 years of age (median=38 years), 97% had completed high school, and 44% had completed college. More than 80% were from California, Georgia, Illinois, Indiana, Louisiana, Maryland, Massachusetts, Michigan, New Jersey, New York, South Carolina, Virginia, and the District of Columbia. Biennial mailed questionnaires were used to update participants' health information. In each cycle of follow-up (1997, 1999, 2001, and 2003), more than 80% of the cohort completed a questionnaire.

Potential participants for our analysis were the 42168 women who did not report a diagnosis of hypertension at baseline, whose blood pressure had been checked in the 2 years prior to entering the study and within the first 2-year interval of follow-up, and who had completed 1 or more of the 1997, 1999, and 2001 follow-up questionnaires. We excluded women with missing values for body mass index (BMI; n=403), education (n=446), smoking status (n=379), alcohol consumption (n=162), or vigorous physical activity (n=1289). We also excluded women whose addresses did not geocode to the block-group level (e.g., post office boxes, businesses, institutions; n=3390). This left 36099 women in the analytic cohort.

The women in the analytic cohort were very similar to those excluded in terms of important potential risk factors for hypertension: age (median=36 vs 37 years, respectively), BMI (median=25.8 vs 25.9 kg/m^2, respectively), years of education (median=15 years for both), participation in 5 or more hours of vigorous physical activity per week (14% for both), smoking 25 or more cigarettes per day (3% for both), and consumption of 14 or more alcoholic beverages per week (2% for both). However, 45% of included women had a family income of $50000 or greater compared with 36% of excluded women. Women excluded because their addresses did not geocode to the block-group level were also similar to the analytic sample in terms of age (median=35 vs 36 years, respectively), BMI (median=25.8 kg/m^2 for both), years of education (median=15 years for both), participation in 5 or more hours of vigorous physical activity per week (16% vs 14%, respectively), smoking 25 or more cigarettes per day (3% for both), and consumption of 14 or more alcoholic beverages per week (2% for both), but those excluded had a lower percentage of women with family income of $50000 or greater than did those included (36% vs 45%, respectively).

Hypertension

Women who reported use of antihypertensive medications, or a diagnosis of hypertension with use of diuretics, on at least one of the 1997, 1999, or 2001 questionnaires were classified as having hypertension.[25] We assessed the accuracy of self-reported hypertension in a random sample of women who met these criteria. We obtained medical records or physician checklists for 139 (75%) of the 185 women who gave us permission, and self-reported hypertension was confirmed in 99%, with all systolic pressures being 140 mm Hg or higher and diastolic pressures being 90 mm Hg or higher.[32] Participants who gave us permission to review their medical records differed from those who did not by years of education (median=16 vs 14 years, respectively) but did not differ by age (median=45 years for both) or BMI (median=29.8 vs 29.6 kg/m^2, respectively).

Exposure Variables

Information on participants' neighborhood of residence was obtained from the 2000 US census, with census block groups used as proxies for residential neighborhoods. Census block groups are subdivisions of census tracts that generally average approximately 1500 people.[33] BWHS participants were linked to their census block group according to the address on their completed baseline questionnaire in a process called geocoding. The geocoding was carried out by a commercial firm that has been shown to geocode accurately.[34]

The selection of census variables for consideration was guided by previous research.[17,18,20–22,26,35,36] We assessed median housing value; percentage of adults aged 25 years or older who had completed college; percentage of adults aged 25 years or older who had completed high school; median household income; percentage of employed persons aged 16 years or older in white-collar occupations (executive, managerial, or professional specialty occupations); percentage of households with interest, dividends, or net rental income; percentage of persons who were Black; percentage of households below the poverty level; and percentage of households with children headed by a single female parent (as defined by the US Census Bureau). We created categorical variables based on quintiles of the distributions of each census variable.

Information on age, weight, smoking status, alcohol consumption, and vigorous physical activity was collected at baseline and on each follow-up questionnaire. Information on education and height was collected at baseline in 1995. Information on family income and household size was collected on the 2003 follow-up questionnaire.

Data Analysis

Univariate analyses and stepwise backward regressions were performed on each of the census variables. On the basis of previous research,[17] we also calculated a composite variable consisting of 6 of the variables considered: median housing value, percentage of adults aged 25 years or older who had completed college, percentage of adults aged 25 years or older who had completed high school, median household income; percentage of employed persons aged 16 years or older in white-collar occupations, and percentage of households with interest, dividends, or net rental income. Our regression results indicated that the census variable most strongly related to hypertension in our data was median housing value; the other census variables were weakly associated or not associated. In addition, our univariate results for median housing value closely matched those for the composite variable. Therefore, we included only median housing value in the final analysis. Median housing value was divided into quintiles on the basis of the distribution of the sample, with quintile 1 representing lowest median housing values and quintile 5 representing highest median housing values.

Person-time was calculated from the start of follow-up in 1995 until the occurrence of hypertension, loss to follow-up, death, or end of follow-up, whichever happened first. We used clustered survival regression models as described by Laird and Olivier[37] and Horton et al.[38] to estimate incidence rate ratios of time to first report of hypertension. These methods specify a piecewise exponential survival distribution and approximate the proportional hazards regression methods; their advantage is that they use generalized estimating equations[39] to account for correlation at the level of neighborhood. The index date for each case of hypertension was defined as the midpoint of the calendar year in which the diagnosis was reported. We used PROC GENMOD (SAS, version 8.02; SAS Institute Inc, Cary, NC) to generate incidence rate ratios and 95% confidence intervals (CIs) using an exchangeable working correlation matrix and an empirical variance estimator. We performed tests for linear trend in the incidence of hypertension across quintiles of median housing value by introducing median housing value into the model as an ordinal variable.

Incidence rate ratios were adjusted for BMI (<20, 20–24, 25–29, 30–34, 35–39, ≥40 kg/m^2), age (5-year age groups ranging from <30 to ≥65), hours of vigorous physical activity per week (none, <5, ≥5), number of cigarettes smoked per day (none, <25, ≥25), number of alcoholic beverages consumed per week (none, <7, 7–13, ≥14), and questionnaire cycle (1995–1997, 1997–1999, 1999–2001). Age, BMI, smoking status, alcohol consumption, vigorous physical activity, and questionnaire cycle were treated as time-varying covariates. To address the possibility of confounding by individual SES, we also controlled for family income (<$15 001, $15 001–$25 000, $25 001–$35 000, $35 001–$50 000, $50 001–$100 000, >$100 000, missing), number of people living in the household (1, 2, 3, 4, ≥5), and years of education (≤12, 13–15, ≥16).

We performed subgroup analyses within categories of BMI, age, years of education, family income, weekly hours of vigorous physical activity, and geographic residence in the "stroke belt," an area in the Southeastern United States with a traditionally high rate of stroke mortality. Stroke belt states include Alabama, Arkansas, Georgia, Indiana, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia.[1,40] We included a continuous term for age in the age-stratified model and a continuous term for BMI in the BMI-stratified model.

To assess the possible effect on our results of misclassification of neighborhood median housing value because of change of address by BWHS participants, we performed a sensitivity analysis by repeating the final model among the 17 604 women in our sample who had remained at the same address during the entire follow-up period.

TABLE 1—Individual-Level Risk Factors for Hypertension Among Black Women (n = 36 099), by Median Housing Value Quintile: Black Women's Health Study, 1995–2001

		Median Housing Value Quintile				
Risk Factor	Overall Sample	1 ($0–$71 599)	2 ($71 612–$100 889)	3 ($100 893–$137 044)	4 ($137 052–$189 341)	5 ($189 357–$624 999)
No. of participants	36 099	7218	7220	7222	7219	7220
No. of neighborhoods (census block groups)	20 192	4355	3940	3783	3824	4920
Body mass index, kg/m^2, median	25.8	26.6	26.2	25.8	25.5	25.0
Age, y, median	36	35	35	36	35	36
≥ 16 y of education, %	49	38	47	51	52	59
Family income ≥ $50 000, %	45	31	42	48	50	52
≥ 5 h/wk of vigorous activity, %	15	13	14	15	16	17
≥ 25 cigarettes per day, %	3	3	3	3	3	3
≥ 14 alcoholic beverages per week, %	2	2	2	2	2	2

RESULTS

The 36 099 women in the study sample were distributed across 20 192 census block groups. Table 1 gives the distribution of various individual-level risk factors across quintiles of median housing value. Years of education completed, income, and participation in physical activity increased with increasing housing value, whereas BMI was inversely related to housing value. Age, heavy smoking, and heavy drinking did not vary across quintiles of median housing value.

During 180 294 person-years of observation, 3780 cases of hypertension were reported. A statistically significant inverse, graded association was found between median housing value and risk for hypertension, even after we adjusted for age, BMI, education, family income, household size, vigorous physical activity, smoking status, alcohol consumption, questionnaire period, and clustering within census block group ($P < .001$, for linear trend; Table 2). The adjusted incidence rate ratio for women living in the lowest quintile of median housing value relative to those living in the highest quintile was 1.29 (95% CI = 1.14, 1.45).

BMI was the strongest confounder of the association of housing value with hypertension. We repeated the analysis in the subgroup of women among whom confounding by BMI would be unlikely, i.e., women who were not

TABLE 2—Relation of Neighborhood Median Housing Value to Risk for Hypertension Among Black Women (n = 36 099): Black Women's Health Study, 1995–2001

Median Housing Value Quintile	Cases of Hypertension	Person-Years of Observation	Age-Adjusted Incidence Rate Ratio (95% CI)	Multivariate Incidence Rate Ratio (95% CI)[a]
1 ($0–$71 599)	871	35 491	1.53 (1.38, 1.69)	1.29 (1.14, 1.45)*
2 ($71 612–$100 889)	847	36 007	1.45 (1.31, 1.61)	1.29 (1.15, 1.45)*
3 ($100 893–$137 044)	798	35 876	1.35 (1.21, 1.49)	1.23 (1.09, 1.38)*
4 ($137 052–$189 341)	642	36 438	1.07 (0.96, 1.20)	0.99 (0.87, 1.12)*
5 ($189 357–$624 999)	622	36 482	Reference	Reference

Note. CI = confidence interval.
[a]Adjusted for the following individual factors: age, body mass index, vigorous physical activity, education, family income, number of people in household, smoking status, alcohol consumption, questionnaire cycle, and clustering within census block groups.
*$P < .001$, for test for linear trend.

overweight (BMI$<$25 kg/m^2). Median housing value was strongly associated with hypertension in this subgroup, with an incidence rate ratio of 1.76 (95% CI=1.33, 2.34) for the lowest quintile of housing value relative to the highest quintile (Table 3). The association of median housing value with hypertension was also evident at all levels of family income, education, physical activity, and age group. It was also evident among women who lived in the 11 states designated as the "stroke belt" and among those who did not.

The overall association between median housing value and hypertension among the 17 604 participants who had not moved since enrollment in the study was similar to that observed in the overall sample. Among women who had not moved, the incidence rate ratio for women living in the lowest quintile of median housing value relative to the highest quintile was 1.32 (95% CI=1.13, 1.54). The incidence rate ratio for the same comparison among women who moved at least once during study follow-up was 1.27 (95% CI=1.06, 1.52; data not shown).

DISCUSSION

Residents of neighborhoods with limited financial and social resources may experience chronic stress in the form of crime, unemployment,[19] and lack of municipal services such as police, fire, and sanitation.[11,12] Chronic social and environmental stressors have been associated with increased rates of poor health in general[41–44] and with hypertension in Blacks.[25–27,45] Both animal and human data indicate that chronic exposure to stress activates the sympathetic-medullary system, increases plasma catecholamine levels, and elevates blood pressure levels.[46,47] Over time, increased levels of catecholamines and the resulting vascular reactivity may lead to structural changes in the vascular wall and the subsequent development of hypertension.[45,46]

To our knowledge, our study is the first prospective study of median housing value and hypertension that included large numbers of middle-class Black women. We found a significant inverse, graded association between median housing value and hypertension even after we adjusted for important individual risk factors. Median housing value had a clear effect at all levels of education (including among women who had completed college or greater) and among women at each level of family income examined, including family incomes greater than $50 000. The association between median housing value and hypertension also was apparent among the leanest women, the youngest women, and the most active women. These results suggest that housing value can affect the risk for hypertension even among women who are otherwise at relatively low risk because of higher personal SES, low BMI, young age, or regular participation in exercise.

The associations observed in our analysis likely involved the distribution of economic and social factors within the neighborhoods in which many Blacks tend to live. The legacy of residential segregation and continued discrimination in housing and lending practices have resulted in significant differences between Black and White communities.[16,28–30] For example, studies have shown that at the same level of personal education and income, Black persons have only one tenth the wealth of White persons and are more likely than their White counterparts to live in neighborhoods marked by crime, undervalued real estate, and poor schools.[5,6,16,28–30] Our data showed that high proportions of Black women who had completed college or who had family incomes greater than $50 000 lived in neighborhoods within the lowest quintile of median housing value. Unfavorable neighborhood factors, including the lack of resources such as full-service supermarkets, banks, and recreational spaces,[7,12–14,16,44] may serve as a source of stress and overwhelm the otherwise protective effects of individual income, education, and healthy behaviors.[15,43–45]

Strengths and Limitations

A strength of our study was its prospective design, which minimized biased reporting of risk factors. Also, the residential address used preceded the occurrence of hypertension. We controlled for major individual-level socioeconomic risk factors for hypertension—level of education and family income—in our analyses. A missing indicator variable allowed us to include many respondents with missing information on income, even though this method has the potential for some bias for those variables correlated with the missing value.[48] Our results were consistent with models that dropped these respondents from the analysis. However, education and family income were measured at only 1 time point—1995 and 2003, respectively. Were we to have controlled incompletely for family income or education (e.g., because of inaccurate self-reports), then the observed association would have overestimated the true association.

There could have been other unmeasured confounders such as family history of hypertension. BMI was a strong confounder of the association between neighborhood SES and risk of hypertension, but even after we controlled for BMI, a statistically significant association remained. Furthermore, the association was present among women with a BMI

TABLE 3—Relation of Neighborhood Median Housing Value to Risk for Hypertension Among Black Women (n = 36 099), Stratified by Risk Factor: Black Women's Health Study, 1995–2001

	Median Household Value Quintile[a]										
	1 ($0–$71 599)		2 ($71 612–$100 889)		3 ($100 893–$137 044)		4 ($137 052–$189 341)		5 ($189 357–$624 999)		
Risk Factor	Cases of Hypertension	IRR (95% CI)	Cases of Hypertension	IRR (95% CI)	Cases of Hypertension	IRR (95% CI)	Cases of Hypertension	IRR (95% CI)	Cases of Hypertension	IRR (95% CI)	P[b]
BMI, kg/m^2											
< 25	144	1.76 (1.33, 2.34)	144	1.55 (1.18, 2.05)	139	1.25 (0.94, 1.66)	146	1.22 (0.93, 1.61)	130	Reference	<.001
25–29	275	1.21 (0.99, 1.47)	294	1.23 (1.01, 1.49)	282	1.16 (0.96, 1.40)	240	0.95 (0.78, 1.16)	236	Reference	<.01
≥ 30	452	1.20 (1.01, 1.44)	409	1.25 (1.05, 1.48)	377	1.27 (1.06, 1.51)	256	0.90 (0.74, 1.10)	256	Reference	<.001
Age, y											
< 35	183	1.58 (1.19, 2.08)	208	1.78 (1.35, 2.33)	169	1.50 (1.13, 1.99)	126	1.27 (0.95, 1.71)	96	Reference	<.001
35–44	381	1.32 (1.10, 1.59)	329	1.15 (0.96, 1.39)	304	1.15 (0.96, 1.39)	233	0.92 (0.75, 1.12)	236	Reference	<.001
≥ 45	307	1.15 (0.95, 1.38)	310	1.26 (1.05, 1.51)	325	1.21 (1.02, 1.45)	283	0.95 (0.79, 1.15)	290	Reference	<.05
Education, y											
≤ 12	239	1.37 (1.01, 1.87)	160	1.44 (1.05, 1.97)	133	1.22 (0.88, 1.70)	118	1.15 (0.82, 1.61)	74	Reference	<.01
13–15	334	1.27 (1.03, 1.56)	296	1.15 (0.93, 1.41)	292	1.23 (1.00, 1.52)	212	0.92 (0.73, 1.15)	189	Reference	<.01
≥ 16	298	1.26 (1.06, 1.50)	391	1.35 (1.15, 1.58)	373	1.22 (1.04, 1.43)	312	0.98 (0.83, 1.16)	359	Reference	<.001
Vigorous physical activity, h/wk											
None	472	1.21 (0.99, 1.47)	424	1.34 (1.10, 1.63)	352	1.18 (0.96, 1.45)	319	0.99 (0.80, 1.23)	297	Reference	<.01
< 5	340	1.27 (1.08, 1.49)	367	1.22 (1.05, 1.43)	384	1.18 (1.01, 1.38)	273	0.93 (0.78, 1.10)	279	Reference	<.001
≥ 5	59	1.80 (1.19, 2.72)	56	1.55 (1.02, 2.35)	62	1.82 (1.22, 2.72)	50	1.35 (0.89, 2.03)	46	Reference	<.01
Family income											
< $25 001	162	1.32 (0.94, 1.86)	89	1.33 (0.92, 1.91)	64	1.39 (0.95, 2.04)	57	1.16 (0.77, 1.74)	44	Reference	>.05
$25 001–$50 000	296	1.57 (1.26, 1.96)	228	1.33 (1.05, 1.67)	202	1.48 (1.17, 1.86)	123	0.99 (0.77, 1.28)	111	Reference	<.001
> $50 000	252	1.15 (0.97, 1.36)	385	1.30 (1.12, 1.51)	370	1.12 (0.96, 1.30)	334	0.97 (0.83, 1.13)	355	Reference	<.001

Note. IRR = incidence rate ratio; CI = confidence interval.
[a]Adjusted for the following individual factors: age, BMI, vigorous physical activity, education, family income, number of people in household, smoking status, alcohol consumption, questionnaire cycle, and clustering within census block groups.
[b]Test for linear trend.

lower than 25 kg/m^2, among whom residual confounding by BMI would have been minor.

Another strength of the study was the very large sample size, which allowed for high statistical power and informative subanalyses. The participation rate of the original cohort was more than 80%, decreasing the chance of bias from selective losses. In addition, women excluded because of missing data were largely similar to those included in the analysis. Although substantial residential mobility has been documented among BWHS participants,[49] an analysis of the 17 604 women in the sample who had not moved from their baseline addresses yielded results similar to those women in the overall sample.

Previous studies used blood pressure readings to classify participants as hypertensive.[25–27] We relied on self-report of physician-diagnosed hypertension. The methodological literature indicates a high degree of accuracy of self-reporting of physician-diagnosed hypertension,[50,51] and our validation of participant self-report also indicated a high level of accuracy.

Nondifferential underdiagnosis of hypertension was likely.[2,32] However, we limited the analysis to women whose blood pressure had been measured in the 2 years before entering the study in 1995, which would have reduced the possibility of hypertension not being diagnosed. Moreover, 97% of the women in the BWHS reported having health insurance in 1997, indicating a high degree of access to medical care. Underdiagnosis of hypertension in the BWHS likely would have biased our results toward the null; that is, we may have underestimated the strength of the association between neighborhood median housing value and risk for hypertension. If underdiagnosis had been differential (i.e., was more common in poorer neighborhoods), then the true association between neighborhood and hypertension may have been underestimated.

There is no consensus on which particular measures best estimate the socioeconomic conditions of a neighborhood.[33,36] We chose to characterize neighborhood SES according to area median housing value based on the results of backward-stepwise regression and on the individual performance of each variable in relation to hypertension. Other studies of neighborhood and health have used census indicators of SES such as median family or household income,[17,18,21,22,26] percent poverty,[20,22] proportion of Black residents,[22] educational attainment,[17,18,26] female-headed households,[22] unemployment,[19,22] wealth and assets,[17,26] occupation,[17,26] and per capita crime rate.[19,22]

Studies also have varied in their approach to handling multiple census variables. Some have relied on composite scores or indices to reflect underlying concepts such as advantage or deprivation.[17] No consensus exists on what combination of variables might be optimal, but use of other area measures, or combinations of measures, might have more accurately characterized neighborhood SES than the one we chose to use.[36,52] Variable misspecification would likely have driven our results toward the null.

Conclusions

One of the goals of *Healthy People 2010: Understanding and Improving Health* is to eliminate the persisting racial and ethnic disparities in health.[53] Our results underscore the growing appreciation that health and disease are influenced not only by characteristics of the individual but also by the conditions under which people live.[54] Furthermore, our findings indicate that the influence of social context is not limited to poor and underserved Black women but extends to the "upper levels" of this group as well. Our observation that the risk of hypertension in young, lean, active, well-educated, and higher-income Black women was inversely associated with median housing value suggests that hypertension risk in Black women will not be reduced simply by methods that focus on individual behavior change. A greater understanding of the underlying social inequalities that adversely affect health[55] and of the mechanisms and pathways that are amenable to intervention is required. ■

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Contributors

Y.C. Cozier, J.R. Palmer, and L. Rosenberg originated the idea for this study. J.R. Palmer and L. Rosenberg designed the Black Women's Health Study and supervised the data collection. All authors contributed to the analysis and interpretation of the data and writing of the article.

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Human Participant Protection

The study was approved by the institutional review boards of Boston University Medical Center and Howard University. Participants indicated their informed consent by completing mailed health questionnaires and providing written releases for medical records.

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