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Neighborhood Characteristics and Ideal Cardiovascular Health Among Black Adults: Results From the Morehouse-Emory Cardiovascular (MECA) Center for Health Equity

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Abstract

Background: Neighborhood environment is increasingly recognized as an important determinant of CVH among Black adults. Most research to date has focused on negative aspects of the neighborhood environment, with little attention being paid to the specific positive features, in particular the social environment, that promote cardiovascular resilience among Black adults.

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Objective: We examined whether better neighborhood physical and social characteristics are associated with ideal CVH among Black adults, as measured by Life's Simple 7 (LS7) scores.

Methods: We recruited 392 Black adults (age 53 ± 10, 39% male) without known CV disease living in Atlanta, GA. Seven neighborhood domains were assessed via questionnaire: aesthetic quality, walking environment, safety, food access, social cohesion, activity with neighbors, and violence. CVH was determined by LS7 scores calculated from measured blood pressure, glucose, cholesterol, body mass index (BMI), and self-reported exercise, diet, and smoking, and categorized into poor (0–8), intermediate (9–10), and ideal (11–14). Multinomial logistic regression was used to examine the association between neighborhood characteristics and the odds of intermediate/ideal CVH categories compared to poor CVH after adjustment for age, gender, household income, education, marital status, and employment status.

Results: Better scores in the neighborhood domains of social cohesion and activity with neighbors were significantly associated with higher adjusted odds of ideal LS7 scores (OR 2.02, 95% CI [1.36–3.01] and 1.71 [1.20–2.45] per 1 standard deviation [SD] increase in respective scores). These associations were stronger for both social cohesion (OR 2.61, 95% CI [1.48–4.61] versus 1.40 [0.82–2.40]) and activity with neighbors (OR 1.82, 95% CI [1.15–2.86] versus 1.53 [0.84–2.78]) in Black women compared to men. Specifically, better scores in social cohesion were associated with higher odds of ideal CVH in exercise (OR 1.73 [1.16–2.59]), diet (OR 1.90 [1.11–3.26]), and BMI (OR 1.52 [1.09–2.09]); better scores in activity with neighbors were also similarly associated with higher odds of ideal CVH in exercise (OR 1.48 [1.00–2.19]), diet (OR 2.15 [1.23–3.77]), and BMI (OR 1.45 [1.07–1.98]; per 1 SD in respective scores).

Conclusion: More desirable neighborhood characteristics, particularly social cohesion and activity with neighbors, were associated with better CVH among Black adults.

INTRODUCTION

Neighborhood environment has increasingly been recognized as an important driver of cardiovascular health (CVH).[1] Multiple studies have shown that living in socioeconomically disadvantaged neighborhoods is associated with a greater burden of cardiovascular risk factors, and cardiovascular disease (CVD) incidence and mortality.[2–5] Both physical (e.g. food access and walking environment) and social features (e.g. support and cohesion) of neighborhoods are at play and the effects on CVH are likely mediated through a multitude of interrelated mechanisms that are biological, environmental and behavioral.[6]

Most research to date on neighborhoods and health has focused on multiethnic communities and racial differences between Black and White adults, and the negative aspects of Black neighborhoods that contribute to poor CVH.[7] However, recent data suggests that while there are certain neighborhoods where Black Americans have elevated risk for CVD, there are also communities where they actually have lower than expected rates of CVD, even when adjusting for socioeconomic status (SES).[8] However, the specific positive features of neighborhoods, in particular the social environment, that promote cardiovascular resilience, defined here as having ideal cardiovascular health despite the presence of high levels of contextual (i.e. race-related or socioeconomic status) risk, among Black adults have yet to be fully elucidated.

The American Heart Association (AHA) has designed and promoted a set of seven CVH metrics (four modifiable health behaviors–smoking, weight, physical activity, and diet; three health factors –blood pressure, total cholesterol, and glucose) known as Life's Simple 7 (LS7).[9] Prior studies have shown that ideal cardiovascular health determined by LS7 is associated with lower risk of incident type 2 diabetes, CVD and all-cause mortality.[10–12] The association between ideal LS7 with individual neighborhood physical and social environments has not been fully elucidated. Therefore, we examined whether specific features of neighborhood physical and social environment were associated with ideal CVH among a sample of Black Americans in a southern metropolitan city. In particular, we were interested in examining positive aspects of the neighborhood environment and thus, hypothesized that Black Americans from neighborhoods with favorable social characteristics will have better CVH.

METHODS

Study Sample

The current investigation was conducted as part of the Morehouse-Emory Cardiovascular (MECA) Center for Health Equity study. We recruited 394 individuals, between age 30 to 70, who self-identified as Black or African American from local communities of the Atlanta-Sandy Springs-Alpharetta, GA metropolitan area, representing 201 unique census tracts, using convenience sampling as previously detailed.[13] Given the strict selection criteria (e.g., Black race and between ages 30–70), MECA was not designed to be fully representative of the census tract sampled and as such, participants were older, had higher levels of education, and lower incomes in comparison to the 2010 Census data on individuals living in the same census tracts (Supplemental Table S1). In brief, those with known history of cardiovascular disease, such as prior myocardial infarction, congestive heart failure, cerebrovascular accidents, coronary artery disease, peripheral arterial disease, atrial fibrillation, and cardiomyopathies, were excluded from the enrollment. Additionally, those with chronic diseases (cancer, human immunodeficiency virus infection, or lupus), substance abuse (alcohol or illicit drug), or psychiatric illness were excluded. Finally, pregnant or lactating females and those with mobility limitations (not able to increase physical activity levels) were excluded as well. Participants visited either Morehouse School of Medicine or Emory University School of Medicine for a study visit consisting of physical examination, blood draw, and questionnaires. The study protocol was approved by the Institutional Review Boards of both institutions, and all participants provided written informed consent.

Self-Reported Neighborhood Characteristics

Perceptions of neighborhood characteristics were assessed via the Neighborhood Health Questionnaire, a reliable and valid questionnaire that has been used in studies of cardiovascular health (Supplemental Table S2).[14] Participants were asked to answer a series of questions pertaining to 7 domains of neighborhood characteristics: aesthetic quality (5 questions, α=0.79), walking environment (7 questions, α=0.86), availability of healthy foods (3 questions, α=0.92), safety (3 questions, α=0.82), violence (4 questions, α=0.86), social cohesion (4 questions, α=0.89), and activities with neighbors (5 questions, α=0.86). Possible responses ranged from 1 ("never") to 4 ("often") for the domains of violence

and activities with neighbors, and from 1 (“strongly disagree”) to 5 (“strongly agree”) for the other domains. A summary score for each domain of neighborhood characteristics was computed as the mean response per question to retain the score range of each respective domain. Additionally, a composite score of overall neighborhood characteristics was calculated as the mean of the standardized scores for the 7 domains of neighborhood characteristics (with violence reverse-coded).

Study Covariates

We obtained information on age, sex, residential address, and socioeconomic status, such as annual household income (<$25,000, $25,000 to $50,000, >$50,000, do not know), education (≤ high school graduate, some college or technical school, ≥ college graduate), marital status (married or not), and employment status (currently working either full-time or part-time, or not) via self-report on questionnaires. Physical exam consisted of obtaining vital signs and anthropometric measurements. All blood draws were performed after >6 hours of fasting to measure plasma levels of cholesterol and glucose. Medical history was also provided via self-report on questionnaires. The presence of hypertension was defined by any of the following: current use of anti-hypertensive medications, systolic blood pressure ≥ 130 mmHg, or diastolic blood pressure ≥ 80 mmHg. The presence of diabetes mellitus was determined by either current use of diabetes medications or fasting glucose ≥126 mg/dL. Finally, the presence of hyperlipidemia was defined by either current use of lipid-lowering medications or fasting total cholesterol ≥240 mg/dL.

Life’s Simple 7 Scores

CVH of enrolled participants was assessed by LS7 scores, a metric developed by the American Heart Association. Seven domains of CVH (exercise, diet, smoking history, blood pressure, glucose, cholesterol, and body mass index) were scored as 0 (poor), 1 (intermediate), or 2 (optimal), according to the previously published algorithm.[9] Information on measurement of the specific subcomponents of LS7 in this cohort is presented in (Supplemental Table S3). The summary score was then computed by summing the 7 domain sub-scores. Summary scores ranged from 0 to 14, which were subsequently categorized into poor (0–8), intermediate (9–10), and ideal (11–14) for analysis in accordance with prior studies.[7, 15] Our primary analyses were designed to examine the overall LS7 score. Subcomponents were analyzed in secondary analyses.

Statistical Analysis

Demographic, socioeconomic, and clinical characteristics were presented by the categories of LS7 scores (poor, intermediate, and ideal) for descriptive purposes. Continuous variables were reported as means (± standard deviation [SD]) or as median (25^{th} and 75^{th} interquartile range) while categorical variables were reported as frequency counts and proportions (%), where appropriate. For continuous variables, analysis of variance tests were used for normally distributed variables while Kruskal-Wallis tests were used for non-normally distributed variables. Chi-square tests were used to compare proportions. The proportions of those individuals with ideal LS7 scores were compared across tertiles of composite neighborhood scores as well as individual domains of neighborhood characteristics using Cochran-Armitage tests. Initially, proportional odds model was considered to model the

LS7 categories. The score test, however, revealed that proportional odds assumption was violated in multiple neighborhood score models. Therefore, multinomial logistic regression was used to assess the odds ratio (OR) of having ideal or intermediate LS7 scores compared to poor LS7 per 1 standard deviation (SD) increment in the composite score of neighborhood characteristics (treated as a continuous variable). Covariates were added in a stepwise fashion to examine the effect of additional covariate adjustment: Model 1: unadjusted; Model 2: adjusted for age and sex (male vs female); Model 3: Model 2 + marital status + socioeconomic status (annual household income, education, and employment status). The same regression modeling with the same covariates was used to examine the OR of ideal/intermediate LS7 compared to poor, per 1 SD increment in each of the 7 neighborhood domains individually. Subsequently, in secondary analyses, we performed multinomial logistic regression modeling with the same covariate adjustment to assess the OR of having ideal LS7 sub-component score for each of the LS7 components per 1 SD increment in the domains of neighborhood characteristics. In particular, we focused on those domains of neighborhood characteristics that were significantly associated with higher OR of total LS7 scores. Finally, we examined effect modification by gender. The interaction between domains of neighborhood characteristics and gender was tested using a neighborhood characteristic X gender term. Even though the interactions were not significant, subsequent analyses were stratified by gender as exploratory analyses. All statistical analyses were performed using SPSS 25.0 (Armonk, NY) and R 4.0 (Vienna, Austria); P-value < 0.05 was considered statistically significant.

Data Statement

The data that support the findings of this study are available from the corresponding author, TL, upon reasonable request.

RESULTS

Of the 394 subjects enrolled, the mean age was 52.8 ± 10.3 with 39% males. The mean LS7 score of the overall cohort was 8.0 ± 2.2, and 231 (58.6%), 109 (27.7%) and 54 (13.7%) had poor, intermediate, and ideal LS7 scores, respectively (Table 1). Those with more ideal categories of LS7 scores tended to be younger, have higher household income, and be more highly educated. By definition, those with intermediate and ideal LS7 score categories also had lower prevalence of cardiovascular comorbid conditions and lower levels of cardiometabolic indices (Table 1).

The proportion of those with ideal LS7 scores tended to be greater in higher tertiles of the composite neighborhood scores (P=0.024; Figure 1). Similar relationships were also observed when examined according to the tertiles of the individual domains of neighborhood characteristics. In particular, the tertiles of social cohesion and activity with neighbors demonstrated a dose-dependent association with the prevalence of ideal LS7 (P=0.0003 and 0.01, respectively; Figure 1). We also noticed trends in higher prevalence of ideal LS7 in higher tertiles of neighborhood food access and walking environment but there was no statistical significance (Figure 1).

In multinomial logistic regression analysis, 1 SD increment in the composite neighborhood score was significantly associated with greater odds of having ideal LS7 compared to poor LS7 (OR 1.54, 95% confidence interval [1.11–2.14]; Table 2). This association remained significant after adjustment for age, sex, marital status and SES (OR 1.62 [1.11–2.36]). Of the 7 domains of neighborhood characteristics, both social cohesion and activity with neighbors were significantly associated with greater odds of ideal LS7 compared to poor LS7 in fully adjusted models (OR 2.02 [1.36–3.01] and 1.71 [1.20–2.45], respectively, per 1 SD increment; Figure 2). Higher scores in walking environment, safety, and food access were also associated with greater odds of ideal LS7, but were not statistically significant. No clear associations were observed for violence and aesthetic quality. Finally, neither the composite nor the individual 7 neighborhood characteristics showed significant associations with the odds of intermediate LS7 compared to poor LS7 (Table 2, Figure 2).

In order to determine which aspects of ideal CVH were associated with our observed associations, we further investigated the relationship for social cohesion and activity with neighbors. We noted that 1 SD increment in social cohesion score was associated with greater odds of ideal exercise (OR 1.73 [1.16, 2.59]), diet (OR 1.90 [1.11, 3.26]), and BMI (OR 1.52 [1.09, 2.09]) scores of LS7. The same pattern of association was observed between activity with neighbors and exercise (OR 1.48 [1.00, 2.19]), diet (OR 2.15 [1.23, 3.77]), and BMI (OR 1.45 [1.07, 1.98]) (Figure 3; Table S4). Finally, gender stratified models revealed that our observed associations of social cohesion (OR 2.61, 95% CI [1.48–4.61] versus 1.40 [0.82–2.40]) and activity with neighbors (OR 1.82, 95% CI [1.15–2.86] versus 1.53 [0.84–2.78]) and ideal CVH were more pronounced in Black women, compared to Black men (Table S5 and S6).

DISCUSSION

In this cross-sectional analysis of Black Americans in a major Southern US city, we demonstrated that self-reports of desirable neighborhood characteristics were associated with ideal cardiovascular health. Social environment, which includes social cohesion and activity with neighbors, is strongly associated ideal CVH among Black Americans. Specifically, better social cohesion and accessibility to activity with neighbors are associated with ideal exercise, diet, and BMI scores, which represent modifiable health behaviors. These associations were present even when adjusting for individual-level income and education and therefore, may represent factors that promote resilience to cardiovascular risk among Black Americans.

To our knowledge, this study is the first to examine the relationship between neighborhood characteristics and ideal CVH encompassing both modifiable health behaviors and physiologically measured health factors among Black Americans as set forth by the 2020 AHA Strategic Goals.[9] Prior studies have demonstrated that ideal CVH is associated with lower CVD and all-cause mortality in multi-ethnic communities[12, 16, 17]. Therefore, achieving ideal CVH is likely important in reducing CVD morbidity and mortality. The association between neighborhood characteristics and individual level cardiovascular risk factors is well known[5, 18, 19], but few studies have examined this association with the

composite metric and its individual subdomains, encompassing both modifiable health behaviors and physiologically measured health factors, in a single study.

In the Multi-Ethnic Study of Atherosclerosis (MESA), investigators found that neighborhood characteristics such as favorable food stores, physical activity resources, and walking/physical activity environment were associated with ideal CVH in a cohort of White, Black, Hispanic and Asian adults, whereas aspects of the social environment were not[7]. We observed that associations between aspects of the physical environment, specifically safety, walking environment and food access, were in the expected direction but were not statistically significant. This could be due to the sample size of this study. One other difference between MESA and our study is that we investigated these factors in a cohort within a single city, versus several cities across the country. Although single site studies have found associations between neighborhood characteristics and health, it is possible that there is less within-city variability on characteristics of the neighborhood physical environment among Black Americans, which would make it more difficult to detect overall associations with CVH.

One of the most novel aspects of our study was the focus on specific positive features of neighborhoods (in particular the social environment) that promote cardiovascular resilience among Black individuals. We demonstrate that higher scores in social cohesion were associated with ideal CVH–findings that are consistent with prior research in non-Black cohorts. For example, using the same measure of social cohesion utilized in the current analysis, Lagisetty et al. demonstrated that South Asian women living in neighborhoods with high social cohesion had 46% lower likelihood of having hypertension.[20]. Studies from other cohorts using conceptually similar measures have also found similar results. For example, a study by Orth-Gomer and colleagues found that Swedish men with coronary heart disease were twice as likely to lack social integration (operationalized as lacking social connections) as those without the disease.[21] Similarly, Kim et al. noted that higher perceived neighborhood cohesion –defined as perceived degree of connectedness between and among neighbors and their willingness to intervene for the common good-- demonstrated 22% reduced odds of myocardial infarction in Americans over the age of 50.[22]

Relatively few studies have examined associations between social cohesion and cardiovascular health in Black adults and findings have been mixed.[23–25] A study of White and Black adults in Chicago, IL aged 65 and older found no associations between social cohesion (conceptualized as social interactions with neighbors) and stroke mortality in older Black adults, although a 66% decrease in stroke mortality with each one unit increase in social cohesion was observed in older Whites.[26] Conversely, in the Jackson Heart Study (JHS) of Black adults from Mississippi, higher social cohesion (which was measured using the same questionnaire as MECA) was associated with a 22% lower incidence of Type 2 diabetes in the full cohort,[25] and in a separate analysis, low social cohesion was associated with 63% increased likelihood of having higher cumulative biological risk which encompasses multiple physiological (including the cardiovascular) systems among Black men only.[24] Our cohort is situated in Atlanta, GA, highlighting the fact that the impact of neighborhood social environment on cardiovascular health may vary by geographic locales within the U.S. Because these are arguably very different contexts for Black Americans

in terms of segregation, historical policies, and opportunity structures, further research examining how social cohesion and CVH risk varies for Black adults across contexts is warranted.

One novel finding of our study is that increased activity with neighbors is independently associated with ideal CVH. To our knowledge, this is the first time that this has been described in literature in any population. Social cohesion encompasses individuals' perceptions of their neighbors and whether a support system exists. Activity with neighbors probes into how often individuals are interacting with each other in a neighborhood. This novel finding is especially important because it represents an entryway for tangible public health interventions to improve CVH in Black communities. Previous studies have demonstrated that social support can improve physical activity for both White and Black individuals[27] In our study, social cohesion and activity with neighbors were associated with improved exercise, diet and lower BMI adding to existing literature that community or neighborhood level interventions promoting a healthy lifestyle are a potential entryway to improve CVH through modifiable health behaviors among Black adults.

We uniquely demonstrate here that the observed associations of social cohesion and activity with neighbors and ideal CVH are more pronounced in Black women compared to men. To our knowledge, only one prior study, also conducted in Atlanta, GA, has highlighted the importance of social cohesion in terms of heath among Black women.[23] While this study showed an association between social cohesion and inflammatory markers, we further demonstrate that higher levels of neighborhood social cohesion is associated with clinically significant improvements in CVH among Black women. Prior research has demonstrated that women have stronger and more involved social networks, and that Black women in particular, may derive support from neighborhood fictive kin networks (individuals in their neighborhoods who are not related by blood or marriage).[28–30] Therefore, this may explain our stronger findings of social cohesion and activity with neighbors on CVH among Black women; however further exploration into this important phenomenon across geographic areas in the US is warranted.

There are several limitations that must be considered. Data on neighborhood characteristics are self-reported and our study was conducted in one geographic locale, which may not represent all Black communities. However, conducting the study in the Atlanta metropolitan area is also a strength since it is large (>1.6 million) and the South suffers from greater burden of CVD relative to other areas in the US.[31, 32] In addition, we employed convenience sampling, and had strict inclusion criteria (e.g. no CVD and between ages 30–70) which may introduce selection bias into our results, and limit generalizability. Nonetheless, our participants came from >200 census tracts, which provides us with substantial within-cohort variability. Finally, given the cross-sectional design, we cannot address causality. Longitudinal studies are needed to further assess neighborhood social or sociocultural characteristics and ideal CVH among Black Americans.

Nevertheless, we have observed patterns that suggest that favorable social environment is associated with ideal CVH, and may act through improved diet, exercise habits, and lower BMI of community residents. We demonstrate these associations among mainly

middle-age Black Americans, which is particularly important given their overall excess rates of mortality relative to their younger or older peers.[33, 34] Thus, this age cohort represents an important group to target for public health officials to improve CVH among Black Americans.

Differences across neighborhoods are partly the result of policies (or absence of policies) that are amenable to intervention.[35] Structural changes to the neighborhood-built environment and public health policies to improve the social environment could perhaps improve the CVH of Black Americans. For example, studies have shown that greater length of residence is associated with improved social cohesion, especially for poor neighborhoods.[36] Research has shown that Black neighborhoods have been disproportionately targeted by gentrification.[37] Therefore, policies allowing Black Americans to stay in neighborhoods where they have social ties could represent an avenue for intervention. Further research is needed into neighborhood level interventions to improve CVH among Black Americans.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Abbreviations

AHA	American Heart Association
BMI	Body Mass Index
CI	Confidence Interval
CV	Cardiovascular
CVD	Cardiovascular Disease
CVH	Cardiovascular Health
JHS	Jackson Heart Study
LS7	Life’s Simple 7
MECA	Morehouse-Emory Cardiovascular Center for Health Equity
MESA	Multi-Ethnic Study of Atherosclerosis
OR	Odd’s Ratio
SD	Standard Deviation
SES	Socioeconomic Status

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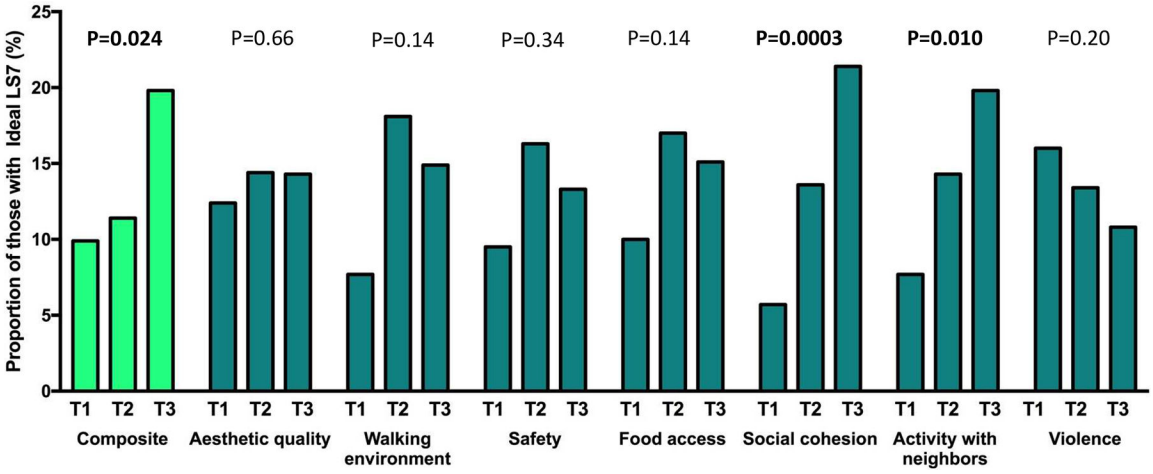

Figure 1. Prevalence of ideal Life's Simple 7 (LS7) scores according to tertiles of neighborhood characteristics, with violence reverse-coded. Higher tertiles represent improving neighborhood characteristics.

P-values are generated by Cochran-Armitage test for trend. Abbreviations: LS7 = Life's Simple 7; T1-tertile 1; T2-tertile 2; T3-tertile 3.

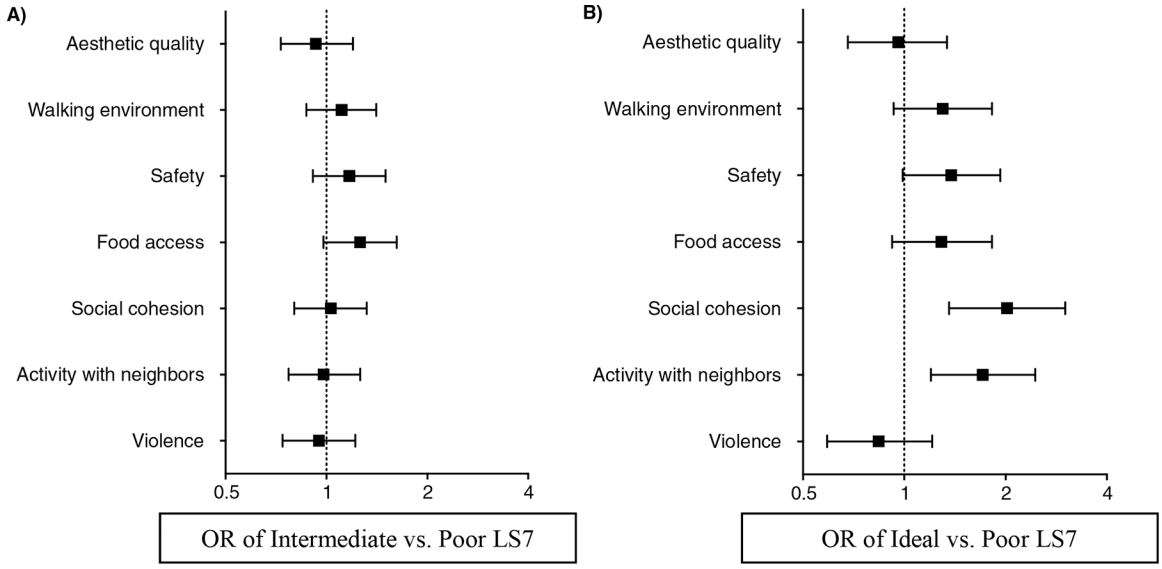

Figure 2. Odds ratio (OR) of having intermediate or ideal Life's Simple 7 (LS7) scores compared to poor according to neighborhood characteristics (violence was reverse coded).

OR of having intermediate LS7 (A) or ideal LS7 (B) scores compared to poor LS7 per 1 standard deviation increment increase in neighborhood characteristics are depicted with 95% confidence intervals. Estimates are adjusted for age, sex, annual household income, education, marital status, and employment status.

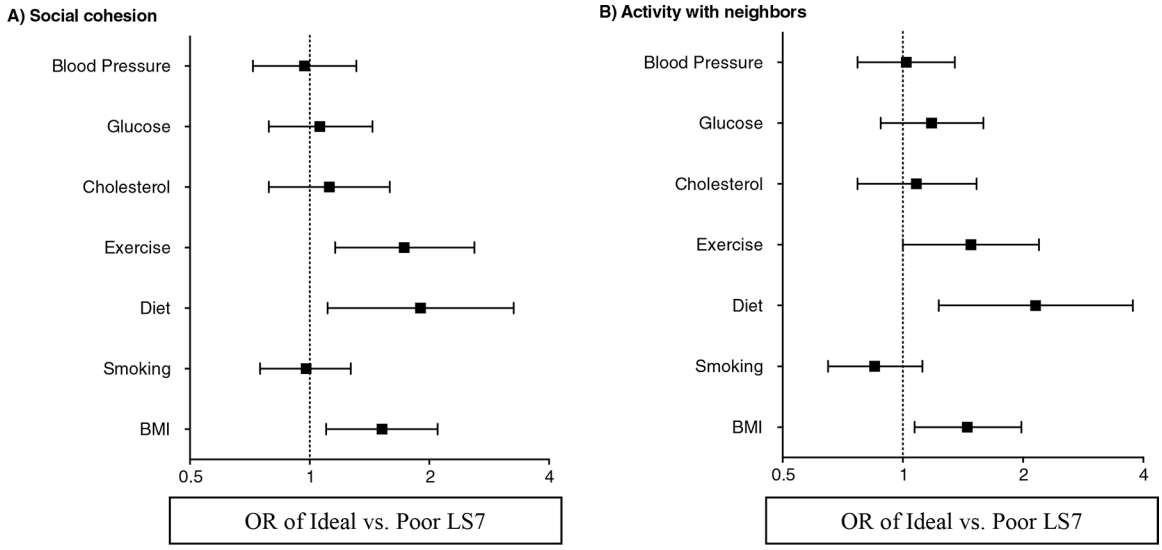

Figure 3. Odds ratio (OR) of having ideal components of Life's Simple 7 (LS7) compared to poor according to social cohesion and activity with neighbors.

OR of having ideal LS7 sub-component scores compared to poor per 1 standard deviation increment in social cohesion (A) and activity with neighbors (B) are depicted with 95% confidence intervals. Estimates are adjusted for age, sex, annual household income, education, marital status, and employment status.

Table 1.

Demographic, socioeconomic, and clinical characteristics of the cohort stratified by the categories of LS7 scores

	Poor (N=231)	Intermediate (N=109)	Ideal (N=54)	P-value
Demographic/socioeconomic variables				
Age, years	55.3 ±8.9	51.0 ± 10.2	46.0 ± 12.3	**<0.001**
Male, n (%)	83 (36)	45 (41)	26 (48)	0.22
Annual household income, n (%)				**0.021**
< $10,000	56 (24)	20 (19)	10 (19)	
$10,000 to <$25,000	68 (29)	25 (23)	5 (9)	
$25,000 to <$50,000	51 (22)	35 (32)	24 (44)	
≥ $50,000	46 (20)	23 (21)	13 (24)	
Do not know	10 (4)	5 (5)	2 (4)	
Education history, n (%)				**0.043**
High school or less	26 (11)	5 (5)	1 (2)	
Some college/tech school	134 (58)	62 (58)	30 (56)	
College grad or higher	70 (30)	42 (39)	23 (43)	
Currently married, n (%)	57 (25)	39 (36)	12 (22)	0.060
Employed (fulltime/part time), n (%)	104 (45)	59 (54)	32 (59)	0.096
Objective/Clinical measures				
Hypertension, n (%)	207 (90)	57 (52)	13 (24)	**<0.001**
Diabetes mellitus, n (%)	78 (34)	5 (5)	0 (0)	**<0.001**
Hyperlipidemia, n (%)	103 (45)	14 (13)	2 (4)	**<0.001**
Current smoker, n (%)	151 (65)	26 (24)	4 (7)	**<0.001**
BMI, kg/m^2	35 ± 8	31 ± 7	26 ± 4	**<0.001**
SBP, mmHg	136 ± 19	125 ± 18	119 ± 15	**<0.001**
DBP, mmHg	84 ± 12	78 ± 10	72 ± 9	**<0.001**
Glucose, mg/dL	97 [90, 112]	88 [84, 94]	86 [82, 91]	**<0.001**
Cholesterol, mg/dL	200 ± 42	185 ± 34	173 ± 28	**<0.001**
HDL, mg/dL	56 ± 17	58 ± 16	66 ± 17	**0.002**
LDL. mg/dL	122 ± 38	109 ± 29	93 ± 24	**<0.001**
Triglycerides, mg/dL	100 [76, 142]	80 [60,108]	61 [52,85]	**<0.001**
Total LS7, score	6.5 ± 1.3	9.4 ± 0.5	11.6 ± 0.7	**<0.001**

*Values are mean ± standard deviation, median [25^{th} and 75^{th} interquartile range], or n (%).

Abbreviations: BMI = body mass index; SBP = systolic blood pressure; DBP = diastolic blood pressure; HDL = high-density lipoprotein; LDL = low-density lipoprotein; LS7 = Life's Simple 7.

Table 2.

Association between composite neighborhood health score and Life's Simple 7 (LS7) score *

Model	Covariates	Intermediate vs poor			Ideal vs poor		
		OR	95% C.I.	P-value	OR	95% C.I.	P-value
1	Unadjusted	1.11	0.88 – 1.39	0.40	1.54	1.11 – 2.14	**0.010**
2	Model 1+ age and sex	1.16	0.91 – 1.46	0.23	1.67	1.17 – 2.36	**0.004**
3	Model 2 + SES †	1.11	0.86 – 1.43	0.43	1.62	1.11 – 2.36	**0.012**

* Odds ratio of having higher LS7 categories in reference to the lowest category per 1 standard deviation increment of neighborhood health scores is depicted.

† Includes income (<$25,000, $25,000 to <$50,000, ≥$50,000, and do not know), education (≤ high school graduate, some college or technical school, ≥ college graduate), marital status, and employment status

Abbreviations: LS7 = Life's Simple 7; OR = odds ratio; C.I. = confidence interval; SES = socioeconomic status.