Social determinants of cardiovascular disease risk factor presence among rural and urban Black and White men

Rakale Collins Quarells, PhD, **Jinnan Liu, PhD**, and **Sharon K. Davis, PhD**
Social Epidemiology Research Center, Morehouse School of Medicine, NCPC-315, 720 Westview Drive, SW, Atlanta, GA, 30310, USA

Social Epidemiology Research Center, Morehouse School of Medicine, Atlanta, GA, 30310, USA

Social Epidemiology Research Center, Morehouse School of Medicine, Atlanta, GA, 30310, USA

Abstract

Background—Social determinants of health are increasingly being addressed as a causal factor for disparities in health. The purpose of this study was to assess the effects of specified social determinants of health on cardiovascular disease (CVD) clinical risk factors in Black and White men residing in rural and urban Georgia.

Methods—Self-report data were collected on a total of 548 Black and White men aged >18 years from 2004-2005. Data were derived from a random telephone survey. Separate logistic regression models were conducted to examine the effects of specified social determinants on the presence of two or more CVD clinical risk factors. In addition, differences within rural and urban men were also assessed.

Results—Lower education, unemployment, lower income, and higher general stress were all significantly related to the presence of two or more CVD clinical risk factors. As expected, the covariates of age, race, and residential location also played a significant role in cardiovascular health. Rural men were nearly twice as likely to have two or more CVD risk factors compared to their urban men (*P*<0.01). Models examining location separately found urban Black men to be 2.6 times as likely to have more than two CVD risk factors (*P*<0.02).

Conclusion—Findings reveal social determinants are associated with CVD risk factor differences between Black and White men and between rural and urban residents. It is important for policymakers and the healthcare industry to address these social determinants of health as they try to improve the health of the people they serve.

Keywords

Cardiovascular disease; Men; Rural health; Urban health; African Americans

Introduction

Social determinants of health are increasingly being addressed as a causal factor for racial disparities in health. Social determinants of health include, but are not limited to, the

conditions in which people are born, grow, live, work and age, including health care systems. Moreover, social determinants have been categorized in terms of: health status, health behavior, and health care [1]. More specifically, studies have shown that the above mentioned social determinants also affect cardiovascular diseases and their risk factors [2]. Social determinants of cardiovascular disease (CVD) health status such as socioeconomic status (SES), general stress, experience of racial discrimination, and stress due to racial discrimination are examined in this paper. SES includes level of education, employment status and level of income. Few studies have looked at the effects of social determinants in rural and urban communities; and none have assessed the effects of social determinants on health status differences between Black and White men residing in rural and urban locations. The purpose of this study is to examine the effects of specified social determinants of health status on cardiovascular health among Black and White men residing in rural and urban Georgia.

Subjects, materials, and methods

Dataset and participants

Data from the Regional Assessment Health Surveillance Study (RAHSS) were derived from a random telephone survey of a representative sample of Black and White adults residing in 11 counties in Georgia. The instrument used was based on a modified version of the validated Behavioral Risk Factor Surveillance Survey [3] and other validated instruments [4]. Data were collected from 2004-2005. A total of 548 Black and White adult men aged 18-90 years were included in the sample. Rural participants were from four rural counties (Bulloch, Candler, Evans, and Jenkins Counties), while urban participants were from one urban county (Fulton County), all in Georgia. There were a total of 256 rural and 292 urban residents. Participants self-identified as Black ($n = 180$) or White ($n = 368$).

Outcome and predictor variables

The study's main outcomes included self-reported CVD clinical risk factors. Clinical risk factors were based on respondents who answered "yes" to ever being told by a doctor, nurse or other health professional that they had diabetes, hypertension, and/or elevated cholesterol. In addition, self-reported height and weight were used to determine body mass index (BMI). Those persons with a BMI of 25 were considered overweight or obese and at greater risk for CVD.

Social determinants were the predictor variables. Social determinants of CVD health were defined as SES (based on years of education, annual income, or employment status), general stress, racial discrimination, and stress due to racial discrimination. Specifically, respondents were asked their highest level of education and that level was collapsed into three categories: less than high school, high school diploma, and some college or more. Annual income was collapsed into three categories based on a self-report income of <$25,000, $25,000-$50, 000, and >$50,000. Employment status was collapsed into two categories of employed (including those employed full time, self-employed, retired) and unemployed (including those out of work, unable to work and students). General stress was based on the question: "How would you rank the level of day-to-day stress and worry in your life?" Possible answers included (1) very little to none, (2) some, (3) high or very high. Racial discrimination was based on the question: "In general, have you ever experienced racial discrimination in any aspect of your life such as work, school, or shopping because of the color of your skin and race that was stressful to you?" Answers included (1) yes, or (2) no. Stress due to exposure to racial discrimination was measured based on the response to the question: "Please rank your level of stress when you experience racial discrimination. Would you say you experienced (1) low to no stress at all or (2) moderate or high stress.

Age was self-reported in years and race was self-identified. Location was designated based on county of residence.

Statistical analyses

Separate logistic regression models were conducted to examine the effects of the social determinants on the presence of CVD clinical risk factors. Differential effects of the socioeconomic status components were explored using models that included education, employment status, and income separately. Also included in each model were age, race, and location as covariates. The effects of social determinants on clinical risk factors within rural and urban locations were assessed by conducting separate analyses for rural and urban residents. Age in years was entered as a continuous variable; race, location, level of education, employment status, annual income, general stress, racial discrimination, and stress due to racial discrimination were entered as categorical variables. Odds ratios (OR), 95% confidence intervals (CI) and level of statistical significance are reported as a two-tailed P value of 0.05. All analyses were performed using Statistical Analyses Software, version 9.2 [5].

Results

In this study the relationship between social determinants of health and self-reported clinical risk factors for CVD was examined. Participants in the study included 548 Black and White men residing in both rural ($n = 256$) and urban ($n = 292$) locations in Georgia (Table 1). Ages of the men ranged from 18-90 years, with a mean age of 48.29 years. In examining the CVD clinical risk factors, the majority of the sample was considered overweight or obese based on self-reported height and weight. Most men had not been told that they had hypertension, diabetes, or high cholesterol. However, significant differences did exist with self-reported hypertension by location and race. Among the urban population, 43% of Blacks were hypertensive compared to 26% of Whites ($P<0.00$). There were also significantly more urban Black men that were diabetic compared with their White counterparts, 14% and 3%, respectively ($P<0.00$). For the outcome models, clinical risk factors were combined in order to examine men with two or more CVD clinical risk factors (51%) compared to those with one or less clinical risk factors (49%). Among urban men, a significantly greater number of Blacks had two or more risk factors (55%) compared to their White counterparts (39%).

Among the social determinants of health, the components of SES (education, employment, and income) all significantly differed between Blacks and Whites living in rural and urban locations. Overall, over half (60%) of the sample had completed high school and some college education. The majority of the sample was employed (84%) with an annual income greater than $50,000. Furthermore, although over half of all men reported experiencing racial discrimination (64.6%), rates were significantly higher for Blacks (53-69%) compared to Whites (20-24%) in both urban ($P<0.00$) and rural ($P<0.00$) locations.

Social determinants and CVD clinical risk factors

To examine the relationships between social determinants and CVD clinical risk factors, separate social determinant models were constructed for education, employment, and income to avoid multi-co-linearity and still examine their important individual contributions (Table 2). In each of the separate models with education, income, and employment, older men were more likely to have two or more risk factors compared to younger men (OR = 1.05; CI = 1.04-1.07, all models). Similarly, men residing in rural locations were nearly twice as likely to have two or more clinical risk factors compared to their urban counterparts in all models (OR = 1.83; CI = 1.172.85,education model; OR = 1.80; CI = 1.19-2.74,

employment model; and OR = 1.98; CI = 1.23-3.17,income model). In addition, in the overall model with income, race was also found to significantly influence the presence of CVD clinical risk factors (OR = 1.92; CI = 1.08-3.49). Blacks were nearly twice as likely to have greater than two CVD clinical risk factors.

Residential location was examined separately with the three social determinant models. In the model with education, among rural residents, older men were slightly more likely to have greater than two CVD clinical risk factors (OR = 1.05; CI = 1.03-1.08). Among urban men, older age and race increased the likelihood of having greater than two CVD clinical risk factors (OR = 1.05; CI = 1.03-1.07 and OR = 2.44; CI = 1.15-5.18, respectively). Black men were twice as likely to have greater than two CVD clinical risk factors.

In the model with employment among rural men, older age and employment status were significantly related to the presence of two or more CVD clinical risk factors (OR = 1.06; CI = 1.04-1.08 and OR = 3.89; CI = 1.52-9.97, respectively). Unemployed men living in rural locations were nearly four times more likely to have two or more CVD clinical risk factors. The analysis with urban men found older age, race, and stress to have a significant role in the presence of two or more CVD clinical risk factors (OR = 1.05; CI =1.03-1.07; OR = 2.62; CI = 1.26-5.47; and OR = 2.25; CI = 1.10-4.62, respectively). Blacks living in urban areas were 2.6 times as likely to have more than two CVD clinical risk factors. Furthermore, urban men with higher stress were twice as likely to have a greater number of risk factors compared to those reporting some stress.

Similar to the earlier findings, in the social determinant model with income, age (OR = 1.06; CI = 1.04-1.08), race (OR = 1.94; CI = 1.08-3.49), and location (OR = 1.98; CI = 1.23-3.17) were found to significantly influence the presence of two or more risk factors. When social determinants among rural residents were examined, only age remained significant in the model (OR = 1.07; CI = 1.03-1.08). Among urban residents, age (OR = 1.06; CI = 1.04-1.08) race (OR = 3.13; CI = 1.32-7.397) and general stress (OR = 2.12; CI = 1.01-4.45) were found to be significant. Blacks living in urban locations were three times more likely to have greater than two CVD clinical risk factors (OR = 3.26; CI = 1.37-7.79), but urban residents with higher general stress were twice as likely to have greater than two CVD clinical risk factors (OR = 2.17; CI = 1.03-4.59) compared to those with some stress.

Discussion

Overall, the findings of this study showed that social determinants of health do significantly impact the cardiovascular health of men. Specifically, education, employment, income, and general stress were all significantly related to CVD clinical risk factor presence. As expected, the covariates of age, race, and residential location also played a significant role in cardiovascular health. To date, few studies have examined social determinants of health among Black and White rural and urban men.

These findings support the current literature that social determinants are important and contribute to current health disparities [1,2]. Of particular importance is the differential finding with components of socioeconomic status (SES). For the most part, SES is usually defined as education, employment, income, and/or occupation. Education and/or income are most commonly used interchangeably as proxies for SES. Furthermore, lower educational level, unemployment status, and lower income have been well established as risk factors for poorer health status [2,6-8]. Interestingly, the findings differed dramatically depending on which component of SES was entered in the model. Race of the men was only significant in the social determinant model with income and not in the models with education and employment status. Perhaps this is related to lower income in Blacks compared to Whites.

These differences show that all of the components of SES do not represent it equally. Therefore, if only one is examined then potential relationships may be missed. Further research is needed to better understand how and why the different components of SES interact differently with risk factors for CVD.

Significant rural and urban differences were also found in all of the social determinant models. In all models rural men were found to have poorer health (i.e., two or more CVD clinical risk factors) compared to urban men, as is consistent with the literature [9]. Men living in rural Georgia compared to those in urban Georgia also had almost twice the risk of having two or more risk factors. This disparity between rural and urban residents has been associated with lower SES, reduced access to care, and a lack of preventive services utilized by rural residents [10]. Interestingly, in the current study, among rural men, the only social determinant related to the presence of CVD clinical risk factors was employment status. By contrast, among urban men, general stress was the only social determinant significantly related to the presence of CVD clinical risk factors. Exposure to a very high level of general stress increased the likelihood of men having two or more CVD clinical risk factors among those residing in urban Georgia. This finding is consistent with past studies that have demonstrated the relationship between stress and CVD risk factors [11-14].

Limitations

Results from this study provide important new information regarding the association of social determinants on CVD risk factors among Black and White men. However, a broad extrapolation of the study findings may not be feasible because of a number of inherent constraints and limitations. Outcome findings, for instance, were based on a sample of individuals drawn from one state in the southern region of the United States and may not be applicable in others. However, there is no reason to believe that these current findings will significantly differ from studies replicated in similar sociodemographic communities elsewhere in the USA. Reporting and recall bias inherent in self-reported indices is another methodologic issue that requires acknowledgement. Control for recall bias between the primary predicators and outcome variables was attempted by initially informing respondents that the study was designed to assess health status differences between those residing in rural Georgia and those residing in urban Georgia. Outcome findings were also based on cross-sectional observations and do not provide evidence concerning causality related to social determinants on CVD clinical or behavior risk factor development. Despite these observations of research limitations, the information produced by this report will contribute to the existing body of knowledge and subsequent development of research concerning the effects of social determinants on health.

Conclusion

The primary objective of this study was to advance public health discourse and relevant research related to social determinants of health. The unique milieu within racial/ethnic groups with respect to social determinants of health include a convergence of social, environmental, and biologic factors that individually and collectively interact as risk factors that contribute to the risk of CVD and subsequent morbidity and mortality. These findings suggest that social determinants of health are indeed associated with CVD risk factors and that Black men are more affected by them. It is important for policymakers and the healthcare industry to address these social determinants of health as they try to improve the health of the people they serve. Moreover, programs designed to improve health status among disproportionately affected sub-populations may not be as effective if social determinants are not considered.

References

1. Xanthos C, Treadwell HM, Holden KB. Social determinants of health among African-American men. J Mens Health. 2010; 7:11–19.

2. Clark AM, DesMeules M, Luo W, Duncan AS, Wielgosz A. Socioeconomic status and cardiovascular disease: risks and implications for care. Nat Rev Cardiol. 2009; 6(11):712–22. [PubMed: 19770848]

3. Nelson DE, Holtzman D, Bolen J, Stanwyck CA, Mack KA. Reliability and validity of measures from the Behavioral Risk Factor Surveillance System (BRFSS). Soz Praventivmed. 2001; 46(Suppl 1):S3–42. [PubMed: 11851091]

4. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. J Health Soc Behav. 1983; 24:385–96. [PubMed: 6668417]

5. SAS Institute Inc.. SAS/STAT version 9.2 User's Guide. SAS Institute Inc, NC USA; Cary, NC: 2008.

6. Shea S, Stein AD, Basch CE, Lantiqua R, Maylahn C, Strogatz DS, et al. Independent associations of educational attainment and ethnicity with behavioral risk factors for cardiovascular disease. Am J Epidemiolol. 1991; 134:567–82.

7. Winkleby MA, Kraemer HC, Ahn DK, Vardy AN. Ethnic and socioeconomic differences in cardiovascular disease risk factors findings for women from the Third National Health and Nutrition Examination Survey, 1988-1994. JAMA. 1998; 280:356–62. [PubMed: 9686553]

8. Arnett DK, McGovern PG, Jacobs DR Jr, Shahar E, Duval S, Blackburn H, et al. Fifteen years trends in cardiovascular risk factors (1980-1982 through 1985-1997), The Minnesota Heart Survey. Am J Epidemiol. 2002; 156:929–35. [PubMed: 12419765]

9. Gamm, LD.; Hutchison, LL.; Dabney, BJ.; Dorsey, AM., editors. Rural Healthy People 2010: A Companion Document to Healthy People 2010. Vol. 2. The Texas A&M University System Health Science Center, School of Rural Public Health, Southwest Rural Health Research Center; College Station, TX: 2003.

10. Hueston WJ, Hubbard ET. Preventive services for rural and urban African American adults. Arch Fam Med. 2000; 9:263–6. [PubMed: 10728114]

11. Morris-Prather CE, Harrell JP, Collins R, Leonard KL, Boss M, Lee JW. Gender differences in mood and cardiovascular response to socially stressful stimuli. Ethn Dis. 1996; 6:123–31. [PubMed: 8882841]

12. Hemingway H, Marmot M. Psychosocial factors in the aetiology and prognosis of coronary heart disease: systematic review of prospective cohort studies. BMJ. 1999; 318:1460–7. [PubMed: 10346775]

13. Baum A, Garofalo JP, Yali AM. Socioeconomic status and chronic stress. Does stress account for SES effects on health? Ann NY Acad Sci. 1999; 896:131–44. [PubMed: 10681894]

14. Pearlin LI, Schieman S, Fazio EM, Meersman SC. Stress, health, and the life course: some conceptual perspectives. J Health Soc Behav. 2005; 46:205–19. [PubMed: 16028458]

Table 1

Descriptive table for Men's Health: Regional Assessment of Health Surveillance Study, 2004–2005 [*]

Characteristics	Rural 256			Urban 292			Full sample†	
	White	Black	t_P	White	Black	t_P		548
Age (years) Mean (SD)	49.82 (17.65)	44.57 (15.91)	0.032	48.17 (16.25)	48.16 (16.99)	0.9976	48.29 (16.88)	
	%	%	X²_P	%	%	X²_P	n	%
Cardiovascular clinical risk factors								
BMI category								
BMI ≥25	68.62%	79.41%	0.0911	57.78%	66.07%	0.1578	361	65.88%
BMI<25	31.38%	20.595		42.22%	33.93%		187	34.12%
Hypertension status								
Yes	38.30%	51.47%	0.0591	25.56%	42.86%	0.0021	201	36.68%
No	61.70%	48.53%		74.44%	57.14%		347	63.32%
Diabetes status								
Yes	12.77%	11.76%	0.8306	3.33%	14.29%	0.0006	54	9.85%
No	87.23%	88.24%		96.67%	85.71%		494	90.15%
Cholesterol status								
Yes	43.05%	38.10%	0.5652	37.82%	38.20%	0.9528	174	39.73%
No	56.95%	61.90%		62.18%	61.80%		264	60.27%
Clinical risks								
2 or more	59.60%	59.52%	0.9927	38.46%	55.06%	0.0119	224	51.14%
Less than 2	40.40%	40.48%		61.54%	44.94%		214	48.86%
Social determinants								
Education								
Less than high school	14.36%	23.53%	0.0026	2.78%	13.39%	<0.0001	63	11.50%
High school	35.11%	50%		8.33%	35.71%		155	28.28%
Some college or more	50.53%	26.47%		88.89%	50.89%		330	60.22%
Employment [***]								

Characteristics	Rural 256			Urban 292			Full sample†	
	White	Black	t_P	White	Black	t_P	n	548
	%	%		%	%		n	%
Age (years) Mean (SD)	49.82 (17.65)	44.57 (15.91)	0.032	48.17 (16.25)	48.16 (16.99)	0.9976	48.29 (16.88)	
	%	%	X²_P	%	%	X²_P	n	%
Employed	85.03%	64.71%	0.0004	92.22%	79.46%	0.0014	458	83.73%
Unemployed	14.97%	35.29%		7.78%	20.54%		89	16.27%
Income								
<25K	34.83%	52.38%	0.0331	6.83%	40.38%	<0.0001	148	29.25%
25k and <50k	41.57%	34.92%		16.15%	33.65%		157	31.03%
50k	23.60%	12.70%		77.02%	25.96%		201	39.72%
General Stress Level								
Very little or none	39.89%	48.53%	0.3368	23.33%	48.21%	<0.0001	204	37.23%
Some	34.04%	25%		36.67%	29.46%		180	32.85%
High or very high	26.06%	26.47%		40%	22.32%		164	29.93%
Experience of racial discrimination								
Yes	19.68%	52.94%	<0.0001	24.44%	68.75%	<0.0001	354	64.60%
No	80.32%	47.06%		75.56%	31.25%		194	35.40%
Stress related to racial discrimination								
Low or no stress at all	83.51%	54.41%	<0.0001	83.89%	43.75%	<0.0001	394	71.90%
Moderate or higher	16.49%	45.59%		16.11%	56.25%		154	28.10%

*
Data were derived from a cross-sectional survey conducted from 2004 through 2005 in one Urban area (Fulton county) and four Rural areas (Bulloch, Candler, Evans and Jenkins County) in Georgia using 2-part stratified random sampling.

**
Body mass index was calculated as weight in kilograms divided by the square of height in meters.

***
The Employed included those who were self-employed, employed full-time and Retired; The Unemployed category included those out of work, unable to work, and students.

†
Full sample includes both Rural and Urban respondents.

Table 2

Results from adjusted logistic regression models predicting the effects of social determinants on the cardiovascular clinical risk factors

	Rural 256			Urban 292			Rural vs Urban 548		
	Clinical cardiovascular risk factors			Clinical cardiovascular risk factors			Clinical cardiovascular risk factors		
	n=120	vs	n=85	n=115	vs	n=141	n=235	vs	n=226
Outcome variable	OR	95% CI	P value	OR	95% CI	P value	OR	95% CI	P value
Primary predictors									
Education									
< High school	0.845	0.327, 2.187	0.7286	2.729	0.712, 10.455	0.1429	1.228	0.579, 2.604	0.5927
High school	Referent			Referent			Referent		
Some college	0.735	0.368, 1.468	0.3833	1.583	0.718, 3.493	0.2550	0.960	0.579, 1.592	0.8750
Employment									
Employed	Referent			Referent			Referent		
Unemployed	3.833	1.523, 9.644	0.0043	0.720	0.285, 1.814	0.4856	1.746	0.946, 3.223	0.0749
Income									
< 25K	Referent			Referent			Referent		
25k and <50k	0.616	0.294, 1.295	0.2014	1.707	0.644, 4.525	0.2827	0.888	0.497, 1.587	0.6884
50k	0.859	0.375, 1.966	0.7185	1.609	0.641, 4.040	0.3110	0.972	0.539, 1.754	0.9254
General Stress									
Very little or none	[1]0.702	[1]0.340, 1.446	[1]0.3370	[1]0.677	[1]0.335, 1.365	[1]0.2752	[1]0.711	[1]0.433, 1.167	[1]0.1775
	[2]0.774	[2]0.372, 1.615	[2]0.4954	[2]0.686	[2]0.342, 1.376	[2]0.2882	[2]0.737	[2]0.448, 1.211	[2]0.2286
	[3]0.732	[3]0.346, 1.549	[3]0.4153	[3]0.692	[3]0.323, 1.479	[3]0.3421	[3]0.771	[3]0.458, 1.301	[3]0.3303
Some	Referent			Referent			Referent		
High or very high	[1]1.158	[1]0.519, 2.586	[1]0.7197	[1]1.973	[1]0.971, 4.010	[1]0.0604	[1]1.525	[1]0.904, 2.573	[1]0.1138
	[2]1.182	[2]0.515, 2.714	[2]0.6935	[2]2.097	[2]1.034, 4.249	[2]0.0400	[2]1.533	[2]0.907, 2.592	[2]0.1107
	[3]1.190	[3]0.516, 2.743	[3]0.6835	[3]2.119	[3]1.010, 4.445	[3]0.0469	[3]1.586	[3]0.920, 2.733	[3]0.0969
Racial discrimination									
No	Referent			Referent			Referent		
Yes	[1]0.587	[1]0.106, 3.250	[1]0.5422	[1]0.835	[1]0.290, 2.407	[1]0.7389	[1]0.725	[1]0.296, 1.775	[1]0.4815
	[2]0.731	[2]0.131, 4.066	[2]0.7207	[2]0.861	[2]0.300, 2.469	[2]0.7807	[2]0.753	[2]0.310, 1.828	[2]0.5313

Outcome variable	Rural 256 — Clinical cardiovascular risk factors n=120	vs	n=85	Urban 292 — Clinical cardiovascular risk factors n=115	vs	n=141	Rural vs Urban 548 — Clinical cardiovascular risk factors n=235	vs	n=226
	[3]0.501	[3]0.088, [3]2.853	[3]0.4362	[3]0.740	[3]0.229, [3]2.391	[3]0.6145	[3]0.618	[3]0.233, [3]1.641	[3]0.3345
Stress due to racial discrimination									
Low or no stress	Referent			Referent			Referent		
Moderate or high	[1]1.909	[1]0.332, [1]10.977	[1]0.4685	[1]1.878	[1]0.622, [1]5.672	[1]0.2641	[1]1.818	[1]0.721, [1]4.584	[1]0.2051
	[2]1.387	[2]0.240, [2]8.007	[2]0.7143	[2]1.701	[2]0.570, [2]5.075	[2]0.3410	[2]1.729	[2]0.692, [2]4.317	[2]0.2409
	[3]1.897	[3]0.320, 11.235	[3]0.4803	[3]1.757	[3]0.518, [3]5.962	[3]0.3661	[3]1.975	[3]0.723, [3]5.392	[3]0.1843
Covariates									
Age (per 1 year increase)	[1]1.053	[1]1.030, [1]1.076	[1]<.0001	[1]1.054	[1]1.034, [1]1.074	[1]<.0001	[1]1.052	[1]1.037, [1]1.067	[1]<.0001
	[2]1.055	[2]1.033, [2]1.078	[2]<.0001	[2]1.053	[2]1.033, [2]1.073	[2]<.0001	[2]1.054	[2]1.040, [2]1.069	[2]<.0001
	[3]1.054	[3]1.031, [3]1.078	[3]<.0001	[3]1.058	[3]1.036, [3]1.080	[3]<.0001	[3]1.055	[3]1.039, [3]1.071	[3]<.0001
Race (Black vs White)	[1]1.090	[1]0.470, [1]2.527	[1]0.8404	[1]2.443	[1].153, [1]5.178	[1]0.0197	[1]1.647	[1]0.950, [1]2.855	[1]0.0756
	[2]0.997	[2]0.430, [2]2.312	[2]0.9952	[2]2.484	[2]1.216, [2]5.077	[2]0.0126	[2]1.592	[2]0.942, [2]2.691	[2]0.0825
	[3]1.397	[3]0.592, [3]3.295	[3]0.4455	[3]3.127	[3]1.322, [3]7.397	[3]0.0094	[3]1.939	[3]1.077, [3]3.491	[3]0.0272
Location (Rural vs Urban)							[1]1.826	[1]1.170, [1]2.849	[1]0.0080
							[2]1.804	[2]1.186, [2]2.743	[2]0.0058
							[3]1.977	[3]1.231, [3]3.174	[3]0.0048

Level of significance was established as a two-tailed *P* value of <0.05.

The clinical cardiovascular risk factors included "yes" vs "no" responses to the query of hypertension, diabetes, and high cholesterol, and body mass index equal or more than 25, with less than two clinical risk factors as the referent group. OR, odds ratio; CI, confidence interval.

Education, Employment, and Income were run in separate models to avoid co-linearity.

[1] Model with Education

[2] Model with Employment

[3] Model with Income.