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Allostatic Load, Income, and Race Among Black and White Men in the United States

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Abstract

Research indicates that income is significantly associated with allostatic load (AL) and that this association may differ between White and Black Americans. Most existing income–AL link work focuses on women and less is known about this association among men. Using data from the National Health and Nutrition Examination Survey (NHANES), we examined whether race moderates the association between income and AL among Black and White men in the United States (n = 5,685). We find that, regardless of income levels, Black men have significantly higher prevalence of being in the high-AL group compared with high-income White men. Our findings suggest that Black men do not receive the same health benefits for increased income relative to their White counterparts.

Keywords

black men, special populations, allostatic load, income, unequal returns

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Introduction

Despite significant social advantages, men in the United States have shorter life spans and greater levels of life-threatening chronic diseases relative to women (Griffith et al., 2019; Rieker & Bird, 2005). Evidence from previous research demonstrates that Black men's health profiles are worse compared with their White counterparts (Bell & Thorpe, 2019; Wilson-Frederick et al., 2014). A number of explanations have been explored for men's health disparities including masculinity, income, and stress (Bell et al., 2018; Bell & Thorpe, 2019; Gilbert et al., 2016; Griffith et al., 2016; Nuru-Jeter et al., 2018).

Stress exposure is an important mechanism through which social and environmental experiences become embodied (Upchurch et al., 2015). Allostatic load (AL) is one of the primary measures scholars use to quantify the cumulative burden of exposure to stress. AL is theorized to capture repeated adaptations to stressors that can lead to dysregulation in multiple physiological human systems (Beckie, 2012; Geronimus et al., 2006). This dysregulation has been identified to be detrimental to health and well-being, with a number of studies demonstrating that AL is associated with higher levels of mortality and poor physical and mental health outcomes (Beckie, 2012; Borrell et al., 2020; Thorpe et al., 2020).

Previous research suggests that lower income levels significantly predict AL levels (Hickson et al., 2012; Upchurch et al., 2015). Consistent with fundamental

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cause theory, which posits that resources, especially related to income, significantly shape health disparities (Phelan et al., 2010), there is a well-established link between income and AL, such that most previous studies indicate that higher income is generally associated with lower AL scores (Merkin et al., 2020; Rainisch & Upchurch, 2013). These findings further align with the conservation of resources (COR) theory, which proposes that socioeconomic resources, such as income, are significantly linked with the availability of resources and the ability to gain and protect resources, which in turn are associated with well-being (Hobfoll, 1989, 2011). There is evidence documenting significant racial and ethnic disparities in AL (Gaskin et al., 2020; Geronimus et al., 2006; Upchurch et al., 2015). These disparities are not fully explained by income differences across groups (Gaskin et al., 2020; Geronimus et al., 2006). Research suggests that, relative to White Americans, biological dysregulation among Black Americans is not as significantly patterned by income and other SES measures (Hickson et al., 2012). Most of the existing research focuses specifically on women contrasting the income–AL link between different racial groups. This research suggests that income differences may explain most of the AL differences between White and Hispanic women, but does not account for as much variation between White and Black American women (Gaskin et al., 2020). The little work that includes men focuses on comparing the income–AL association among Black men and women (Hickson et al., 2012). These studies provide some preliminary evidence that the income–AL relationship may work differently among Black American men, but it is not well understood whether race moderates the income–AL link among men in the United States.

Minority Stress Theory

Minority stress theory is a relevant framework for exploring the role race may play in the income–AL association. It posits that members of oppressed social groups experience additional stressors as a result of their social position with the social structure (Meyer, 2003; Williams et al., 2019). This theory further suggests that the nature of minority stress is chronic and tied to social processes. Important here, Black Americans experience added stressors (Sternthal et al., 2011) and that these stressors are chronic (Lewis et al., 2015). This racialized stress has been linked to poor health outcomes (Cobb et al., 2019; Colen et al., 2018). Other research indicates that resources, such as income, which are generally health protective, may not have the same effect for Black Americans (Turner et al., 2017) in large part because of racism-related stress (Colen et al., 2018). In the context of our study, it is important to understand whether race moderates the relationship between income and AL as unique racialized stressors among Black men may contribute to differential outcomes relative to White men.

Although there is strong evidence that both income and race have important implications for AL, it is less clear whether the income–AL link varies by race among American men. Given the increasing evidence of relatively poor health among Black men amid significant exposure to minority stressors, it is important to understand if these patterns extend to the association between income and AL among Black and White men. In this study, we examined whether race moderated the association between income and AL among U.S. men. Relative to White men, we expected that higher income will not be linked with lower risk of high AL for Black men. Understanding race differences in the association between income and AL among men will contribute important knowledge to the study of men's health disparities in AL.

Method

Data for this study were drawn from the National Health and Nutrition Examination Survey (NHANES), which focuses on the health, nutritional, and functional status of the noninstitutionalized civilian population in the United States. Conducted as a continuous annual survey since 1999 (Chen et al., 2018), NHANES has released public use data in 2-year increments (e.g., NHANES 1999–2000, NHANES 2001–2002, and NHANES 2003–2004). Data were collected from respondents in two steps. First, information regarding the participant's health history, health behaviors, and risk factors were obtained during the home interview. Second, participants were invited to participate in a medical examination where they received a detailed physical examination at a mobile examination center (Chen et al., 2018). Each of these surveys used a version of a stratified, multistage probability sampling design (Fakhouri et al., 2020). Additional details regarding NHANES data and methodology is described elsewhere (NHANES, 2018). The National Center for Health Statistics ethics review board approved protocols and written informed consent was obtained from all NHANES participants.

In this analysis, we combined nine waves of the NHANES data between 1999 and 2016 (n = 92,062). We limited our analytical sample to all men aged ≥20 years who had valid data on biomarkers used to create AL score and identified themselves as non-Hispanic White (NHW) and non-Hispanic Black (NHB). Important covariates including education and marital status are only asked of respondents aged ≥20 years. The NHANES family income variable ranges from 1 (*$0–$4,999*) to 11 (*$75,000 and above*). We dichotomize this variable into less than

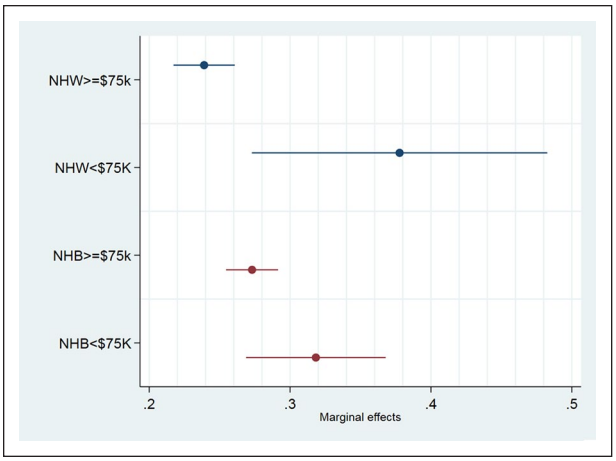

Figure 1. Race × Income Marginal Effects.
Source. National Health and Nutrition Examination Study, 1999–2016.

$75,000 and equal or more than $75,000. This yielded an analytic sample of 5,685 men, which included 1,633 men who reported family income greater than or equal to $75,000 and 4,529 men who reported family income less than $75,000.

Our dependent variable, AL, was derived from eight biomarkers, including systolic blood pressure (mm Hg), diastolic blood pressure (mm Hg), pulse rate (beats/min), body mass index (BMI; kg/m^2), glycohemoglobin (%), direct high-density lipoprotein (HDL)-cholesterol (mg/dL), total cholesterol (mg/dL), and serum Albumin (g/dL). Following the approach developed by Chyu and Upchurch (2011), we considered values above the 75th percentile as high risk for all the biomarkers, except for HDL and serum albumin, for which values below the 25th percentile was defined as high risk (Chyu & Upchurch, 2011; Geronimus et al., 2006). Each biomarker that was considered to be high risk was assigned a 1 and those considered to be low risk were assigned a 0. After summing across the biomarker indicators, we obtained a score ranging from 0 to 8 for each respondent. Finally, based on prior literature (Geronimus et al., 2006; Seeman et al., 1997), we created a dummy variable to identify men with a high AL versus low AL (1, if AL ≥4; 0, if AL <4).

Covariates included demographic and health-related characteristics. Demographic variables included age (years), marital status (1 = *married*, 0 = *not married*), and education categories (less than high school graduate, high school graduate or General Educational Development equivalent recipient, or more than high school education). Health-related characteristics included health insurance (1 = *yes*, 0 = *no*), self-reported health (fair/poor vs. excellent/very good/good), and household size (total number of people in the household).

Analytic Approach

The mean and proportional differences between NHB and NHW men with income ≥$75,000 and income <$75,000 for demographic, health-related characteristics and biomarkers were evaluated using Student's *t* tests and chi-square test. In our analyses, the prevalence of AL ≥4 was greater than 10%; therefore, we used a weighted modified Poisson regression analysis (McNutt et al., 2003; Thorpe et al., 2017; Zou, 2004) that produced prevalence ratios (PRs) and corresponding 95% confidence intervals (CIs; McNutt et al., 2003; Thorpe et al., 2017; Zou, 2004). We ran three models for our analyses. Model 1 was an unadjusted model examining the relationship between income–race and AL score. We created a categorical variable by interacting income more than $75,000 and race/ethnicity (NHW and NHB) and included that variable as the main independent variable. Model 2 was an adjusted Model 1, including all control variables except self-reported health, and Model 3 is the full model including all control variables. Because the interaction between income and race/ethnicity was significant ($p = .0005$), we followed the interaction approach used in Gaskin et al. (2014) and created four dummy variables using race (NHB and NHW) and income (if >$75K) as interaction between race/ethnicity and income. The interaction marginal effects are plotted in Figure 1. All descriptive statistics and Poisson regression estimates were weighted using the NHANES individual-level sampling weights for 1999 to 2016 (nine waves of data). The p values $< .05$ were considered statistically significant; *t* tests were two-sided. All statistical procedures were performed using STATA statistical software, Version 15.

Results

The distribution of sociodemographic characteristics and AL among NHB and NHW men for the total sample and by income is presented in Table 1. Of the 5,685 men, 12.9% were NHB and the average age was 47.3 ± 12.9 years. Overall, the majority of men reported their education as some college and above, family income between $35,000 and $74,999, being married, and having health insurance. A small portion of the men reported their health as fair or poor. Men who reported family income greater than or equal to $75,000 were more likely to be younger, have some college education or above, be married, and have health insurance than men who reported family income less than $75,000. Men who reported income greater than or equal to $75,000 were less likely to rate their health as fair or poor relative to men who reported income less than $75,000.

Table 1. Distribution of Sociodemographic Characteristics and Mean Allostatic Load Score Among Adult Men, NHANES 1999–2016.

Variables	All (N = 5,685)	Family income ≥$75K ($n$ = 1,528)	Family income <$75K ($n$ = 4,665)	p value[a]
Age—years (*M*, *SD*)	47.3 (12.9)	46.5 (9.5)	47.7 (14.7)	.0455
Non-Hispanic Black (%)	1,778 (12.1)	347 (6.5)	1,431 (15.2)	.000
Education (%)				
Less than high school	1,337 (14.2)	117 (4.9)	1,220 (19.5)	.000
High school graduate/GED	1,676 (25.4)	278 (16.8)	1,398 (30.4)	
Some college and above	3,319 (60.2)	1,279 (78.1)	2,040 (49.9)	
Family income (%)				
$0–$34,999	2,416 (25.7)	—	2,416 (40.5)	
$35,000–$74,999	2,249 (37.7)	—	2,249 (59.4)	
≥$75,000	1,675 (36.5)	1,675 (100)	—	
Missing	106 (1.1)			
Married (%)	4,154 (68.6)	1,327 (78.9)	2,827 (62.7)	.000
Self-rated fair/poor (%)	277 (3.1)	25 (1.1)	252 (4.3)	.000
Covered by health insurance (%)	5,196 (84.4)	1,572 (94.0)	3,624 (79.0)	.000
Household size	2.9 (1.1)	3.1 (1.0)	2.7 (1.2)	.000

Note. GED = General Educational Development.
[a]p value reports adjusted Wald test results for age and chi-square for all other variables.

Table 2. Distribution of Individual Biomarkers and AL Score Among Income in Adult Men, NHANES 1999–2016.

Variables	All (N = 5,685), *M/SD*	Family income ≥$75K ($n$ = 1,633), *M/SD*	Family income <$75K ($n$ = 4,529), *M/SD*	p value[a]	Quartiles 25%	50%	75%
Cardiovascular markers (%)							
Systolic blood pressure (mm Hg)	2,251 (29.6)	476 (24.0)	1,775 (32.9)	<.001	108	116.7	128
Diastolic blood pressure (mm Hg)	2,215 (36.8)	647 (39.1)	1,568 (35.4)	.030	61.3	68.7	76
Pulse rate (beats /min)	1,237 (19.9)	288 (18.4)	949 (20.8)	.089	64	72	80
Metabolic markers (%)							
Body mass index (kg/m^2)	2,429 (40.0)	687 (40.7)	1,742 (39.8)	.636	22.7	26.6	31.2
Glycohemoglobin (%)	2,167 (26.8)	459 (22.1)	1,708 (29.5)	<.001	5.1	5.3	5.6
Direct HDL-cholesterol (mg/dL)	1,740 (29.5)	496 (25.8)	1,344 (31.6)	<.001	42	51	62
Total cholesterol (mg/dL)	2,012 (33.5)	564 (34.8)	1,448 (32.8)	.275	160	187	215
Inflammatory markers (%)							
Serum albumin (g/dL)	2,470 (32.4)	560 (28.4)	1,910 (34.6)	<.001	4.1	4.3	4.5
High-AL[b] (%)	1,874 (26.8)	457 (24.8)	1,417 (27.9)	.030	—	—	—

Note. AL = allostatic load; HDL = high-density lipoprotein.
[a]p value reports adjusted Wald test results. [b]AL score computed as sum of all markers, existence of a condition considered as 1 and otherwise as 0. Values above the 75th percentile were defined as high risk for all the biomarkers, with the exception of HDL and serum albumin for which values below the 25th percentile were defined as high risk. High AL was based on those men who had 4 or more biomarkers, which was considered to be high risk.

The distribution of individual biomarkers and AL by family income among NHB and NHW men is presented in Table 2. Men who reported income greater than or equal to $75,000 were less likely to be above the at-risk cut points for systolic blood pressure, glycohemoglobin, HDL serum albumin, and having four or more high-risk biomarkers compared with men who reported family income less than $75,000. Men who reported income greater than or equal to $75,000 were more likely to be above the at-risk cut points for diastolic blood pressure than men who reported income less than $75,000. No differences were observed between men who reported income greater than or equal to $75,000 and those men who reported income less than $75,000 as it relates to pulse rate, BMI, and total cholesterol.

The association between AL, race, and family income among NHB and NHW men is presented in Table 3. After adjusting for age, education, marital status, insurance status, fair or poor health, and total number of people in the household, NHB men who reported income greater than or equal to $75,000 (PR = 1.58, 95% CI = [1.28, 1.94]) and NHB men who reported income less than $75,000 had a higher prevalence of being in the high-AL group (PR = 1.25, 95% CI = [1.09, 1.44]) compared with

Table 3. AL Score[a], Adult White and Black NH Men in National Health and Nutrition Examination Survey 1999–2016 (N = 5,685).

	Model 1		Model 2		Model 3	
Variables	PR	CI-95%	PR	CI-95%	PR	CI-95%
Family income # racial/ethnical (Ref: NH White with income ≥$75K)						
NH White, <$75K	1.14	[1.01, 1.30]	1.08	[0.95, 1.23]	1.08	[0.95, 1.22]
NH Black, ≥$75K	1.56	[1.27, 1.92]	1.58	[1.28, 1.94]	1.58	[1.28, 1.94]
NH Black, <$75K	1.25	[1.09, 1.44]	1.26	[1.09, 1.45]	1.25	[1.08, 1.45]
Age (years)			1.01	[1.01, 1.01]	1.01	[1.01, 1.02]
Education (Ref: Less than high school)						
High school graduate/GED			1.09	[0.95, 1.25]	1.10	[0.96, 1.27]
Some college and above			0.86	[0.75, 0.97]	0.87	[0.76, 0.99]
Marital status (Ref: Unmarried)						
Married or living with partner			0.97	[0.85, 1.09]	0.97	[0.86, 1.10]
Covered by health insurance			1.16	[0.98, 1.37]	1.15	[0.98, 1.37]
Self-rated health (Ref: Excellent/very good/good)						
Fair/poor					1.24	[1.00, 1.53]
Household size	0.99	[0.94, 1.02]	1.04	[0.99, 1.09]	1.04	[1.00, 1.09]

Note. AL = allostatic load; PR = prevalence ratio; CI = confidence interval; GED = General Educational Development; HDL = high-density lipoprotein.

[a]For this analysis, we used the AL score computed as sum of all 8 biomarkers, existence of a condition considered as 1 and otherwise as 0. Values above the 75th percentile were defined as high risk for all the biomarkers, with the exception of HDL and serum albumin for which values below the 25th percentile were defined as high risk. We then created a dummy variable, that is, 1 if AL score ≥ 4 or 0 if otherwise, and used that variable for the Poisson model. High AL was based on those men who had 4 or more biomarkers, which was considered to be high risk.

NHW men who reported income greater than or equal to $75,000.

As a check on the robustness of our findings, we estimated a regression model stratified by income (see Appendix A) and ran regression models using a lower income cut point ($35,000; see Appendix B). In both sensitivity analyses, we identify similar results to those discussed above.

Discussion

In this article, we sought to determine whether race moderates the association between income and AL among NHB and NHW men in the United States. Using minority stress theory, we expected that higher income would not be associated with lower prevalence of being in the high-AL group for NHB men compared with NHW men. The findings provide strong support for our hypothesis. Relative to White men with family income equal to or greater than $75,000, NHB men were more likely to be in the high-AL group irrespective of income. Both NHB men with family income below $75,000 and equal to or greater than $75,000 were more likely to be in the high-AL group relative to reference group. Relative to NHW men, higher income is not associated with lower risk of being in the high-AL group among NHB men. Our work here indicates that race plays a significant role in the association between income and AL among U.S. men.

Most of the existing research on race, income, and AL to date has been among women. Our findings are consistent with those drawn from women in the United States, which indicate that income does not explain AL variation as well for Black Americans as it does for White Americans (Gaskin et al., 2020; Hickson et al., 2012). Previous research comparing Black women and men suggests that biological dysregulation in the latter group is less tied to socioeconomic status (Hickson et al., 2012). We contribute to the literature by focusing specifically on this association among Black and White men. Our research indicates that, relative to White men, higher income in Black men does not seem to offer protection against being in the high-AL group.

Our main finding aligns with other research on race, socioeconomic status, and health outcomes, particularly that Black men experience diminished or unequal returns of various measures of SES to health (Assari & Bazargan, 2019; Farmer & Ferraro, 2005; Hudson et al., 2012, 2019). In other words, relative to White men, Black men gain less health benefit from socioeconomic resources such as income and education. Furthermore, some studies report that higher income may be associated with higher obesity rates among Black men (Bell & Thorpe, 2020). Our findings suggest that stressors associated with upward mobility that contribute to diminished returns may be a factor in the association between income and AL, given that NHB men have a higher likelihood of having high AL regardless of their income.

According to minority stress theory, members of oppressed groups experience additional stressors, relative to dominant group members, which contribute to poor health. These stressors are chronic and are products of the racial hierarchy. Specifically, structural racism, interpersonal discrimination, and psychosocial factors have been implicated as contributing factors to Black/White men's health disparities. Structural racism refers to the totality of racialized social relations and practices, such as redlining, which have led to deeply entrenched racial residential segregation throughout the United States, as key factors in the creation and reification of racial inequality (Bailey et al., 2017; Bonilla-Silva, 1997; Gee & Ford, 2011). For example, Thorpe and colleagues (2015) reported that social and environmental conditions play a key role in Black–White differences in chronic conditions among men who lived in urban, low-income integrated census tracts in the Exploring Health Disparities in Integrated Communities–Southwest Baltimore (EHDIC-SWB) Study, highlighting the role that residential segregation may play in Black's men health. Similarly, Brown et al. (2015) identified that neighborhood conditions explain much of the Black/White differences in functional limitations among men. Black adults with higher incomes are more likely to live in poorer, more racially segregated neighborhoods than high-income White adults (Darden et al., 2018; Reardon et al., 2015). It is likely that the mechanisms through which racial segregation negatively impacts health among low-income Black adults also affects high-income Black adults, resulting in weak associations between income and AL among Black men.

Structural racism contributes to racial disparities in criminal justice contact. Compared with White men, Black men are at a significantly higher risk for arrests, convictions, and incarceration (Hudson et al., 2019; Wildeman & Wang, 2017). Furthermore, serious criminal justice contact is associated with higher reports of everyday discrimination among Black men (Taylor et al., 2016), which may contribute to poor health. Given the negative impact that criminal justice contact has on health, it is an important consideration here (Archibald et al., 2018; Boen, 2020; Wildeman & Wang, 2017). Qualitative research with Black men suggests that they are cognizant of the role that residential racial segregation, unequal educational opportunities, and racial disparities in criminal justice contact play in their life chances (Hudson et al., 2016).

There is significant evidence that interpersonal discrimination contributes to poor health for Black men (Wheaton et al., 2018; Williams et al., 2019) and reports of racial discrimination increase with higher income and education for Black men (Hudson et al., 2012; Jackson & Williams, 2006). Black middle-class men tend to find themselves in White spaces more often and deal with stressors related to identity management, hypervisibility, and differential treatment (Hudson et al., 2020), which may contribute to the lower health returns they receive for their higher socioeconomic status (i.e., diminished returns) relative to their White counterparts. Indeed, some scholars conclude that working in predominantly White workspaces may explain why high-SES Black men report more interpersonal discrimination (Assari & Moghani Lankarani, 2018).

This study has significant strengths. First, we use a large, nationally representative sample of Black and White men to build on the income–allostatic link research. Second, we use a higher income cut point ($75,000) than most previous studies, which allows us to examine whether the association between income and allostatic works differently at higher income brackets. Third, the inclusion of biomarkers was crucial for calculating our measure of biological dysregulation.

Future Research

Our study is not without limitations, which include the use of cross-sectional data. Hence, we are not able to examine causal effects. Future researchers should examine whether changes or stability in income over time affect AL among men in different racialized groups in the United States. It is possible that upward or downward income trajectories may result in different patterns from the ones we identified here. Key historical events, such as the Great Recession, might play an important role, so future researchers might explore how they impact the association explored here because Black and White men were differentially impacted by them (Addo & Darity, 2021; Thomas et al., 2018).

The associations observed here are also not generalizable to Black women or other racial groups. Some research indicates that Black women in higher socioeconomic status groups have similar experiences navigating predominantly White spaces and are subjected to various types of discrimination (Sacks, 2019). There may be similarities in the experiences of higher income Black men and Black women and further research is needed in this area.

One area of focus for future researchers may include differences in exposure to racial violence between Black and White men and what contribution that makes to the diminished health returns among higher income Black men. There are significant racial disparities in hostile police encounters and police killings (Edwards et al., 2019; Geller et al., 2014). Even when they are not victims in police violence, their mental health may be affected by police killings of Black Americans in their respective states (Bor et al., 2018). It is essential to examine how this may contribute to poor health among higher income Black men as increased socioeconomic resources do not necessarily protect against these types of encounters. Our

focus here was on the specific income–AL association and the moderating role that race plays. Future researchers should explore socioeconomic measures that include income, education, occupation, and particularly wealth (Marsh et al., 2007). Given that wealth has been identified as the greatest area of inequality between Black and White Americans (Hamilton et al., 2015), it is important to understand how wealth may be associated with AL among U.S. men.

Implications

The findings of this study suggest that, relative to White men, higher income among Black men is not associated with lower risk of poor health. Public health interventions that focus only on income may not significantly reduce health disparities between Black and White men in the United States. Structural and interpersonal racism, and psychosocial factors, need to be addressed if our goal is to address racial disparities among Black and White men.

Conclusion

In this article, we explored whether race moderated the association between income and AL among Black and White men. We found that, compared with White men with reported family income equal or greater than $75,000, Black men had higher risk of high AL regardless of their income. This finding is consistent with research on the diminished health returns of higher socioeconomic status for Black Americans relative to White Americans. The findings here underscore the need to address racism and racism-related stressors at the public policy level. Interventions aimed at reducing health disparities should not focus only on income among Black American men. This study has implications for social workers and clinicians who need to be cognizant of the unique stressors and relative poor health of Black American men.

Future research would benefit from a longitudinal focus on dynamic changes or stability in income and how those are related to biological dysregulation in Black and White men. Those interested in this area would also benefit from exploring a multidimensional socioeconomic status definition, including income, wealth, and other relevant indicators. Future research should investigate what are the exact mechanisms that contribute to this moderation. Although there is significant evidence that racialized minority stress contributes to these findings, we were not able to test this directly. More studies are needed to untangle the complex ways that psychosocial factors may contribute to Black men's health, including how stressors get under the skin to dysregulate systems over time.

Considering the growing number of researchers investigating diminished health returns among Black men, a focus on higher income Black men would provide a greater understanding of the unique stressors and experiences that might lead to lower health returns and inspire interventions targeted toward reducing racial health disparities among U.S. men.

Appendix A. AL Score[a], Adult White and Black NH Men in National Health and Nutrition Examination Survey 1999–2016, Stratified Model by Income.

	Family income ≥ $75K		Family income < $75K	
Variables	PR	CI-95	PR	CI-95
Racial/ethnical (Ref: NH White)				
NH Black	1.57	[1.27, 1.95]	1.16	[1.03, 1.31]
Age (years)	1.02	[1.01, 1.03]	1.01	[1.01, 1.02]
Education (Ref: Less than high school)				
High school graduate/GED	1.11	[0.76, 1.61]	1.06	[0.91, 1.23]
Some college and above	0.67	[0.47, 0.95]	0.94	[0.82, 1.08]
Marital status (Ref: Unmarried)				
Married or living with partner	0.97	[0.73, 1.27]	0.97	[0.85, 1.12]
Covered by health insurance	1.53	[0.91, 2.57]	1.13	[0.95, 1.36]
Self-rated health (Ref: Excellent/very good/good)				
Fair/poor	1.48	[0.93, 2.35]	1.21	[0.95, 1.54]
Household size	1.06	[0.99, 1.14]	1.03	[0.98, 1.10]

Note. AL = allostatic load; NH = non-Hispanic; PR = prevalence ratio; CI = confidence interval; GED = General Educational Development; HDL = high-density lipoprotein.

[a]For this analysis, we used the AL score computed as sum of all eight biomarkers, existence of a condition considered as 1 and otherwise as 0. Values above the 75th percentile were defined as high risk for all the biomarkers, with the exception of HDL and serum albumin, for which values below the 25th percentile were defined as high risk. We then created a dummy variable, that is, 1 if AL score ≥ 4 or 0 if otherwise, and used that variable for the Poisson model. High AL was based on those men who had 4 or more biomarkers, which was considered to be high risk.

Appendix B. Poisson Estimates for AL Score[a], Adult White and Black NH Men in National Health and Nutrition Examination Survey 1999–2016.

	Model 1		Model 2		Model 3	
Variables	PR	CI-95	PR	CI-95	PR	CI-95
Family income (Ref: WNH ≥$35K)						
NH White, <$35K	1.26	[1.13, 1.41]	1.22	[1.09, 1.36]	1.121	[1.08, 1.35]
NH Black, ≥$35K	1.36	[1.19, 1.56]	1.42	[1.24, 1.62]	1.42	[1.24, 1.62]
NH Black, <$35K	1.17	[1.03, 1.33]	1.22	[1.07, 1.40]	1.21	[1.06, 1.39]
Age (years)			1.01	[1.01, 1.02]	1.01	[1.01, 1.02]
Education (Ref: Less than high school)						
High school graduate/GED			1.12	[0.96, 1.27]	1.12	[0.98, 1.30]
Some college and above			0.89	[0.78, 1.01]	0.90	[0.79, 1.02]
Marital status (Ref: Unmarried)						
Married or living with partner			0.99	[0.87, 1.12]	0.99	[0.87, 1.12]
Covered by health insurance			1.18	[1.00, 1.40]	1.18	[1.00, 1.48]
Self-rated health (Ref: Excellent/very good/good)						
Fair/poor					1.19	[0.96, 1.48]
Household size	0.99	[0.95, 1.03]	1.05	[1.00, 1.09]	1.05	[1.00, 1.09]

Note. AL = allostatic load; NH = non-Hispanic; WNH = White non-Hispanic; PR = prevalence ratio; CI = confidence interval; GED = General Educational Development; HDL = high-density lipoprotein.

[a]For this analysis we used the AL score computed as sum of all 8 biomarkers, existence of a condition considered as 1 and otherwise 0. Values above the 75th percentile were defined as high risk for all the biomarkers, with the exception of HDL and serum albumin, for which values below the 25th percentile was defined as high risk. We then created a dummy variable, that is, 1 if AL score ≥ 4 or 0 if otherwise, and used that variable for the Poisson model.

Interaction test: 0.0005.

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