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Explaining Racial Disparities in Obesity Among Men: Does Place Matter?

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Abstract

National data indicate that black men have higher rates of obesity than white men. Black men also experience earlier onset of many chronic conditions and premature mortality linked to obesity. Explanations for these disparities have been underexplored and existing national-level studies may be limited in their ability to explicate these longstanding patterns. National data generally do not account for race differences in risk exposures resulting from racial segregation or the confounding between race and socioeconomic status. Therefore, these differences in obesity may be a function of social environment rather than race. We examined disparities in obesity among black and white men living in the same social and environmental conditions, who have similar education levels and incomes using data from the Exploring Health Disparities in Integrated Communities-SWB (EHDIC-SWB) study. We compared the findings to a national sample. Logistic regression was used to examine the association between race and obesity adjusting for demographics, SES and health conditions. In the national sample, Black men had a higher odds of obesity (OR=1.29, 95% CI: 1.12–1.49) than white men. However in EHDIC-SWB, which accounts for social and environmental conditions of where these men live, Black men had similar odds of obesity (OR=1.06, 95% CI: 0.70–1.62) compared to white men. These data highlight the importance of the role that setting plays in understanding race disparities in obesity among men. Social context may be a key determinant of health when seeking to understand race disparities in obesity among black and white men.

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Introduction

Obesity is a major public health problem with considerable health consequences (Griffith, Johnson-Lawrence, Gunter, & Neighbors, 2011; Malnick & Knobler, 2006). Over the last decade there have been persistent and increasing disparities in the prevalence of obesity between genders and between people of different race/ethnic groups (Flegal, Carroll, Ogden, & Curtin, 2010; Ogden, Carroll, Kit, & Flegal, 2013). National data indicate that non-Hispanic black (hereafter referred to as black) men have higher rates of obesity than white non-Hispanic (hereafter referred to as white) men (Flegal et al., 2010). For example, the prevalence of obesity among black men is 37.1% compared to 32.4% for white men and second only to Hispanic men at 40.1% (Ogden, Carroll, Kit, & Flegal, 2014). Further, black men also experience earlier onset of many chronic conditions and premature mortality linked to obesity (Warner & Hayward, 2006). Yet, race disparities in obesity among men are a topic that has received little attention (Newton Jr, Griffith, Kearney, & Bennett, In press).

The majority of the information on race disparities in obesity among men is based on national data, which may be suboptimal in documenting and understanding obesity disparities among men for two reasons. First, when examining obesity disparities among men using national data, race and socioeconomic status (SES) are confounded (Bruce et al., 2011; Griffith et al., 2011; LaVeist, Thorpe, Mance, & Jackson, 2007). That is, obesity varies by race (Ogden et al., 2014). Also, obesity varies by SES (McLaren, 2007; Sobal & Stunkard, 1989; Stunkard & Sørenson, 1993). Because minority men tend to belong to the lower SES groups, there is a huge overlap between race and SES that complicates our efforts to determine whether it is the independent association of race or SES or the interaction between race and SES that drives racial disparities in obesity among men (LaVeist, Pollack, Thorpe, Fesahazion, & Gaskin, 2011; LaVeist et al., 2007).

The second problem with using national data to understand race disparities in obesity among men is the confounding of race and segregation. Where men live in the United States can contribute to their obesity rates (Dwyer-Lindgren et al., 2013; Ezzati, Martin, Skjold, Vander Hoorn, & Murray, 2006; Le et al., 2014). This is largely because national obesity estimates do not account for obesogenic factors that may be facilitated by segregation. Obesogenic environments may include greater access to high fat and high sugar foods, lower access to opportunities to be physically active in safe environments, and few healthy resources to mitigate stress (Griffith, Schulz, Johnson, & Herbert, 2010; Schulz, Williams, Israel, & Lempert, 2002; Schulz et al., 2005; Zenk, Schulz, Hollis-Neely et al., 2005; Zenk, Schulz, Israel et al., 2005; S. N. Zenk et al., 2006). As a result of the United States being a highly segregated society, minority men and in particular, African American men tend to live in vastly different communities than white men. These different communities have unique health risk exposures and health care resources (Bowie et al., 2009; Gaskin, Price, Brandon, & LaVeist, 2009; LaVeist, Gaskin, & Trujillo, 2011; LaVeist et al., 2008). Furthermore, based on Risk Exposure Theory and the Resource Deprivation Theory (LaVeist, 2005), communities that are largely populated with minorities tend to also be associated with poor housing conditions (Black & Macinko, 2008), crime (Lee, 2000), decreased options for healthy food (Moore & Diez Roux, 2006; Powell, Slater, Chaloupka, & Harper, 2006;

Bower, Thorpe, Rohde, & Gaskin, 2014), and have fewer health-promoting resources relative to white areas (Gaskin, Dinwiddie, Chan, & McCleary, 2012a; Gaskin, Dinwiddie, Chan, & McCleary, 2012b). It is this differential risk exposure to structural factors that can limit a man's choices for health promotion and can accelerate the progression of overweight or beginning of obesity among heavy men. These two reasons highlight problems with using national-level datasets to describe race disparities in obesity among men.

Failing to account for the social and environmental conditions where men live can lead to potentially incorrectly ascribing the findings to behavior alone rather than to differences in social and environmental conditions. This is a particularly important problem in men's health research because sex differences in health outcomes are primarily attributed to differences in health behavior between men and women and not to the differential impact of structural forces (Lohan, 2007). Moreover, there is a burgeoning body of work that has demonstrated that differences in social and environmental conditions where people live accounts for a meaningful proportion of race disparities in health outcomes (Bleich, Thorpe, Sharif-Harris, Fesahazion, & LaVeist, 2010; D. J. Gaskin et al., 2009; LaVeist, Thorpe Jr, Galarraga, Bower, & Gary-Webb, 2009; LaVeist et al., 2008; Thorpe Jr, Brandon, & LaVeist, 2008; Thorpe et al., 2013). This evidence supports the fact that one's social and environmental context remains an important, but understudied, determinant of health that is further limited by the inability of national data to produce truly appropriate comparisons across race groups (LaVeist, Thorpe, Mance, & Jackson, 2007; LaVeist et al., 2009; Williams & Collins, 2001).

Studies relating racial segregation to obesity among men are inconclusive, leaving the question of the role of place or setting in obesity among men unanswered. Some research found that racial segregation was related to higher levels of obesity among women, but not among men (Boardman, Saint Onge, Rogers, & Denney, 2005; Chang, Hillier, & Mehta, 2009; Kershaw, Albrecht, & Carnethon, 2013). Another study found that among older adults, living in economically disadvantaged areas has been found to be associated with higher odds of obesity among both men and women (Grafova, Freedman, Kumar, & Rogowski, 2008). However, to date, no study has focused on the social and environmental conditions of where men live as a possible explanation for the obesity disparities among black men and white men. The purpose of this study is to investigate whether race disparities in obesity among men persist in a community of black people and white people living in similar social and environmental conditions.

Methods

Study Population

EHDIC is an ongoing multi-site study of race disparities within communities where African Americans and whites live together and where there are no race differences in socioeconomic status (SES), as measured by median income. This analysis is based on data from the first EHDIC study site in Southwest Baltimore, Maryland (EHDIC-SWB), a low-income urban area.

EHDIC-SWB was a cross-sectional face-to-face survey of the adult population (aged 18 and older) of two contiguous census tracts collected between June and September 2003. In addition to being economically homogenous, the study site was also racially balanced and well integrated, with almost equal proportions of African American and white residents. In the two census tracts, the racial distribution was 51% African American and 44% white, and the median income for the study area was $24,002 and did not differ by race. The census tracts were block listed to identify every occupied dwelling in the study area. During block listing, 2,618 structures were identified. Of those, 1636 structures were determined to be occupied residential housing units (excluding commercial and vacant residential structures). Up to five attempts were made to contact an eligible adult in 1244 occupied residential housing units. A total of 65.8% of the occupied housing units were enrolled in the study. This resulted in 1,489 study participants (41.9% of the 3,555 adults living in these two census tracts recorded in the 2000 Census). Because our survey had similar coverage across each census block group including the study area, the bias to geographic locale and its relationship with SES should be minimal (LaVeist et al., 2008).

Comparisons to the 2000 Census for the study area indicated that the EHDIC-SWB sample included a higher proportion of African Americans and women, but was otherwise similar on other demographic and socioeconomic indicators (LaVeist et al., 2008). Specifically, our sample was 59.3% African American and 44.4% male, whereas the 2000 Census data showed the population was 51% African American and 49.7% male. Age distributions in our sample and 2000 Census data were similar with a median age range of 35–44 years for both samples. The lack of race difference in median income in the census, $23,500 (African American) vs. $24,100 (white), was replicated in EHDIC with $23,400 (African American) vs. $24,900 (white).

The survey was administered in person by a trained interviewer and consisted of a structured questionnaire, which included demographic and socioeconomic information, self-reported height and weight, self-reported health behaviors and chronic conditions, and three blood pressure (BP) measurements. The EHDIC study has been described in greater detail elsewhere (LaVeist et al., 2008). The study was approved by the Committee on Human Research at the Johns Hopkins Bloomberg School of Public Health. These analyses are based on the 628 African American and white men in the EHDIC-SWB sample.

The National Health Interview Survey (NHIS) is a cross-sectional survey conducted annually by the National Center for Health Statistics via in-home interviews administered by U.S. Census Bureau. NHIS uses a nationally representative sample of the U.S. non-institutionalized civilian population from all 50 states and the District of Columbia, with oversampling of blacks and Hispanics (National Center for Health Statistics, 2004). Individuals aged 17 and over are eligible to participate in the survey. Participants are surveyed regarding their demographic characteristics, health behaviors and conditions, functional limitations, cancer screening and health care access and utilization. Detailed information regarding NHIS can be found elsewhere (National Center for Health Statistics, 2004). We used data from the 2003 NHIS for this study. Men 18 years of age and older who reported their race to be either black only or white only and responded no to the question

regarding Hispanic ethnicity were included in our analyses. This strategy resulted in a sample size of 10,455 male adults, of whom 1,551 are black and 8,904 are white.

Measures

To facilitate comparison across each survey, questions from the NHIS were replicated in the EHDIC-SWB study. Each measure included in these analyses was coded similarly in both datasets. Body mass index (BMI) was calculated by dividing self-reported weight in kilograms by self-reported height in meters squared (kg/m^2). Men whose BMI ≥ 30 kg/m2 were considered obese (1=yes; 0=no).

The primary independent variable was race. Men self-reported their race as Black/African American or white. Covariates included demographic and health-related characteristics known to be associated with race or overweight/obesity. Demographic variables included age (years), married (1=yes; 0=no), income level (<$35,000, $35,000–75,000, ≥$75,000), and education level (0=less than high school graduate; 1=high school graduate/GED; 2= more than high school graduate).

Health-related variables included: health insurance (1=yes; 0=no), physical inactivity (1=yes; 0=no), smoking and drinking status (0=never; 1=former; 2=current), self-reported health status, and chronic conditions. Men reported whether their health as excellent, very good, good, fair or poor. A binary variable was constructed to classify men who reported their health as fair or poor. Health conditions were based on physician diagnoses of the following: hypertension, diabetes, stroke and heart disease. A binary variable was created for each health condition to indicate whether the men had been diagnosed by a physician with that particular health problem.

Statistical Analyses

The *Student's* t and Chi-square tests were used to assess the mean and proportional differences between African American and white men across a range of demographic and health-related factors. Generalized linear models that specified the logit link and binomial distribution were used to calculate age-adjusted proportions. Each chronic condition was modeled as a function of race and age. Logistic regression models were specified to examine the association between race and each health condition adjusting for the demographic and health characteristics described above. Survey procedures were used when specifying the statistical models to account for the complex survey sampling design of the NHIS. P-values < 0.05 were considered statistically significant and all tests were two-sided. All analyses were conducted using STATA 13 (StataCorp LP, 2013).

Results

The distribution of select demographic variables of men who participated in NHIS or EHDIC-SWB by race is shown in Table 1. There were 10,455 African American (14.8%) and White men in NHIS. African American men were, on average, four years younger than White men. There was a smaller proportion of African American who reported being married or having income greater than $75,000 relative to White men. There were a larger

proportion of African American men who reported less than a high school education compared to white men.

In EHDIC-SWB, there were 628 men with 60.6% identifying as African Americans. African American men were on average four years younger than white men. In addition, a smaller proportion of African American men reported being married and reported less than a high school education compared to whites. There were no differences in income level between the groups of men.

The distribution of age-adjusted proportions for health-related characteristics and weight status variables of the men in NHIS and EHDIC-SWB are shown in Table 2. Among men in NHIS, smaller proportions of African American men had health insurance, and were current drinkers compared to white men. However, larger proportions of African American men were physically inactive, never or former smokers, never or former drinkers, reported fair/poor health, reported being diagnosed with hypertension, diabetes, having a stroke, or being obese than white men. Among men in the EHDIC-SWB, a larger proportion of African Americans had health insurance and reported never smoking compared to white men. There were a smaller proportion of African American men who reported being a former smoker than white men. There were no differences between African American and white men with being physically inactive, being a current smoker, being a never, former, or current drinker, being obese, or reporting fair/poor health, hypertension, diabetes, or heart disease.

The association between black and white men with being overweight/obese and obese is presented in Table 3 for NHIS and EHDIC-SWB. After adjusting for age, marital status, insurance, income, education, fair/poor health, physical inactivity, smoking and drinking status, hypertension, diabetes, stroke and heart disease, African American men in NHIS had greater odds of being obese (OR =1.29, 95% CI 1.12, 1.49) than white men. In our EHDIC-SWB sample that accounts for the social and environmental conditions in which these men live, African American men had a odds of being obese (OR =1.06, 95% CI 0.70, 1.62) to white men.

Discussion

In this study we sought to examine the nature of race disparities in obesity among black and white men who live in similar social and environmental conditions. We compared these findings to the NHIS 2003 sample adult file. Our study of obesity among men living in a racially integrated low-income urban area produced results showing that black and white men had similar rates of obesity. These findings differ considerably from studies using national level data and highlight the importance of place as a key social determinant of health among men.

Black men are disproportionately represented among those living and working in economically and socially challenging environments (Xanthos, Treadwell, & Holden, 2010). In addition, poverty, substandard educational resources, family disruption, and segregation are often part of their social landscape; however, few studies have assessed the degree to

which these factors have implications for non-black men. Our findings present new potential areas of exploration.

While literature on social determinants of health disparities tends to separate individual behavior from the social, built and economic environment where it occurs, our findings illustrate the importance of recognizing the interdependence of these factors for understanding health and health disparities (Bruce et al., 2009;Griffith, Metzl, & Gunter, 2011; Jackson & Knight, 2006; LaVeist et al., 2011; Mezuk et al., 2010; Thorpe, Bowie, Wilson-Frederick, Coa, & LaVeist, 2013). Particularly in the context of men's health disparities, this paper emphasizes the importance of considering other factors that intersect with gender to determine how and where to intervene to improve men's health (D. M. Griffith, 2012).

Race and ethnicity remain useful markers of one's exposure to health-harming environments and substances, social disadvantage and health-promoting resources (LaVeist, 2000). Understanding the poor status of men's health and premature death includes considering how racialized and gendered social determinants of health independently and interactively shape men's lives and experiences, particularly through economic and environmental factors (Pease, 2009; Treadwell & Braithwaite, 2005; Young, Meryn, & Treadwell, 2008). What the EHDIC-SWB study illustrates, however, is that it is important to recognize that racial comparisons using national-level data often obscure how individual and neighborhood poverty, poor educational opportunities, underemployment and unemployment, and multiple forms of discrimination can vary by place and influence the capacity of men to achieve and maintain good health (LaVeist et al., 2011; LaVeist et al., 2007; Treadwell & Braithwaite, 2005). The fact that some racial groups are more likely to live in poverty, work in low-paying and dangerous occupations, reside in closer proximity to polluted environments, be exposed to toxic substances, experience threats and realities of crime, and live with cumulative worries about meeting basic needs highlights the importance of considering both gendered and non-gendered aspects of their environments, identities and experiences (Treadwell & Braithwaite, 2005; Xanthos et al., 2010; Young et al., 2008).

There are several caveats of EHDIC-SWB study that may impact interpretations. EHDIC-SWB does not account for race differences in work exposures which may contribute to disparities in obesity. For instance men in low activity occupations have a higher probability of being obese relative to men in high activity occupations (King et al., 2001). In addition, work related stress has been positively associated obesity (Kivimäki et al., 2006; Schulte et al., 2007). The EHDIC-SWB data were collected in a low-income urban population and these findings may not generalize to other minority groups, rural and suburban areas, and higher SES groups. Because both the EHDIC-SWB and NHIS datasets are cross-sectional we are unable to make causal inferences. Height and body weight were self-reported in both EHDIC-SWB and NHIS. Nevertheless, self-reported height and body weight bias do not vary by race/ethnicity (Ezzati et al., 2006; Li et al., 2012).

To better understand the relationship between long-term health risks, weight and body size, sex-specific guidelines for blacks may be more appropriate measures than the current use of BMI (Sumner, Ricks, Sen, & Frempong, 2007). For black men, some investigators have

found that years of life lost as a result of obesity does not occur until men reach a BMI of 32 kg/m2, with greatest longevity occurring between 23 kg/m2 and 30 kg/m2 in Black women and men (Fontaine, Redden, Wang, Westfall, & Allison, 2003). Further, we acknowledge that there are limitations to BMI as a measurement of obesity, particular when discussing patterns of obesity across gender, racial and ethnic groups. Racial and ethnic differences between BMI and percent body fat are well documented (Deurenberg, Yap, & van Staveren, 1998; Deurenberg, Deurenberg-Yap, & Guricci, 2002; Wagner & Heyward, 2000). Blacks tend to have a higher BMI than whites at similar levels of percent fat, thus overestimating the risk of obesity in black men and women ((Deurenberg et al., 1998; Wagner & Heyward, 2000). Additionally, BMI thresholds that define obesity are not gender-specific, which poses particular problems for estimating true rates of obesity among blacks, whose sex differences in body fat content is greater than whites (Hill et al., 1999).

In conclusion, after accounting for the social and environmental conditions in which low-income urban men live, race differences in obesity were no longer apparent in EHDIC-SWB. These findings add to a small but critical line of men's health research. Further multidimensional investigation is urgently needed in order to better address and reduce problems associated with the burden of obesity among black and white men. Health promoting strategies and interventions should consider the role that social and environmental conditions play in obesity disparities among men in the United States.

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Table 1

Select demographics and health-related characteristics by dataset, NHIS 2003 and EHDIC-SWB [a]

	NHIS			EHDIC-SWB		
Variable	**Whites n=8,904**	**Black n=1,551**	**P Value**	**Whites n=247**	**Black n=381**	**P Value**
Age, mean SE	46.2±0.2	41.9±0.5	<0.001	43.4±0.9	39.4±0.7	<0.001
Married, (%)	68.0	53.6	<0.001	25.1	16.3	0.007
Income (%)						
< $35,000	22.7	33.0	<0.001	72.5	74.5	0.565
$35,000–$75,000	28.2	27.5	0.621	20.2	21.0	0.820
>$75,000	24.4	12.8	<0.001	7.3	4.5	0.132
Did not respond	24.7	26.7	0.227			
Education level,						
Less than high school graduate	11.8	21.0	<0.001	44.5	34.9	0.016
High school graduate/GED	30.1	32.5	0.119	36.8	45.4	0.034
More than high school graduate	58.1	46.5	<0.001	18.6	19.7	0.742

[a] Plus-minus values are means ± SD.

Table 2

Age-Adjusted Distribution of Health Related Characteristics among Men in EHDIC-SWB and NHIS 2003 [a]

	NHIS			EHDIC-SWB		
Variable	**Whites n=8,904**	**Black n=1,551**	**P Value**	**Whites n=247**	**Black n=381**	**P Value**
Health Insurance (%)	89.7	84.3	<0.001	50.3	58.9	0.039
Physical Inactivity (%)	30.0	43.8	<0.001	18.7	14.7	0.182
Smoking Status (%)						
Never	47.0	53.4	<0.001	65.4	62.4	0.453
Former	19.3	25.9	<0.001	12.1	7.3	0.039
Current	23.4	23.0	0.735	18.6	27.3	0.014
Drinking Status (%)						
Never	14.3	26.1	<0.001	11.9	15.3	0.240
Former	13.6	18.0	<0.001	34.4	31.4	0.443
Current	70.7	53.9	<0.001	53.4	53.1	0.926
Fair/Poor Health	8.7	16.7	<0.001	32.4	27.5	0.204
Hypertension	23.3	33.1	<0.001	26.2	26.1	0.967
Diabetes	4.9	8.6	<0.001	5.7	5.9	0.920
Stroke	1.3	2.1	0.006	4.5	3.0	0.309
Heart Disease	9.4	7.6	0.054	12.6	8.7	0.103
Obese[b]	24.7	31.4	<0.001	21.9	23.5	0.648

[a] Plus-minus values are means ± SD.

[b] Obese is defined as BMI ≥ 30.

Table 3

Association between Black and White Men with being Overweight/Obese and Obese in 2003 NHIS and EHDIC-SWB*

	NHIS 2003[a]	EHDIC-SWB
	O.R. (95% CI)	O.R. (95% CI)
Obese[b]	1.29 (1.12–1.49)	1.06 (0.70–1.62)

*OR=odds ratio; CI=confidence interval; White adults are the reference category.

[a]Only models that contained variables in both EHDIC and NHIS 2003 datasets were conducted. All estimates using NHIS 2003 data account for the stratified, multistage probability sampling design by applying the appropriate weights and strata variables.

[b]Obese is defined as BMI ≥ 30.

Models included race, age, marital status, insurance status, household income, education level, fair/poor health, physical inactivity, smoking and drinking status, heart disease, hypertension, diabetes, and stroke.