

Differences in Obesity Among Men of Diverse Racial and Ethnic Background

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Abstract

Racial/ethnic disparities exist in obesity prevalence among men, with Hispanic men exhibiting the highest prevalence compared with non-Hispanic White and non-Hispanic Black men. Most studies do not parse out Hispanic groups; therefore, it is unclear whether the increases in obesity rates among Hispanic men applies to all groups or if there are particular groups of Hispanic men that are driving the increase. The goal of this study is to examine the variations in obesity among men of diverse racial/ethnic backgrounds and determine if obesity is affected by nativity. The data used in this study were from 11 years (2002-2012) of the National Health Interview Survey. Logistic regression was used to examine the relationship between race/ethnicity, obesity, and nativity. After adjusting for covariates, there are differences in obesity prevalence, with the largest prevalence among Puerto Rican men and Mexican American men. Consistent with previous literature, it has been suggested that men born in the United States are more likely to be obese than men born outside the United States. This study underscores the importance of distinguishing Hispanic groups when examining obesity, and provides information for future, targeted intervention strategies related to obesity among high-risk groups.

Keywords

obesity, Hispanic subgroups, men, disparities, race, ethnicity, nativity

Introduction

Obesity is the second leading cause of death in the United States (Mokdad, Marks, Stroup, & Gerberding, 2004), making it a high public health priority. Moreover, obesity leads to a variety of adverse health outcomes, including cardiovascular disease, stroke, type 2 diabetes, and selected types of cancer (U.S. Department of Health and Human Services, 2001). Recent studies suggest that obesity prevalence continues to be on the rise in the United States, with more than one third (34.9%) classified as being obese adults (Flegal, Carroll, Ogden, & Curtin, 2010; Ogden, Carroll, Kit, & Flegal, 2013).

Previous studies seeking to understand disparities in obesity has focused largely on women, particularly non-Hispanic Black women, because of their higher risk for obesity and nutritional influence at home (Martinez, Powell, Agne, Scarinci, & Cherrington, 2012; Versey, 2014). However, obesity rates among men have increased significantly between 1999 and 2012 from 27.5% to 33.5% with much less attention (Flegal et al., 2010; Ogden et al., 2013). In addition, there are stark racial and ethnic disparities in obesity, whereby the highest prevalence

typically occurs among non-Hispanic Black men followed by Hispanic men (Flegal et al., 2010). However, for the first time in 2011-2012, the prevalence of obesity among Hispanic men (40.1%) exceeded non-Hispanic White (32.4%), non-Hispanic Black (37.1%), or non-Hispanic Asian men (10.0%; Ogden et al., 2013).

Most studies that have examined obesity prevalence among men have focused largely on non-Hispanic White, non-Hispanic Black, and Hispanics (Flegal et al., 2010). Among studies that included Hispanic men, it is common for investigators to either group all Hispanic individuals into one single category, or to primarily include Mexican Americans (Wen, Kowaleski-Jones, & Fan, 2013). This is

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problematic because Hispanic/Latino individuals come from diverse ethnic, geographic, cultural, and socioeconomic backgrounds with different cultural practices that could affect diet, physical activity, and other health behaviors (Daviglius et al., 2012). In particular, one study suggests that prevalence of obesity varies widely between Hispanic/Latino men of different origins, with Puerto Rican men having the highest rates of obesity (40.9%) and South American men having the lowest (26.8%; Daviglius et al., 2012). In this study, participants were limited to four communities in the United States: Bronx, New York; Chicago, Illinois; Miami, Florida; and San Diego, California. Because of the heterogeneity among various Hispanic groups, it is difficult to target weight loss interventions associated with Hispanic ethnicity.

Most studies do not differentiate between Hispanic groups; therefore, it is unclear whether the increases in obesity rates among Hispanic men applies to all groups or if there are particular groups of Hispanic men that are driving the increase. It is hypothesized that in addition to Hispanic ethnicity, nativity also has an impact on obesity rates (Akresh, 2010). Previous studies suggest that Hispanic adults who were born in the United States are more likely to be obese than those born outside the United States (Bates, Acevedo-Garcia, Alegría, & Krieger, 2008). According to Bates and colleagues (2008), the increase in obesity rates is due to the process of acculturation, exposure to certain types of food, marketing, pricing, and physical infrastructure. Studies also indicate that higher levels of acculturation are associated with less healthy dietary behaviors (Martinez et al., 2012).

Because the Hispanic population is a heterogeneous group that comprises the nation's largest minority group (Ennis, Ríos-Vargas, & Albert, 2011), it is important to determine the prevalence of obesity among groups of Hispanic men. The objective of this study was to determine the differences in obesity among men of diverse racial and ethnic backgrounds using groups of Hispanic men. It was hypothesized that Puerto Rican and Mexican American men are more likely to be obese than non-Hispanic White men, and men born in the United States are more likely to be obese than men born outside the United States (Bates et al., 2008; Daviglius et al., 2012).

Method

The National Health Interview Survey (NHIS) is an annual, cross-sectional household interview survey that is designed to monitor the health of the U.S. population. Initiated in 1957, the NHIS is the major data collection program of the National Center for Health Statistics (NCHS), which is a part of the Centers for Disease Control and Prevention. The NHIS includes individuals living in noninstitutionalized populations of the United

States, and oversamples non-Hispanic Blacks, Hispanics, and persons 60 years and older. NHIS consists of a multi-stage, complex sampling design that incorporates stratification and clustering (Pleis & Lucas, 2009; Pleis, Schiller, & Benson, 2003).

For the purposes of this project, NHIS data from the years 2002-2012 were analyzed. In total, there were 305,865 adults aged 20 years or older who completed the Sample Adult Survey information during those years. Women were excluded from the study to focus on the obesity prevalence among men ($n = 171,264$). Non-Hispanic African American men were excluded to examine the heterogeneity among groups of Hispanic men ($n = 17,228$). Men who reported mixed race/ethnicity were also excluded ($n = 9,988$). Thus, the sample size included 107,385 men aged 20 years or older. There were 84,636 non-Hispanic White men, and 22,749 Hispanic men in the sample. Men also indicated their Hispanic origin or ancestry: 2,078 Puerto Ricans men, 9,658 Mexican men, 5,364 Mexican American men, 1,283 Cuban/Cuban American men, 586 Dominican men, and 3,780 Central or South American men.

The dependent variable in this analysis was obesity. Body mass index (BMI) was calculated as self-reported weight (kg) divided by self-reported height (m^2). Obesity was defined as BMI greater than or equal to $30 \text{ kg}/m^2$.

The main independent variable is Hispanic origin or ancestry. Men were first asked if they were of Hispanic ethnicity and then asked to specify the group that represents their Hispanic origin or ancestry. Men who responded, "Multiple Hispanic," "Other Latin American, type not specified," "Other Spanish," or "non-specific type, type refused, type not ascertained" were not included.

Covariates included age, marital status, education, income, insurance status, physical activity, and nativity. Age was measured continuously in years. Marital status was classified in three groups: currently married, formerly married, or never married. Men who reported living with their partner or married were classified as currently married. Men who were widowed, divorced, or separated were categorized as formerly married. Education was also categorized into three categories: less than high school diploma/GED, high school graduate/GED recipient, and degree achieved higher than high school diploma/GED. Income was grouped as, \$0 to \$34,999, \$35,000 to \$74,999, \$75,000 or more, and missing. A missing category was included to retain those men who did not report income and to determine the influence (if any) of missingness of income on obesity. Physical activity was grouped as, physically active or physically inactive. Men were considered physically active if they reported performing vigorous-moderate physical activity. Nativity was classified as born in or outside the United States. Men who were born in a U.S. territory

Table 1. Distribution of Demographic and Health-Related Characteristics of Men 20 Years of Age or Older in National Health Interview Survey 2002-2012.

	Non-Hispanic White (n = 84,636)	Puerto Rican (n = 2,078)	Mexican (n = 9,658)	Mexican American (n = 5,364)	Cuban (n = 1,283)	Dominican (n = 586)	Central or South American (n = 3,780)	p Value
Age, years (mean ± SD)	47.9 ± 0.1	43.0 ± 0.4	38.3 ± 0.2	39.9 ± 0.3	48.8 ± 0.6	40.3 ± 0.7	39.3 ± 0.3	<.001
Marital status (%)								
Never	18.2	24.1	20.2	25.8	17.0	22.7	24.2	<.001
Currently	69.1	62.9	72.6	63.2	71.6	65.2	66.8	<.001
Formerly	12.8	13.0	7.2	11.0	11.4	12.1	9.0	<.001
Education (%)								
Less than high school	10.5	28.1	58.4	26.7	23.1	29.6	35.0	<.001
High school graduate/ GED	28.5	30.0	23.2	31.6	26.7	25.5	23.2	<.001
More than high school	61.1	41.9	18.4	41.8	50.2	45.0	41.7	<.001
Income (%)								
\$0-\$34,999	23.6	36.0	46.4	30.6	37.4	41.3	38.3	<.001
\$35,000-\$74,999	30.2	31.9	29.9	33.2	25.4	35.0	31.7	<.001
≥\$75,000	20.6	13.6	7.0	14.5	16.4	8.0	12.3	<.001
Missing	25.7	18.6	16.7	21.7	20.9	15.8	17.7	<.001
Insured (%)	86.5	78.5	44.4	70.1	72.8	69.9	51.1	<.001
Physical activity (%)	29.8	41.2	49.5	34.6	54.6	54.2	43.0	<.001
Nativity (%)								
Born outside United States	4.6	4.2	84.1	18.3	76.0	79.9	88.6	<.001
Obesity (%)	27.1	34.4	26.5	36.3	25.8	19.9	21.5	<.001

were included in the “born outside United States” category. Nativity was included to adjust for the distinctive lifestyles of participants born outside the United States. Survey year was included to account for potential secular trends across the years of data.

The distribution of demographic and health-related characteristics by race/ethnicity of men 20 years of age or older in NHIS 2002-2012 was evaluated using Student's *t* for continuous variables and chi-square tests for categorical variables. Three logistic regression models were used to evaluate the association between race/ethnicity on obesity. Model 1 was unadjusted, while Model 2 was adjusted for nativity only. Model 3 includes the variable from Model 2 plus age, marital status, education, income, insurance status, and physical activity. Because of the known differences in nativity on health outcomes, additional analyses stratifying by nativity status were conducted (Akresh, 2010; Wen et al., 2013). Following the procedure recommended by the NCHS, all analyses used Taylor-linearization procedures for the complex multi-stage sampling design and a weight variable was created to account for the combining of multiple years of NHIS (Pleis & Lucas, 2009). *p* Values less than or equal to .05 were considered statistically significant and all *t* tests were two-sided. All statistical procedures were performed using STATA statistical software, Version 12 (StataCorp LP, College Station, TX).

Results

The demographic and health-related characteristics of men aged 20 years or older across various racial/ethnic groups is displayed in Table 1. All groups of Hispanic men were younger than non-Hispanic White men except Cuban men, who had the highest mean age (48.8 ± 0.6 years). All groups had lower rates of being currently married compared with non-Hispanic White men except Mexican men and Cuban men, whose rates of being currently married were with 72.6%, 7,012 men (*p* < .001) and 71.6%, 919 men (*p* < .001), respectively. Compared to non-Hispanic Whites, although all groups of Hispanic men had a lower prevalence earning a degree higher than a high school diploma or GED, Cubans had the highest prevalence of earning a degree higher than a high school diploma or GED (50.2%, 644 men, *p* < .001). In addition, Cubans reported the highest income (16.4%, 210 men, *p* < .001). Puerto Ricans exhibited the highest rates of insurance coverage (78.5%, 1,631 men, *p* < .001); whereas, Mexicans reported the lowest rates of health insurance coverage, 44.4%, 4,288 men, with a *p* < .001, relative to non-Hispanic whites. Prevalence of performing physical activity was highest among Cubans (54.6%, 701 men, *p* < .001) compared to non-Hispanic whites. Central or South American men displayed the highest rates of originating outside the United States, 88.6%,

Table 2. Association Between Race/Ethnicity and Obesity Among Men in National Health Interview Survey 2002-2012.

	Model 1, OR [CI]	Model 2, OR [CI]	Model 3, OR [CI]
Non-Hispanic White	1.0	1.0	1.0
Puerto Rican	1.43 [1.27, 1.60]	1.42 [1.27, 1.60]	1.42 [1.26, 1.61]
Mexican	0.98 [0.92, 1.04]	1.37 [1.27, 1.50]	1.34 [1.23, 1.47]
Mexican American	1.55 [1.43, 1.67]	1.64 [1.52, 1.77]	1.67 [1.55, 1.81]
Cuban	0.95 [0.82, 1.09]	1.28 [1.11, 1.49]	1.28 [1.11, 1.49]
Dominican	0.68 [0.50, 0.90]	0.91 [0.67, 1.22]	0.88 [0.66, 1.20]
Central or South American	0.74 [0.67, 0.83]	1.06 [0.95, 1.21]	1.12 [0.98, 1.26]
Nativity (Reference: Born in United States)		0.65 [0.60, 0.69]	0.62 [0.57, 0.67]

Note. Model 1: Unadjusted; Model 2 also includes Nativity; Model 3 includes variable from Model 2 plus age, marital status, education, income, insurance status, and physical activity. OR = odds ratio; CI = confidence interval.

3,349 men, with $p < .001$. The highest prevalence of obesity were reported among Mexican Americans and Puerto Ricans, 36.3% (1,947 men) and 34.4% (715 men), respectively. The prevalence of obesity was 27.1% (22,936 men) among non-Hispanic Whites, while the prevalence of obesity among Mexicans was 26.5% (2,559 men), and 25.8% (331 men) among Cubans. The lowest prevalence of obesity was reported among Central or South Americans and Dominicans, with 21.5% (813 men) and 19.9% (117 men), respectively ($p < .001$).

The association between race/ethnicity and obesity among men is reported in Table 2. Model 1 tested the unadjusted relationship between race/ethnicity and obesity, comparing Hispanic groups with non-Hispanic White men. Compared with non-Hispanic White men, Puerto Rican, Mexican American had higher odds of obesity; whereas Dominican and Central or South American men had lower odds of obesity. Mexican and Cuban men had similar odds of obesity relative to non-Hispanic White men. According to Model 2, which adjusted for nativity, Puerto Rican men had 42% greater odds of being obese (odds ratio [OR] = 1.42, confidence interval [CI] = [1.27, 1.60]) than non-Hispanic White men. Additionally, Mexican men had 37% greater odds (OR = 1.37, CI = [1.27, 1.50]) of being obese than non-Hispanic White men, and Mexican American men had 64% greater odds of being obese (OR = 1.64, CI = [1.52, 1.77]) than non-Hispanic White men. Cuban men had 28% greater odds of being obese (OR = 1.28, CI = [1.11, 1.49]) than non-Hispanic White men. In addition, men who were born outside the United States had 35% lower odds of being obese than men who were born in the United States.

In Model 3, which added age, marital status, education, income, insurance status, and physical activity, Puerto Rican men had 42% greater odds of being obese (OR = 1.42, CI = [1.26, 1.61]) than non-Hispanic White men. Additionally, Mexican men had 34% greater odds (OR = 1.34, CI = [1.23, 1.47]) of being obese than non-Hispanic White men, and Mexican American men had

Table 3. Association Between Race/Ethnicity and Obesity Among Men in National Health Interview Survey 2002-2012, Stratified by Nativity.

	Born in United States, OR [CI]	Born outside United States, OR [CI]
Non-Hispanic White	1.0	1.0
Puerto Rican	1.42 [1.25, 1.61]	1.28 [0.61, 2.68]
Mexican	1.51 [1.31, 1.75]	1.31 [1.13, 1.51]
Mexican American	1.70 [1.56, 1.85]	1.47 [1.16, 1.85]
Cuban	1.13 [0.84, 1.53]	1.22 [1.02, 1.45]
Dominican	0.70 [0.38, 1.29]	0.93 [0.65, 1.33]
Central or South American	1.25 [0.95, 1.65]	1.07 [0.91, 1.26]

Note. Both models were adjusted for age, marital status, education, income, insurance status, physical activity, and nativity. OR = odds ratio; CI = confidence interval.

67% greater odds of being obese (OR = 1.67, CI = [1.55, 1.81]) than non-Hispanic White men. Cuban men had 28% greater odds of being obese (OR = 1.28, CI = [1.11, 1.49]) than non-Hispanic White men. In addition, men who were born outside the United States had 38% fewer odds of being obese than men who were born in the United States.

The association between race/ethnicity and obesity among men stratified by nativity is displayed in Table 3. Among those born in the United States, Puerto Rican men had 42% greater odds of being obese (OR = 1.42, CI = [1.25, 1.61]) than non-Hispanic White men. Also among men in the United States, Mexican men had 51% greater odds of being obese (OR = 1.51, CI = [1.31, 1.75]) than non-Hispanic White men, and Mexican American men had a 70% greater odds of being obese (OR = 1.70, CI = [1.56, 1.85]) than non-Hispanic White men. Among men born outside the United States, Mexican men had 31% greater odds of being obese (OR = 1.31, CI = [1.13, 1.51]) than non-Hispanic White men. Also among men outside the United States, Mexican American men had 47%

greater odds of being obese ($OR = 1.47$, $CI = [1.16, 1.85]$) than non-Hispanic White men, and Cuban men had 22% greater odds of being obese ($OR = 1.22$, $CI = [1.02, 1.45]$) than non-Hispanic White men.

Discussion

This study examined the relationship between race/ethnicity, obesity, and nativity among men. It was hypothesized that obesity prevalence varies by race and Hispanic ethnicity and that nativity had an impact on obesity prevalence. Using multiple logistic regression models, there was evidence to suggest that odds of obesity varied by race/ethnic groups. Certain Hispanic groups of men had higher odds of obesity than non-Hispanic White men. Nativity also affected the nature of racial/ethnic disparities among some of these groups. Higher odds of obesity were associated with being born in the United States, as opposed to being born outside the United States. These differences in obesity prevalence suggest the possibility of distinctive cultural or behavioral factors that could affect diet, physical activity, and other health-related behaviors. Future obesity interventions should consider a more tailored approach focusing on cultural and behavioral factors that are unique to each Hispanic group of men.

The data identify marked variation in obesity prevalence within the Hispanic population, particularly in men of Puerto Rican and Mexican American background. There is evidence that Puerto Rican men and Mexican American men experience higher rates of obesity compared with other Hispanic populations, as well as non-Hispanic White men. These results are supported by previous literature, indicating that Puerto Ricans are the most likely to be obese, followed by Mexican Americans, and other racial/ethnic groups (Daviglius et al., 2012). However, the findings of this study represent a nationally representative sample in the United States. The results of this study suggest possible differences in health-related behaviors in populations of Hispanic men and highlight the importance of examining groups of Hispanics for the purposes of targeted health-promoting strategies and interventions.

The research in this study also supports evidence that nativity affects obesity prevalence in the United States. There are indications that men who are born in the United States are more likely to be obese than men born outside the United States. This finding supports existing studies that indicate obesity prevalence increases with years spent in the United States (Ahluwalia, Ford, Link, & Bolen, 2007; Bates et al., 2008). Based on previous research, it is postulated that acculturation, differences in food consumption, lack of physical activity, and geographic and regional variation contribute to higher prevalence of obesity in the United States (Wen et al., 2013).

There have been many studies that examine the health outcomes of Mexican Americans because they represent the majority of Hispanics in the United States (Ahluwalia et al., 2007; Kershaw, Albrecht, & Carnethon, 2013; Martinez et al., 2012). Research assesses that in addition to a variety of social and environmental factors, longer lengths of residency in the United States, as well as higher levels of acculturation, are associated with higher rates of obesity in Mexican American men (Martinez et al., 2012). There have also been studies that investigate the health disparities among Puerto Ricans. (Pérez, Sánchez, & Ortiz, 2013; Tucker et al., 2010). According to the literature, individuals of Puerto Rican descent report the worst health status and highest prevalence of several acute and chronic medical conditions, including hypertension, type 2 diabetes, and tuberculosis, when compared with non-Hispanic Whites and other Hispanic groups (Council on Scientific Affairs, 1991). The reasons for these health disparities remain largely unexplained; however, this study adds to previous research that illustrates the need for an understanding of the dynamics involved in these poor health outcomes for each of these groups of men (Tucker et al., 2010).

There are several limitations to this study. The data were obtained from a cross-sectional sample survey, which precludes the ability to establish temporal relationships. Although weight and height were self-reported, there is no bias in reporting by race/ethnicity (Ezzati, Martin, Skjold, Vander Hoorn, & Murray, 2006; Li et al., 2012). Last, there are limitations to BMI as a measurement of obesity, especially when discussing patterns of obesity across gender, racial, and ethnic groups (Thorpe et al., 2014). Although BMI is highly correlated with percentage of body fat, it does not distinguish fat and lean tissue (Flegal et al., 2010). It is also worth noting that participants tend to overestimate height and underestimate weight; thus there is a potential for producing self-reported height and body weight bias (Thorpe et al., 2014).

Nevertheless, this study has a number of strengths. First, this study combined 11 years (2002-2012) of NHIS data. This ensured that there would be a sufficient number of men in each of the race and Hispanic groups. In addition, NHIS contains several variables (e.g., health behaviors, nativity, and SES) that are known to confound the relationship between race/ethnicity and obesity. The authors are not aware of any study that has used a nationally representative sample to examine race and ethnic differences in obesity in the United States.

As the United States continues to become a nation where minority racial/ethnic groups will become the majority of the population, it is critically important to understand the health status of groups of the U.S. population. This study explores the relationship between race/ethnicity, obesity, and nativity among men. The findings of this study suggest that the odds of obesity vary by

racial/ethnic groups and nativity has an impact on obesity prevalence. This study provides information for future, targeted intervention strategies related to obesity among high-risk Hispanic populations. Further research is also needed to determine what specific factors, such as diet and physical activity habits, are associated with obesity disparities among different Hispanic groups of men.

Declaration of Conflicting Interests

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