



Food insecurity and adult overweight/obesity: Gender and race/ethnic disparities



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ABSTRACT

The majority of the food insecurity-obesity research has indicated a positive association among women, especially minority women. Less research has been conducted on men, and the findings are inconsistent. The aim was to assess whether gender and race/ethnic disparities exists between the food insecurity and overweight/obesity relationship among adults ages 18–59. We used the cross-sectional 2011 and 2012 National Health Interview Survey data (N = 19,990). Three or more affirmative responses on the 10-item USDA Food Security Scale indicated food insecure experiences. Self-reported height and weight were used to calculate body mass index according to the Centers for Disease Control and Prevention. Multivariate logistic regression models were stratified by gender and race/ethnicity to estimate the association between food insecurity and overweight/obesity controlling for several demographic characteristics. Adults on average were 36 years of age (51% female; 56% white, 27% Hispanic, and 17% black), 27% were food insecure, and 65% were overweight/obese. Food insecurity was most prevalent among blacks and Hispanics, regardless of gender. A greater percentage of food insecure women were overweight/obese compared to food secure women among all race/ethnicity groups; while similar proportions of white, black, and Hispanic men were overweight/obese irrespective of their food security status. In covariate-adjusted models, food insecurity was associated with a 41% and 29% higher odds of being overweight/obese among white and Hispanic women, respectively. Food insecurity was not related to overweight/obesity among black women nor among white, black, and Hispanic men. The complex relationship between food insecurity and obesity suggests a need to investigate potential behavioral and physiological mechanisms, and moderators of this relationship.

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1. Introduction

Sixty-nine percent of U.S. adults are overweight or obese (Ogden, Carroll, Kit, & Flegal, 2014). While the overweight and obesity prevalence rates are similar among Hispanic women (77%) and Hispanic men (79%), there are disparities in the overweight or obesity prevalence rate among white women (63%) compared to white men (71%) and black women (82%) compared to black men (69%) (Ogden et al., 2014). For the past decade there has been an increasing trend in obesity among women, and a consistent elevated, but not increasing, obesity trend among men (Flegal, Kruszon-Moran, Carroll, Fryar, & Ogden, 2016). The concern with

the increasing and elevated obesity trends is that they are associated with severe health consequences. Obesity has been associated with arthritis, diabetes, hypertension, and high cholesterol (Mokdad et al., 2003). Consequently, the obesity-related comorbidities are associated with the staggering cost of health care (Finkelstein, Trogdon, Cohen, & Dietz, 2009), more so than smoking and or problem drinking (Sturm, 2002).

The negative health and financial consequences associated with obesity has resulted in researchers focusing on how sources of stress within the family environment may be a contributor (Hernandez & Pressler, 2014, 2015; Hernandez, Pressler, Dorius, & Mitchell, 2014). Food insecurity, or the lack of availability or access to healthful food because of insufficient money or other resources (Coleman-Jensen, Rabbitt, Gregory, & Singh, 2016), is a type of financial stress within the family environment that often coexists with obesity. Roughly 13% (i.e. 16 million) of adults

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experience food insecurity in the U.S, with greater disparities observed among women, and black and Hispanic households (Coleman-Jensen et al., 2016).

The research that has focused on the association between food insecurity and obesity has primarily found a positive association among adult women (Franklin et al., 2012; Gooding, Walls, & Richmond, 2012; Hanson, Sobal, & Frongillo, 2007; Martin & Lippert, 2012; Pan, Sherry, Njai, & Blanck, 2012; Townsend, Peerson, Love, Achterberg, & Murphy, 2001; Wilde & Peterman, 2006), especially among Mexican American women (Kaiser, Townsend, Melgar-Quinonez, Fujii, & Crawford, 2004; Smith, Colon-Ramos, Pinard, & Yaroch, 2016). The dearth of research examining race/ethnic differences in the food insecurity-obesity association is stronger among race/ethnic minority adult women compared to white adult women (Adams, Grummer-Strawn, & Chavez, 2003). On the other hand, less research has been conducted on adult men, and the findings are not consistent. Two studies have found positive yet non-significant results (Gooding et al., 2012; Pan et al., 2012). One study found positive and significant effects but small in magnitude compared to findings focused on food insecure women (Wilde & Peterman, 2006), while another study found the association to vary by the level of food insecurity (Hanson et al., 2007). The scarcity and inconsistent findings has resulted in few studies investigating race/ethnic differences in the relationship between food insecurity and obesity among adult men.

The purpose of this study was to determine whether these association between food insecurity and obesity differs by race/ethnicity among adult women and men ages 18–59. We hypothesized a positive and significant association between food insecurity and overweight or obese status among minority (black and Hispanic) women, and positive yet non-significant findings among white women, and white, black, and Hispanic men. It is necessary to identify the subpopulations at risk for experiencing the food insecurity-overweight/obesity relationship so that mechanisms and moderators can be investigated and later policies and programs addressing food insecurity and obesity can be adjusted accordingly.

2. Methods

The 2011 and 2012 person, family, and sample adult files from National Health Interview Survey (NHIS) data was employed for this study (N = 210,006). The National Center for Health Statistics (NCHS), which is part of the Centers for Disease Control and Prevention (CDC) conducts this cross-sectional survey annually. A multistage probability sample survey design is used to acquire a nationally representative sample of the US non-institutionalized civilian population. For individuals included in the survey, demographics and health of all family members are obtained. Within each family, an adult 18 years of age or older is selected at random and interviewed to obtain additional information. Additional details about the NHIS survey can be found elsewhere (National Center for Health Statistics).

The sample was restricted to only include adults 18–59 years of age (162,265 cases excluded), who were of a normal weight (BMI = 18.5) or higher (759 cases excluded), and not pregnant (681 cases excluded). The cut off at age 59 was used because the Administration on Aging refers to individuals over the age of 60 as older adults and oversees the provisions of the Older Americans Act, which provides special services and programs designed to assist these individuals to live independently (Administration for Community Living, 2015). Although food insecurity rates are substantially higher among low-income households (i.e. <200% FPL), households slightly above the low-income status also experience food hardship (Gundersen & Garasky, 2012; Gundersen, Kreider, & Pepper, 2011; Hernandez, 2015). For this reason the sample was

restricted to adults who were less than or equal to 299% of the federal poverty line (FPL) (23,187 cases excluded). Further, only adults who identified their race/ethnicity status as non-Hispanic white, non-Hispanic black or Hispanic were included due to low response rates among other racial groups (1933 excluded). Last, only adults with data on all variables of interest were included in the analytic sample (1191 excluded). The final sample consisted of 19,990 adults. This study was approved by the University of Houston's Institutional Review Board.

2.1. Measures

Body Mass Index (BMI). Height (feet and inches) and weight (pounds) were self-reported and used to calculate BMI (kg/m^2). Participants' BMI was then categorized as normal weight (BMI = 18.5–24.9) or overweight/obese (BMI \geq 25.0) based on the standards developed by the CDC (Centers for Disease Control and Prevention, 2015). The BMI categories were then used to create the dichotomous dependent variable used to predict overweight/obese.

Food Insecurity. The 10-item USDA Food Security Scale was used to assess adult food security status. Affirmative responses to three or more items indicated that the participant experienced food insecurity; affirmative responses to two or fewer items suggested that the participant was food secure (Coleman-Jensen et al., 2016).

Gender and Race/ethnicity. Gender and race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic) were self-reported by participants.

Covariates. Demographic characteristics were included as covariates in all models to control for factors that may be related to food insecurity as well as overweight/obesity. Characteristics included: age (years), marital status (single vs. married/cohabitating), nativity (foreign born vs. native born), education [less than high school diploma (reference), high school diploma, associates degree, bachelors degree or more], employment (unemployed vs. employed), household income based on the Federal Poverty Line (FPL) [0.00–0.99 FPL (reference), 1.00–1.99 FPL, 2.00–2.99 FPL], health insurance status [private (reference), public, no coverage], physical activity (self-reported weekly minutes of moderate to vigorous activity), and region [South (reference), West, Midwest, Northeast].

2.2. Analytic plan

Using STATA SE version 13.0 statistical software weighted descriptive and multivariate regression models were conducted. To account for the complex sampling design of NHIS and survey weights, survey procedures were used. A series of multivariate logistic regression models were conducted where overweight/obesity status was regressed onto food insecurity status, controlling for demographic characteristics. All models were stratified by gender and race/ethnicity status.

3. Results

Sixty-five percent of the adults were classified as overweight/obese, 27% were classified as food insecure, 51% female, 56% white, 17% black, and 27% Hispanic (Table 1). Adults were approximately 36 years of age, primarily born in the U.S. (78%), low-income (69%, <1.99 FPL), and with a high school diploma or more (78%). Fifty percent of the adults were married/cohabiting (50%), over half were employed (57%), and health insurance varied with 40% having private insurance, 24% having public insurance, and 36% having no coverage.

A greater percentage of black women were overweight/obese,

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