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Ethnic density and obesity: Evidence from fixed-effects models ☆

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ABSTRACT

We use data from the 1980 to 2004 waves of the National Longitudinal Survey of Youth, 1979 Cohort to examine the association between the ethnic density of metropolitan areas and obesity among U.S. blacks and Latinos. Although minority groups' obesity rates tend to be higher in metropolitan areas containing many co-ethnics, controlling for other areal characteristics and unobserved time-constant confounders via fixed-effects models dramatically alters this association. In the fixed-effects models, higher levels of co-ethnic density are inversely associated with black males' obesity risk and unrelated to the obesity risk of black females, Latinas, and Latino males. For most groups, marrying and having children increases the risk of obesity.

1. Introduction

Obesity and related body mass indices have increased sharply in the U.S. since 1980 (Finkelstein et al., 2005; Ogden and Carroll, 2010; Ogden et al., 2007). Prior to 1980, less than 15% of adults ages 20 to 74 were obese (Ogden et al., 2007; Ogden and Carroll, 2010). As of 2008, more than one-third of adults in the same age range, and nearly one-fifth (18.4%) of adolescents ages 12–18, were obese (Ogden et al., 2012). The adverse health and economic consequences of obesity are well-known (Himes, 2000; Renna and Thakur, 2010; Biro and Wien, 2010; Ogden et al., 2007; Finkelstein et al., 2005; Visscher and Seidell, 2001; Mehta and Chang, 2009), leading this condition to be labeled an "epidemic" by the Centers for Disease Control (CDC) (Centers for Disease Control and Prevention (CDC), 1999) and a disease by the American Medical Association (American Medical Association, 2013).

Although obesity is significantly associated with overall poorer health regardless of sex, ethnicity, and nativity status (Gorman et al., 2010; Read and Reynolds, 2012; Zajacova and Burgard, 2010), obesity prevalence is not equally distributed among the major racial and ethnic groups in the U.S. Latino and non-Latino black males and females, regardless of age, are more likely to be obese than their white counterparts (Ogden and Carroll, 2010; Ogden et al., 2012).

Because obesity is a condition that is especially prevalent among blacks and Latinos, it is important to understand what factors shape obesity outcomes for these racial and ethnic groups. Rigorous inquiry into these explanations requires consideration of the possible impact of both individual-level characteristics and characteristics of the geographic areas in which minority ethnic groups reside (Ruel et al., 2010; Mellerson, et al., 2010; Lisabeth et al., 2010; Robinson et al., 2009). One such areal characteristic that has been argued to influence obesity outcomes is the racial and ethnic composition of the residential community, which is often referred to as the group, or ethnic, density effect (Halpern, 1993; Halpern and Nazroo, 1999; Bécares et al., 2012).

Studies that have explored the association between ethnic population density and BMI, overweight, or obesity have generated mixed results. For example, Kirby et al. (2012) find that residing in a community with a high concentration of co-ethnics is associated with a lower BMI for black males. However, that study (Kirby et al., 2012) and others (Chang, 2006; Do et al., 2007) find that co-ethnic density is positively related to body size for other ethnic groups. Still other studies find no association between ethnic density and body size (Chang et al., 2009; Park et al., 2008; Boardman et al., 2005; Robert and Reither, 2004).

The purpose of this analysis is to examine the association between co-ethnic density and obesity among blacks and Latinos across U.S. metropolitan areas and nonmetropolitan counties. We go beyond prior studies of this issue mainly by using panel data from the National Longitudinal Survey of Youth, 1979 Cohort linked to census data describing the racial and ethnic composition of respondents' metropolitan area or nonmetropolitan county of residence. The use of long-term panel data allows us to partially address the issue of

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nonrandom selection into geographic contexts by estimating fixed-effects regression models that control for unobserved time-invariant confounders of the association between ethnic density and obesity.

2. Background and hypotheses

How the presence of co-ethnics in the local geographic community influences obesity risk is theoretically indeterminate. Residing in a geographic area that contains a comparatively large number of co-ethnics could be either a health benefit or a health liability. Applying the sociocultural and physical components of Swinburn et al.'s (1999) ANGELO (analysis grid for environments linked to obesity) framework, there are several reasons why ethnic density might be associated with lower or higher obesity rates among blacks and Latinos.

First, expanding on the group, or ethnic, density effect hypothesis (Halpern, 1993; Halpern and Nazroo, 1999; Bécares et al., 2012), lower obesity risk among minority groups may be observed in areas of higher co-ethnic group densities because co-ethnics may serve as a source of social support for minority ethnic groups. By limiting exposure to racial discrimination (Halpern, 1993; Halpern and Nazroo, 1999; Bécares et al., 2012), living among a higher density of co-ethnics may reduce the risk of obesity for minority groups. At the neighborhood level, increasing levels of black concentration are associated with declining levels of perceived discrimination (Hunt et al., 2007; Borrell et al., 2013), and living in predominantly black areas (greater than 50% black) has been shown to both reduce instances of perceived discrimination (Welch et al., 2001) and reduce whites' prejudicial attitudes towards racial and ethnic minorities (Gilliam et al., 2002; Oliver and Wong, 2003). In turn, ethnic minorities who report experiencing racial or ethnic discrimination have higher BMIs (Cunningham et al., 2013), higher waist circumference (Cunningham et al., 2013; Hunte, 2011), higher visceral fat (Lewis et al., 2011), and experience other health problems (Flores et al., 2008). By reducing the risk of experiencing discrimination, living in areas of high co-ethnic densities may also reduce obesity risk.

Kirby et al. (2012) find some support for the hypothesis that living with a high concentration of co-ethnics has health benefits. Using pooled 2002–2007 data from Medical Expenditure Panel Survey linked to 2000 Census data, Kirby et al. (2012) find that black men who live in neighborhoods (defined by the census block group) with a co-ethnic density of at least 25% have, on average, lower BMIs than black men living in neighborhoods with lower black densities.

However, living among a large number of co-ethnics may also increase the risk of obesity. First, if the cultural norms and expectations of the group that govern physical exercise, and/or diet and eating behaviors (McArthur et al., 2001; Stafford et al., 2009) encourage the development of obese body sizes, then living among a high proportion of co-ethnics may increase obesity risk. For example, higher consumption of calories (Zamora et al., 2010), lower consumption of fruits and vegetables (Dubowitz et al., 2008), and higher amounts of sedentary activity (Gordon-Larsen et al., 1999) may transmit obesogenic behaviors to co-ethnics.

Second, as noted by Kirby et al. (2012) and Alleyne and LaPoint (2004), social norms concerning body size and the acceptability of overweight and obesity may also influence the role of racial and ethnic density on obesity risk. Living in metropolitan areas or counties with a higher proportion of co-ethnics increases the likelihood of strong social ties with co-ethnics, which would likely influence perceptions of ideal body size (Hruschka et al., 2011) and social norms concerning body size (Christakis and Fowler, 2007). Because overweight and obese blacks and Latinos are more likely than their white counterparts to underestimate their weight, to fail to identify themselves as overweight or obese (Paeratakul et al., 2002; Chithambo and Huey, 2013; Dorsey et al., 2009; Bennett and Wolin, 2006; Park et al., 2011; Mirza et al., 2005), and to express satisfaction with their body size (Ali et al., 2013; Chithambo and Huey, 2013; Thomas et al., 2008), larger body sizes may be more acceptable in areas with higher densities of blacks and Latinos.

In support of these conjectures, a few studies have found co-ethnic density to be positively associated with higher weight status. Using the 2000 Behavioral Risk Factor Surveillance System (BRFSS) data linked to 2000 Census data, Chang (2006) finds that when metropolitan black density is measured by the isolation index, it is positively associated with BMI and the risk of being overweight (albeit not obese) for blacks. Chang (2006) also finds that the percentage of the metropolitan-area population that is black is positively associated with black residents' BMI. Studies at the neighborhood level have found similar results. Do et al.'s (2007) analysis of 1988–1994 data from the National Health and Examination Survey (NHANES III) finds the black density of a neighborhood to be significantly related to having a higher BMI among black men. Kirby et al. (2012) find a similar relationship for ethnic density and weight status for Hispanics: Hispanics living in neighborhoods that were at least one quarter Hispanic were shown to have an increased risk of obesity and higher BMI.

Other studies, however, have failed to find an association between ethnic density and body mass index (Do et al., 2007; Robert and Reither, 2004; Park et al., 2008; Chang et al., 2009) or obesity risk (Boardman et al., 2005; Chang et al., 2009) among blacks or Hispanics. Do et al. (2007) find no statistically significant relationship between the black and Hispanic density of a neighborhood and the BMI of black women and Hispanic women and men, respectively, after other individual- and neighborhood-level characteristics were controlled. Using the 1986 American's Changing Lives Study data attached to 1980 Census data, Robert and Reither (2004) fail to observe a statistically significant relationship between the black density of a census tract (measured by percent black) and BMI for either black women or black men. Using data from the 1994 National Health Interview Survey, Boardman et al. (2005) find that the impact of living in a neighborhood that is at least one-quarter black on obesity risk became statistically insignificant once they controlled for the neighborhood poverty rate and the obesity rate of a neighborhood. Studies of populations in two Northeast cities have yielded similar results. In their study using data from a 2000–2002 health survey of New York City residents, Park et al. (2008) find neither the proportion black nor the proportion Hispanic of a neighborhood to be significantly associated with the BMI of the group. Using data from the 2002 and 2004 Southeastern Pennsylvania Household Health Survey, Chang et al. (2009) find the obesity risk and weight status of black males and females to be unaffected by black density once other areal characteristics were controlled. These inconsistent findings regarding the association between ethnic density and weight status warrants a re-examination of this issue.

3. Analytical challenges

For several reasons, it is difficult for observational studies to infer a causal effect of ethnic density (as well as other areal characteristics) on health conditions, including obesity. First, individuals are not randomly assigned to areas with varying levels of co-ethnic density. Rather, individuals decide to move or remain in geographic areas with particular sociodemographic characteristics based in part on attributes that could also influence their health behaviors and health outcomes (Grafova et al., 2014). Some of these characteristics, such as their socioeconomic status, can be observed. Other characteristics, such as a willingness to interact with majority group members, or knowledge of unhealthy aspects of ethnic culture, are likely unobservable.

Another challenge to inferring a causal effect of ethnic density on obesity is that the level of ethnic density likely covaries with