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Income inequality and weight status in US metropolitan areas

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Abstract

Prior empirical studies have demonstrated an association between income inequality and general health endpoints such as mortality and self-rated health, and findings have been taken as support for the hypothesis that inequality is detrimental to individual health. Unhealthy weight statuses may function as an intermediary link between inequality and more general heath endpoints. Using individual-level data from the 1996–98 Behavioral Risk Factor Surveillance System, we examine the relationship between individual weight status and income inequality in US metropolitan areas. Income inequality is calculated with data from the 1990 US Census 5% Public Use Microsample. In analyses stratified by race–sex groups, we do not find a positive association between income inequality and weight outcomes such as body mass index, the odds of being overweight, and the odds of being obese. Among white women, however, we do find a statistically significant *inverse* association between inequality and each of these weight outcomes, despite adjustments for individual-level covariates, metropolitan-level covariates, and census region. We also find that greater inequality is associated with higher odds for trying to lose weight among white women, even adjusting for current weight status. Although our findings are suggestive of a contextual effect of metropolitan area income inequality, we do not find an increased risk for unhealthy weight outcomes, adding to recent debates surrounding this topic.

Keywords: Income inequality; Obesity; Body mass index; Contextual analysis; Socioeconomic factors; USA

Introduction

A large number of empirical studies have suggested that, in addition to individual socioeconomic status, the extent of contextual social inequality may be relevant to health (Kawachi & Kennedy, 1999; Kawachi, Wilkinson, & Kennedy, 1999b; Kawachi, 2000; Subramanian, Blakely, & Kawachi, 2003). Proponents of the income inequality hypothesis argue that for a given

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locality, a greater degree of income inequality is *detrimental* to the health of its residents. In recent years, this hypothesis has been subject to a fair amount of criticism centered on issues such as confounding of results by individual incomes (Gravelle, 1998; Judge, Mulligan, & Benzeval, 1998; Gravelle, Wildman, & Sutton, 2002), racial composition (Deaton & Lubotsky, 2003), or regional differences (Mellor & Milyo, 2002, 2003); the possibility that inequality merely acts as a proxy for health-determining structural conditions with which it is correlated (Lynch, Smith, Kaplan, & House, 2000; House, 2001); and non-supportive empirical findings (e.g., Mellor & Milyo, 2001, 2002, 2003; Muller, 2002; Osler et al., 2002; Shibuya, Hashimoto, & Yano, 2002; Sturm & Gresenz, 2002). These arguments and findings, however, have been answered and critiqued in return (e.g., Kawachi & Blakely, 2001, 2002; Marmot & Wilkinson, 2001; Blakely & Kawachi, 2002; Blakely, Lochner, & Kawachi, 2002; Wilkinson, 2002; Subramanian et al., 2003).

We examine the relationship between income inequality in US metropolitan areas and three weight status measures, and also declared weight loss behavior. Our work accounts for prior methodological criticisms. The health outcomes commonly investigated are very general endpoints such as life expectancy, mortality, and self-rated health. To the degree that prior work supporting a detrimental effect of inequality on these outcomes is valid, weight status may function as an intermediary link between inequality and more general health measures. Overweight and obesity are well known to be associated with various morbidities and functional limitations (NHLBI Obesity Education Initiative Expert Panel, 1998; Must et al., 1999), and may also be associated with an increased risk of mortality (Harris et al., 1988; Stevens et al., 1992; Lee, Manson, Hennekens, & Paffenbarger, 1993; Manson et al., 1995).

Several pathways have been proposed with respect to the link between income inequality and health, and an extension of each to weight outcomes would predict that the higher the degree of income inequality in a community, the greater the burden of obesity (or overweight) and poor health habits leading to higher weight statuses in that community. Some have proposed that income inequality leads to a disinvestment in human capital and public services (Kaplan, Pamuk, Lynch, Cohen, & Balfour, 1996; Kawachi & Kennedy, 1999), an erosion of social capital or "social cohesion," (Kawachi, Kennedy, Lochner, & Prothrow-Stith, 1997; Kawachi & Kennedy, 1999), and a sense of relative deprivation (e.g., Wilkinson, 1992, 1996). In areas with lower social capital, e.g., persons may be at higher risk for being overweight because they lack appropriate health information and affective supports, or are less subject to normative social controls over unhealthy behaviors. It should be noted, however, that in the sociological literature, social capital has been shown to have both positive and negative effects on various socioeconomic attainments (Portes, 1998). In the case of relative deprivation, prolonged psychological stress and frustration may lead to chronic exposures to cortisol, which is associated with weight gain. Weight-promoting behaviors may also function as a coping response to stress and frustration. Lastly, we might expect an association between inequality and weight status to be greater at lower individual income levels, since it is primarily persons at the lower end of the income distribution that are adversely affected by pathways such as relative deprivation.

Few studies have considered the role of income inequality on weight outcomes. Kahn, Tatham, Pamuk, and Heath (1998) examine the effect of state-level income inequality on self-reported weight gain at the waist as opposed to other anatomic sites. The outcome assessed is *location of weight gain*, adjusting for weight status. The authors hypothesize that inequality induces psychological stress, which leads to weight gain in the abdominal region. They find that for men, inequality has a significant but modest positive effect on the odds of gaining weight at the waist. No significant effects are found among women. Our study differs in several respects. First, we focus on weight status itself, rather than area of weight gain, given a particular weight status. Second, we assess inequality at the metropolitan level rather than state level. As we discuss below, the metropolitan area is perhaps a better unit of analysis given the mechanisms being postulated. Third, Kahn et al.'s study is restricted to a specific age range (50–64), and does not include data on individual incomes. We include adults of all ages, and we assess the effect of inequality with adjustments for individual income and several other individual-level covariates.

In another study, Diez-Roux, Link, and Northridge (2000) examine the relationship between income inequality and four cardiovascular disease risk factors, one of which is body mass index (BMI). Adjusting for individual-level income, they find that for women, inequality has a significant, positive association with BMI (among those with household incomes $<\$25\,\text{K}$). Results for men are not significant. This study also measures inequality at the state level. Furthermore, the central findings do not adjust for race. Race is known to be significantly correlated with weight status, and is also associated with inequality. For example, black women are more likely than whites to be overweight (Flegal, Carroll, Ogden, & Johnson, 2002), and areas with higher inequality are associated with a higher proportion of black residents (Deaton & Lubotsky, 2003). As race is a potential confounder of