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Incarceration and adult weight gain in the National Survey of American Life (NSAL)

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ABSTRACT

Background. The United States has the unenviable distinction of having both the highest obesity rate among Organisation for Economic Co-operation and Development (OECD) member countries and the highest incarceration rate in the world. Further, both are socially patterned by race/ethnicity and socioeconomic position. Incarceration involves various health behaviors that could influence adult weight trajectory.

Methods. We evaluated the associations between history and duration of adult incarceration and weight gain using the National Survey of American Life (N = 6082 adults residing in the 48 contiguous states between February 2001 and March 2003). We propensity score-matched individuals to control for the probability of having a history of incarceration. To examine the relation between prior incarceration and adult weight gain, we fit gender-stratified generalized estimating equations controlling for propensity of incarceration history, age, education, income, race/ethnicity, and marital status.

Results. For males (N = 563), incarceration was associated with about a 1.77 kg/m^2 lower gain in body mass index (BMI) during adulthood, after adjusting for age, education, income, race/ethnicity, and marital status in addition to the propensity of having a history of incarceration (95% CI: −2.63, −0.92). For females (N = 286), no significant overall relationship was found between a history of incarceration and adult weight gain. In subgroup analyses among those with an incarceration history, we found no overall association between duration of incarceration and adult weight gain in men or women. In sensitivity analyses, neither tobacco smoking nor parity changed the results.

Conclusions. The results of this study indicate that incarceration is associated with a lower transition of weight gain in males, but not in females..

Introduction

The United States incarcerates 716 out of every 100,000 Americans, giving it the unenviable distinction of having the highest incarceration rate in the world and accounting for 22% of the world's prisoners despite having only 4.4% of the world's population (Walmsley, 2012). This high risk of incarceration is concentrated among racial minorities and individuals with low socioeconomic standing (Pettit and Western, 2004). One in 21 African American men and one in 279 African American women are currently incarcerated and almost one in three of African American men will be incarcerated at least once in their lifetime (Harawa and Adimora, 2008). Key drivers of the 400% increased incarceration rate since 1980 include the federal government's "War on Drugs" and insufficient funding of deinstitutionalized community mental health centers (Harawa and Adimora, 2008; Dumont et al., 2013; Torrey, 1995). With the advent of this era of "mass incarceration," incarceration is likely to affect individual and population health in a variety of ways. Although under-researched, incarceration has been linked to various negative health outcomes, including various infectious diseases (Binswanger et al., 2009; Braithwaite and Arriola, 2003; Hammett and Drachman-Jones, 2006; Massoglia, 2008; Schnittker et al., 2011), hypertension (Binswanger et al., 2009; Schnittker et al., 2011; Wang et al., 2009), asthma (Binswanger et al., 2009; Schnittker et al., 2011), cardiovascular disease (Binswanger et al., 2009; Schnittker et al., 2011), cancer (Binswanger et al., 2009), and psychopathology (Schnittker et al., 2011). In recent analyses, researchers have found that Black men have lower mortality while incarcerated; however, this protective effect was attributed to protection from motor vehicle accidents and similar injuries as well as increased mortality associated with compassionate release, as opposed to a "healthy prisoner" selection effect (Baćak and Wildeman, 2015; Spaulding et al., 2011).

There is a relatively large body of literature highlighting the prevalence of obesity among prisoners, namely male prisoners (Binswanger et al., 2009; Herbert et al., 2012). A systematic meta-analysis of 31 cross-sectional surveys published worldwide on the relationship between incarceration and body weight found that, overall, incarcerated men were less likely to be overweight or obese compared to their counterparts in the general population, while the opposite was true among women (Herbert et al., 2012). Among higher income countries, both incarcerated men and women were more likely to be overweight or obese

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compared to the general population. Few studies have evaluated the relation between incarceration and weight changes over time, but they seem consistent with these data (Gates and Bradford, 2015; Clarke and Waring, 2012). In the most recent analysis of weight transitions after incarceration, both men and women gained weight in prison, although women gained more weight than men (Gates and Bradford, 2015). Individuals with shorter sentences (shorter duration of incarceration) gained 2.2 times more than those with longer sentences; however, there was no relationship between being classified as overweight or obese and duration of incarceration (Gates and Bradford, 2015).

However, there are no studies that track the weight of former inmates when they return to their communities. With the vast majority of inmates returning within four years — the average felony sentence in state courts is about 38 months (United States, Bureau of Justice Statistics, 2009), it may be important to think about incarceration history when thinking about adult weight gain, especially among racial/ethnic minorities. Incarceration could conceivably play a role in patterning adult weight over time. While there is little information regarding the dietary quality/quantity and physical activity patterns in American prisons, data from prison systems in Australia, the United Kingdom, and other developed countries indicate that female prisoners' energy intake exceeded recommended daily allowances (RDAs), while there was a large range among men (Herbert et al., 2012). While gym equipment and recreational opportunities in American prisons used to be more extensive, a series of amendments (including Zimmer's 1996 "No Frills Prison Act") have limited the provision of and access to fitness equipment and/or instruction in federal prisons (Carlson and Garrett, 1999). Various state prison systems followed suit, leading to several lawsuits questioning whether denial of recreational time constitutes "cruel and unusual punishment" or infringes on prisoner rights (AELE Law Enforcement Legal Center, 2008). Exposure to dietary restrictions in jail or prison could either lead to greater behavioral disinhibition or maintenance of prison eating patterns post-release, whereas increased physical activity patterns could continue post-release.

Outside of prisons, individuals face broader obesogenic environments with fewer restriction on behavior/activity. Americans have become increasingly overweight over the last 50 years, with about 75% of the U.S. adult population classified as overweight or obese (Fryar et al., n.d.). National statistics reveal that weight gain during adulthood has increased by more than 50% in the past 40 years, contributing to increasing trends in obese and extremely obese categories (Fryar et al., n.d.; Hays et al., 2002). While adult weight gain is often accepted in the United States as a normative part of life, even among normal weight individuals, adult weight gain may have harmful health effects, increasing the risk of colon cancer (Bird et al., 1998), diabetes (Colditz et al., 1995), coronary heart disease (Willett et al., 1995), and breast cancer in post-menopausal women (Eliassen et al., 2006). Better characterizing the dynamic factors driving adult weight gain is an important public health endeavor. This is especially true among racial/ethnic minorities who are more likely to be overweight or obese (Insaf et al., 2014). Moreover, in the age of mass incarceration among disadvantaged Black and Latino communities, incarceration history may be another driver of health disparities in weight transitions over the lifecourse.

The existing studies do not investigate weight changes among formerly incarcerated individuals in non-institutional settings. Using a propensity score-matched, cross-sectional national sample of non-institutionalized U.S. adults, this study evaluated the relationship between incarceration history and weight gain since age 18, using gender-stratified generalized linear regression models.

Methods

Sample population

This study used data from the National Survey of American Life (NSAL), a multi-stage, cross-sectional, household probability study that is part of the Collaborative Psychiatric Epidemiology Surveys. The sample included non-institutionalized, English-speaking U.S. adults aged 18 and older residing in the 48 contiguous states between February 2001 and March 2003. The study targeted three racial/ethnic groups living in urban and rural centers where Black Americans were residentially concentrated: African Americans, Blacks of Caribbean ancestry, and non-Hispanic Whites. African Americans were individuals who identified as Black but did not report Caribbean ancestry. Caribbean Blacks were persons who identified as Black and also indicated that they were of West Indian or Caribbean descent, or were from a Caribbean-area country, or had parents or grandparents who were born in a Caribbean-area country. The Black samples were nationally representative. While the White sample was only representative of Whites who lived in census tracts with 10% or greater Black population, each of the racial/ethnic groups are comparable to other nationally representative samples based on education, income, gender, region, urbanicity, marital status, and various other characteristics (Jackson et al., 2004a). Household screening yielded 6082 total adult responses (891 non-Hispanic Whites, 1621 Caribbean Blacks, 3570 African Americans) (Collaborative Psychiatric Epidemiology Surveys, n.d.). The response rate for the national sample of non-Hispanic Whites and African Americans was 69.7% and 70.7%, respectively, while the response rate for the Caribbean supplement was 77.7% (Jackson et al., 2004a). About 86% of the interviews were conducted face-to-face using computer-assisted instrument (CAPI) software, while the rest were conducted by telephone (Jackson et al., 2004a). Respondents were compensated $50 for their time. More details about the design, sampling, methodology, and other characteristics associated with the NSAL have been described at length elsewhere (Jackson et al., 2004a; Collaborative Psychiatric Epidemiology Surveys, n.d.; Heeringa et al., 2004; Jackson et al., 2004b; Pennell et al., 2004).

Measures

History of incarceration

The primary exposure of interest for this study was an individual's history of incarceration. Participants were asked a series of questions regarding their history of detention, including whether they spent time in a reform school, detention center, jail or prison; how many times the respondent served time in jail or prison; how long s/he spent there altogether; and the year and month s/he first went to jail or prison for a month or more. We operationalized incarceration in two ways: history of any incarceration and the total duration of incarceration.

Adult weight gain

The primary outcome for this study was adult weight gain, measured as an increase in body mass index (BMI; kg/m^2) after age 18. The NSAL contains two self-reported weight measures: respondents' recall of their weight at age 18 and their current weight at the time of survey administration. Each respondent also reported his/her current height. A BMI for each time point was calculated using the respondent's reported weight at each time point and his/her current height, assuming that height does not change considerably after age 18. Adult BMI gain was calculated by subtracting each respondent's body mass index at age 18 from his/her current BMI with a positive value indicating weight gain during adulthood and a negative value indicating weight loss.

Propensity for history of incarceration

A number of background characteristics contribute to an individual's propensity to have a history of incarceration, and they could make finding an exchangeable comparison group difficult. Furthermore, with their divergent probability of incarceration, men and women are likely to experience different propensities for criminality and incarceration. Gender-specific propensity scores were calculated based on a logistic regression model that included predictors of incarceration documented in the literature: age (6 indicators: 18–24, 25–34, 35–44, 45–54, 55–64, 65+ years) (Arum and Beattie, 1999; Laub and Sampson, 2008; Sampson and Laub, 1990), race/ethnicity (African American, Caribbean-Black, White) (Arum and Beattie, 1999; Laub et al., 1998), ever history of selected mental illnesses before age 18 (4 separate indicator variables) (Erickson et al., 2008; Greenberg and RRA, 2008), family history of selected mental illnesses that could contribute to family instability (7 separate indicator variables) (Laub et al., 1998), US nativity (Arum and Beattie, 1999), highest parental education level (<12 years of education, 12 years, 13–15 years, 16+ years of education) (Arum and Beattie, 1999; Harper and McLanahan, 2004), self-reported welfare status during childhood (Sampson and Laub, 1990; Harper and McLanahan, 2004; Pratt and Cullen, 2005), presence of biological father during childhood (Harper and McLanahan, 2004), and