Short communication

An empirical assessment of the "healthy prisoner hypothesis"

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ABSTRACT

Lower mortality among inmates, compared to the general population, is typically ascribed to access to health care during incarceration and the low risk of death due to homicide, accidents, and drug overdose. In this study, we test an alternative explanation based on selection of healthy individuals into jails and prisons—"the healthy prisoner hypothesis." According to this hypothesis, inmates have to be healthy to commit crimes and become incarcerated, which explains why they experience lower mortality than comparable segments of the general population. Using ten waves of data from the National Longitudinal Survey of Youth 1997, we compare individuals who become incarcerated the following year to those who do not on four measures of health—depression, self-rated health, functional limitations, and injury or illness requiring medical attention. Results from matched samples indicate that future inmates are hardly ever in significantly better health the year prior to their incarceration. These findings strongly suggest that the paradoxical mortality advantage of inmates is not due to health selection.

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1. Introduction

The social science community has become increasingly aware of the consequences of mass incarceration for social inequality, including disparities in health (Dumont et al., 2012; Wakefield and Uggen, 2010). A great deal of the research on health effects has focused on mortality (Wildeman and Muller, 2012). Studies have typically found that inmates die at lower rates than expected even after being matched to the general population on key characteristics such as age, race/ethnicity, and sex (e.g. Spaulding et al., 2011; Patterson, 2010). Despite a consensus on the empirical findings regarding the incarceration—mortality relationship, there is less agreement about its causes. Whereas some scholars have argued that the provision of health care to individuals who would otherwise be without it plays a key role in the low mortality rates of inmates (Patterson, 2010), others have suggested that prisons and jails are safer given the risks inmates are exposed to in the community prior to incarceration (Spaulding et al., 2011).

Another potential explanation for the lower mortality rates of inmates is selection bias due to the "healthy prisoner effect." This idea is based on the "healthy worker hypothesis" originally proposed to explain lower mortality and morbidity of the employed than the unemployed segments of the population by showing that healthy individuals are more likely to enter the workforce (Baillargeon, 2001). Scholars have speculated the same dynamic might be at work among inmates, with individuals who engage in crime being, on average, in better health than the general population. Studies in Georgia (Spaulding et al., 2011), North Carolina (Rosen et al., 2011), and England and Wales (Fazel and Benning, 2006) have discussed the possibility that some of the mortality advantage may be attributable to the "healthy prisoner effect." Other research has found that inmates are in fact worse off, especially with regard to chronic health conditions—but it is not clear whether this is due to diseases preceding incarceration or deteriorating health during or immediately after incarceration (Binswanger et al., 2009).

Thus far, no research has empirically assessed the positive health selection into jails and prisons by comparing the health of individuals who will experience incarceration to those who will not. In the present study, we test the "healthy prisoner hypothesis" using data from the National Longitudinal Survey of Youth 1997 (NLSY97). Because these data include multiple observations on the same persons, they make it possible to compare the health of individuals who will become incarcerated in the following year to the health of individuals who will not. Using propensity score matching, our analysis found no systematic support for the hypothesis

that people who become incarcerated are healthier than matched members of the general population. These findings are in line with a growing body of research documenting multiple sources of social disadvantage among current and former inmates—highlighting the need to focus on what happens during and after incarceration (Wakefield and Uggen, 2010).

2. Methods

2.1. Sample

Data are drawn from the NLSY97, a nationally representative panel survey administered by the United States Bureau of Labor Statistics. In the first round of data collection in 1997, data were collected from 8984 participants born between 1980 and 1984—and their parents. Follow-up interviews with the same participants were carried out annually. In this study we analyzed ten waves of data (2001–2009), covering a range between 16 and 29 years of age. During that period, 590 participants were incarcerated at least once. The NLSY97 has been used previously to study how incarceration relates to socioeconomic attainment (e.g. Apel and Sweeten, 2010) but not as frequently to study how it relates to health. The survey had a fairly high retention rate—the proportion of participants who were interviewed in both the first and the last round of data collection was close to 83%. To retain as many participants who have been incarcerated as possible, we recovered missing information by creating 40 multiply imputed datasets using the R package Amelia II (Honaker et al., 2011). The highest percentage of missing cases was recorded for the variable indicating hard drug use (14%).

2.2. Measures

Participants were coded as having been incarcerated if they reported having spent any time in a jail or a prison during a survey round (1 = yes, 0 = no). The sample of former inmates was restricted to participants who were not incarcerated in two consecutive waves. Each year, participants were asked to rate their health on a standard scale from 1 = excellent to 5 = poor. Depression was assessed every two years since 2000 with a modified version of the Mental Health Inventory (MHI-5; Berwick et al., 1991) that asked about the amount of time during the past month that participants, for example, felt downhearted and blue. The responses were recorded on a scale from 1 = none of the time to 4 = all of the time and summed into a single index where higher scores reflected a more depressed state (range: 1–20). Annually, since 2003, participants answered how many times, during the past 12 months, they were physically injured or ill and had to be treated by a doctor or a nurse. The five response options were: 0, 1, 2, 3, and 4 or more times; the last four categories were collapsed. Finally, starting with 2007, participants were asked whether they were limited in the amount of work they do on a job for pay because of their health (1 = yes, 0 = no).

Demographic covariates included gender, cohort (1980–1984), and race/ethnicity (1 = White, 2 = Black, 3 = Other). Covariates describing family background included information on whether participants lived with both parents, mother's age at birth, and mother's years of education. As an environmental risk for incarceration, participants answered whether there were gangs in their neighborhood (1 = yes, 0 = no). We used a series of 10 items with a binary yes/no response scale to assess criminal and delinquent behaviors (e.g. "Have you ever attacked someone with the idea of seriously hurting them or have a situation end up in a serious fight or assault of some kind?"). Affirmative answers were summed to produce an index where higher scores represented more incidents

of delinquency (range: 1–10). Participants were also asked whether they were suspended from school (1 = yes, 0 = no) and the percentage of peers who have used illegal drugs (1 = almost none (less than 10%) to 5 = almost all (more than 90%)). Time-varying covariates included whether participants have been arrested in the past year, received income from a job, completed high school or more schooling, and whether they used hard drugs. All time-varying covariates were assessed on a binary response scale (1 = yes, 0 = no).

2.3. Statistical analysis

The design of our analysis is unconventional in that we are testing a hypothesis related to future incarceration. At time 1, we compare the health of individuals who do and do not become incarcerated at time 2. As others have emphasized, an appropriate reference group should be used in studies of the "healthy worker effect" (Kirkeleit et al., 2013). A suitable analysis would compare participants who are similar on characteristics that may predispose them to both poor health and incarceration. Such a comparison yields more confidence that observed differences in health prior to incarceration are not due to intervening factors. This analytic strategy is in line with studies of mortality that matched inmates to the general population on key demographic characteristics (e.g. Spaulding et al., 2011). We matched future inmates to non-inmates using propensity score matching (Rosenbaum, 2002). While also adequately adjusting for confounding, matching is known to be less sensitive to model specification than standard regression analysis and precludes probing for results that confirm researchers' hypotheses. We used matching for data preprocessing, as described by Ho et al. (2007), rather than for causal inference.

We estimated the propensity scores using logistic regression with the binary incarceration status in the year following the assessment of health as the dependent variable. Matching was performed on each of the 40 imputed datasets and estimates across datasets were combined using standard formulas (Rubin, 1987). Each participant who became incarcerated the following year was matched to three participants who were not incarcerated. To find appropriate non-incarcerated individuals, we used nearest neighbor matching without replacement and within caliper of .25 of the standard deviation of the propensity score. According to standardized differences in means, balance improved substantially after matching on most covariates (Rosenbaum, 2002). The pre-treatment covariates used to create matched samples included histories of arrest and incarceration, family background, and other variables described in the previous section. Matched samples were created using the MatchIt package in R (Ho et al., 2011). In the first stage of the analysis, we compared differences in health before incarceration on unmatched data, followed by an analysis of matched samples. Because of a relatively small number of inmates, we did not stratify the analysis by race or gender.

2.4. Results

Table 1 presents differences on covariates between participants who were incarcerated at least once between 2001 and 2009 and those who were not. In line with research on demographic correlates of incarceration, significantly more men and minorities have been incarcerated. Incarcerated participants, furthermore, come from less advantaged family backgrounds and have engaged in significantly more antisocial behaviors, including school suspensions, teenage delinquency, and have had more delinquent peers. Unsurprisingly, between 2001 and 2009, incarcerated participants have been arrested more frequently, have used hard drugs more often, have had fewer waves during which they received income