Short communication

Racial/ethnic differences in trends in heroin use and heroin-related risk behaviors among nonmedical prescription opioid users

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ABSTRACT

Background: This study examines changing patterns of past-year heroin use and heroin-related risk behaviors among individuals with nonmedical use of prescription opioids (NMUPO) by racial/ethnic groups in the United States.
Methods: We used data from the National Survey on Drug Use and Health (NSDUH) from 2002 to 2005 and 2008 to 2011, resulting in a total sample of $N = 448,597$.
Results: Past-year heroin use increased among individuals with NMUPO and increases varied by frequency of past year NMUPO and race/ethnicity. Those with NMUPO in the 2008–2011 period had almost twice the odds of heroin use as those with NMUPO in the 2002–2005 period (OR = 1.89, 95%CI: 1.50, 2.39), with higher increases in non-Hispanic (NH) Whites and Hispanics. In 2008–2011, the risk of past year heroin use, ever injecting heroin, past-year heroin abuse or dependence, and the perception of availability of heroin increased as the frequency of NMUPO increased across respondents of all race/ethnicities.
Conclusion: Individuals with NMUPO, particularly non-Hispanic Whites, are at high risk of heroin use and heroin-related risk behaviors. These results suggest that frequent nonmedical users of prescription opioids, regardless of race/ethnicity, should be the focus of novel public health efforts to prevent and mitigate the harms of heroin use.

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1. Introduction

Studies using national U.S. data have shown that individuals with previous nonmedical use of prescription opioids (NMUPO) are at greater risk of heroin use (Becker et al., 2008; Jones, 2013; SAMHSA, 2011). Risk increases as past year frequency of NMUPO increases (Jones, 2013). Increased rates of NMUPO across the U.S. have been linked to the increased prescribing of opioid pain relievers, such as OxyContin, since the 1990s (Manchikanti, 2007; Volkow et al., 2011). Rates of NMUPO only recently seemed to have reached a plateau (SAMHSA, 2012), probably due to the recent restrictions placed in the prescription opioids market as well as the introduction of new abuse-deterrent formulations of these drugs (Cicero et al., 2012, 2014). Links between NMUPO and prescription opioids abuse/dependence, NMUPO onset and transition to heroin and other illegal substances (Becker et al., 2008; Brands et al., 2004; Cleland et al., 2011; Compton and Volkow, 2006; Mars et al., 2013),

and NMUPO-related and heroin-related fatal overdoses (Becker et al., 2008; Blanco et al., 2007; Cicero et al., 2005; Unick et al., 2013), have raised particular concerns in recent years. In addition, a particular public health concern is that the transition to heroin and further injecting heroin may increase the risk of bloodborne infections (Miller et al., 2004; Thorpe et al., 2002).

The transition from NMUPO to heroin use may be explained by individual motivations such as desire to get a more potent high, by heroin being easier to use, cheaper (given the low cost of heroin in the U.S. (Ciccarone et al., 2009) and more easily available compared to prescription opioids (Cicero et al., 2012, 2014). Moreover, the transition from NMUPO to heroin use might be different across race/ethnic groups (Becker et al., 2008; Blanco et al., 2007; Green et al., 2005; Keyes et al., 2013; Mars et al., 2013; Morrison et al., 2000). Minorities have been less likely to receive prescriptions for opioid medications compared to non-Hispanic (NH) Whites (Morrison et al., 2000; Pletcher et al., 2008). NH Whites have been at greater risk of NMUPO onset and prescription opioids-related disorders compared to other ethnic groups (Green et al., 2005; Mars et al., 2013; Morrison et al., 2000). Also, although previous studies have shown that the prevalence of heroin use has been

found to be greater among Hispanics and NH Whites compared to other race/ethnic groups (Bernstein et al., 2006a; Kopstein, 1998), recent data indicates that NH Whites are overrepresented among heroin/opioid-related fatal overdose cases (Mack, 2013; Paulozzi, 2012; Paulozzi, 2011; Rudd et al., 2014; Unick et al., 2013). Some evidence also shows that among teenagers, the strong association between early onset of NMUPO and heroin use does not vary by race/ethnic groups (Cerdá et al., under review). It is possible that small sample sizes, with low representation of NH Blacks and Hispanics, or aggregation of different racial/ethnic groups into one category as non-Whites, may limit the availability of information regarding race/ethnic differences in NMUPO and risk of heroin use. Having access to this knowledge could be helpful in the development of strategies targeting specific groups being at greatest risk of adverse outcomes.

Specifically, in this study we: (1) examine the change in the patterns of past-year NMUPO and heroin use between 2002–2005 and 2008–2011 across racial/ethnic groups; (2) examine the association between past year frequency of NMUPO with heroin use, heroin-related risk behaviors and exposure to heroin availability by race/ethnicity. Data came from the National Survey on Drug Use and Health (NSDUH), a large nationally-representative household sample (approximately 67,500 persons are interviewed each year (SAMHSA, 2013), as it has good representation of various races/ethnicities in the US.

2. Methods

2.1. Data

We used NSDUH data from 2002 to 2005 and 2008 to 2011, resulting in a total sample of $N = 448,597$ participants (obtained from combining data from each of the 8 years used in analyses). The survey uses a multistage area probability sample for each of the 50 states and DC and oversamples younger age groups (aged 12–25) as well as African–Americans and Hispanics. Response rate for household screening and completed interviews ranged between 87–91% and 74–79%, respectively. Interviews were administered by computer-assisted personal interviewing (CAPI) and audio computer-assisted self-interviewing (ACASI) for illegal drug use and other sensitive behaviors (Morral et al., 2003). Detailed survey methodology is available elsewhere (SAMHSA, 2009, 2011, 2013).

2.2. Measures

2.2.1. Outcome. The main outcome was self-reported heroin use in the past year. Participants were asked if they had used heroin within the last 12 months prior to the survey (yes/no).

2.2.2. Covariates. Main exposure variable: Our main exposure variable was self-reported past year NMUPO, by race/ethnicity. Nonmedical use refers to situations in which a subject used a substance that was not prescribed for him/her, or reporting that he/she took the drug only for the experience or feeling it caused (SAMHSA, 2009). Participants were classified as responding affirmatively to NMUPO if they endorsed using prescription opioids non-medically during the preceding 12 months. Frequency of past year NMUPO was coded as the number of days in which participants used prescription opioids nonmedically and categorized in 3 groups ('1–29', '20–99', and '100–365' days) as described previously (Jones, 2013).

Correlates of heroin use: DSM-IV abuse and dependence on heroin were included as covariates for the purpose of this study (combined as heroin use disorder). Information on either prescription opioids or heroin abuse and dependence was obtained from a set of structured questions based on dependence criteria for substance

disorders from the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) (American Psychiatric Association, 2000).

Participants endorsing they had used heroin in the past, were also asked about the heroin route of administration (i.e., had ever used a needle and syringe to inject heroin). Heroin availability was also assessed. For analyses heroin availability was dichotomized as: (1) fairly/very easy, and (2) difficult to obtain, which included previous categories: probably impossible, very difficult, and fairly difficult.

Demographic covariates: Other demographics included the following: (1) age; gender; (2) race/ethnicity, categorized as [non-Hispanic (NH) White, NH Black, Hispanic, and others (others included NH Native American/AK Native, NH Native Hawaiian/Other Pacific Islands, NH Asian, NH more than one race)]; (3) past-year family income; and (4) Metropolitan Statistical Area (MSA).

2.3. Statistical analysis

Overall average annual rate of past year heroin use by frequency of past year NMUPO for the two periods (2002–2005 and 2008–2011) and average annual rate by racial/ethnic group were calculated and converted to annual rates per 1,000 population. Significant differences between the two periods in each of the NMUPO use frequency category were assessed using two-tailed *t*-test.

The association between heroin use and frequency of NMUPO use, in the entire sample and also by racial/ethnic group for 2008–2011, was estimated using weighted logistic regression models, adjusted for demographics, and using the category '1–29 days' as reference. The association between the frequency of NMUPO use in 2002–2005 and in 2008–2011 by race/ethnicity and the other outcomes of interest were also assessed using similar models adjusted for demographics. Standard errors to obtained prevalence estimates of substance use in NSDUH were calculated using a Taylor series linearization approach (Chromy and Abeyasekera, 2005) to take into account the effects of complex survey design features of the NSDUH survey. Standard errors of non-linear statistics can only be expressed approximately using first order Taylor series approximations (Chromy and Abeyasekera, 2005). All analyses were carried out using STATA version 13 statistical software (STATA, 2013).

3. Results

3.1. Heroin use rates (unadjusted)

Table 1 shows the average annual rates of past year heroin use for the two study periods by frequency of past year NMUPO and racial/ethnic group. The rate of heroin use among NH Whites, which was lower than that of NH Blacks and Hispanics in 2002–2004, increased by 75% in 2008–2011, which was the highest rate across racial/ethnic groups in this period (2.57 per 1000). Among Blacks, significant increases in the rate of heroin use were only observed between those using any prescription opioids in the past year and those using prescription opioids 100–365 days in the past year. For Hispanics, increases were significant among those using prescription opioids any and 1–29 days in the past year. For all racial/ethnic groups other than NH Whites, there was no increase in the overall average annual rate of heroin use. This was also the case for those not using prescription opioids in the past year. In addition, the rate of ever injecting heroin and heroin abuse/dependence among past year heroin users did not significantly change between the two time periods for any race/ethnic groups (results shown in