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Perceived risk of heroin use among nonmedical prescription opioid users

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HIGHLIGHTS

- NMPO users with lifetime heroin use had lower perceived risk of heroin use.
- Prescription opioid use disorder did not moderate this association.
- Known risk factors for heroin use were associated with lower perceived heroin risk.
- Among NMPO users, perceived risk of heroin decreased modestly from 2002 to 2013.

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ABSTRACT

Aims: The prevalence of heroin use among nonmedical prescription opioid (NMPO) users has increased in recent years. Identifying characteristics associated with heroin use in this population can help inform efforts to prevent heroin initiation and maintenance. The aim of this study was to evaluate differences in perceived risk of heroin among NMPO users with and without histories of heroin use, and to examine temporal trends in perceived risk of heroin among this population.
Methods: Data are from the 2002–2013 National Survey on Drug Use and Health, and included all past-year NMPO users ($N = 49{,}045$). Participants reported perceived risk of trying heroin once or twice and regular heroin use. Responses were coded dichotomously (great risk vs. other risk) and logistic regression analyses were used to evaluate the association between lifetime heroin use and perceived risk of heroin, and to determine temporal changes in perceived risk.
Results: Results indicated a significant association between lifetime heroin use and lower likelihood of reporting great risk of trying heroin (OR = 0.38, 95% CI: 0.33, 0.44, $p < 0.001$), and of regular use of heroin (OR = 0.39, 95% CI: 0.32, 0.48, $p < 0.001$). There was a significant, yet modest, trend toward decreasing perception of great risk from 2002 to 2013.
Conclusions: Findings from this analysis of nationally representative data indicate that NMPO users with a history of heroin use perceive heroin to be less risky than those without heroin use. Perception of risk has decreased from 2002 to 2013 in this population, consistent with increasing rates of heroin initiation.

1. Introduction

An estimated 681,000 individuals in the United States used heroin in 2013, representing an 82.6% increase since 2007 (Substance Abuse and Mental Health Services Administration [SAMHSA], 2014). This increase is largely driven by escalating rates of heroin initiation among nonmedical prescription opioid analgesic (NMPO) users (Compton, Jones, & Baldwin, 2016; Jones, 2013). For example, past-year heroin initiation rates were 19 times higher among individuals reporting lifetime NMPO use relative to those without a history of NMPO use (Muhuri, Gfroerer, & Davies, 2013). These trends are concerning because, among NMPO users, heroin use is associated with intravenous (IV) drug use (Mars, Bourgois, Karandinos, Montero, & Ciccarone, 2014; Mateu-Gelabert, Guarino, Jessell, & Teper, 2015; Meyer, Miller, & Sigmon, 2015; Potter et al., 2013), poor treatment outcomes (i.e., low rates of opioid abstinence and retention) (McCabe et al., 2013; Meyer et al., 2015; Nielsen, Hillhouse, Mooney, Ang, & Ling, 2015; Nielsen, Hillhouse, Thomas, Hasson, & Ling, 2013; Potter et al., 2013), and overdose (Frank et al., 2015; Lake et al., 2015). Understanding differences between NMPO users with and without heroin use is needed to identify potential risk factors for initiating heroin use.

Cross-sectional and prospective studies have identified several sociodemographic and substance-related characteristics associated

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with heroin use among NMPO users, such as frequent NMPO use (Jones, 2013; Muhuri et al., 2013), prescription opioid dependence (Carlson, Nahhas, Martins, & Daniulaityte, 2016; Jones, 2013; Muhuri et al., 2013), early age of NMPO initiation (Carlson et al., 2016; Rigg & Monnat, 2015), use of prescription opioids to get high (as opposed to self-medicating for pain) (Carlson et al., 2016), IV or intranasal NMPO use (Carlson et al., 2016), and young adult age (i.e., 18–25 years old) (Jones, 2013; Rigg & Monnat, 2015). Although these findings help identify at-risk groups of NMPO users who might benefit from close monitoring and intervention to prevent transition to heroin use, most of these characteristics are not modifiable, and thus cannot be directly targeted with intervention. Dynamic risk factors, or those that can be modified, can be used as therapeutic targets in prevention and treatment efforts to mitigate the risk of heroin initiation and maintenance. The current study aimed to investigate the association between heroin use and a potential dynamic risk factor: perceived risk of using heroin.

Lower perceived risk is associated with use of substances, such as alcohol (Chomynova, Miller, & Beck, 2009; Thornton, Baker, Johnson, & Lewin, 2013), tobacco (Gerking & Khaddaria, 2012; Thornton et al., 2013), marijuana (Apostolidis, Fieulaine, Simonin, & Rolland, 2006; Kilmer, Hunt, Lee, & Neighbors, 2007; Piontek, Kraus, Bjarnason, Demetrovics, & Ramstedt, 2013; Thornton et al., 2013), and MDMA (Leung, Ben Abdallah, Copeland, & Cottler, 2010). Among adolescents, greater perceived risk is associated with disapproval of a substance and lower prevalence of substance use (Johnston, O'Malley, Miech, Bachman, & Schulenberg, 2016).

Lower perceived risk of prescription opioids is associated with both initiation and continued use of prescription opioids (Arria, Caldeira, Vincent, O'Grady, & Wish, 2008; Lord, Brevard, & Budman, 2011). Although NMPO users generally perceive prescription opioids as "safer" than illicit drugs (Daniulaityte, Falck, & Carlson, 2012; Mars et al., 2014), limited information is available on perceived risk of heroin among NMPO users. A study of past-year opioid users found that perceived risk of heroin was higher among NMPO-only users relative to heroin-only users, and NMPO users who had also used heroin (Rigg & Monnat, 2015). However, this study did not examine the impact of other variables potentially associated with perceived risk, such as severity of NMPO use (e.g., number of days of use, presence of an opioid use disorder).

Moreover, little is known about temporal trends in perceived risk of heroin use in NMPO users. Despite widespread media and public health attention to the misuse of opioids and opioid overdose risk in recent years (Cicero, Ellis, Surratt, & Kurtz, 2014; McCarty et al., 2015), heroin use has continued to escalate (Jones, 2013; SAMHSA, 2014). It is unclear whether perceived risk of heroin has changed during this period in the context of these trends.

The overarching aim of this study was to examine differences in perceived risk of heroin use among NMPO users with and without histories of heroin use. Participants ages 12 and older from a large, nationally representative survey in the United States who reported past-year NMPO use were included in this study. We hypothesized that NMPO users who had never used heroin would perceive greater risk of heroin use relative to those who had used heroin in their lifetime. In an exploratory analysis, we examined temporal trends from 2002 to 2013 in perceived risk of heroin among individuals reporting past-year NMPO use.

2. Method

2.1. Data source

Data were obtained from the National Survey on Drug Use and Health (NSDUH) public use data files for the years 2002 through 2013. The NSDUH is an annual survey designed to produce national estimates on the prevalence and correlates of substance use. Participants were selected through an independent, multistage area probability sample for each of the 50 states and Washington, DC. Survey responses were collected via audio computer-assisted self-interview and computer-assisted personal interview administered by a trained interviewer. To maintain confidentiality, the public use data file was de-identified and consists of a nationally representative subset of the total sample; from 2002 to 2013, an average of 55,435 participants was included in the public use data file. Detailed survey methods are reported elsewhere (SAMHSA, 2014).

2.2. Measures

2.2.1. Sociodemographic measures

Sociodemographic measures included gender, age, race/ethnicity, education, and annual income. Population density (large urban, small urban, rural) was determined based on 2000 Census data and the June 2003 Core-Based Statistical Area classifications.

2.2.2. Substance use

Survey respondents endorsing past-year NMPO use from 2002 to 2013 ($N = 49{,}045$) were included in this analysis. NMPO use refers to the use of opioid analgesics that are not prescribed to the individual, or taking opioid analgesics exclusively for the experience or feelings they produce (SAMHSA, 2014). To determine NMPO use, participants were shown cards with pictures and names of opioid analgesics (e.g., Percocet®, Vicodin®, Lortab®) and specified which, if any, they had ever used nonmedically. If a participant endorsed nonmedical use of any prescription opioid, they were classified as having lifetime NMPO use. These respondents then identified the length of time since their most recent use and were categorized into groups based on most recent use (i.e., lifetime use, past-year use, past-month use); these variables were included in the NSDUH public use data file. Likewise, participants were asked if they had ever used heroin in their lifetime. For both heroin and NMPO use, participants answered questions about frequency of use in the past year.

Participants answered additional questions about tobacco, alcohol, and other illicit substance use (i.e., marijuana, cocaine, crack cocaine, hallucinogens, inhalants, tranquilizers, stimulants or amphetamines, sedatives). Survey respondents reporting past-year alcohol or drug use answered a standardized set of questions to establish *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (American Psychiatric Association, 2000) criteria for substance abuse or dependence.

2.2.3. Perceived risk of heroin

All survey respondents were asked to answer questions about their perceived risk of several drugs of abuse, including heroin. Participants reported how much they believe people risk harming themselves physically or otherwise when they try heroin once or twice, and when they use heroin regularly (i.e., once or twice a week). Response options included "great risk," "moderate risk," "slight risk," and "no risk." Responses were then dichotomized into great perceived risk and other (moderate, low, no) perceived risk, consistent with other studies of perceived risk (Pacek, Mauro, & Martins, 2015; Schuermeyer et al., 2014).

2.3. Data analysis

We examined whether a history of heroin use was associated with the perceived risk of heroin, using logistic regression analyses. Separate regression models were developed for the risk of trying heroin once or twice, and regular use of heroin (i.e., 1–2 times per week). Dichotomized perceived risk (great risk vs. any other risk) was the dependent variable for these analyses, and lifetime heroin use was the focal independent variable. These models included sociodemographic and clinical covariates that have previously been associated with heroin use among NMPO users, or that might be associated with perceived risk (i.e., age, gender, race, family income, population density, education, age of first NMPO use, number of days of NMPO use in the past-year, presence of

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