



Injection drug use and overdose among young adults who use prescription opioids non-medically



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HIGHLIGHTS

- Over one-quarter of participants had ever injected drugs.
- Over three-quarters of participants who ever injected drugs first injected heroin.
- White race, older age, homelessness associated with likelihood of injecting drugs.
- Past overdose or seeing an overdose associated with likelihood of injecting drugs.

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ABSTRACT

Introduction: Non-medical prescription opioid (NMPO) use is a critical public health problem in the United States, with 2.1 million new initiates annually. Young adult NMPO users are at high risk for initiating injection drug use. We assessed correlates of injection drug use among young adult NMPO users in Rhode Island, a state heavily impacted by opioid overdose.

Methods: We used data from the Rhode Island Young Adult Prescription Drug Study (RAPiDS), which recruited 199 residents aged 18–29 who reported past-30-day NMPO use (65.3% male). We compared individuals who reported ever having injected with individuals who reported never injecting, using logistic regression to identify independent correlates of injection.

Results: Among eligible participants, the mean age was 24.6 years and 61.3% were white. Over one-quarter ($n = 59$, 29.6%) of the sample had ever injected drugs. The majority ($n = 46$, 78.0%) of participants who had ever injected drugs reported injecting heroin as her/his first drug; the majority also reported previously snorting her/his first drug that was injected ($n = 46$, 78.0%). In multivariable analyses, white race, older age, lifetime homelessness, and ever having overdosed or seen someone overdose were independently associated with an increased likelihood of ever injecting drugs.

Conclusions: These findings demonstrate a high prevalence of lifetime injection drug use among young adults who use prescription opioids non-medically. Given the observed associations between injection drug use and witnessing as well as experiencing overdose, interventions are urgently needed to improve overdose education and naloxone distribution to young adult NMPO users who inject drugs.

1. Background

Non-medical prescription opioid (NMPO) use—defined as intentional use of opioids outside of prescribed parameters or without a

prescription (Lessenger & Feinberg, 2008; Voon & Kerr, 2013)—is a public health problem marked by increasing morbidity and mortality in the United States (Kuehn, 2007). In 2015, there were 12.5 million individuals who used an NMPO in the past year (representing 4.7% of the

Abbreviations: NMPO, Non-medical prescription opioid; RAPiDS, Rhode Island Young Adult Prescription Drug Study; LGBTQ, Lesbian, gay, bisexual, or queer; GED, General Education Development

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population aged 12 or older) and 2.1 million new initiates (Hughes et al., 2016). As a result, opioid overdose has become an epidemic in the United States, with one and a half times more drug overdose deaths than deaths due to motor vehicle crashes in 2015 (Rudd, Seth, David, & Scholl, 2016; Traffic Safety Facts, 2016). There were 20,101 prescription opioid overdose deaths in 2015 compared to 18,893 in 2014, an increase of 6.4% (ASAM, 2016; CDC, 2014). Yearly, opioid overdose costs \$20.4 billion due to lost productivity and medical expenses (Inocencio, Carroll, Read, & Holdford, 2013). Rhode Island has been heavily impacted by NMPO use and opioid overdose. In 2015, 290 individuals died of an overdose, the fifth highest age-adjusted rate in the nation (Drug Overdose Deaths; Drug Overdose Death Data, 2016).

The prevalence of NMPO use is particularly high among young adults; the percentage of past-year users was highest among 18- to 25-year-olds, reaching 8.5% in 2015 (Hughes et al., 2016). These rates of NMPO use trail only marijuana as the most commonly reported drug of use among young adults (Hughes et al., 2016). Among young adults, NMPO use has been associated with an increased likelihood of injection initiation and transitioning to heroin use (Carlson, Nahhas, Martins, & Daniulaityte, 2016; Cerda, Santaella, Marshall, Kim, & Martins, 2015; DeBeck et al., 2016; Mars, Bourgeois, Karandinos, Montero, & Ciccarone, 2014). A range of injecting behaviors, including sharing needles and syringes as well as other injecting equipment, can result in an increased risk of infectious disease acquisition, including HIV and hepatitis C virus (HCV) (Hagan et al., 2001; Peters et al., 2016; Thorpe et al., 2002; Zibbell, Hart-Malloy, Barry, Fan, & Flanagan, 2014). Injection drug use also places individuals at higher risk for overdose than other forms of drug consumption (Darke & Hall, 2003). A study of 596 young adults in New York City and Los Angeles, California, found that recent injection drug use was associated with increased odds of non-fatal overdose (Silva, Schrage, Kecojevic, & Lankenau, 2013). In a study of 560 street-involved youth and young adults in Vancouver, Canada, 41.1% reported ever having injected drugs (Kerr et al., 2009). In this sample, non-fatal overdose was independently associated with injection drug use (Kerr et al., 2009).

Analysis of recent injection drug use trends shows a sharp increase in injection drug use among whites compared to blacks and Hispanics (Wejnert et al., 2016). Heroin use in particular, which was previously most frequent among low-income, non-white individuals living in urban areas, has become more common among middle-class white men and women living in nonurban settings (Cicero, Ellis, Surratt, & Kurtz, 2014). The increasing prevalence of heroin use is largely explained by use among young adults, with initiation rates two to seven times higher than other age groups and a rate of past-year use three and a half times higher than older adults (Ihongbe & Masho, 2016). Additionally, white race, ever having been arrested, and past-year NMPO use have been linked to increased odds of recent and lifetime heroin use among young adults (Ihongbe & Masho, 2016). As the need for evidence-based interventions to combat opioid overdose and opioid overdose mortality increases (Haegerich, Paulozzi, Manns, & Jones, 2014), it is necessary to assess the evolving correlates of injection drug use among young adults who use prescription opioids non-medically, a rapidly growing population.

This study aimed to assess sociodemographic, structural, childhood, and drug-related correlates of lifetime injection drug use among young adults who use prescription opioids non-medically in Rhode Island. Our primary hypothesis was that certain sociodemographic characteristics, such as white race and rural residence, structural factors, such as ever having been arrested, childhood exposures, such as emotional, physical, and sexual abuse, and drug-related experiences, such as ever having overdosed by accident, are correlated with injection drug use among young adult NMPO users. We also sought to establish a profile of the injection-related experiences of young adult NMPO users in order to inform targeted overdose prevention and education interventions.

2. Material and methods

2.1. Study design and sample selection

This analysis uses data from 199 participants in the Rhode Island Young Adult Prescription Drug Study (RAPIIDS). Participants were recruited between January 2015 and February 2016 through a combination of targeted canvassing and mixed internet-based recruitment. In brief, targeted canvassing relied primarily on bus advertisements and flyer-ing in areas where drug-using young adults were known to congregate, and mixed internet-based recruitment included regular posts on online classified sites (e.g., Craigslist), social media (i.e., Facebook), and forums (e.g., Reddit). The RAPIIDS recruitment methodology has been detailed previously (Evans, Hadland, Clark, Green, & Marshall, 2016; Liebling et al., 2016; Macmadu, Carroll, Hadland, Green, & Marshall, 2017).

Eligibility criteria included: age 18 to 29 at the time of the interview, Rhode Island resident, not currently enrolled in substance use treatment, and able to complete an interview in English. Written informed consent was obtained. Participants were also required to confirm non-medical use of prescription opioids in the past 30 days by indicating which opioids she/he recently used non-medically, based on a modified version of the Substance Abuse and Mental Health Service Administration's "pill card A" (SAMHSA, 2009).

Eligible participants completed a computer-assisted interview of approximately 45 min with a trained interviewer and sensitive portions of the survey were self-administered using a computer. Study participants were provided \$25. The Brown University Institutional Review Board approved the study protocol.

2.2. Measures

The primary outcome for this analysis was self-reported lifetime injection drug use. The operational definition of this outcome was ever having used a needle to chip, fix, muscle, or inject drugs even once (yes vs. no).

The RAPIIDS survey instrument measured sociodemographic characteristics, structural factors, childhood experiences, and drug-related experiences. The selection of variables to include in the analysis was guided by the a priori hypotheses described above. Specifically, the analysis included measures of sociodemographic factors such as age, sex, ethnicity, race, sexual orientation, educational attainment, employment, and geographic residence. Age was defined as a continuous variable measured by year. Sex was defined as a binary measure of sex at birth (male vs. female). Ethnicity was defined as being of Hispanic or Latino descent (yes vs. no). The race variable included the possible responses: American Indian or Alaska Native, Asian, black (African, Haitian, or of Cape Verdean descent), Native Hawaiian or other Pacific Islander, white, mixed, bi-racial, or multi-racial, and something else. For the purpose of these analyses, the categories were collapsed into white and non-white races. Sexual orientation was also collapsed into two categories: straight vs. gay, lesbian, bisexual, queer, or something else. Educational attainment was measured by highest level of education received. Employment was defined as being currently employed full-time or part-time (yes vs. no). Geographic residence type used self-reported current ZIP code or town of residence and was categorized as urban, suburban, or rural according to standard US census definitions and the Rhode Island land use survey (Rhode Island Land Use Trends and Analysis (Including Land use Surveys for the Period 1970–1995), 2000).

Structural factors included homelessness, juvenile detention, arrest, and incarceration. Homelessness was defined as ever having been homeless. History of juvenile detention, arrest, and incarceration were assessed by asking individuals if she/he had ever been detained in a juvenile detention center or training school, ever been arrested, and had ever been detained or incarcerated in an adult jail or prison,

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