Non-medical opioid use in youth: Gender differences in risk factors and prevalence

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ABSTRACT

Background: Non-medical use (NMU) of prescription opioids in youth is of concern since they may continue this pattern into adulthood and become addicted or divert medications to others. Research into risk factors for NMU can help target interventions to prevent non-medical use of opioids in youth.

Method: The National Monitoring of Adolescent Prescription Stimulants Study (N-MAPSS) was conducted from 2008 to 2011. Participants 10–18 years of age were recruited from entertainment venues in urban, rural and suburban areas of 10 US cities. Participants completed a survey including questions on their use of prescription opioids. NMU was defined as a non-labeled route of administration or using someone else's prescription. Information on age, gender, alcohol, marijuana and tobacco use was also collected. Summary descriptive, chi-square statistics and logistic regression were conducted using SAS 9.4.

Results: Of the 10,965 youth who provided information about past 30 day prescription opioid use, prevalence of reported opioid use was 4.8% with 3.2% reported as NMU ($n = 345$) and 1.6% as medical use (MU) only ($n = 180$). More males than females (55.7% vs. 44.4%) reported opioid NMU ($p < 0.0001$). Logistic regression revealed that among males (comparing NMU to MU only), current smokers were 4.4 times more likely to report opioid NMU than non-smokers (95% CI: 1.8, 10.7). Among females (comparing NMU to MU only), current smokers and alcohol users were more likely to report opioid NMU than those who had never smoked or used alcohol (OR = 3.2, 95% CI: 1.4, 7.0 and OR = 4.1, 95% CI: 1.7, 10.4, respectively).

Conclusions: These results suggest that further research on gender differences in opioid NMU is needed; interventions for opioid NMU may need to be gender specific to obtain the best results.

1. Introduction

Non-medical use (NMU) of prescription opioids can lead to addiction and overdose, putting increased pressure on healthcare resources (Gruber, Silveri, & Yurgelun-Todd, 2007; Manchikanti & Singh, 2008; Meyer, Patel, Rattana, Quock, & Mody, 2014). In addition, prescription opioid NMU has been identified as a risk factor for heroin use, which is also an important public health concern (Compton, Jones, & Baldwin, 2016; Palamar, Shearston, Dawson, Mateu-Gelabert, & Ompad, 2016; Cerdá, Santaella, Marshall, Kim, & Martins, 2015). NMU includes use of higher doses or use longer than prescribed as well as use of someone else's medication. Prescription opioid use in accordance with prescribing guidelines and issued by a medical practitioner is considered medical use (MU) (McCabe, West, & Boyd, 2013).

The National Survey on Drug Use and Health (NSDUH), conducted in 2015 in the United States on 68,073 people 12 years of age and older, revealed that the prevalence of past year pain reliever NMU was 3.9% among 12–17 year olds (Hughes et al., 2016). The 2015 Monitoring The Future (MTF) survey among high school students revealed that older adolescents (12th graders) had the highest annual prevalence of OxyContin® and Vicodin® use (3.7% and 4.4% respectively), with the lowest annual prevalence seen in 8th graders (0.8% and 0.9%, respectively) (Johnston, O'Malley, Miech, Bachman, & Schulenberg, 2016). Prevalence of past year prescription opioid NMU also increases with age in adolescents from the NSDUH, with a prevalence of 2.9% for youth aged 12–13 years and 9.4% for youth aged 16–17 years. Prescription opioid NMU was also slightly higher for females (6.7%) than males (5.6%) in these adolescents (Edlund et al., 2015). It is known that youth who use opioids, whether prescribed by a medical practitioner or used non-medically, are likely to continue opioid use in the future (McCabe et al., 2013). Analyses of data from the MTF survey have revealed that approximately one third of older adolescents (aged 18 years) with prescription opioid NMU will continue such use in the future (McCabe, Schulenberg, O'Malley, Patrick, & Kloska, 2014; Miech,

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Johnston, O'Malley, Keyes, & Heard, 2015).

Opioid NMU raises concern since there was an increase of nearly 3000 deaths in the United States between 2013 and 2014 from overdose of prescription opioids among all age groups (Centers for Disease Control and Prevention, 2016) and approximately 420,000 visits to the emergency department in 2011 that were attributed to prescription narcotic pain reliever non-medical use or abuse (Substance Abuse and Mental Health Services Administration, 2013b). As such, interventions to prevent opioid NMU in youth are vital to reduce non-medical use in the future.

Known risk factors for illicit drug use in youth (which includes prescription drug NMU) include older age: 16–17 year olds are more likely to be illicit drug users than younger children aged 12–13 years (Manchikanti & Singh, 2008). Gender is also a known risk factor for illicit drug use: males are more likely to be illicit drug users than females (Manchikanti & Singh, 2008). Employment has been identified previously as a protective factor for illicit drug use in adults: employed people are less likely to be illicit drug users than unemployed people (Manchikanti & Singh, 2008). However, employment has also been associated with an increased risk of opioid NMU (Back, Payne, Simpson, & Brady, 2010). Marijuana use (McCabe et al., 2011; Whiteside et al., 2013), alcohol use (McCabe et al., 2011), tobacco use (McCabe et al., 2011) and poor school grades (Whiteside et al., 2013) have also been previously identified as risk factors for opioid NMU in youth. While these risk factors have been identified previously, they have not been studied by gender in youth.

Identifying areas where interventions can be implemented to prevent opioid NMU is important to help reduce the large burden of overdose that is leading to morbidity and mortality. Previous studies have evaluated gender differences in prevalence of opioid NMU in youth, however they have not investigated the gender differences in established risk factors for NMU in youth. As part of the National Monitoring of Adolescent Prescription Stimulants Study (N-MAPSS) we had the opportunity to assess the prevalence of and risk factors for prescription opioid NMU by gender in a national study of youth 10–18 years of age in urban, suburban, and rural US. In this study, we want to identify if there are specific risk factors which influence opioid NMU but not MU only.

2. Methods

2.1. Study design

The National Monitoring of Adolescent Prescription Stimulants Study (N-MAPSS) was a national study conducted in four waves from 2008 to 2011 (Cottler, Striley, & Lasopa, 2013). This cross-sectional survey study design assessed MU and NMU of prescription stimulants, opioids and other prescription medications. To be eligible for the study, participants had to be 10 to 18 years of age and reside in an urban, suburban or rural zip code of one of ten cities. Those unaware of their zip code, non-English readers, those who were cognitively impaired and those in college were excluded from the study. Participants were recruited from entertainment venues (including shopping malls, movie theaters, sports and recreation centers, libraries, arcades, skate parks, and parks) in urban, suburban, and rural areas of 10 cities across the US. Cities included in the survey were selected from among the 10 Office of Management and Budget (OMB) regions coming from states with the highest rate of stimulant prescribing patterns (as identified from the IMS Health database), which was the intended primary purpose of the study. The cities were: Seattle, Los Angeles, Denver, St. Louis, Houston, Cincinnati, Tampa, Philadelphia, New York and Boston. Recruitment goals for urban, suburban, and rural areas were established in order to ensure adequate participation of youth from all areas. This venue intercept method proved effective in obtaining a representative sample of youth. Specifically, in N-MAPSS, we were able to obtain a sample distribution for age, gender, race and urban/rural

composition comparable to the US Census data (Cottler et al., 2013). Detailed information on the methodology has been published elsewhere (Cottler et al., 2013).

Recruiters approached 21,444 youth during the four waves and invited them to participate in the study. Of 16,143 potentially eligible youth, 3403 (21.1%) were found to be ineligible. Of 12,740 eligible youth, 1272 did not stop to hear about the study and are noted as refusals (10.0%). In total, 11,048 youth completed the survey. Youth aged 10 and 11 years were offered an option for an interview to reduce errors due to problems with reading or reading comprehension. However, anonymity was maintained throughout and parents were not present when the interview was conducted or completed to maintain privacy. Implied assent was obtained, indicated by survey completion. Parental permission was not solicited as per Washington University and University of Florida Human Protection Research Offices because all survey data were anonymous. The research protocol was approved by the Washington University Human Protection Research Office.

2.2. Measurements

Youth were given paper surveys to complete. Questions about prescription medications (including stimulants) were accompanied by pictures of the medications for ease of identification. In addition to the section on stimulants, prescription opioids were also elicited with photos for ease of recognition. The opioids examined in this analysis were: Vicodin®, hydrocodone, OxyContin® and oxycodone. Past 30-day use of these opioids was assessed near the end of the questionnaire using the following questions: "In the last 30 days, have you taken [Specific drug name]? Examples are pictured above" Participants were provided with pictures of both brand and generic versions of all drugs at various doses and were surveyed about drugs with the same active ingredient within the same question e.g. In the last 30 days, have you taken Vicodin or hydrocodone?

Sources of opioids were assessed by the question: "In the last 30 days, have you used [Specific drug name] that belonged to…[List of responses]". Assessed were: one of your parents, your brother or sister, a different family member, someone from school, someone from work, someone you don't know, someone not listed above? This question was designed to capture all use of prescription opioids that had been diverted from another source. Routes of administration were assessed by the question: "In the last 30 days, what are all the ways you used [Specific drug name]?". Routes of administration were: by mouth (oral), snorted or sniffed, smoked, other. Opioid NMU in the past 30 days was defined as a non-approved route of administration (non-labeled route of administration of medication rather than taken by the labeled oral route) or use that was not prescribed (use of someone else's prescription). In this study, information on dose of prescription opioids was not available and so this does not form part of the definition of NMU. MU in the past 30 days was defined as use with a prescription and no NMU.

Risk factors of interest were captured through questionnaire items like demographic characteristics (sex and age), living situation (living with both parents, separated parents and not living with parents), employment (including part-time work; yes or no) and school grades (A-B, C-D and F-Unknown). Gender was inferred by sex in this study. Information was also elicited on alcohol and marijuana use (never, ever use but not in past 30 days and past 30 days) and tobacco use (non-smoker, former smoker [smoked tobacco in the past but not currently] and current smoker). Past 30 day use was considered recent use for alcohol, marijuana and prescription opioid use.

2.3. Analysis

Those with missing values for recent opioid use were excluded from this analysis (83/11,048). Descriptive statistics summarized demo-