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Sex differences in patterns of prescription opioid non-medical use among 10–18 year olds in the US

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HIGHLIGHTS

- The majority of youth endorsing NMU reported using someone else's opioids
- Females most often reported using opioids that belonged to a parent or classmate
- Males most often reported using opioids that belonged to a classmate
- Strategies should prevent youth from sharing opioids with friends from school

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ABSTRACT

Background: Non-medical use (NMU) of prescription opioids is a public health concern and sex differences in prevalence of NMU have been observed previously. Little is known about how youth are obtaining and using these drugs. While any regular use could be problematic, NMU is particularly concerning. More information is needed on NMU patterns among youth and how these patterns might differ by sex.

Methods: The National Monitoring of Adolescent Prescription Stimulants Study (N-MAPSS) recruited youth 10–18 years of age from 10 US metropolitan areas from 2008 to 2011 with a final sample of 11,048 youth. The cross-sectional survey included questions on past 30 day use of prescription opioids (10,965 provided responses), with NMU defined as non-oral use and/or use of someone else's opioids. NMU through use of a patient's own prescription orally for a reason other than prescribed could not be identified, though this is usually contained within the standard definition of NMU.

Results: Among the 10,965 youth, past 30 day prevalence of NMU of prescription opioids was 3.1% (n = 345) with 59.7% (n = 206) using someone else's opioids only, 5.2% (n = 18) having non-oral use only and 35.1% (n = 121) having both. In total, seven sources and three routes of administration were assessed. The most common source among males was someone from school (n = 111, 60.0%), with no highly prevalent second source. Among females, there were two prevalent sources of prescription opioids; a parent (n = 59,41.6%) and someone from school (n = 53,37.3%). For non-oral use, snorting prescription opioids was more frequent among males compared to females (n = 85, 31.8% and n = 44, 17.1%; $p < .01$).

Conclusions: Based on these findings, to combat the current opioid crisis, implementation of strategies to prevent youth from sharing opioids, especially with friends from school, should be considered and tested.

1. Introduction

Non-medical use (NMU) of prescription opioids is a concern in the United States (US) because prescription opioid use has increased dramatically in the past 25 years and NMU is associated with many adverse consequences, including increased risk of overdose (Mojtabai, 2017; National Institute on Drug Abuse, 2014; Pezalla, Rosen, Erensen, Haddox, & Mayne, 2017). In 2015, there were 22,000 deaths in the US from overdose of prescription opioids, an increase of nearly 3000 deaths from 2014 (Centers for Disease Control and Prevention, 2017).

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NMU of prescription drugs (including prescription opioids) has been defined as use of someone else's opioids or use of a patient's own prescription in a way other than prescribed (Boyd & McCabe, 2008; Boyd, Teter, West, Morales, & McCabe, 2009; Shield, Jones, Rehm, & Fischer, 2013). Obtaining opioids from another source or using opioids in a way other than prescribed are considered two different patterns of NMU, which is the focus of this analysis. Medical Use (MU) is defined as prescription opioid use in accordance with the instructions from a prescriber (McCabe, West, & Boyd, 2013b). Recently, there has been a change by some surveys and the published literature to use of the term "misuse" rather than NMU (Schepis, McCabe, & Teter, 2018; Substance Abuse and Mental Health Services Administration, 2017), with a focus on the reason for using opioids rather than where they were obtained or how they were used. While these two definitions overlap, they are not necessarily the same. Confusion has been caused previously by inconsistencies in the literature with these terms. For consistency, we have used the definition of NMU as provided above because our focus is on how opioids were obtained and used by youth. This definition of NMU is also in line with the original Schaffer Commission report on drug use in America (Commision on Marihuana and Drug Abuse, 1973).Youth 10 to 18 years are an age group of concern for NMU of opioids for several reasons. The prevalence of NMU in this age group is not insignificant; youth aged 12 to 17 years have a past 12 month prevalence of 3.5% (Substance Abuse and Mental Health Services Administration, 2017). In addition, one third of older adolescents (aged 18 years) who use prescription opioids non-medically will continue NMU in the future (McCabe, Schulenberg, O'Malley, Patrick, & Kloska, 2014; Miech, Johnston, O'Malley, Keyes, & Heard, 2015). Given this evidence, earlier interventions to prevent prescription opioid NMU in youth are important.

Strategies to change behavior can be aided by the use of theoretical models which aim to both explain behavior and provide reasoning for how behavior can be changed. The socio-ecological model contains four levels which are considered to interact with or influence behavior: individual, relationship, community and societal levels (McLeroy, Bibeau, Steckler, & Glanz, 1988). We chose to analyze data from our National Monitoring of Adolescent Prescription Stimulants Study (N-MAPSS), which contained variables consistent with constructs from the socio-ecological model. While the primary focus of the study was on the use of prescription stimulants, many questions were also asked of the youth regarding other prescription medications including opioids. The socio-ecological model framework was used to examine NMU behavior in this study because the model allows different contexts and settings for risk and protective factors to be considered. It is not solely focused on one level, such as relationships with others. It is also the chosen model for examining prescription drug misuse by the Substance Abuse and Mental Health Services Administration (Substance Abuse and Mental Health Services Administration, 2016). Within this analysis, we examined all levels except the societal level because there was no variable within the dataset used that could accurately reflect this level of the socio-ecological model. The individual level involves biological and personal factors that influence behavior, while the relationship level consists of close relationships with others. The community level refers to the area where people reside. All of these levels may influence NMU of prescription opioids. Sex may not be an actual risk factor for prescription opioid NMU, but sex differences may occur because behavior is influenced by other factors which differ by sex or gender. For example, at the relationship level, parental monitoring and guidance may differ by sex and gender, with different expectations directed towards males and females (Hyde, 2014; Witt, 1997).

Studies of sex differences in adult prescription opioid NMU have been summarized previously (Serdarevic, Striley, & Cottler, 2017), but studies among youth have focused on older adolescents (Edlund et al., 2015; McCabe, West, & Boyd, 2013a) or adolescents from specific geographic regions only (Boyd, Esteban McCabe, & Teter, 2006; Boyd, McCabe, Cranford, & Young, 2007). A gap in the literature relates to where youth 10 to 18 years obtain their prescription opioids and how they are using them, though this has been examined previously among older adolescents and adults (Schepis et al., 2018). Previous research has shown that there are sex differences in the prevalence of NMU among youth (Osborne, Serdarevic, Crooke, Striley, & Cottler, 2017) and among patterns of NMU in older adolescents only but not among younger adolescents (for which patterns of NMU have not been studied previously) (McCabe et al., 2013a). It is currently unknown if sex differences also exist among patterns of NMU in youth 10 to 18 years of age. The aim of this analysis was to examine sex differences in patterns of prescription opioid NMU in youth aged 10 to 18 years. Specifically, we examined whether females and males obtain opioids from the same sources and number of sources, in addition to whether females and males exhibit the same patterns of NMU.

2. Methods

2.1. Study design

N-MAPSS was a national study conducted in four waves in the US from 2008 to 2011 (Cottler, Striley, & Lasopa, 2013). This cross-sectional survey assessed the MU and NMU of prescription stimulants, opioids and other prescription medications. Participants 10 to 18 years of age were recruited from entertainment venues (such as shopping malls, movie theaters, sports and recreation centers, libraries, arcades, skate parks, and parks) in urban, suburban, and rural areas of 10 cities. This venue intercept approach has been used previously in other studies for recruiting hard to reach populations (Cummings, Auerswald, & Ott, 2014; Muhib et al., 2001; Patrick et al., 2017). It involves creating a sampling frame of all venues where the target population may visit and then randomly selecting date and time for recruitment (Muhib et al., 2001).

Recruiters approached 21,444 youth during the four waves and invited them to participate; 25% declined to learn about the study and 21% of those expressing initial interest were ineligible. Of those who elected to learn about the study, 10% refused to participate. In total, 11,048 youth who completed the survey comprise the final sample and represent an overall response rate of 68% (11,048/16,143 potentially eligible youth). Anonymity was maintained throughout and parental permission was not required to participate because no identifying information was collected. A waiver was granted by the two University IRBs in accordance with 45 CFR 46.408 because requiring parental or guardian permission would have increased the risk to the participants through the collection of identifiable information and through the potential for parent/child conflict. This additional risk was determined to outweigh the increased protection offered by parental consent in this anonymous study. Unrelated to subject protection, collecting identifiable data through parental consent might have introduced bias into the data collected. Parents were also not allowed to sit with or help their child with the survey answers if they were nearby at the time of survey completion. Survey completion implied assent for all participants, as approved by Washington University and University of Florida Human Protection Research Offices. The research protocol was approved by both Institutional Review Boards.

Since stimulant use was the primary focus of the study, cities were selected from 10 states with the highest rates of stimulant prescribing patterns in 2008 (as identified from the IMS Health database and Office of Management and Budget regions). Selected cities were: Seattle, Los Angeles, Denver, St. Louis, Houston, Cincinnati, Tampa, Philadelphia, New York and Boston. The study design incorporated appropriate sampling targets from each geographic region, with recruitment goals for urban, sub-urban and rural areas. We were able to obtain a sample distribution for age, sex, race and urban/rural composition mostly comparable to the 2010 US Census data, indicating a representative sample (Cottler et al., 2013).