Drug and Alcohol Dependence 183 (2018) 73–77

Contents lists available at ScienceDirect

Drug and Alcohol Dependence

journal homepage: www.elsevier.com/locate/drugalcdep

Short communication

Prevalence and correlates of benzodiazepine use and misuse among young adults who use prescription opioids non-medically

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ARTICLE INFO

Keywords:
Adolescent health
Comorbidity
Drugs
Mental health
Prescription drug misuse

ABSTRACT

Background: Benzodiazepine use dramatically increases the risk of unintentional overdose among people who use opioids non-medically. However, little is known about the patterns of co-occurring benzodiazepine and opioid use among young adults in the United States.

Methods: The Rhode Island Young Adult Prescription Drug Study (RAPiDS) was a cross-sectional study from January 2015—February 2016. RAPiDS recruited 200 young adults aged 18–29 who reported past 30-day non-medical prescription opioid (NMPO) use. Using Wilcoxon rank sum test and Fisher's exact test, we examined correlates associated with regular prescribed and non-medical use (defined as at least monthly) of benzodiazepines among NMPO users in Rhode Island.

Results: Among participants, 171 (85.5%) reported lifetime benzodiazepine use and 125 (62.5%) reported regular benzodiazepine use. Nearly all (n = 121, 96.8%) reported non-medical use and 43 (34.4%) reported prescribed use. Compared to the 75 participants who did not regularly use benzodiazepines, participants who reported regular use were more likely to be white (66.3% vs. 58.0%, p = 0.03), have ever been incarcerated (52.8% vs. 37.3%, p = 0.04), and have ever been diagnosed with a psychiatric disorder (bipolar: 29.6% vs. 16.0%, p = 0.04; anxiety: 56.8 vs. 36.0%, p = 0.01). Although the association was marginally significant, accidental overdose was higher among those who were prescribed the benzodiazepine they used most frequently compared to those who were not (41.9% vs. 24.4%, p = 0.06).

Conclusion: Benzodiazepine use and misuse are highly prevalent among young adult NMPO users. Harm reduction and prevention programs for this population are urgently needed.

1. Introduction

Benzodiazepines are a class of psychoactive drugs used for their sedative, muscle relaxant, anticonvulsant, and anxiolytic properties to treat a range of conditions (Olkkola and Ahonen, 2008; Page et al., 2002). Benzodiazepines are most often prescribed for anxiety or insomnia, but are also used for depression, obsessive-compulsive disorder (OCD), post-traumatic stress disorder (PTSD), seizures, withdrawal symptoms, and sedation prior to medical procedures (Olkkola and Ahonen, 2008; Page et al., 2002).

From 2002 to 2014, the number of people prescribed benzodiazepines in the United States increased by 31%, and the proportion of co-prescribed opioids and benzodiazepines increased from 6.8% to 9.6% (Hwang et al., 2016). Among people who use opioids, benzodiazepine use has been associated with several adverse outcomes, including increased risk for overdose (Curtin et al., 2017; Stein et al., 2017a), poorer retention in opioid treatment (Franklyn et al., 2017), more emergency department visits (Jones and McAninch, 2015; Sun et al., 2017; Herbert et al., 2017), heroin use (Darke et al., 2010), HIV infection (Ickowicz et al., 2015), and hepatitis C virus infection (Bach et al., 2016).

For those who misuse opioids, benzodiazepine use has been associated with being white (Cropsey et al., 2015; Tucker et al., 2016); being female (Cropsey et al., 2015; Stein et al., 2017b); older age (Stein

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https://doi.org/10.1016/j.drugalcdep.2017.10.023
Received 21 August 2017; Received in revised form 23 October 2017; Accepted 28 October 2017
Available online 07 December 2017
0376-8716/

et al., 2017b); and incarceration history (Tucker et al., 2016). Non-medical benzodiazepine use has been associated with screening positive for anxiety, depression, and other mental health concerns in this population (Chen et al., 2011; Lavie et al., 2009). Research has found that concurrent non-medical benzodiazepine and other opioid use can be motivated by desires to create a greater "high" as well as decrease symptoms of opiate withdrawal (Chen et al., 2011; Stein et al., 2016). Finally, when pain conditions and anxiety co-occur, some clinicians may prescribe both opioids and benzodiazepines despite the increased risk for overdose (Park et al., 2015). Thus, concurrent, non-medical use of these medications may have iatrogenic origins.

While benzodiazepine use and misuse have been studied among people prescribed opioids (Dasgupta et al., 2016), patients on methadone treatment for opioid use disorder (Chen et al., 2011), and people who use heroin (Darke et al., 2010), very few studies have examined the prevalence and correlates of benzodiazepine use among young adults who use prescription opioids non-medically. Among the general population of young adults aged 18–25, 3.6 million (one in ten) reported any benzodiazepine use in the past year, 1.8 million (half) of whom reported non-medical benzodiazepine use in the past year (SAMHSA, 2015). More research is needed to understand the patterns of co-occurring benzodiazepine use among young adults who engage in non-medical prescription opioid (NMPO) use in order to inform overdose prevention, treatment, and harm reduction strategies.

Our analysis uses data from the Rhode Island Young Adult Prescription Drug Study (RAPiDS), which recruited individuals aged 18–29 in Rhode Island who reported recent NMPO use. We sought to determine the prevalence and correlates of regular benzodiazepine use and misuse among this sample. We also explored the prevalence, correlates, and chronology of medical and non-medical benzodiazepine use among participants with regular benzodiazepine use.

2. Methods

2.1. Participants

Young adults (18–29 years) who reported 30-day NMPO use (using prescription opioids without a prescription or not as a doctor directed) were invited to participate in RAPiDS between January 2015 and February 2016. RAPiDS was approved by the Brown University Institutional Review Board. More detailed methods regarding recruitment and inclusion criteria can be found in previously published papers (Evans et al., 2016; Liebling et al., 2016).

2.2. Primary measures

Participants were shown a card with pictures of the following benzodiazepines: Klonopin (clonazepam), Xanax (alprazolam)/Ativan (lorazepam), Valium (diazepam), Librium, Limbitrol, Rohypnol, Serax, and Tranxene. Participants who indicated ever using these benzodiazepines then identified which on the card they used most regularly (defined as more than once a month), as well as other benzodiazepines they had ever used. Specifically, these participants were asked if a doctor, dentist, or nurse had ever prescribed this benzodiazepine to them and the age they were first prescribed. Participants were also asked if they had ever used the benzodiazepine non-medically, what age they first took it non-medically, and how often they have used it in the last six months (daily vs. weekly vs. monthly).

2.3. Statistical analyses

Through Wilcoxon rank sum test and Fisher's exact test, we explored factors associated with regular benzodiazepine use, comparing participants who did not regularly use benzodiazepines vs. participants who regularly used benzodiazepines, both non-medically and medically. Additionally, we examined the factors associated with ever being prescribed the benzodiazepine used most regularly. Variable selection was guided by previous research on opioid use, benzodiazepine use, and overdose (Riley et al., 2016). All analyses were conducted in SAS version 9.3. *P*-values were two-sided; p-values < 0.05 were considered significant.

Additional factors explored were age; sex at birth (male vs. female); race (white vs. non-white); Hispanic or Latino descent; ever experiencing homelessness (defined as not having a regular place to stay, living in a shelter because of nowhere to go, or living in a place not ordinarily used for sleeping); experiencing homelessness in the last six months; ever being incarcerated; ever overdosing by accident; using NMPOs to feel less depressed or anxious; screening positive for depressive symptomology, using a cut-off of ≥ 10 on the Center for Epidemiologic Studies Depression Short Scale (CES-D10) (Andresen et al., 2013); ever being diagnosed with Attention-Deficit Disorder (ADD)/Attention-Deficit Hyperactivity Disorder (ADHD), a depressive disorder, bipolar disorder, or anxiety disorder; and screening positive for unhealthy alcohol use (a score ≥ 3 for women and ≥ 4 for men), based on the Brief Alcohol Use Disorders Identification Test (AUDIT-C) (Bradley et al., 2007).

3. Results

Among 200 participants, the median age was 25 (IQR = 22-28), 131 (65.5%) were male, and 123 (61.5%) were white. A total of 171 (85.5%) reported lifetime benzodiazepine use. Table 1 summarizes the characteristics of those reporting regular benzodiazepine use (n = 125, 62.5%) versus those who did not report regular benzodiazepine use (n = 75, 36.5%). Among the former group, 121 (96.8%) reported non-medical benzodiazepine use, while only 43 (34.4%) reported ever being prescribed the benzodiazepine they use most regularly. Table 2 summarizes the correlates by those who have or have not been prescribed the benzodiazepine they use most frequently.

Xanax (alprazolam)/Ativan (lorazepam) were the mostly commonly used benzodiazepines, where 151 (88.3%) of the 171 participants with lifetime benzodiazepine use reported Xanax (alprazolam)/Ativan (lorazepam) use in their lifetime. Klonopin (clonazepam) and Valium (diazepam) were the second and third most commonly used benzodiazepines in one's lifetime, endorsed by 126 (73.7%) and 106 (62.0%), respectively. Among the 43 participants who had ever been prescribed the benzodiazepine they used most regularly, the age (in years) of first prescribed ranged from 12 to 27, with a median of 19 (IQR = 18–23). Among the 121 participants who had ever engaged in non-medical use of the benzodiazepine they used most regularly, the age of first non-medical use ranged from 9 to 28, with a median of 19 (IQR = 17–22). Among 39 participants who reported both prescribed and non-medical use, the median age of first prescribed use was 19 (IQR = 18–23), and the median age of first non-medical use was 18 (IQR = 17–22). Of these 39 participants, 16 (41.0%) used the benzodiazepine non-medically before being prescribed it, 12 (30.8%) were prescribed it before using it non-medically, and 11 (28.2%) were first prescribed it and used it non-medically at the same age. Further, persons prescribed the benzodiazepine they used regularly were more likely to use NMPOs to feel less depressed or anxious (64.8% vs. 40.0%, $p = 0.002$) and were marginally more likely to report a history of overdose (41.9% vs. 24.4%, $p = 0.06$).

4. Discussion

Our study illustrates a high prevalence and lifetime rate of initiation of benzodiazepine use among young adults who use NMPOs. We observed a number of correlates with co-occurring benzodiazepine and NMPO use that have been identified in previous research, including being of white race/ethnicity (Cropsey et al., 2015; Tucker et al., 2016); having a history of incarceration (Tucker et al., 2016); and co-occurring anxiety and mood disorders (McHugh et al., 2017; Vogel et al., 2013).