



HHS Public Access

Author manuscript

J Adolesc Health. Author manuscript; available in PMC 2019 February 01.

Published in final edited form as:

J Adolesc Health. 2018 February ; 62(2): 241–244. doi:10.1016/j.jadohealth.2017.09.018.

Prevalence of nonmedical use of prescription opioids and association with co-occurring substance use disorders among adolescents in substance use treatment

Alia A. Al-Tayyib, PhD^{a,b}, Paula Riggs, MD^c, Susan Mikulich-Gilbertson, PhD^c, and Christian Hopfer, MD^c

^aDenver Public Health, Denver Health and Hospital Authority, Denver, Colorado

^bDepartment of Epidemiology, Colorado School of Public Health, Aurora, Colorado

^cDivision of Substance Dependence, University of Colorado School of Medicine, Aurora, Colorado

Abstract

Purpose—We sought to describe the prevalence of nonmedical use of prescription opioids (NMUPO) and association with co-occurring substance use disorders in a sample of adolescents in substance treatment.

Methods—Adolescents in two substance treatment programs were recruited for participation between 2009 and 2013. The Composite International Diagnostic Interview-Substance Abuse Module (CIDI-SAM) was administered to assess substance use patterns and lifetime abuse or dependence.

Results—A total of 378 adolescents completed the CIDI-SAM: mean age 16.1 (SD=1.1), 78% male, 50% white, non-Hispanic. Of the 378 adolescents, 62 (16.4%) reported NMUPO and 59 (15.6%) were diagnosed with opioid/heroin abuse or dependence. Mean age at first NMUPO was 14.3 (SD=1.4). NMUPO was associated with a 3.31 (95% CI: 2.83, 3.79) fold increase in having 3 or more co-occurring substance use diagnoses.

Conclusions—NMUPO is quite prevalent among adolescents receiving substance use treatment. Intervention to interrupt NMUPO from progressing to heroin use or developing into a disorder is critical.

Implications and Contribution—There is limited information describing the prevalence of NMUPO and co-occurrence of substance use disorders in adolescent treatment populations. The current study found a significant association between NMUPO and co-occurrence of 3 or more substance use disorders suggesting that clinicians treating adolescents for non-opioid substance use disorders should address NMUPO.

Corresponding author information: Alia Al-Tayyib, PhD, Denver Public Health, 605 Bannock Street, Denver, CO 80204-4507, USA, Tel: +1 303 602 3601, Fax: +1 303 602 3615, alia.al-tayyib@dhha.org.

Parts of this paper were presented at the 2015 annual meeting of the College on Problems of Drug Dependence in Phoenix, AZ.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Keywords

nonmedical use of prescription opioids; co-occurring substance use disorders

Nonmedical use of prescription opioids (NMUPO) is a significant public health problem in the United States that often begins in adolescence [1]. According to the most recent National Survey on Drug Use and Health (NSDUH), an estimated 276,000 adolescents aged 12 to 17, representing 1.1% of adolescents in the United States, were current misusers of prescription opioids [2]. Data from the Monitoring the Future study show that NMUPO in adolescence is associated with increased risk of substance use disorder symptoms in adulthood (adjusted odds ratio 2.61, 95% confidence interval: 1.88–3.61) [3]. A history of NMUPO in adolescence also predicts the transition to heroin in young adulthood [1, 4, 5].

In 2015, an estimated 122,000 adolescents had a pain reliever use disorder while an estimated 6,000 adolescents had a heroin use disorder [2]. According to NSDUH, only 6.3% of adolescents aged 12 to 17 who needed substance use treatment received treatment. The bulk of the literature describing NMUPO among adolescents comes from the National Survey on Drug Use and Health and the Monitoring the Future study which are representative of adolescents in the general population. To add to the extant knowledge surrounding NMUPO among adolescents, we examined a cohort of adolescents in two substance use treatment programs. We sought to describe the prevalence of nonmedical use of prescription opioids and examine the association between NMUPO and co-occurring substance use disorders in a sample of adolescents receiving substance treatment.

METHODS

Data collection

Between September 9, 2009 and August 8, 2013, adolescents were recruited from two substance treatment programs in the Denver metropolitan area (a university-based treatment program and a community hospital-based program). The majority of patients (95%) in the university-based treatment program were in mandated treatment, either through social services or through the juvenile justice system. In the community hospital-based program, approximately 65% of patients were in mandated treatment, 15% were self-referrals, and 20% were hospital discharges.

Members of the research team were notified of each new admission to the treatment programs and a professional research assistant (PRA) would attempt to contact the potential participant and a parent/guardian to introduce the study and assess interest in participation. Inclusion criteria were: in treatment for substance use disorders; 13–18 years of age; IQ 80; and valid written consent for 18 year olds or parental consent and assent for those 17 years. Exclusion criteria were: refusal of valid informed consent or assent; psychosis; obvious intoxication; current risk of suicide, violence, or fire setting sufficiently great to interfere with evaluation or to endanger evaluators; and insufficient English skills for consenting or assenting for interviews. Participants were compensated \$100 for their participation.

The study protocol was reviewed and approved by the Colorado Multiple Institutional Review Board.

Measures

For the current analysis, we utilized measures from the Composite International Diagnostic Interview- Substance Abuse Module (CIDI-SAM;[6]). The CIDI-SAM assesses substance use patterns, including onset, duration, and intensity of use. The CIDI-SAM is a structured, 30–60 minute interview designed for trained, lay interviewers. The CIDI-SAM provides DSM-III-R and DSM-IV symptom count and diagnostic data regarding abuse and dependence for nicotine, alcohol, and 9 classes of illicit drugs including cannabis, opioids, sedative/hypnotics, inhalants, amphetamines, cocaine, hallucinogens, PCP, and club drugs (e.g. Ecstasy or MDMA, GHB, ketamine, rohypnol).

Experience with nonmedical use of prescription opioids was the main outcome of interest. We calculated a categorical variable with the following categories: (1) no NMUPO; (2) NMUPO without a diagnosis of abuse or dependence; and (3) opioid/heroin abuse or dependence. NMUPO was defined as lifetime use of opioids more than 5 times when they were not prescribed, in larger amounts than prescribed, more often than prescribed, or for longer than prescribed. The CIDI-SAM defines opioids as “codeine, Darvon, Demerol, Dilaudid, methadone, morphine, opium, Percodan, Talwin, T’s & blues.” Scoring algorithms based on whole life substance-related problems were used to derive the number of Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) for life-time abuse and dependence symptoms [6]. For comparability with the updated DSM-V criteria which includes both prescription opioids and heroin in opioid use disorders, we have included both in the opioid/heroin abuse or dependence category.

Statistical analysis

Chi-square (χ^2) statistics were calculated to assess differences based on experience with nonmedical use of prescription opioids. Ordered logistic regression was used to calculate odds ratios and associated 95% confidence intervals (CI) for the association between experience with NMUPO and various substance use disorders. Crude and adjusted odds ratios were calculated. Odds ratios were adjusted for gender, race/ethnicity, and age. All analyses were conducted using StataSE Version 14 (StataCorp, College Station, TX).

RESULTS

A total of 378 participants between the ages of 13 and 18 are included in the current analysis. The study sample represents a convenience sample of adolescent patients in the treatment programs as research staff was unable to meet with every new admission. The sample represents approximately 20% of the population in the treatment programs. The majority (78.6%) were male and half (50.3%) were white, non-Hispanic (Table 1). The mean age was 16.1 (SD: 1.14). Overall, 257 (68.0%) reported no NMUPO, 62 (16.4%) reported NMUPO, and 59 (15.6%) were classified as having opioid/heroin abuse or dependence. Experience with NMUPO differed significantly by race/ethnicity with white, non-Hispanics

more likely to report NMUPO and to be diagnosed with opioid/heroin abuse or dependence. Mean age of first NMUPO was 14.3 (SD: 1.64).

Both NMUPO and opioid/heroin abuse or dependence were associated with an increase in the odds of having 3 or more co-occurring substance use disorder diagnoses with a 3.31 (95% CI: 2.83, 3.79) fold increase with NMUPO and a 4.79 (1.04, 8.56) fold increase with opioid abuse or dependence, after adjusting for gender, race/ethnicity, and age (Table 2). Opioid/heroin abuse or dependence was associated with a 5.04 (95% CI: 1.69, 8.39) fold increase in co-occurring alcohol abuse or dependence, a 5.16 (95% CI: 1.82, 8.50) fold increase in cannabis abuse or dependence, a 4.83 fold increase (95% CI: 1.39, 8.26) fold increase in amphetamine abuse or dependence, a 5.40 (95% CI: 1.86, 8.94) fold increase in club drug abuse or dependence, and a 5.45 (95% CI: 2.02, 8.89) fold increase in hallucinogen abuse or dependence. While the associations between NMUPO and individual co-occurring substance use disorders were not significant, NMUPO was associated with the likelihood of having 3 or more co-occurring substance use diagnoses when controlling for age, race/ethnicity, and gender.

DISCUSSION

In our sample of adolescents in substance use treatment, NMUPO was prevalent and was associated with an increased likelihood of having 3 or more co-occurring substance use disorders. Given the perception of low risk associated with NMUPO among adolescents [7], addressing NMUPO before it progresses to heroin use or develops into an opioid/heroin use disorder is essential. Clinically, adolescents with addictive disorders are at increased risk for abuse of any substance with abuse potential [8]. Therefore, additional attention is required to discuss NMUPO with adolescents in substance use treatment programs due to risk of progressing to heroin use or developing into an opioid use disorder.

We also found co-occurrence of opioid/heroin abuse or dependence with either: alcohol, cannabis, amphetamine, club drugs, or hallucinogens abuse or dependence was approximately 5 times as likely. While multiple studies have examined co-occurrence of psychiatric disorders with substance use disorders in adolescent treatment populations, to our knowledge, only a handful of studies have examined co-occurrence of different substance use disorders with opioid use disorder [9, 10].

Our study is not without limitations. We combined opioid abuse and disorder to include both prescription opioids and heroin. It is possible that co-occurrence of other substance use disorders differs between the two. However, given the small number of those with heroin use disorder (n=15) our ability to make comparisons was limited. Our study is also limited to a single geographic area and is a convenience sample of approximately 20% of the treatment population therefore may not be representative of adolescents in treatment programs in other areas of the country.

Despite these limitations, our findings have important clinical implications. Intervention to interrupt NMUPO from progressing to heroin use or developing into an opioid use disorder in a population at high risk is critical.

Acknowledgments

Funding support: K01DA036452 (Al-Tayyib), R01DA035804 (Hopfer), K24DA032555 (Hopfer), P60DA011015 (Hewitt), R01DA34604 (Mikulich-Gilbertson)

The authors would like to thank Kristen Raymond for her contributions to the collection of the data and Shannon McWilliams for her data management efforts. We also thank the participants for providing this important information.

References

1. Cerda M, et al. Nonmedical Prescription Opioid Use in Childhood and Early Adolescence Predicts Transitions to Heroin Use in Young Adulthood: A National Study. *J Pediatr.* 2015; 167(3):605–12. e1–2. [PubMed: 26054942]
2. Quality, C.f.B.H.S.a. Key substance use and mental health indicators in the United States: Results from the 2015 National Survey on Drug Use and Health. 2016.
3. McCabe SE, Veliz P, Schulenberg JE. Adolescent context of exposure to prescription opioids and substance use disorder symptoms at age 35: a national longitudinal study. *Pain.* 2016; 157(10): 2173–8. [PubMed: 27227693]
4. Carlson RG, et al. Predictors of transition to heroin use among initially non-opioid dependent illicit pharmaceutical opioid users: A natural history study. *Drug Alcohol Depend.* 2016; 160:127–34. [PubMed: 26785634]
5. Compton WM, Jones CM, Baldwin GT. Relationship between Nonmedical Prescription-Opioid Use and Heroin Use. *N Engl J Med.* 2016; 374(2):154–63. [PubMed: 26760086]
6. Cottler LB, et al. The DSM-IV field trial for substance use disorders: major results. *Drug Alcohol Depend.* 1995; 38(1):59–69. discussion 71–83. [PubMed: 7648998]
7. Nargiso JE, Ballard EL, Skeer MR. A systematic review of risk and protective factors associated with nonmedical use of prescription drugs among youth in the United States: a social ecological perspective. *J Stud Alcohol Drugs.* 2015; 76(1):5–20. [PubMed: 25486389]
8. Palmer RH, et al. Genetic etiology of the common liability to drug dependence: evidence of common and specific mechanisms for DSM-IV dependence symptoms. *Drug Alcohol Depend.* 2012; 123(Suppl 1):S24–32. [PubMed: 22243758]
9. Subramaniam GA, Stitzer MA. Clinical characteristics of treatment-seeking prescription opioid vs. heroin-using adolescents with opioid use disorder. *Drug Alcohol Depend.* 2009; 101(1–2):13–9. [PubMed: 19081205]
10. Welsh JW, et al. Association Between Substance Use Diagnoses and Psychiatric Disorders in an Adolescent and Young Adult Clinic-Based Population. *J Adolesc Health.* 2017

Demographic characteristics and substance use disorders by experience with nonmedical use of prescription opioids (NMUPO) in a sample of adolescents in substance use treatments, 2009–2013

TABLE 1

	Total	No NMUPO	NMUPO	Opioid/heroin abuse or dependence	P-value
TOTAL	378	257 (68.0)	62 (16.4)	59 (15.6)	
Demographics					
Gender					
Male	297 (78.6)	194 (75.5)	51 (82.3)	52 (88.1)	0.076
Female	81 (21.4)	63 (24.5)	11 (17.7)	7 (11.9)	
Race/Ethnicity					
White, non-Hispanic	190 (50.3)	112 (43.6)	41 (66.1)	37 (62.7)	0.005
Black, non-Hispanic	37 (9.8)	31 (12.1)	1 (1.6)	5 (8.5)	
Hispanic	82 (21.7)	60 (23.4)	10 (16.1)	12 (20.3)	
Multiracial/other	69 (18.3)	54 (21.0)	10 (16.1)	5 (8.5)	
Age					
13–14	39 (10.3)	34 (13.2)	2 (3.2)	3 (5.1)	0.019
15–16	193 (51.1)	132 (51.4)	36 (58.1)	25 (42.4)	
17–18	146 (38.6)	91 (35.4)	24 (38.7)	31 (52.5)	
Substance Use Disorders					
Alcohol abuse or dependence					
Yes	216 (57.1)	124 (48.3)	44 (71.0)	48 (81.4)	<0.001
No	162 (42.9)	133 (51.8)	18 (29.0)	11 (18.6)	
Cannabis abuse or dependence					
Yes	321 (84.9)	218 (84.8)	52 (83.9)	51 (86.4)	0.922
No	57 (15.1)	39 (15.2)	10 (16.1)	8 (13.6)	
Amphetamine abuse or dependence					
Yes	57 (15.1)	13 (5.1)	16 (25.8)	28 (47.5)	<0.001
No	321 (84.9)	244 (94.9)	46 (74.2)	31 (52.5)	
Cocaine abuse or dependence					
Yes	63 (16.7)	19 (7.4)	18 (29.0)	26 (44.1)	<0.001
No	315 (83.3)	238 (92.6)	44 (71.0)	33 (55.9)	

	Total	No NMUPO	NMUPO	Opioid/heroin abuse or dependence	P-value
Club drugs abuse or dependence					
Yes	84 (22.2)	26 (10.1)	27 (43.6)	31 (52.5)	<0.001
No	294 (77.8)	231 (89.9)	35 (56.5)	28 (47.5)	
Hallucinogen abuse or dependence					
Yes	57 (15.1)	14 (5.5)	18 (29.0)	25 (42.4)	<0.001
No	321 (84.9)	243 (94.6)	44 (70.8)	34 (57.6)	
Multiple diagnoses					
Less than 3	245 (64.8)	215 (83.7)	25 (40.3)	5 (8.5)	<0.001
3 or more	133 (35.2)	42 (16.3)	37 (59.7)	54 (91.5)	

NOTE: Subcategory total may not add to overall total due to missing data.

Crude and adjusted odds ratios and associated 95% confidence intervals for the association between various substance use disorders and experience with nonmedical use of prescription opioids in a sample of adolescents in substance use treatment, 2009–2013

TABLE 2

	No NMUPO	NMUPO	Opioid/heroin abuse or dependence
Alcohol abuse or dependence			
Crude OR	ref	1.53 (1.13, 1.93)	2.52 (2.07, 2.97)
Adjusted OR*	ref	4.00 (0.67, 7.33)	5.04 (1.69, 8.39)
Cannabis abuse or dependence			
Crude OR	ref	0.79 (0.24, 1.34)	1.73 (1.15, 2.30)
Adjusted OR	ref	4.17 (0.85, 7.50)	5.16 (1.82, 8.50)
Amphetamine abuse or dependence			
Crude OR	ref	1.15 (0.89, 1.40)	2.27 (1.93, 2.62)
Adjusted OR	ref	3.66 (0.24, 7.08)	4.83 (1.39, 8.26)
Cocaine abuse or dependence			
Crude OR	ref	1.12 (0.87, 1.38)	2.19 (1.85, 2.53)
Adjusted OR	ref	3.05 (−0.33, 6.44)	4.16 (0.76, 7.56)
Club drugs abuse or dependence			
Crude OR	ref	1.28 (1.00, 1.56)	2.39 (2.02, 2.75)
Adjusted OR	ref	4.26 (0.73, 7.78)	5.40 (1.86, 8.94)
Hallucinogen abuse or dependence			
Crude OR	ref	1.13 (0.87, 1.38)	2.22 (1.87, 2.56)
Adjusted OR	ref	4.33 (0.92, 7.74)	5.45 (2.02, 8.89)
3 or more co-occurring diagnoses			
Crude OR	ref	1.99 (1.61, 2.37)	3.42 (−0.31, 7.16)
Adjusted OR	ref	3.31 (2.83, 3.79)	4.79 (1.04, 8.56)

NOTE: adjusted for gender, race/ethnicity, and age