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Motives for Nonmedical Use of Prescription Opioids among High School Seniors in the United States: Self-Treatment and Beyond

Sean Esteban McCabe, PhD[*,†], **Carol J. Boyd, PhD**[*,†], **James A. Cranford, PhD**[*], and **Christian J. Teter, Pharm.D.**[*,‡,‖]

[†] Institute for Research on Women and Gender, University of Michigan, Ann Arbor, MI

[‡] School of Pharmacy, Northeastern University, Boston, MA

[‖] Alcohol and Drug Abuse Treatment Program, McLean Hospital, Belmont, MA

Abstract

Objective: To assess motives for nonmedical use of prescription opioids among U.S. high school seniors and examine associations between motives for nonmedical use and other substance use behaviors.

Design: Nationally representative samples of U.S. high school seniors (modal age 18) were surveyed during the spring of their senior year via self-administered questionnaires.

Setting: Data were collected in public and private high schools.

Participants: The sample consisted of five cohorts (2002-2006) of 12,441 high school seniors.

Main Outcome Measures: Self-reports of motives for nonmedical use of prescription opioids and substance use behaviors.

Results: More than one in every 10 high school seniors reported nonmedical use of prescription opioids and 45% of past-year nonmedical users reported “to relieve physical pain” as an important motivation. The odds of heavy drinking and other drug use were lower among nonmedical users of prescription opioids motivated only by pain relief compared with nonmedical users who reported pain relief and other motives and those who reported non-pain relief motives only. The odds of medical use of prescription opioids were lower among nonmedical users who reported non-pain relief motives only compared with nonmedical users motivated only by pain relief and those who reported pain relief and other motives.

Conclusions: The findings indicate motives should be considered when working with adolescents who report nonmedical use of prescription opioids. Future efforts are needed to identify adolescents who may need appropriate pain management and those at increased risk for prescription opioid abuse.

INTRODUCTION

Prescription opioids are the foundation for the treatment of acute and chronic pain and these medications are highly efficacious when used properly.[1] However, the nonmedical use of prescription opioids has increased significantly among adolescents and young adults over the past decade in the United States.[2-5] The *National Survey on Drug Use and Health (NSDUH)*, the *Monitoring the Future (MTF)* study, and the National Epidemiologic Survey on Alcohol

[*] (Corresponding) Substance Abuse Research Center, University of Michigan, Ann Arbor 2025 Traverwood Dr., Suite C Ann Arbor, MI, USA 48105-2194 Telephone: (734) 998-6500, Fax: (734) 998-6508 plius@umich.edu.

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and Related Condition (NESARC) represent three of the largest national drug studies in the United States.[2,3,6,7] While these three studies use different measures to assess nonmedical use of prescription opioids, each measure includes non-prescribed use of scheduled opioid analgesics. The past-year nonmedical use of prescription opioids is most prevalent among young adults 18 to 25 years old in the United States.[4,6-8] In 2006, the number of persons aged 12 or older who initiated nonmedical use of prescription opioids within the past 12 months was greater than the estimated numbers of those who initiated marijuana or cocaine.[8] Despite the high incidence and prevalence increases in nonmedical use of prescription opioids, considerable gaps in knowledge remain because most studies fail to distinguish between individuals who use someone else's prescription opioids for self-treatment (i.e., to relieve physical pain) and those who use someone else's prescription opioids for motives other than self-treatment – such as to get high.[9]

Two recent school-based studies suggest self-treatment motivates a substantial proportion of those adolescents and young adults who engage in nonmedical use of prescription opioids.[10,11] Indeed, the most prevalent motive endorsed by secondary and postsecondary students who reported nonmedical use of prescription opioids was “to relieve pain” (79% in the secondary student sample and 63% in the postsecondary student sample). Those nonmedical users who reported “to relieve pain” as their sole motive had fewer drug related problems than other nonmedical users.[10,11] Furthermore, one study showed the odds of drug related problems did not differ between nonmedical users who reported to relieve pain as their sole motive and those individuals who did not engage in nonmedical use of prescription opioids.[11]

Adolescence represents a particularly important developmental period to understand motives for nonmedical use of prescription opioids because individuals who initiate nonmedical use of prescription opioids at or before 18 years of age are more likely to develop prescription opioid use disorders than those who initiate later in life.[12] Examining the motives for nonmedical use of prescription opioids and related substance use behaviors in a national sample of high school seniors in the United States would help identify nonmedical users who may need appropriate pain management and those at increased risk for drug abuse. Improving the knowledge base regarding motives for nonmedical use of prescription opioids is critical for informing clinical practice and designing effective prevention efforts. The objectives of the present study are to 1) assess the prevalence of motives for nonmedical use of prescription opioids in a nationally representative sample of high school seniors in the United States; 2) assess the associations between motives for nonmedical use of prescription opioids and substance use behaviors and medical use of prescription opioids.

METHODS

Study Design

The *MTF* study annually surveys a cross-sectional, nationally representative sample of high school seniors in approximately 135 public and private schools in the coterminous United States.[3] The *MTF* study uses a multi-stage sampling procedure: In stage 1, geographic areas or primary sampling units are selected; in stage 2, schools within primary sampling units are selected (with probability proportionate to class size); and in stage 3, students within schools are selected. The student response rates for high school seniors ranged from 82% to 83% between 2002 and 2006. Because so many questions are included in the *MTF* study, much of the questionnaire content is divided into six different questionnaire forms which are randomly distributed. This approach results in six virtually identical subsamples. The measures relevant for this study (e.g., motives for nonmedical use of prescription opioids) were asked on Form 1, so this study focuses on the subsamples receiving Form 1 within each cohort. Institutional Review Board (IRB) approval was granted for this study by the University of Michigan IRB Health Sciences.

Sample

Approximately 12,441 individuals completed Form 1 in the five cohorts between 2002 and 2006 during the spring of their senior year and these respondents comprise the study sample. The sample included 53% women, 62% white, 10% African-American, and 28% were from other racial groups or did not specify their race. The modal age of the individuals in the sample was 18 years of age.

Measures

Nonmedical use of prescription opioids was assessed with a series of items asking respondents on how many occasions (if any) they used prescription opioids on their own, without a doctor's orders (e.g., Vicodin®, OxyContin®, Percodan®, Percocet®, Demerol®, Dilaudid®, morphine, opium, codeine). Respondents were asked about nonmedical use in their lifetimes and the past 12 months. The response scale for these items included: 1) no occasions, 2) 1-2 occasions, 3) 3-5 occasions, 4) 6-9 occasions, 5) 10-19 occasions, 6) 20-39 occasions, and 7) 40 or more occasions.

Motives for nonmedical use of prescription opioids were assessed by asking respondents who reported nonmedical use of prescription opioids to indicate the most important reasons for using prescription opioids without a doctor's orders from a list of 17 binary items (see Table 1).

Route of administration for nonmedical use of prescription opioids was assessed with five items that asked which methods respondents used for taking prescription opioids not prescribed to them. The binary items included: 1) intranasal (snorting or sniffing); 2) smoking; 3) injection; 4) orally (by mouth); and 5) other.

Co-ingestion of nonmedical use of prescription opioids and other drugs was measured with 10 items focused on the number of times prescription opioids were used at the same time as other drugs so that the effects overlapped (e.g., alcohol, marijuana, LSD, hallucinogens other than LSD, cocaine, heroin). The response scale ranged from 1) not at all to 7) every time.

Binge drinking was measured with a single item focused on the frequency of having five or more drinks in a row during the past 2 weeks. The response scale ranged from 1) none to 6) 10 or more times. *Cigarette use* was measured by asking respondents how frequently they smoked cigarettes during the past 30 days. The response scale ranged from 1) none to 7) 2 or more packs per day. *Marijuana and other illicit drug use*--including marijuana, cocaine, LSD, psychedelics other than LSD, heroin--were measured by asking respondents how many occasions (if any) they used [specified drug] in their lifetime, past 12 months, and past 30 days. The response scale for these items ranged from 1) no occasions to 7) 40 or more occasions.

Medical use of prescription opioids was assessed by asking respondents whether they had ever taken prescription opioids because a doctor told them to use them. Respondents were informed that prescription opioids are sometimes prescribed by doctors and drugstores are not supposed to sell them without a prescription. These included: Vicodin®, OxyContin®, Percodan®, Percocet®, Demerol®, Dilaudid®, morphine, opium, and codeine. The response scale included: 1) No; 2) Yes, but I had already tried them on my own; 3) Yes, and it was the first time I took any.

Statistical Analysis

Analyses were restricted to those respondents with complete data on demographic characteristics and drug use variables. The unadjusted prevalence rates for motives to engage in nonmedical use of prescription opioids – across demographic characteristics and substance

use behaviors – were calculated with cross-tabulations. Chi-square tests of homogeneity and logistic regression analyses were conducted to determine whether socio-demographic characteristics and substance use behaviors were significantly associated with motives for nonmedical use of prescription opioids. For purposes of analysis, the following four mutually exclusive groups were examined: 1) no past-year nonmedical use of prescription opioids, 2) past-year nonmedical use to relieve physical pain only, 3) past-year nonmedical use to relieve physical pain and other motives, and 4) past-year nonmedical use for motives other than to relieve physical pain. The multistage sampling design resulted in clustering of data, which may cause some overstatement of the statistical significance when conducting analyses that do not fully account for the complex design. Based on the number of comparisons being performed, only chi-square and logistic regression results were considered significant at $p < 0.01$. All statistical analyses were performed using SPSS 15.0 (SPSS Inc., Chicago, IL, USA).

RESULTS

Prevalence of motives for nonmedical use of prescription opioids

Approximately 12.3% of the respondents -- high school seniors in the United States -- reported lifetime nonmedical use of prescription opioids and 8.0% reported past-year nonmedical use. Table 1 shows the prevalence of motives for nonmedical use of prescription opioids among high school seniors in the United States. The leading motives included “to relax or relieve tension” (56.4%), “to feel good or get high” (53.5%), “to experiment-see what it's like” (52.4%), “to relieve physical pain” (44.8%), and “to have a good time with friends” (29.5%). The motives for nonmedical use of prescription opioids did not differ between women and men based on chi-square tests with two exceptions; women reported higher prevalence rates than men “to get to sleep” (31.8% vs. 21.3%, $p < 0.01$) and “because of anger and frustration” (14.8% vs. 8.1%, $p < 0.01$). The majority of nonmedical users of prescription opioids reported more than one motive. Among nonmedical users who reported motives, approximately 6.1% reported pain relief as their only motive, 38.7% endorsed pain relief and other motives, and 55.2% reported non-pain relief motives only.

The association between past-year frequency of nonmedical use of prescription opioids and motives was examined. The past-year frequency of 10 or more occasions was significantly higher for several motives than the past-year frequency of other motives ($p < 0.01$). For example, the past-year frequency of 10 or more occasions was higher among individuals who reported “to get through the day” as compared to other motives (53.8% vs. 21.9%, $p < 0.001$). Interestingly, the past-year frequency of 10 or more occasions among nonmedical users motivated only by pain relief (21.7%) was lower than those motivated by pain relief and other motives (33.7%) but similar to those who reported non-pain relief motives only (20.5%).

Motives for nonmedical use of prescription opioids and other substance use behaviors

Table 2 shows prevalence estimates of substance use behaviors among high school seniors based on motives for past-year nonmedical use of prescription opioids. Bivariate analyses using chi-square tests showed statistically significant associations for all substance use behaviors ($p < 0.01$). The prevalence of substance use was generally highest among nonmedical users who reported non-pain relief motives, followed by those who reported pain relief and other motives, nonmedical users motivated only by pain relief, and lowest among those who did not engage in nonmedical use of prescription opioids in the past 12 months.

Among nonmedical users of prescription opioids, those motivated only by pain relief were considerably less likely to use prescription opioids via non-oral routes of administration (e.g., intranasal, injection, smoking) than nonmedical users who reported other motives. For instance, 2.2% of nonmedical users motivated only by pain relief used via intranasal administration while

32.8% of those who reported pain relief and other motives, and 35.3% of nonmedical users who reported non-pain relief motives used via intranasal administration ($p < 0.001$). Furthermore, 11.4% of nonmedical users motivated only by pain relief co-ingested prescription opioids and alcohol while a much higher percentage of those who reported pain relief and other motives (53.2%) and non-pain relief motives (57.8%) had co-ingested prescription opioids and alcohol ($p < 0.001$).

Multiple logistic regression analysis revealed the odds ratios (ORs) for both groups of nonmedical users of prescription opioids who reported non-pain relief motives were significantly greater than high school seniors who did not engage in past-year nonmedical use of prescription opioids for all 23 substance use outcomes ($p < 0.01$). Furthermore, the ORs for nonmedical users of prescription opioids who were motivated only by pain relief were significantly greater than high school seniors who did not engage in past-year nonmedical use of prescription opioids for 8 out of 23 substance use outcomes ($p < 0.01$). In addition, the ORs for nonmedical users who were motivated only by pain relief were significantly lower for both groups of nonmedical users who reported non-pain relief motives for the majority of substance use outcomes.

Motives for nonmedical use of prescription opioids and medical use of prescription opioids

The lifetime medical use of prescription opioids was reported by approximately 14.0% of those who did not engage in past-year nonmedical use of prescription opioids, 76.1% of nonmedical users of prescription opioids motivated only by pain relief, 71.4% of those motivated by pain relief and other motives, and 46.7% of those who reported non-pain relief motives only ($p < 0.001$). Among past-year nonmedical users of prescription opioids, approximately 56.5% of those motivated only by pain relief as compared to 23.1% of those who reported pain relief and other motives, and 14.2% of those who reported only non-pain relief motives had initiated medical use of prescription opioids before nonmedical use of prescription opioids. In contrast, approximately 19.6% of those motivated only by pain relief as compared to 48.3% of those who reported pain relief and other motives, and 32.5% of those who reported only non-pain relief motives initiated nonmedical use of prescription opioids before medical use of prescription opioids.

Logistic regression analysis revealed the odds of medical use of prescription opioids were greater among nonmedical users of prescription opioids motivated only by pain relief (OR = 19.5, 95% CI = 9.9 – 38.6), nonmedical users motivated by pain relief and other motives (OR = 15.4, 95% CI = 11.8 – 19.9), and those who reported non-pain relief motives only (OR = 5.4, 95% CI = 4.4 – 6.6) as compared to high school seniors who did not engage in past-year nonmedical use of prescription opioids. In addition, the odds of medical use of prescription opioids were greater among nonmedical users of prescription opioids motivated only by pain relief (OR = 3.6, 95% CI = 1.8 – 7.3) and nonmedical users motivated by pain relief and other motives (OR = 2.8, 95% CI = 2.1 – 3.9) compared with nonmedical users who reported non-pain relief motives only.

COMMENT

The prevalence of nonmedical use of prescription opioids among adolescents and young adults in the United States is now at its highest level in 15 years and represents a public health concern.[2-5] The present study found a wide range of motives for nonmedical use of prescription opioids and 45% of nonmedical users were motivated to relieve physical pain. The prevalence of nonmedical use to relieve pain is similar to the only other study to examine motives for nonmedical use of prescription opioids based on nationally representative samples of American high school seniors between 1976 and 1984 which found that 50% of nonmedical users were motivated to relieve physical pain.[13] Notably, lifetime and annual prevalence rates of

nonmedical use of prescription opioids in the earlier study[13] (10% and 6%, respectively) were lower than this study (12% and 8%, respectively). Furthermore, the present study found that nonmedical users of prescription opioids who reported relieve physical pain as their sole motivation had significantly lower rates of substance use behaviors than other nonmedical users.

Recent studies have identified several important characteristics of nonmedical use of prescription drugs that can influence drug abuse potential, including co-ingestion with other drugs and route of administration.[11,14-18] The findings of the present study provide evidence that motives were significantly associated with frequency of past-year nonmedical prescription opioid use, non-oral routes of administration, co-ingestion of prescription opioids and other drugs, and substance use behaviors. Nonmedical users of prescription opioids motivated only to relieve physical pain had considerably lower odds than nonmedical users reporting other motives to co-ingest prescription opioids with other drugs or use prescription opioids via non-oral routes. Notably, nonmedical users who reported to relieve physical pain and other motives generally resembled nonmedical users who reported only non-pain relief motives in regards to substance use behaviors. These results reinforce previous studies that have shown adolescents and young adults who engage in nonmedical use of prescription opioids for motives other than "to relieve pain" are at increased risk for drug use and drug related problems.[10-11]

Future clinical and research efforts should attempt to differentiate between motives for nonmedical use of prescription opioids because the present study identified subtypes that were significantly associated with medical use of prescription opioids and substance use behaviors. Interestingly, we found few gender differences in the motives for nonmedical use of prescription opioids which resembles findings from earlier work within secondary school students.[10,13] Notably, we found that over 7 in every 10 nonmedical users of prescription opioids motivated by pain relief reported a lifetime history of medical use of prescription opioids. Recent work indicates nearly 40% of high school seniors who reported nonmedical use of prescription opioids in the past 12 months obtained these medications from their own previous prescription.[21] These results suggest that appropriate pain management and careful therapeutic monitoring could contribute to reductions in the nonmedical use of prescription opioids among adolescents. In addition, the elevated rates of substance use behaviors found among nonmedical users reporting any motives other than "to relieve physical pain" indicate such behaviors are part of a pattern of "multi-problem" behavior.[22] Taken together, these findings suggest screening efforts should be employed to identify nonmedical users of prescription opioids who may require appropriate pain management and/or those who need more comprehensive assessment for substance use disorders.

Based on the elevated risk for substance abuse among nonmedical users who reported any motives other than "to relieve physical pain", future work should identify subgroups of nonmedical users who endorse combinations of motives because most nonmedical users have multiple motives underlying their behavior. Further, nonmedical users of prescription opioids motivated only by pain relief had greater odds of over 33% of the substance use outcomes relative to their high school peers who did not use prescription opioids nonmedically. Future research is needed to determine the extent to which increased rates of substance use among such individuals could be related to untreated pain. Although the risk for substance abuse appears to be lower among nonmedical users of prescription opioids motivated by pain relief relative to nonmedical users with other motives, it is important to note that there are health risks to those who use prescription opioids on their own, without a doctor's orders, regardless of motive. For example, nonmedical users of prescription opioids do not benefit from clinical assessments and monitoring nor do they receive important medical information that accompanies appropriate pain management. Thus, nonmedical users are likely unaware of the medication's proper use, contraindications or potential for interaction with other drugs.

The present study had some limitations that need to be taken into account while considering the implications of the findings. First, the results may not be generalized to other adolescent populations because our sample was drawn from high school seniors and did not include individuals who had dropped out or who were absent from school on the day of the survey administration. Future research should examine motives for nonmedical use of prescription opioids in adolescents not attending high school to assess whether findings in the present study can be replicated in other populations. Second, nonresponse may have introduced potential bias in the present study and the data are subject to the potential bias introduced when collecting substance use behaviors via self-reports surveys. The present study attempted to minimize potential biases by implementing conditions that previous research has shown minimizes biases such as informing potential respondents that participation was voluntary, assuring potential respondents that data would remain confidential.[23-25] It is worth noting that the prevalence rates of nonmedical use of prescription opioids in the present study were comparable to rates reported from national studies of adolescents and young adults.[5,8] Finally, the cross-sectional design of the study presented limitations and longitudinal studies are needed to examine subtypes of nonmedical users of prescription opioids over time.

Despite these limitations, the findings of the present study provide further evidence that a variety of motives are currently subsumed under the estimates of nonmedical use of prescription opioids commonly reported in national drug use studies such as the *NSDUH, MTF, and NESARC*.[10,11,26] Efforts to reduce consequences associated with nonmedical use of prescription opioids must be based on knowledge of the motives associated with this behavior because treatment implications can differ based on subtypes of nonmedical users. In this regard, identifying motivations associated with nonmedical use of prescription opioids at an early stage can help distinguish individuals in need of an evaluation for pain management and/or those who need more comprehensive assessment and may require substance abuse treatment. The findings of the present study suggest it is essential to move away from combining multiple subtypes into the same measure of nonmedical use of prescription opioids.

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Table 1

Motives for nonmedical use of prescription opioids among high school seniors, 2002-2006

Motives for nonmedical use	Overall Nonmedical Users (N=759)	
	%	(n)
To relax or relieve tension	56.4	428
To feel good or get high	53.5	406
To experiment -- see what it's like	52.4	398
To relieve physical pain	44.8	340
To have a good time with my friends	29.5	224
To get to sleep	26.5	201
Because of boredom, nothing else to do	18.6	141
To get away from my problems or troubles	16.6	126
To increase effects of some other drug(s)	15.3	116
Because of anger or frustration	11.6	88
To get through the day	12.0	91
To control coughing	7.6	58
To seek deeper insights and understanding	7.5	57
As a substitute for heroin	3.0	23
To fit in with a group I like	2.1	16
Because I am “hooked”	2.5	19
To decrease effects of some other drug(s)	1.1	8

Table 2

Prevalence of substance use as a function of motive for nonmedical use of prescription opioids, 2002-2006

	High school seniors (modal age 18)				
Substance use behaviors	**No past-year nonmedical use of prescription opioids (n=10,367) %**	**Past-year nonmedical use to relieve physical pain only (n = 46) %**	**Past-year nonmedical use to relieve physical pain and other motives (n = 294) %**	**Past-year nonmedical use for non-pain relief motives only (n = 419) %**	**Significance differences between groups $p < 0.01$**
Past two weeks					
Binge drinking	20.9	28.3	52.9	62.8	*b,c,d,e,f*
Past 30 days					
Alcohol	44.7	63.0	79.9	90.0	*b,c,e,f*
Cigarettes	19.9	33.3	58.8	66.4	*b,c,d,e*
Marijuana	16.2	17.4	56.6	73.3	*b,c,d,e,f*
Cocaine	1.0	0.0	14.9	19.5	*b,c*
Amphetamines	1.8	6.8	25.3	24.3	*b,c*
Tranquilizers	0.8	4.3	15.3	14.7	*a,b,c*
LSD	0.4	0.0	4.5	6.1	*b,c*
Other psychedelics	0.7	2.2	11.9	15.8	*b,c*
Heroin	0.1	0.0	2.8	5.7	*b,c*
Marijuana and other drugs	17.5	34.8	68.7	80.0	*a,b,c,d,e,f*
Drugs other than marijuana	4.2	21.7	47.6	48.3	*a,b,c,d,e*
Past 12 months					
Alcohol	69.4	76.1	97.5	99.5	*b,c,d,e*
Marijuana	29.0	43.5	77.4	91.3	*b,c,d,e,f*
Cocaine	2.2	2.2	27.0	39.5	*b,c,d,e,f*
Amphetamines	4.0	13.6	42.2	46.5	*a,b,c,d,e*
Tranquilizers	2.1	24.4	43.1	44.1	*a,b,c*
LSD	1.0	2.2	18.1	19.6	*b,c*
Other psychedelics	2.7	4.4	33.9	40.4	*b,c,d,e*
Heroin	0.2	0.0	8.6	9.6	*b,c*
Marijuana and other drugs	31.1	56.5	86.1	95.5	*a,b,c,d,e,f*

	High school seniors (modal age 18)				
Substance use behaviors	**No past-year nonmedical use of prescription opioids (n=10,367) %**	**Past-year nonmedical use to relieve physical pain only (n = 46) %**	**Past-year nonmedical use to relieve physical pain and other motives (n = 294) %**	**Past-year nonmedical use for non-pain relief motives only (n = 419) %**	**Significance differences between groups $p < 0.01$**
Drugs other than marijuana	9.3	34.8	68.7	79.7	*a,b,c,d,e,f*
Co-ingestion of prescription opioids and other drugs	N/A	16.3	65.1	79.0	*d,e,f*
Lifetime					
Non-oral administration route	N/A	4.4	40.7	49.8	*d,e*
Intranasal administration	N/A	2.2	32.8	35.3	*d,e*
Medical use of prescription opioids	14.0	76.1	71.4	46.7	*a,b,c,e,f*

[a] Based on logistic regression (no past-year use vs. nonmedical use to relieve pain only): p < .01

[b] Based on logistic regression (no past-year use vs. nonmedical use to relieve pain and other motives): p < .01

[c] Based on logistic regression (no past-year use vs. non-pain relief motives only): p < .01

[d] Based on logistic regression (nonmedical use to relieve pain only vs. to relieve pain and other motives): p < .01

[e] Based on logistic regression (nonmedical use to relieve pain only vs. motives other than to relieve pain): p < .01

[f] Based on logistic regression (nonmedical use to relieve pain and other motives vs. motives other than to relieve pain): p < .01