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Nonmedical use of prescription opioids among U.S. college students: Prevalence and correlates from a national survey

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Abstract

Objectives—This study examined the prevalence rates and correlates of nonmedical use of prescription opioid analgesics among U.S. college students in terms of student and college characteristics.

Methods—This study analyzed data from a nationally representative sample of 10,904 randomly selected students attending 119 four-year colleges in 2001.

Results—The lifetime prevalence of nonmedical prescription opioid use was 12% and the past year prevalence was 7%. Approximately one in every four colleges had a prevalence of 10% or higher for past year nonmedical use of prescription opioids. Multivariate regression analyses indicated nonmedical use was more likely to occur among college students who were white, residents of fraternity and sorority houses, attended more competitive colleges, earned lower grade point averages, and reported higher rates of substance use and other risky behaviors.

Conclusions—This study provides evidence that the nonmedical use of prescription opioids represents a problem on college campuses. These findings have important implications for developing prevention efforts and therapeutic strategies aimed at reducing the nonmedical use of prescription opioid analgesics among college students while not hindering necessary medication management for pain.

Keywords

Prescription opioids; College students; Substance abuse; Prevalence; Substance use; Drug abuse

1. Introduction

Prescription opioid analgesics are potent pain relievers that are efficacious when utilized in both acute and chronic pain related conditions (Savage, 2003). Yet, despite the medical necessity of prescription opioid analgesics, there is growing concern regarding the high abuse potential of these medications (Zacny et al., 2003). Indeed, several national studies and reports

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(e.g., Johnston, O'Malley, & Bachman, 2003a,2003b,2003c;SAMHSA, 2002a,2002b,2003a, 2003b) as well as anecdotal case reports (e.g., Crowther, 1974;DeSio, Bacon, Peer, & Lema, 1993;Reynaud, Petit, Potard, & Courty, 1998;Yewell, Haydon, Archer, & Manaligod, 2002) provide strong evidence that the nonmedical use and abuse of prescription opioids represents an increasing problem among young adults and college students in the United States. The *Monitoring the Future* (MTF) study reported that the nonmedical use of many prescription opioids by college students and other young adults aged 18–22 is now at its highest level in the past two decades (Johnston et al., 2003a,2003b,2003c).

Currently, approximately 1 in every 10 Americans between the ages of 18 and 25 report the nonmedical use of opiate analgesics in the past year (Johnston et al., 2003a;SAMHSA, 2002a). Among four different classes of psychotherapeutic drugs (opioid analgesics, tranquilizers, stimulants, and sedatives), opioid analgesics was the class with the greatest nonmedical use, abuse, and dependence according to the 2001 National Household Survey on Drug Abuse (NHSDA) (Zacny et al., 2003). The NHSDA incidence data revealed a fourfold increase in the overall nonmedical use of prescription opioids in the past two decades. In particular, more than two million individuals in the United States aged 12 or older initiated nonmedical use of opioid analgesics for the first time in 2000; this is in contrast to only 400,000 annual initiators in the mid-1980s. Within those aged 18–25 years, there were statistically significant increases in the lifetime nonmedical use of a variety of opioid analgesics between 2000 and 2001 (e.g., hydrocodone, morphine, and oxycodone) (SAMHSA, 2002b).

National studies of college students have reported increases in the nonmedical use of prescription opioid analgesics; *The Harvard School of Public Health College Alcohol Study* (CAS) reported an increase in the nonmedical use of opioid-type drugs in the past decade (Gledhill-Hoyt, Lee, Strote, & Wechsler, 2000;Mohler-Kuo, Lee, & Wechsler, 2003) and the MTF study found an appreciable increase over the past two decades in the nonmedical use of opioid analgesics among high school seniors and college students (Johnston et al., 2003a, 2003b,2003c). Table 1 illustrates the databases used to determine recent national prevalence rates of nonmedical use of prescription opioid analgesics among college students and young adults.

While these national reports clearly provide valuable information regarding the prevalence of this form of drug abuse, unfortunately, they offer a limited understanding of the risk factors associated with the nonmedical use of opioid analgesics on college campuses. Information concerning the prevalence of nonmedical use of prescription opioid analgesics at individual colleges or universities remains very limited as compared to what is known about heavy drinking and other drug use behaviors (Gledhill-Hoyt et al., 2000;Johnston et al., 2003a;O'Malley & Johnston, 2002;Strote, Lee, & Wechsler, 2002;Wechsler et al., 2002). While the national prevalence of heavy drinking among college students has remained steady for the past decade, the nonmedical use of prescription opioid analgesics has increased significantly among college students (Gledhill-Hoyt et al., 2000;Johnston et al., 2003a;Mohler-Kuo et al., 2003). Little epidemiological research exists that accurately assesses the characteristics of those individuals most at risk for nonmedical use of prescription opioid analgesics (Zacny et al., 2003).

Anecdotal case reports also documented the nonmedical use of prescription opioid medications in the United States among college student and young adult populations (e.g., Crowther, 1974;DeSio et al., 1993;Reynaud et al., 1998;Yewell et al., 2002). As early as the mid-1970s, Crowther (1974) reported on the nonmedical use of opioid analgesics in college populations, and more recently, DeSio et al. (1993) noted that the fentanyl patch was being abused intravenously. Anecdotal case reports illustrate the severe consequences that can occur

among young adults. For example, the harmful consequences from the intranasal abuse of prescription opioid analgesics, including hydrocone, codeine, oxycodone, and methadone, have been reported in a case series of five patients (Yewell et al., 2002). The Drug Abuse Warning Network (DAWN) data also suggest that there are harmful consequences associated with the nonmedical use of prescription opioid analgesics (SAMHSA, 2003a). For instance, DAWN data indicate that the overall mention of opioid analgesics/combinations by Emergency Departments (EDs) significantly increased from 1995 to 2002 (163%). Emergency department visits naming hydrocodone/combinations increased 160% in 2002 and hydrocodone/combinations were the most commonly named pain reliever/s reported to DAWN (SAMHSA, 2003a). These anecdotal case reports and surveillance data provide valuable information about the potential risks associated with the nonmedical use of opioid analgesics but provide little specific information about what subpopulations are at the greatest risk for the nonmedical use of opioid analgesics.

If health professionals are to develop evidence-based prevention and treatment practices to reduce the nonmedical use of opioid analgesics, it is apparent that more information about this abuse problem is needed (Zacny et al., 2003). To date, there have been no studies that have examined the risk factors associated with the nonmedical use of prescription opioid analgesics within a nationally representative sample of college students. Thus, the purpose of the present study was: (1) to assess the prevalence of nonmedical use of prescription opioid analgesics within a large representative sample of college students and (2) determine the factors associated with nonmedical use in terms of student and college characteristics and other substance use behaviors.

2. Methods

2.1. Study population and data collection

The present study used data from the 2001 CAS of 119 American four-year colleges and universities in 40 states. An administrator from each college or university provided a random sample of 215 college students. One school was excluded because the response rate was considerably lower than the other 119 schools. A total of 10,904 students returned questionnaires, yielding an overall response rate of approximately 52% (range 22%–86%). Response rate was not associated with the main outcome variable (i.e., the Pearson correlation coefficient between the nonmedical use of opioid analgesic medication and the response rate at the college level was 0.04 in absolute value with p=0.694). Consistent with previous studies, the data were weighted based on gender, age, and ethnicity in order to be more representative of each school. Study design and procedures are described in more detail elsewhere (Wechsler et al., 2002).

The final sample of 119 colleges closely resembled the U.S. distribution of students enrolled full-time at four-year colleges and universities in the United States (Knapp et al., 2004). Sixty-nine percent of students attended public institutions and 31% attended private institutions. Sixty-nine percent of students attended schools in medium- to large-sized cities and 31% attended colleges in small towns and rural areas. Eighty-seven percent of students attended nonreligiously affiliated colleges and 13% attended religiously affiliated schools. Forty-seven percent of students attended large institutions (>10,000 students), 23% medium-sized institutions (5,001–10,000 students), and 29% small institutions (1,000–5,000 students). Twenty-three percent of students attended schools located in the Northeast, 29% in the South, 30% in the Midwest, and 18% in the West. Finally, five percent of students attended women's colleges and 2% attended Historically Black Institutions.

2.2. Measures

2.2.1. Nonmedical use of prescription opioid analgesics—Respondents were asked "How often, if ever, have you used any of the drugs listed below? Do not include anything you used under a doctor's orders." Drug items included "Other opiate-type prescription drugs (codeine, morphine, Demerol, Percodan, Percocet, Vicodin, Darvon, Darvocet)." The response scale was: (1) never used; (2) used, but not in the past 12 months; (3) used, but not in the past 30 days; and (4) used in the past 30 days.

2.2.2. Cigarette use—Respondents were asked "How often, if ever, have you used any of the drugs listed below? Do not include anything you used under a doctor's orders." Drug items included "cigarettes." The response scale for cigarette smoking was the same as nonmedical use of prescription opiate analgesics.

2.2.3. Alcohol use—Heavy episodic drinking (or binge drinking) is defined as the consumption of at least five drinks in a row for men and at least four drinks in a row for women during the 2 weeks preceding completion of the questionnaire (Wechsler, Dowdall, Davenport, & Rimm, 1995). *Frequent binge drinking* was defined as having three or more binge drinking episodes in the past 2 weeks.

2.2.4. Illicit drug use—Respondents were asked "How often, if ever, have you used any of the drugs listed below? Do not include anything you used under a doctor's orders." Drug items included marijuana, cocaine, prescription stimulants (Ritalin, Dexedrine, or Adderall), and ecstasy. The response scale for each these drugs was the same as nonmedical use of prescription opioid analgesics.

2.3. Data analysis

Data analysis included 10,904 college student respondents from 119 institutions. Statistical analyses were carried out using STATA software package for analysis of complex sample survey data (StataCorp, 2001). Data were weighted to account for colleges' varying sampling fractions. We used contingency tables to present the prevalence estimates of nonmedical use of prescription opioid analgesics in terms of student and college characteristics. Differences among the prevalence of nonmedical use between student and college characteristics were compared using Pearson chi-square statistics. Multiple logistic regressions were used to model student and college characteristics with past year nonmedical use of prescription opioid analgesics, using characteristics that were significantly associated with past year nonmedical use of prescription opioid analgesics according to the bivariate results ($p<0.05$). Adjusted odds ratios (OR) for student and college characteristics and 95% confidence intervals (CI) were reported. A similar multivariate approach was used to examine substance use behaviors associated with nonmedical use of prescription opioid analgesics. We used STATA to obtain correct standard errors of the estimated regression coefficients accounting for the clustered design of the sample.

3. Results

3.1. Prevalence of nonmedical use

Approximately 12% of college students reported lifetime nonmedical use of prescription opioid analgesics, 7% reported nonmedical use in the past year, and 3% reported nonmedical use in the past month. As illustrated in Table 2, according to bivariate analyses, the past year prevalence of nonmedical use of prescription opioid analgesics differed significantly as a function of race/ethnicity, living arrangement, and grade point average. Gender, age, fraternity/

sorority membership, and parental level of education were not significantly related to the nonmedical use of prescription opioid analgesics.

There was a great deal of variation across campuses with respect to the nonmedical use of prescription opioid analgesics in the past year (range 0%–20%). As illustrated in Fig. 1, there were 29 schools that had an aggregate annual prevalence of 10% or higher and only three schools had an annual prevalence of 0%.

As illustrated in Table 3, according to bivariate analyses, the prevalence of nonmedical use of prescription opioid analgesics differed significantly as a function of admission competitiveness and Historically Black School status. Students attending less competitive colleges and Historically Black Schools reported lower levels of nonmedical use. There were no differences in the nonmedical use of prescription opioid analgesics as a function of public vs. private status, geographical region, commuter status, coeducational status, size of enrollment or urbanization.

3.2. Multivariate analyses

Multivariate logistic regression analyses indicated that past year nonmedical use of prescription opioid analgesics was higher among college students who were white, residents of fraternity/sorority houses and off-campus houses, had lower grade point averages and attended more competitive colleges (see Table 4). Most notably, after adjusting for other factors, white students were over two times more likely than African-American and Asian college students to report nonmedical use of prescription opioid analgesics. Non-Hispanic students were over two times more likely than Hispanic college students to report nonmedical use. Residents of off-campus housing and fraternities or sororities were almost two times more likely than students living in same-sex residence halls to use prescription opioids nonmedically. In addition, students who earned a B or lower grade point average were almost two times more likely to report nonmedical use as compared to students who earned a B+ or higher. Finally, students who attended colleges with competitive or highly competitive admissions criteria were more likely than students who attended less competitive colleges to report nonmedical use of prescription opioid analgesics.

Gender interactions in risk factors for nonmedical use of prescription opioid analgesics were examined to determine whether there were significant differences in the effects of risk factors between college men and women. A multiple risk factor approach that included a gender interaction term for each risk factor from Table 4 was run using logistic regression. The only statistically significant gender interaction found for nonmedical use was for competitiveness of college admissions. In particular, attending more competitive colleges served as a stronger risk factor for nonmedical use of opioid analgesics among college men as compared to college women (p=0.042).

3.3. Other substance use and risky behaviors

As illustrated in Table 5, substance use and other risky behaviors were highly associated with the nonmedical use of prescription opioid analgesics after adjusting for student and college characteristics. For instance, nonmedical prescription opioid users were over four times more likely to report frequent binge drinking, over eight times more likely to report marijuana use in the past year, over 13 times more likely to report cocaine use in the past year, over four times more likely to report driving after binge drinking, and almost six times more likely to report being a passenger with a drunk driver than college students who had not used prescription opioid analgesics nonmedically.

At the college level of analyses, the correlation of nonmedical use of prescription opioid analgesics and substance use at the 119 colleges and universities was examined. The correlation between a school's aggregate rate of past year nonmedical use of prescription opioid analgesics and marijuana use in the past year was r=0.51 (p<0.001), nonmedical use of prescription stimulants in the past year was r=0.45 (p<0.001), and level of binge drinking in the past two weeks was r=0.32 (p<0.001).

4. Discussion

The prevalence rates of nonmedical use of prescription opioid analgesics in the present study were slightly higher than prevalence rates based on 2001 MTF results of college students nationally (Johnston et al., 2003a), but lower than American young adults ages 18–25 according to the 2001 NHSDA results (SAMHSA, 2002a). The different prevalence rates between the present study and other national studies can be partially attributed to differences in survey modes, question wording, and study populations (Fendrich & Johnson, 2001;Gfroerer, Wright, & Kopstein, 1997). Despite the differences in prevalence rates, these three national studies converge in the finding that the nonmedical use of opioid analgesics is rapidly becoming second only to marijuana as the most common form of drug use among young adults and college students in the United States (Johnston et al., 2003a;Mohler-Kuo et al., 2003;SAMHSA, 2002a).

In the present study, nonmedical use of prescription opioid analgesics was higher among certain types of college students, in particular among white students, residents of fraternity and sorority houses, residents of houses located off-campus, students with a lower grade point averages, and students attending more competitive four-year colleges and universities. Many of these student characteristics have been shown previously to be associated with the higher rates of substance use among college students and young adults such as heavy episodic drinking (e.g., Cashin, Presley, & Meilman, 1998;Wechsler, Lee, Kuo, & Lee, 2000;Wechsler et al., 2002), marijuana use (e.g., Bell, Wechsler, & Johnston, 1997;Gledhill-Hoyt et al., 2000), and ecstasy use (e.g., Strote et al., 2002;Yacoubian, 2003).

There was no gender difference in the nonmedical use of opioid analgesics, which is consistent with other national samples of college students (Johnston et al., 2003a). In the present study, the higher rates of nonmedical prescription opioid analgesics found among white college students as compared to other racial groups paralleled recent racial differences found among high school seniors (Johnston et al., 2003b). The higher nonmedical rates of prescription opioid analgesics among residents of sorority and fraternity houses is consistent with studies that have found higher rates of other drug use and heavy drinking among college students living in fraternities and sororities (Bell et al., 1997;Cashin et al., 1998;Larimer, Anderson, Baer, & Marlatt, 2000;Wechsler et al., 2002).

The annual rates of nonmedical use of prescription opioid analgesics found in the present study were almost identical for college students under 24 years of age and for those older than 24 years. Unlike national trends for heavy drinking and other drug use, where lower usage rates are observed among college students older than 24 years of age (Babcock & Byrne, 2000;Gledhill-Hoyt et al., 2000;Strote et al., 2002;Wechsler et al., 2002), we found the opposite. In the older age group—when drug use typically declines—nonmedical use of prescription opioids did not decrease. And thus, it appears prescription opioid abuse poses a unique risk for older college students and thereby deserves far greater research attention.

Approximately one in every four schools had an annual prevalence of 10% or higher for aggregate nonmedical use of prescription opioids. At the college level, the prevalence of

nonmedical opioid use co-occurred with a high prevalence of marijuana use and nonmedical use of prescription stimulants; and to a lesser extent with binge drinking. With the exception of admissions standards, there were not many college-level characteristics that were significantly associated with the nonmedical use of prescription opioids. Collectively, these findings provide evidence that this form of drug abuse is pervasive across four-year colleges and universities in the United States.

The present study found that nonmedical users of prescription opioid analgesics were significantly more likely to use other drugs and engage in other risky behaviors. We found that the higher rates of substance use and other risky behaviors and lower grade point averages found among nonmedical users of prescription opioid analgesics provides evidence that nonmedical use of prescription opioid analgesics is part of a pattern of polydrug use and likely represents part of a larger cluster of problem behaviors among college students (Jessor, Donovan, & Costa, 1991). Furthermore, college students who obtain opioid analgesics from nonphysician sources are unlikely to receive the appropriate information about its actions and possible negative interactions with other licit or illicit drugs.

The trends in prescription rates of opioid analgesics are relevant to the discussion of nonmedical use of opioid analgesics. Recent reports have noted increases in the prescribing rates of opioid analgesics in the United States (Joranson, Ryan, Gilson, & Dahl, 2000;Zacny et al., 2003;Zito et al., 2003). The rise in medical prescriptions for opioid analgesics may be due to several factors, including an increased awareness of the undertreatment of pain among children and adolescents (Howard, 2003), and the availability of new analgesic products. Despite the efficacy of prescription opioid analgesics in treating pain, the increase in prescription rates has raised some public health concerns because of their increased availability and potential for nonmedical use. There have been mixed results regarding whether the increased availability of prescription opioid analgesics to treat pain has led to increases of abuse (Joranson et al., 2000;Zacny et al., 2003). Joranson et al. (2000) found that the increase in the medical use of opiate analgesics did not appear to contribute to increases in opioid analgesic abuse while Zacny et al. (2003) did observe heightened risk for abuse. Despite these mixed findings, there is a clear need to strike a balance between the medical necessity to treat patients with prescription opioid medications and the need to reduce nonmedical use of these abusable drugs (Joranson et al., 2000;Ling, Wesson, & Smith, 2003;Simoni-Wastila & Tompkins, 2001).

This study did not assess medically prescribed use of prescription opioid analgesics or pain diagnosis information so it was not possible to assess how many students with legitimate prescriptions for opioid analgesics may have misused their own or someone else’s opioid analgesic medication. Future research should be conducted to better characterize nonmedical users and examine how prescription drugs are diverted to nonmedical use among college students. Another study limitation was the absence of individual and contextual variables that might be associated with nonmedical use of prescription opioid analgesics, such as diagnosis of substance use disorders or diagnosis of acute and chronic pain; such information was not collected. As the data were cross-sectional, inferences about causality were limited and we could not assess whether certain risk factors preceded initiation of nonmedical use of prescription opioid analgesics. Longitudinal data are needed to further examine these causal relationships. We did not have information regarding the quantity of prescription opioids that students were using nonmedically on each occasion, reasons for nonmedical use, route of administration, or if these students were using prescription opiates concurrently with alcohol and other drugs. Future work examining these areas will help to clarify to what extent college students are abusing opioid analgesics.

The present study was subject to the limitations of self-report surveys. However, such surveys have been widely used and are considered generally valid in examining substance use when certain conditions of confidentiality are met (Harrell, 1997;Johnston & O'Malley, 1985;O'Malley, Bachman, & Johnston, 1983;O'Malley & Johnston, 2002). For instance, it was made clear to students in the present study that participation was voluntary, the relevance of the study was explained, and respondents were assured that their responses would remain anonymous. Additionally, nonresponse may have introduced potential bias in the present study. While we can never fully eliminate the possibility of bias introduced through nonresponse, we tried to minimize the impact through weighting procedures. Further, we examined the impact of the response rate and found no significant relationship between response rate and the rate of nonmedical use of opioid analgesics. Finally, the rates of nonmedical use of prescription opioid analgesics reported in this study were comparable to rates found in other similar national results of college students in 2001 (Johnston et al., 2003a,2003b).

The findings of the present study have several important implications for future practice. Given the therapeutic efficacy of prescription opioid analgesics for the treatment of acute and chronic pain (Savage, 2003), there is a need to balance the medical necessity of these drugs and the risk for nonmedical use and abuse among college students. Physicians should instruct all patients who require opioid analgesics for pain about the abuse potential of these medications. Since college students are often responsible for their own medication, physicians should instruct those who live away at college to be sure to store their prescriptions in a secure location. Physicians might also suggest to patients that they limit informing roommates and other peers about their prescriptions, to avoid both possible theft and pressure to divert medication to others. For patients with co-occurring chronic pain and substance use disorders, physicians should maximize the use of non-opioid analgesics, such as non-steroidal anti-inflammatory agents. Furthermore, physicians should supply appropriate amounts of pain medication to adequately treat symptoms, while frequently monitoring patients for both symptoms of pain and addictive behaviors. When needed, treatment contracts can be used, in which patients agree to limit themselves to one prescriber, one pharmacy, and to policies that have been established between the physician and the patient regarding prescription refills (Weaver & Schnoll, 2002). Novel medications that may have less abuse potential (e.g., glutamate modulators, serotonin/norepinephrine reuptake inhibitors, and anticonvulsants, etc.) and/or that exert their mechanism of action independent of the opiate pathway are in development for the treatment of pain (Nitu, Wallihan, Skljarevski, & Ramadan, 2003). Another promising strategy is the development of new delivery systems that provide a gradual onset and sustained delivery of medication but cannot be altered for intranasal or intravenous administration.

Considering the recent increases in the nonmedical use of prescription opioid analgesics among college students and young adults (Johnston et al., 2003a,2003b,2003c), it is imperative to continue monitoring this drug use behavior over time and to develop and evaluate prevention programs aimed at reducing prescription drug abuse. Because the current study focused on nonmedical use and not on opioid dependence, longitudinal research is necessary to examine the relationship between nonmedical use of prescription opioid analgesics and development of substance use disorders (Zacny et al., 2003). Past research has shown that heavy drinking and other substance use, except for cigarette smoking, tends to decline as college students assume post-college responsibilities (Bachman, Wadsworth, O'Malley, Johnston, & Schulenberg, 1997;Bachman et al., 2002;Schulenberg & Maggs, 2002). However, it remains unknown whether these post-college substance use patterns of decline hold true for the nonmedical use of prescription opioid analgesics. Based on the relatively high rates of nonmedical use of opioid analgesics observed among older college students in the present study, future research would benefit from examining the long-term usage patterns of prescription opioid medications by undergraduate students beyond college into young adulthood. Findings from the present study

provide strong support that the nonmedical use of prescription opioid analgesics represents a problem on college campuses that needs to be deterred with effective prevention efforts and therapeutic strategies while not hindering necessary medication management for pain.

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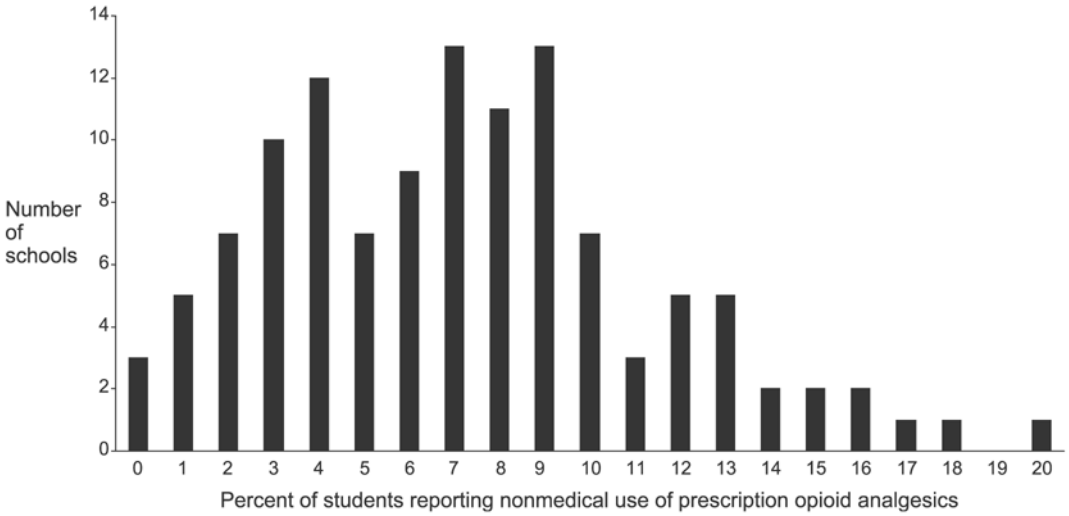

Fig 1.
Distribution of nonmedical use of prescription opioid analgesics across 119 colleges, 2001.

Table 1

Prevalence of nonmedical use of prescription opioids among college students and young adults in the United States

Author(s)	Study	Methodology and population	Sample	Response rate	Opioid analgesic	Prevalence rate
Gledhill-Hoyt et al., 2000	College Alcohol Study	Cross-sectional, mailed paper surveys of a random nationally representative sample of college students attending 119 four-year colleges and universities in 1999	*N*=14,138	59%	Other opiate-type prescription drugs (including codeine, Demerol, and Percodan)	Past year=4.4% Past month=1.3%
Johnston et al., 2003a,2003b, 2003c	Monitoring the Future Study	Longitudinal mailed paper survey of a national sample of college students 1–4 years past high school enrolled full-time in a two- or four-year colleges or universities (modal ages 19–22) in the spring of 2001	*N*=1260	67%	Narcotics other than heroin (e.g. methadone, morphine, Demerol, Talwin, opium, codeine, paregoric, laudanum)	Lifetime=11.0% Past year=5.7% Past month=1.7%
Mohler-Kuo et al., 2003	College Alcohol Study	Cross-sectional, mailed paper surveys of a random nationally representative sample of college students attending 119 four-year colleges and universities in 2001	*N*=10,904	52%	Other opiate-type prescription drugs (codeine, morphine, Demerol, Percodan, Percocet, Vicodin, Darvon, Darvocet)	Past year=7.3% Past month=2.9%
Office of Applied Studies, 2003	National Survey on Drug Use and Health	Cross-sectional, in-home audio-CASI interview of a national sample of young adults ages 18–25 living in American households in 2001	*N*=22,931	75%	Pain relievers (e.g. Vicodin, codeine, Percocet, Darvocet, morphine, oxycontin, Demerol, hydrocodone, methadone)	Lifetime=18.2% Past year=9.6% Past month=3.6%

Table 2

Prevalence of past year nonmedical use of prescription opioids by student characteristics, 2001

Student characteristics	Sample (*n*)	Past year use (%)	χ^2 *p*-value[a]
Gender			
Female	6952	6.7	*p*<0.112
Male	3872	7.7	
Race			
White	8197	8.2	*p*<0.001
African-American	790	3.4	
Asian	835	2.5	
Other	941	6.6	
Hispanic			
Non-Hispanic	9949	7.4	*p*=0.001
Hispanic	831	4.4	
Age			
Under 21	5444	7.1	*p*=0.954
21–23	3959	7.1	
24 or older	1439	7.4	
Living arrangement			
Single-sex residence hall	1296	4.9	*p*=0.005
Co-ed residence hall	2548	6.7	
Other university housing	399	4.6	
Fraternity/sorority house	267	10.3	
Off campus house/other	6247	7.8	
Fraternity/sorority membership			
Non-member	9402	6.9	*p*=0.083
Member	1332	8.7	
Grade point average			
B or lower	4668	8.5	*p*<0.001
B+ or higher	6180	6.0	
Father's level of education			
Less than high school diploma	665	5.5	*p*=0.198
High school diploma	1920	5.7	
Some college	2746	7.2	
Four-year college degree or more	5190	7.8	
Don't know or not applicable	290	6.6	
Mother's level of education			
Less than high school diploma	588	5.3	*p*=0.305
High school diploma	2382	6.1	
Some college	3196	7.9	
Four-year college degree or more	4520	7.3	
Don't know or not applicable	114	9.9	

[a] Chi-square *p*-values indicate whether distributions are significantly different by student characteristics.

Table 3

Prevalence of past year nonmedical use of prescription opioids by college characteristics, 2001

College characteristics	College sample (*n*)	Student sample (*n*)	Past year use (%)	χ^2 *p*-value[a]
Admission criteria				
Less competitive	26	2291	5.1	*p*=0.032
Competitive	71	6380	7.7	
Most competitive	22	2177	7.4	
Type of college				
Private	38	3318	6.6	*p*=0.398
Public	81	7530	7.3	
Geographical region				
Northeast	29	2548	7.5	*p*=0.207
South	37	3163	7.4	
Midwest	33	3207	5.9	
West	20	1930	8.1	
Commuter status				
Noncommuter school	104	9508	7.3	*p*=0.209
Commuter school	15	1340	6.2	
Co-ed status				
Co-educational	114	10,333	7.1	*p*=0.617
Women only	5	515	6.3	
Historically Black Status				
Non-Historically Black	116	10,628	7.2	*p*=0.009
Historically Black	3	220	2.0	
Size of enrollment				
<1,000 students	9	584	8.1	*p*=0.645
1,000–5,000 students	29	2597	6.3	
5,001–10,000 students	28	2532	7.0	
>10,000 students	53	5135	7.5	
Urbanization				
Suburban/urban	87	8044	7.3	*p*=0.458
Rural/small town	32	2804	6.7	

[a] Chi-square *p*-values indicate whether distributions are significantly different by college characteristics.

Table 4

Correlates of nonmedical use of prescription opioids in the past year by student and college characteristics[a]

Characteristic	Adjusted odds ratios	95% CI	*p*-value
Race			
White	–	–	–
African American	0.43	0.29–0.66	<0.001
Asian	0.27	0.16–0.44	<0.001
Other	1.12	0.66–1.90	0.680
Hispanic status			
Non-hispanic	–	–	–
Hispanic	0.45	0.26–0.80	0.007
Living arrangement			
Single-sex residence hall	–	–	–
Co-ed residence hall	1.33	0.94–1.87	0.106
Other university housing	0.91	0.52–1.60	0.749
Fraternity/sorority house	2.00	1.09–3.65	0.025
Off campus house/other	1.69	1.25–2.30	0.001
Grade point average			
B or lower	–	–	–
B+ or higher	0.62	0.53–0.72	<0.001
Admission criteria			
Less competitive	–	–	–
Competitive	1.49	1.14–1.93	0.004
Most competitive	1.62	1.10–2.38	0.015
Historically Black Status			
Non-Historically Black	–	–	–
Historically Black	0.64	0.20–2.07	0.455

– reference category.

[a]The sample size for the full model was 10,650 cases.

Table 5

Substance use behaviors associated with past year nonmedical use of prescription opioid analgesics[a]

Substance use behaviors	Adjusted OR[b]	95% CI	*p*-value
Tobacco and alcohol use			
Cigarette use in the past 30 days	4.63	3.90–5.50	<0.001
Frequent binge drinking in past 2 weeks	4.09	3.26–5.12	<0.001
Illicit drug use in the past 30 days			
Marijuana	6.80	5.58–8.29	<0.001
Cocaine	15.06	9.88–22.97	<0.001
Prescription stimulants	12.38	8.35–18.34	<0.001
Ecstasy	11.34	8.19–15.72	<0.001
Illicit drug use in the past year			
Marijuana	8.46	6.85–10.45	<0.001
Cocaine	13.88	10.37–18.57	<0.001
Prescription stimulants	12.85	9.93–16.62	<0.001
Ecstasy	12.71	10.52–15.36	<0.001
Other risky behaviors in the past 30 days			
Drove after binge drinking	4.21	3.37–5.26	<0.001
Passenger with a drunk driver	5.70	4.64–6.99	<0.001
Drove after drinking alcohol	3.31	2.70–4.05	<0.001

[a] The sample sizes for models ranged from 10,476 to 10,550.

[b] Odds ratios are adjusted for all other predictors in the model and the reference group for each model was students who did not report nonmedical use of opioid analgesics in the past year. All of the models also included the following student and college characteristics: gender, race, Hispanic status, age, living arrangement, parental education, fraternity/sorority membership, grade point average, size of student enrollment, admissions competitiveness, public/private status, geographical region, and commuter status. The results for these variables were not shown.