Research Article

Non-medical Prescription Drug Use among University Students

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ABSTRACT

Background: *Non-medical prescription drug use is an increasing problem among university students.* ***Purpose:*** *The present study investigated university students' involvement in non-medical prescription drug (NMPD) use and associations between use and other risky behaviors.* ***Methods:*** *A sample of 363 university students completed a four page survey assessing involvement in NMPD use and risky behaviors.* ***Results:*** *Results indicated that approximately one in three university students have used prescription drugs without a doctor's prescription. Pain medication (22.4%) was the number one misused prescription drug followed by stimulants (17.5%). Almost half of university students reported using NMPDs with alcohol. Logistic regression analyses revealed being male and being a junior or senior increased the odds of involvement in NMPD use. Additional analyses revealed engaging in NMPD use was associated with increased odds for cigarette use, marijuana use, and suicidal ideation.* ***Discussion:*** *Health professionals should educate students about the dangers of NMPD use and attempt to identify students at high risk.* ***Translation to Health Education Practice:*** *Prevention programs should be developed to target university students who may be at risk for misuse.*

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BACKGROUND

In recent years, the prevalence of non-medical prescription drug (NMPD) use has increased considerably and trends indicate that this is a growing public health problem.[1] According to the National Institute on Drug Abuse,[2] approximately 4 million people reported using NMPDs, which is commonly defined as using prescription drugs obtained without a doctor's prescription. From 1993 until 2005, statistics demonstrate a 342% increase in recent use (past 30 days) of non-medical prescription drugs among U.S. college students.[3] In particular, evidence suggests a steady increase in the non-medical use of drugs including prescription pain relievers, psychotherapeutics, tranquilizers, stimulants and sedatives.[4] Research indicates prevalence rates of NMPD use among university students range from 14% to 25%.[3,5,6]

Physical and psychological dependence is commonly recognized as a consequence of NMPD use.[7] Other long-term effects of prescription drug misuse include paranoia, increased body temperatures, irregular heartbeat and compulsive use.[7] Poisoning and death from NMPDs have increased with the rise in misuse with unintentional poisoning deaths increasing markedly since 1999.[8,9] In addition, research indicates an estimated 500,000 visits to the emergency room each year due to NMPD use.[10]

Previous studies indicate that white males tend to engage in NMPD use more

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frequently than their female counterparts.[11] Teter, McCabe, LaGrange, Cranford and Boyd[12] found that white and Latino college students engage in NMPD use at higher rates than African American and Asian students. Additional findings reveal university students involved in fraternity and sorority members are more likely to engage in this behavior than non-members. Students attending commuter schools and schools with competitive academic standards are also at high risk for NMPD use.[13]

Overall, university students are at high risk for engaging in NMPD use.[14] As this behavior increases among university students, the reciprocal effect may be an expanding acceptance of this behavior on campuses as well as increases in access to prescription drugs from peers.[13] Non-medical prescription drug use is increasingly accepted among university students as a socially accepted behavior and a common method of increasing study time.[1] As such, NMPDs are widely available on campuses and relatively easy to obtain.[1,14,15] Previous research has identified that stress related to academics is common among university students and first use of prescription drugs usually occurs during periods of elevated stress.[1,13] Specifically, university students are relying on stimulant medication, such as Adderall, Ritalin, and Dexedrine to improve academic performance.[1,11] However, research indicates that students engaging in past year NMPD use have significantly lower GPAs than their counterparts.[16] Additional motivating factors for engaging in NMPD use have been identified and such factors include pain relief, experimentation, desire to get high, relaxation, improved concentration and increased overall alertness.[6,13]

Regarding risky behaviors, limited research exists regarding non-medical prescription drug use and other risky behaviors. Research suggests students engaging in NMPD use also engage in other substance abuse.[17,18] Specifically, previous research on stimulants reveals that stimulant use is associated with increased use of alcohol, cigarettes, cocaine, marijuana and ecstasy.[13] Concerning depression, Ford and Schroeder[1] found students with depression were more likely to use stimulants than non-depressed students. No published study examined non-medical prescription drug use and suicidal ideation and attempts. Research on non-medical prescription drug use and risky behaviors is clearly warranted.

PURPOSE

As NMPD use is an increasing public health concern, additional research is necessary to identify specific factors influencing this behavior among university students as well as risky behaviors associated with use. In so doing, health education professionals may develop prevention and intervention programs, which specifically address university students. Therefore, the present study investigated non-medical prescription drug use among university students and potential relationships between use and other risky behaviors. More specifically, the following research questions were examined: (1) What is the extent of non-medical prescription drug use among university students?; (2) What are common reasons students engage in NMPD use?; (3) What are common reasons students do not engage in NMPD use?; (4) Does use of NMPDs differ based on demographic variables including sex, race, grade level, grades received in past 12 months, involvement in fraternity/sorority?; and (5) Does involvement in risky behaviors including sexual behaviors, substance abuse and suicidal ideation differ based on use of NMPDs?

METHODS

Participants

A total of 363 students in physical activity and health classes ($N = 25$) at one large metropolitan university served as participants of this study. All students were informed that participation was strictly voluntarily. Confidentiality and anonymity of responses were ensured. No student refused to participate.

Instrumentation

A four-page, 78-item survey was developed to examine college students' involvement in non-medical prescription drug use. To establish face validity, the survey was developed based on a comprehensive review of the professional literature and individual discussions with college students, health education professionals and drug prevention specialists. Suggestions were offered from these individuals regarding commonly abused and misused prescription drugs. To establish content validity, the survey was distributed to a panel of experts in drug prevention, health education and survey research. Suggested revisions and recommendations offered by the experts were discussed by the research team and incorporated into the final survey instrument if deemed appropriate.

The survey comprised seven major sections. Section one (Involvement in NMPD Use) assessed college students' involvement in NMPD use ($N = 15$ items) and required students to answer by checking the appropriate boxes. Section two (Reasons for Use) examined reasons for NMPD use ($N = 14$) and required students to answer by circling the appropriate boxes. Students who had ever used NMPDs could select more than one reason why they had ever used NMPDs. Section three (Use of Other Substances) assessed students' use of alcohol, tobacco and other drugs when using NMPDs ($N = 11$) and required students to check the appropriate box. Section four (Reasons for Not Using NMPDs) assessed reasons students' do not use non-medical prescription drugs ($N = 10$) and required students to circle the appropriate box. Section five (Sources of Information) examined sources of information for obtaining information about prescription drugs ($N = 3$) and required students to check the appropriate box. Section six (Health Behaviors) examined student involvement in selected health behaviors and required students to answer by filling-in-the-blanks ($N = 15$ items). Health behavior questions were modeled after those used in the Youth Risk Behavior Survey by the Centers for Disease Control and Prevention. Section seven (Demographics) required students to provide demographic and background information ($N = 10$ items) by filling-in-the-blanks and checking the appropriate boxes.

To establish internal consistency reliability, Cronbach α calculations were conducted, which yielded .858 (Reasons for using NMPDs), .843 (Reasons for NMPD use with other drugs), and .868 (Reasons for not using NMPDs). To establish stability reliability, test-retest procedures were utilized by distributing the survey on two separate occasions (seven days apart) to a convenience sample of university students (N = 30). Pearson correlation coefficients were computed to determine test-retest reliability for the parametric subscales (Reasons for Using NMPDs and Reasons for Not Using NMPDs). Test-retest reliability of items was found to be >.85.

Procedures

After obtaining approval from the university institutional review board, surveys were distributed to students enrolled in physical activity and health classes during regularly scheduled class times during the fall of 2009. At the beginning of the class, students were informed of the purpose of the study, the voluntary nature of the survey, and assured that all responses would be kept anonymous and confidential. Students were also informed that they may withdraw from the study at any time if the survey made them uncomfortable. Students who opted to not complete the survey were instructed to sit quietly until all surveys were completed and upon survey completion to turn in their blank survey along with the completed surveys to avoid any possible feelings of discomfort or embarrassment. Surveys were distributed only once in each of the class sessions. All students presented with the survey elected to complete it.

Data Analysis

All data analyses were performed using the Statistical Package for the Social Sciences (SPSS) Version 16.0. Frequency distributions, means and standard deviations were used to describe the demographic and background characteristics of participants. T-tests were performed to determine whether involvement in NMPD use differed based on health behaviors including age of first oral sex, age of first sexual intercourse, number of days used alcohol (past 30 days), number of days binge drank (past 30 days), number of days smoked cigarettes (past 30 days), and number of days smoked marijuana (past 30 days). Logistic regression analyses were performed to determine whether involvement in non-medical prescription drug use differed based on health behaviors including ever had oral sex, ever had sexual intercourse, used alcohol/drugs before last sex, considered attempting suicide (past 12 months), and ever considered attempting suicide. Logistic regression analyses were also performed to determine whether involvement in non-medical prescription drug use differed based on sex, race, membership in a fraternity/sorority, grade level, and grades received in the past 12 months. The following demographic variables were recoded to assist with data analysis: race (white vs. nonwhite), grade level (freshmen/sophomores vs. juniors/seniors/graduate students), and grades received in the past 12 months (mostly A's and B's vs. mostly C's, D's, and F's). To avoid committing a Type I error, the alpha level of significance was set at 0.05.

RESULTS

A total of 363 students completed surveys (100% participation rate). More than half were female (58.0%) and less than half were male (42.0%). Three-fourths (77.7%) of students were white. A total of 14.4% of students were African American, 3.9% were Asian, 0.8% were Hispanic, and 3.1% identified as Other. Regarding grade level, 35.9% were seniors, 21.3% were juniors, 27.5% were sophomores, and 12.3% were freshmen. Half of students (49.0%) reported receiving mostly B's in the past 12 months, whereas 40.6% reported receiving A's, 9.2% reported receiving C's, and 1.1% reported receiving D's. More than half of students (59.5%) reported living off campus, 17.9% reported living on campus, and 21.3% reported living with a parent. A total of 12.8% of students were involved in a fraternity or sorority.

Students' Involvement in NMPD Use

Approximately one in three (32.0%) university students reported ever engaging in non-medical prescription drug use. Of participants, 6.4% used sleeping medication such as Ambien, Halcion, or Restoril, 11.6% used sedative or anxiety medication such as Ativan, Xanax, Valium, or Klonopin, 17.5% used stimulant medication such as Ritalin, Dexedrine, Adderall, or Concerta, and 22.4% used pain medication such as Vicodin, OxyContin, or Tylenol 3 with Codeine without a doctor's prescription. Approximately one in five (21.3%) university students reporting obtain prescription drugs from a friend. Of college students misusing prescription drugs, 6% obtained them from a parent, 5% from a classmate, 5% from a roommate, 3.3% from a sibling, and 0.3% from the Internet.

All students were requested to report any sources used for obtaining information regarding prescription drugs. More than two-thirds (69.3%) of students obtained information regarding prescription drugs from a doctor whereas more than half (57.1%) obtained information from the internet. Three in four (76.2%) students felt information about the side effects of prescription drugs would be helpful in making future decisions about NMPDs. Similarly, 72.4% felt information about potential dangers associated with NMPD use would be helping in making future decisions about use.

Among students using NMPDs, common reasons included more time to study (36.5%), curiosity (36.2%), stress relief (31.9%), and wanting to get high (30.5%). Students using NMPDs strongly disagreed that they engaged in NMPD use because parents told them not to (77.6%), they were pressured by peers (70.7%), and they did not think use could harm them (48.3%). Conversely, among students who have never used NMPDs, common reasons for not using NMPDs included not wanting to use PDs (72.4%), parents would not approve (65.8%), use would hurt academics (65.4%), and personal beliefs (64.2%). Students who have never used strongly disagreed that they did not use NMPDs due to lack of access (41.8%) and religious faith (29.2%).

In addition, 46.2% of students engaging in NMPD use in their lifetime reported using

Table 1. Demographic Characteristics

Item	*N*	%
Sex		
Male	150	42.0
Female	207	58.0
Grade		
Freshman	44	12.3
Sophomore	98	27.5
Junior	76	21.3
Senior	128	35.9
Graduate student	11	3.1
Race		
White	276	77.7
Non-white	79	22.2
Grades received past 12 months		
Mostly As/Bs	320	89.6
Mostly Cs/Ds/Fs	37	10.3
Fraternity/Sorority		
Yes	45	12.8
No	306	87.2

N = 363; Missing values excluded

alcohol along with the prescription medication. Approximately one in three reported using tobacco (36.0%) or marijuana (36.5%) with non-medical prescription drugs. Of NMPD users, 8.0% reported simultaneously using another illicit drug. Common reasons for engaging in other drug use with NMPD use included to increase the high (49.2%) and availability (43.1%).

Non-Medical Prescription Drug Use Based on Demographic Characteristics

Logistic regression analyses indicated that males had greater odds of engaging in non-medical prescription drug use than did females (Table 2). Results also found juniors and seniors had greater odds of engaging in non-medical prescription drug use than did freshmen and sophomores. There were no significant differences in use based on race, grades received in the past 12 months, and involvement in a fraternity or sorority.

Lifetime Use and Involvement in Risky Behaviors

Regarding involvement in risky behaviors, results indicated that 78.1% of students engaged in oral sex and 76.6% of students had engaged in sexual intercourse. One in five students (19.9%) used alcohol or drugs before their last oral sex or sexual intercourse. Concerning substance abuse, students reported on average engaging in alcohol 5.07 days (SD = 5.473) in the past 30 days, driving after drinking .42 days (SD = 1.539), and engaging in episodic heavy drinking 3.00 days (SD = 4.012). Students reported smoking cigarettes on average 3.31 days (SD = 8.267) in the past 30 days and smoking marijuana 1.92 days (SD = 5.980). In addition, 3.3% of students reported seriously considering suicide in their lifetime and 3.4% reported considering suicide in the past 12 months.

Independent sample *t*-tests revealed students who had ever used NMPDs reported having a significantly lower age of initiation for oral sex and sexual intercourse than their counterparts (Table 3). In addition, students who had ever used NMPDs reported using cigarettes and marijuana on a significantly greater mean number of days in the past 30 days than did students who had never used NMPDs.

Logistic regression revealed that those who had ever used NMPDs had greater odds of lifetime involvement in oral sex, sexual intercourse and use of alcohol or other drugs before last oral sex/intercourse (Table 4). Regarding suicidal ideation, students who had ever engaged in NMPD use had greater odds of lifetime suicidal ideation and in considering whether to attempt suicide in the past 12 months.

DISCUSSION

The present study found one in three university students reported using non-medical prescription drugs. As aforementioned, previous research found NMPD use ranged from 14% to 25% among university students.[3,5,6] Pain medication was the most commonly misused prescription drug reported by university students. Research indicates that pain is commonly cited as a primary motivator for misuse of prescription drugs among university students.[6,19-21] Misusing prescription drugs for pain management and treatment may be related to access and availability. University students may misuse prescription drugs, which can be obtained from friends or family, rather than seeking professional medical care. Research is needed to explore potential associations between seeking professional medical care and non-medical use of prescription drugs. In addition, many university students assume prescription drugs are safe as these substances are legal and are originally obtained from a physician.[22] Health professionals should target this misconception by providing education to university students on the effects of using prescription drugs and the dangers of sharing prescriptions with others. Physicians can also assist by providing patients with fact sheets and other information on prescription drug misuse. Additional education by health professionals may assist in reducing prescription drug misuse among university students.

In addition, this study found stimulant medication was the second most misused prescription drug. This is in contrast to

Table 2. Non-Medical Prescription Drug Use Based on Demographic Characteristics

Demographic Characteristic	Did Not Use N (%)	Used N (%)	OR	(95% CI)
Sex				
Female	151 (74.0%)	53 (26.0%)	1.0	(1.239, 3.083)
Male	86 (59.3%)	59 (40.7%)	1.955	
Grade				
Freshman/Sophomore	102 (73.9%)	36 (26.1%)	1.0	(.944, 2.559)
Junior/Senior	135 (64.0%)	76 (36.0%)	1.595	
Race				
Non-white	55 (72.4%)	21 (27.6%)	1.0	(.742, 2.286)
White	181 (66.8%)	90 (33.2%)	1.302	
Grades in past year				
Mostly Cs/Ds/Fs	21 (58.3%)	15 (41.7%)	1.0	(.311, 1.272)
Mostly As/Bs	216 (69.0%)	97 (31.0%)	1.689	
Fraternity/Sorority				
Non-member	200 (67.1%)	98 (32.9%)	1.0	(.367, 1.500)
Member	33 (73.3%)	12 (26.7%)	.742	

Note: Crude odds ratios for non-medical prescription drug use comparing students who ever used versus students who have never used.

Table 3. Non-Medical Prescription Drug Use and Involvement in Risky Behaviors

Involvement in Behaviors	M (SD)	*t*	*P*
Age of first oral sex			
Have not used NMPDs	16.85 (2.252)	2.572	0.011
Have used NMPDs	16.16 (1.821)		
Age of first intercourse			
Have not used NMPDs	17.03 (2.388)	2.240	0.026
Have used NMPDs	16.42 (1.646)		
Number of days used alcohol past 30 days			
Have not used NMPDs	4.41 (4.916)	-3.718	0.063
Have used NMPDs	6.77 (6.323)		
Number of days binge drank past 30 days			
Have not used NMPDs	.40 (3.829)	-3.702	0.417
Have used NMPDs	.51 (4.210)		
Number of days smoked cigarettes past 30 days			
Have not used NMPDs	1.27 (4.723)	-7.030	0.000
Have used NMPDs	7.50 (11.678)		
Number of days smoked marijuana past 30 days			
Have not used NMPDs	1.00 (4.514)	-4.223	0.000
Have used NMPDs	3.86 (7.976)		

N = 363; Missing values excluded from analyses

Table 4. Non-Medical Prescription Drug Use and Involvement in Risky Behaviors

Involvement in Behaviors	Did Not Use *N* (%)	Used *N* (%)	OR	(95% CI)
Ever had oral sex	167 (71.4)	104 (94.5)	6.954	(2.912, 16.605)
Ever had sexual intercourse	160 (69.0%)	107 (96.4%)	12.038	(4.271, 33.936)
Used alcohol or other drugs before last oral sex/intercourse	27 (11.5%)	42 (38.5%)	4.829	(2.769, 8.424)
Considered attempting suicide in the past 12 months	4 (1.7%)	7 (6.3%)	3.870	(1.109, 13.510)
Ever considered attempting suicide	15 (6.4%)	16 (14.4%)	2.459	(1.168, 5.177)

Note: Crude odds ratios for non-medical prescription drug use comparing students who ever used versus students who have never used.

previous studies of university students, which found stimulant medication to be the most frequently used NMPD by this population.[23] Stimulants are commonly misused by university students to improve academic performance and increase concentration.[6,20,21,24] This study found more than one in three students reported using non-medical prescription drugs in order to have more time to study. Ford and Schroeder[1] found that students may use stimulants to meet increasing academic demands as well as to cope with outside employment and extra-curricular activities. One in three students in this study reported more time to study as the primary motivation for using non-medical prescription drugs. Previous research has associated stress with substance use among university students.[25] Such information may indicate that offering on-campus workshops and educational programs on time and stress management may aid in increasing study habits, decreasing stress and in turn reducing prescription drug misuse. However, evaluative studies supporting this contention are lacking. More research, especially program evaluations, are needed to determine if efforts to reduce stress on-campus helps to decrease NMPD use among students.

In addition, students may perceive stimulants as a socially accepted behavior specifically when used for additional study time or in the context of social settings. Previous research identified socializing with friends and peers as a primary time for experimentation and use.[4] Recreational use of NMPDs and use of these substances to increase academic achievement may be widely accepted among university students. Further research is warranted, which explore the social norms associated with stimulant use among university students.

In this study, almost half of students who used NMPDs simultaneously engaged in alcohol use, whereas approximately one in three engaged in simultaneous tobacco or marijuana use. Students in this study cited increasing the high and availability of other substances as main reasons for using alcohol or other drugs with NMPDs. Similarly, findings also revealed that students who misused prescription drugs were also using cigarettes and marijuana at greater rates than their non-using peers. Previous studies reveal that use of stimulants is associated with increased use of other substances including alcohol, tobacco, marijuana, and illicit drugs.[13] Concerning sexual behaviors, students using NMPDs had greater odds of engaging in oral sex and sexual intercourse than students who did not use NMPD. Students using NMPDs also engaged in oral sex and sexual intercourse significantly earlier than non-using peers. Jessor's Theory of Problem Behavior suggests risky behaviors cluster and co-occur as students engaging in one risky behavior tend to engage in others.[26] Such information could be used by university health professionals to potentially identify students at risk for misusing prescription drugs. Routinely asking students who report substance use including using cigarettes or marijuana about involvement in prescription drug misuse may provide opportunities for education and open dialogue regarding the dangers associated with prescription drug misuse.

The present study found university students engaging in NMPD use had greater odds of ever considering suicide and ever considering suicide in the past 12 months. University students may be using non-medical prescription drugs as self-medication and as a means of coping with underlying emotional distress, depression and suicidal ideation. In addition, students may be misusing prescription drugs to self-treat, which involves self-medicating to alleviate symptoms commonly treated with prescription medication.[27] McCabe, Boyd, and Teeter[28] found 39% of students misused prescription drugs as a method of self-treatment. Previous research has identified high levels of emotional distress as a health issue on university campuses.[29] Additional emphasis is needed on identifying and treating students at risk for emotional distress, depression and suicidal ideation, which may be a primary factor in non-medical prescription drug use among university students. Increasing counseling and psychological services on university campuses may be necessary to meet the needs of university students and potentially prevent prescription drug misuse. University health educators should advocate for additional prevention and intervention services.

Limitations

The following study limitations should be noted. First, the monothematic nature of the survey may have resulted in response set-

bias in some participants. Second, socially desirable responses may have been elicited from some individuals as data was self-reported. Third, no adjustment was made to the alpha level for the six t-tests performed. A more conservative alpha level may have resulted in different outcomes. Lastly, as this sample comprised students from one urban, Midwestern university results may not be generalizeable to students in other geographic locations.

TRANSLATION TO HEALTH EDUCATION PRACTICE

Findings from this study offer several implications for health educators. As non-medical prescription drug use is an emerging trend, few university campuses address this use with prevention or intervention programs. Currently, substance abuse prevention efforts on university campuses focus predominantly on alcohol use and episodic heavy drinking. Education on prescription drug misuse is lacking.[14] Such education regarding common misconceptions of prescription drugs and the dangers associated with use are crucial for university students as a method of preventing this behavior. In this study, approximately 75% wanted additional information on prescription drug misuse and felt information would be helpful in making decisions to use. Health educators should meet this need by developing and implementing awareness campaigns targeting the dangers of prescription drug misuse and educating university students on potential academic and social consequences of misuse.

As alcohol use is commonly used with prescription drugs, including education on prescription drugs as part of alcohol awareness and education programs currently implemented may be an effective prevention method. Focusing on potential dangers of NMPD use and simultaneous use of alcohol and other drugs may increase perceived severity among many students and reduce overall use. Going further, educating students on appropriate action steps to treat prescription drug abuse and allocating resources on campus are essential approaches to reducing student NMPD use. With these strategies, university infrastructures may need to be addressed. Ensuring adequate counseling and intervention options on campus may be necessary to assist those using NMPDs.

Recommendations for prevention and intervention strategies also include focusing on the individuals supplying prescription drugs to students. As many in this study reporting obtaining NMPDs from friends, targeting the suppliers eliminates access to prescription drugs. DeSantis[13] found students prescribed stimulants did not adhere to the daily dosage, thereby having an excess at the end of the month. Universities may consider implementing polices addressing students supplying others with NMPDs. Educating students on consequences related to selling and illegally distributing prescription drugs to others is also needed and may be a successful approach to decreasing the distribution of NMPDs on university campuses.

In addition to education, future research on non-medical prescription drug use among university students is clearly warranted. Investigating university students' potential associations between academic stress and misuse is needed. Future studies should assess the relationship between NMPD use and substance abuse and other risky behaviors. Also, examining peer norms regarding use would provide valuable insight for health education campaigns. Evaluating the efficacy of future prevention programs is also necessary to ensure quality prevention programming.

REFERENCES

1. Ford JA, Schroeder RD. Academic strain and non-medical use of prescription stimulants among college students. *Deviant Behav*. 2009;30(1):26-53.

2. National Institute on Drug Abuse. Prescription drugs: Abuse and addiction. Research Report Series. Publication Number 01 4881. Bethesda, MD: National Institutes of Health; 2001.

3. Substance Abuse and Mental Health Services Administration. Results From the 2004 National Survey on Drug Use and Health: Detailed Tables. Rockville, MD: Office of Applied Studies; 2005.

4. Quintero, G. Rx for a party: A qualitative analysis of recreational pharmaceutical use in a collegiate setting. *J Am Coll Health*. 2009;58(1):64-72.

5. Gledhill HJ, Lee H, Strote J, Wechsler H. Increased use of marijuana and other illicit drugs at US colleges in the 1990s: Results of 3 national surveys. *Addiction*. 2000;95:1655-1667.

6. Low KG, Gendaszek AE. Illicit use of psychostimulants among college students: A preliminary study. *Psychol Health Med*. 2002;7(3):283-287.

7. National Institute on Drug Abuse. Prescription medications. Drug Pages. Available at: http://www.nida.nih.gov/drugpages/prescription.html. Accessed May 15, 2010.

8. Paulozzi LJ, Budnitz DS, Yonlgi X. Increasing deaths from opioid analgesics in the United States. *Pharmacoepidemiol Drug Saf*. 2006;15:618-627.

9. Centers for Disease Control and Prevention. Unintentional poisoning deaths, United States, 1999-2004. *MMWR Morb Mortal Wkly Rep*. 2007;56(05):93-96.

10. Maxwell JC. Trends in the abuse of prescription drugs. The Gulf Coast Addiction Technology Transfer Center. The University of Texas at Austin. Available at: www.utexas.edu/research/cswr/gcattc/documents/Prescription-Trends_Web.pdf. Accessed May 15, 2010.

11. Advokat CD, Guidry D, Martino, L. Licit and illicit use of medications for attention-deficit hyperactivity disorder in undergraduate college students. *J Am Coll Health*. 2008;56(6):601-606.

12. Teter CJ, McCabe SE, LaGrange K, et al. (2006). Illicit use of specific prescription stimulants among college students: Prevalence, motives, and routes of administration. *Pharmacotherapy*. 2006;26:1501–1510.

13. DeSantis AD, Webb EM, Noar SM. Illicit use of prescription ADHD medications on a college campus: A multimethodological approach. *J Am Coll Health*. 2008;57(3):315-324.

14. Quintero, G. Controlled release: A cultural analysis of collegiate polydrug use. *J Psychoactive Drugs*. 2009;41(1):39-47.

15. Cicero T, Inciardi A, Munoz A. Trends in abuse of oxycontin and other opioid analgesics in the United States. *J Pain*. 2005;6:662-672.

16. Arria AM, O'Grady KE, Caldeira KM, Vincent KB, Wish ED. Nonmedical use of prescription stimulants and analgesics: Associations with social and academic behaviors among college students. *J Drug Issues*. 2008;38(4):1045-1060.

17. McCabe SE, Teter CJ, Boyd CJ, et al. Nonmedical use of prescription opioids among US college students: Prevalence and correlates from a national survey. *Addict Behav*. 2005;30:789-805.

18. McCabe SE, Knight JR, Teter CJ, et al. Nonmedical use of prescription stimulants among US college students: Prevalence and correlates from a national survey. *Addiction*. 2005;100:96-106.

19. McCabe SE, West BT, Wechsler H. Trends and college-level characteristics associated with the non-medical use of prescription drugs among U.S. college students from 1993 to 2001. *Addiction*. 2007;102(3):455-465.

20. Quintero G, Peterson J, Young B. An exploratory study of sociocultural factors contributing to prescription drug misuse among college students. *J Drug Issues.* 2006;36:903-931.

21. Teter CJ, McCabe SE, Cranford JA, et al. Prevalence and motives for illicit use of prescription stimulants in an undergraduate student sample. *J Am Coll Health*. 2006;53:253-262.

22. Hamilton GJ. Prescription drug abuse. *Psychol Sch.* 2009;46(9):892-898.

23. Substance Abuse and Mental Health Services Administration. Results from the 2005 national survey on drug use and health. DHHS publication SMA 06-4194. Rockville, MD: Office of Applied Studies, U.S. Dept of Health and Human Services; 2006.

24. Babock Q, Byrne T. Student perceptions of methylphenidate abuse at a public liberal arts college. *J Am Coll Health*. 2000;49(3):143-145.

25. Broman CL. Stress, race, and substance use in college. *Coll Stud J*. 2005;39:340-352.

26. Jessor R, Donovan JE, Costa FM. *Beyond adolescence: Problem behavior and young adult development*. Cambridge, England: Cambridge University Press; 1991.

27. Boyd CJ, McCabe SE. Coming to terms with the nonmedical use of prescription medications. *Subst Abuse Treat Prev Policy*. 2008;3:22.

28. McCabe SE, Boyd CJ, Teter CJ. Subtypes of nonmedical prescription drug misuse. *Drug Alcohol Depend*. 2009;102:63-70.

29. American College Health Association. American College Health Association National College Health Assessment spring 2005 reference group data report. *J Am Coll Health*. 2005;55:5

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