Reported Behaviors of Prescription-Drug Misuse and Medication Safety among Students Attending a Rhode Island University

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ABSTRACT

OBJECTIVE: College students are at high risk of illicit drug use, where nonmedical use of prescription medications ranks second behind marijuana. Assessment of college students' behaviors regarding prescription medication storage, disposal and sharing tendencies is needed to provide foundation for medication safety education on campuses.

METHOD: Students (n = 333) completed a prevalence survey assessing prescription medication use, storage and disposal activities upon obtaining prescription at the University pharmacy.

RESULTS: Unsafe student practices of rarely/never storing medications in locked place (77%), improper medication disposal (81%), witnessing (28%) and admitting (27%) medication sharing was reported. Female students were more likely to store medications unlocked ($p < 0.001$). Students living on-campus were more likely to witness sharing of medications ($p = 0.043$), and students living off-campus were more likely to have shared prescription medications ($p = 0.036$).

CONCLUSIONS: Campus education is needed regarding safe medication storage, proper disposal of unused medications, and risks associated with sharing medications.

KEYWORDS: prescription misuse, drug disposal, medication storage

INTRODUCTION

Prescription drug misuse has reached an epidemic level according to Centers of Disease Control.[1, 2] In 2013, approximately 6.5 million people or 2.5% of the United States (U.S.) population were current nonmedical users of prescription drugs.[3] The most recent National Survey on Drug Abuse and Health from Substance Abuse and Mental Health Services Administration (SAMHSA) demonstrated college students are at the highest risk of illicit use, where nonmedical use of prescription medications ranks second behind marijuana use. The prevalence of current use of illicit drugs was 22.3% among full-time college students aged 18 to 22 in 2013, and most common medications misused by persons within this age group included pain relievers, tranquilizers, stimulants and sedatives. Of college students, males (26%) were more commonly current users of prescription drugs compared to females (19.2%). Based on SAMHSA data, most common source of prescription medications used for nonmedical purposes continues to be someone known to the person misusing (71.3%). In a recent study, 85% of college students identified their medication source as a friend, however, parents (18%) and other family members (12%) were also reported as sources.[4] Behaviors among college students are inter-related in regards to medication use, diversion and nonmedical use as they divert their medications to peers.[5]

As part of The U.S. Office of National Drug Control Policy, a Prescription Drug Abuse Prevention Plan was released in 2011, addressing four areas of focus: Education, Monitoring, Proper Medication Disposal, and Enforcement.[6] Education of college students is essential in tackling the problem of prescription drug misuse, as well as, education of healthcare professionals providing their care. Distribution of information regarding dangers of misusing prescription medications, proper storage and disposal is needed. Safe and proper disposal programs allow individuals to dispose of unneeded or expired medications in a safe, timely, and environmentally responsible manner. Additionally, secure medication storage in dormitories and off-campus housing is also needed to provide a barrier to prescription drug misuse. The purpose of this exploratory study was to evaluate reported behaviors and knowledge of college students regarding medication storage, disposal and sharing tendencies to provide a foundation for medication safety education for college campuses.

METHODS AND MATERIALS

Upon obtaining a prescription at the University pharmacy, college students were offered the opportunity to participate in the study. Study description, constituting informed consent, was provided. The study was written in English, and participants were required to complete survey of their own accord. Subjects under 18 years of age or not enrolled at the University were excluded. Students completed an anonymous survey assessing knowledge and behaviors regarding medication use, storage, and disposal. Completed surveys were collected at the pharmacy counter in a collection box. Additionally, a web-based link was provided to students who preferred to complete survey electronically. Study duration was 2 months in Fall Semester 2013.

Demographic data included age, gender (i.e., male, female and other), academic year, major field of study, residence location (i.e. on-campus or off-campus), reason for visit to University Health Services, current medical problems or diagnoses, and medication use. Major field of study was further categorized into 3 domains: health science-related, other science-related, or non-science-related field. Medications used were also categorized into controlled substance or non-controlled substance, in accordance with the U.S. Drug Enforcement Administration classification system.[7] Survey items assessing prevalence of activities related to prescription medication use, storage, and disposal are in **Table 1**. Item content was derived from SAMHSA survey statements on drug use and were validated by an University panel representing college students and healthcare professionals to ensure data captured was intended information and confirm clarity of statements.[3] Student-panel members also tested web-based survey link to ensure functionality.

Data analysis was performed using SPSS (version 20, IBM corp). Descriptive statistics were used for demographic variables, and chi-square tests for categorical variables. Spearman correlations and odds ratio with 95% confidence intervals were used for analyzing correlations among study variables and demographics. Institutional Review Board approved study protocol, and voluntary survey completion by students constituted informed consent to participate.

Table 1. Survey Statements

Survey Items on Likert-type Scale
How often will your medications be kept in a locked place (ex. cabinet with a lock)?
How often have you seen people sharing their medications, such as when studying, in the library, dorms, or at a party?
How often have you shared any of your prescription medications with a friend, family member, or someone you didn't know?
How often has a friend, family member, or someone you didn't know, share their prescription medications with you?
Survey Items with Specific Answers
If you don't finish all of the medication you are getting today, what will you do with the rest of it?
If you shared your prescription medications, what was the effect for the person you shared with?
What was your main reason for sharing your prescription medications with someone else?
How did it work for you?*

*to be answered if participant reported that someone had shared a prescription medication with them

Table 2. Study participants compared to campus demographics

		Number of study participants (%)	Number of University students enrolled (%)
Sample size	**N = 333**		**N = 16, 637**
Gender	Male	109 (32.7%)	7455 (44.8%)
	Female	222 (66.7%)	8932 (53.7%)
	Other	0 (0%)	
	No answer	2 (0.6%)	250 (1.5%)
Year in College	Freshman	113 (34.0%)	4392 (26.4%)
	Sophomore	61 (18.3%)	3361 (20.2%)
	Junior	64 (19.2%)	3144 (18.8%)
	Senior	55 (16.5%)	3165 (19.1%)
	5th year	28 (8.4%)	5th year/6th year/
	6th year/other	12 (3.6%)	other/graduate 2575 (15.5%)
Residence	On campus	206 (61.9%)	7320 (44%)
	Off campus	126 (37.8%)	9317 (56%)
	No answer	1 (0.3%)	
Major Field of Study	Health science	118 (35.5%)	3708 (22%)
	Other science	84 (25.2%)	7092 (43%)
	Non-science/other	131 (39.3%)	5837 (35%)
Controlled Substance Prescription	Yes	29 (8.7%)	(10.6%)*
	No	304 (91.3%)	(89.4%)*

*Percentages of prescriptions filled during academic year 2013–2014

RESULTS

A total of 333 students completed the survey with most using paper-method (98.2 %). Two-thirds (66.7%) of participants were female. Freshman students comprised approximately one-third (34%) of participants accounting for largest proportion of representation among each of the academic years. Most students (61.9%) lived on campus and there was an approximately equal distribution of major fields of study, with 35.5% pursuing a health science-related degree, 25.2% pursuing other science-related degree, and 39.3% pursuing a non-science related degree. Of persons surveyed, 8.7% had a current prescription for a controlled substance, which is a reflection of the larger population at the university as 10.6% of the university health services pharmacy's prescriptions dispensed are controlled substances (**Table 2**).

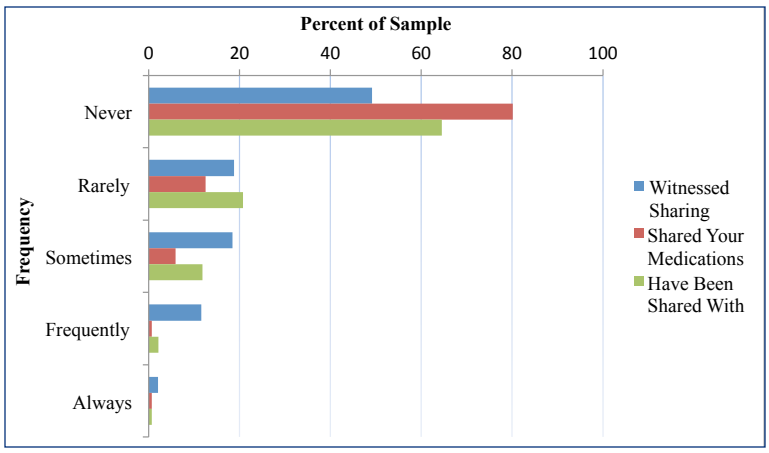
The majority (77%) of students reported they rarely/never kept medications in a safe or locked place. Regarding sharing of pharmaceuticals, 28% reported witnessing sharing of medications once a month or more, and 27% admitted to sharing their medications with someone else. Main reasons cited for sharing medications: 'to help someone with their medical condition' (42.6%) and they 'did not see a reason not to share' (20.4%) with 'no time to go to physician' (14.8%), 'could not afford medication' (4.6%), 'needed money' (2.8%), and 'physician would not provide medication' (0.9%) rounding out additional responses. Forty-one percent reported that

someone else had shared a medication with them, and the most common outcome of this behavior was reported to be alleviation of symptoms. Comprehensive results of medication sharing behaviors are in **Figure 1**.

When asked what they would do with unused medication, 52.5% reported they would save unused medication for another time, rather than disposing of it. Of those who reported they would dispose of unused medication, most common method was throwing away in the trash (81.1%).

Female students were more likely to report never keeping medications stored in locked place (OR 1.564, CI 1.197-2.043, p=0.001). Students who live on campus were more likely to be freshman or lower classmen (Spearman correlation (-0.986, p<0.001), and to have witnessed sharing of medications (57.9% vs. 42.1% off campus, p=0.043). Students who live off campus were more likely to have shared their prescription medications (34.4% vs. 24.4%, p=0.036). No statistically significant differences in drug safety outcomes among groups according to major field of study were observed (p>0.05).

Figure 1. Prevalence of Medication Sharing Behaviors in College Students



DISCUSSION

Use of prescription medications has become increasingly prevalent on college campuses.[8] Increased number of prescriptions equates to more individuals receiving treatment with coinciding rise in medication misuse.[9, 10] Between 1993 and 2005, college students' use of opioids increased by 343 percent, and use of stimulants increased by 93 percent.[10] However, 2013 data from SAMSHA reports nonmedical use of prescription medications in the past year among persons aged 18 to 25 years old has decreased from 2005 (15.1% vs. 12.2%; p < 0.01).[3] Specific pain relievers and stimulant use in persons aged 18 to 25 years old has also decreased since 2005 (12.4% vs. 8.8%; p < 0.01 and 3.8% vs. 3.7%, p = NS, respectively). However, a national college web-based survey of students from 2008-2013 observed no change among nonmedical use of opioids.[11] Though national data among this age group is conflicting, overall percentage of illicit use of prescription medications remains high as does lifetime use (26.6%) in this age group. Furthermore, 2013 national data among persons 18-25 year old in New England reports past year use of 15.5%, which is the highest percentage geographically among this population.

Recent studies completed on college campuses also suggest high rates of misuse.[5, 12] A study completed at a Midwest university observed significant increase in lifetime and past-year prevalence and frequency of nonmedical use of stimulants between 2003 and 2013.[5] Another study at a private liberal arts college in New York reported 36.8% of 303 total students surveyed used prescription drugs nonmedically.[12] This study also found nonmedical use of prescription drugs was higher in upper-classmen compared to freshmen, which is similar to our findings of more upper classmen sharing their medication with others.

Drug diversion of prescription medications is likewise becoming common on campuses. A 2009 study observed one-fourth of college students who were prescribed stimulants admitted to sharing medication with peers, and another recent study reported over 50% of students acknowledged diversion of prescribed stimulants to others.[13, 14] Most recently, McCabe et al. reported similar trends at a Midwest university over past decade of significant increase in stimulant diversion from 1.1% to 2.3%, p < 0.001.[5]

Our study reported similar statistics with 27% admitting to sharing medications with someone else and 28% reporting having witnessed medication sharing once a month or more. Most common reasons for drug diversion were helping to improve another person's medical condition or failing to see a reason not to share. These findings are similar to Stone et al, where college students who were misusers of stimulant medications were found to have positive attitudes in regards to medication seeking, whether giving or selling to friends.[8] Another study observed nonmedical use of stimulants was perceived more acceptable as study aid than other motives such as getting high or losing weight.[15]

To our knowledge, our study is first of its kind to determine college students' behaviors of prescription medication storage and disposal. The majority of students reported never or rarely keeping their medication in a safe or locked place. This finding was not surprising as college dormitories and off-campus housing environments often require shared space among students, particularly kitchens and bathrooms where another's personal items including medications would be accessible. Additionally, disposal programs must be addressed on campuses as over 50% of students surveyed described saving medications to use for another time. If they disposed of unused medications, college students did so improperly by placing them unaltered in the garbage.

It is important to note limitations of this research. Our data were drawn from a sample of students presenting to University pharmacy and as a result may be not generalizable to

other enrolled students. Our sample is only from one New England, public university with females being majority of respondents. These results may not provide similar findings at another university or college with different demographics. A self-report survey was utilized to collect information on prescription medication knowledge and behaviors. Due to voluntary nature and public display of survey, it was impossible to clearly identify the number of students who read survey and opted not to participate. This assessment technique may also have limited accuracy as respondents may have under- or over- reported their behaviors of nonmedical use of prescription drugs. Response bias may exist as participants may be more inclined to respond with what they consider more socially acceptable answers. Lastly, although measures were taken to avoid instrumentation bias during development process, it is possible a small proportion of respondents interpreted survey items in manner other than intended.

SUMMARY

Our findings, along with previous studies, provide support for campus-wide educational directives for appropriate use, secure storage and proper disposal of medications as recommended by The U.S. Office of National Drug Control Policy.[6] An educational campaign for both college students and healthcare professionals providing their care would increase awareness of risks associated with misuse of prescription medications. Future initiatives directed at healthcare providers could address prescribing medications in manner that limits excess or unused supplies. Although this study was not designed to assess students' knowledge regarding specific disposal of medications, based on our findings, it would seem logical educational initiatives addressing proper disposal of unused or unwanted medications would be warranted. Assessment of need in dormitories for secure storage such as combination safe, locked cabinet or drawer in each room, as well as, campus access to proper disposal mechanisms are also warranted for alignment with national policy for medication safety. Overall, data collection at the college level can help guide education of illicit substance abuse at individual universities, as unique trends of misuse may differ from national findings.

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