

RESEARCH

Alcohol Use Behaviors Among Pharmacy Students

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Objective. To identify reasons for drinking, determine the patterns of alcohol abuse, and explore relationships between drinking motives and alcohol abuse patterns in pharmacy students.

Methods. A cross-sectional anonymous, voluntary, self-administered paper survey instrument was administered to first-year (P1) through third-year (P3) pharmacy students as part of a professional seminar.

Results. Survey instruments were completed by 349 pharmacy students (95.9% cooperation rate). Using the Alcohol Use Disorders Identification Test criteria, 23.2% of students reported hazardous or harmful use and 67.2% of students reported consuming alcohol at hazardous levels during the past year. Students who were male (37.0%), single (25.3%), and attended the main campus (26.2%) were more likely than their counterparts to report hazardous or harmful alcohol use. Pharmacy students reported social motives as the most common reason for drinking; however, coping and enhancement motives were more predictive of harmful or hazardous alcohol use.

Conclusion. Approximately 1 in 4 pharmacy students (23%) reported hazardous or harmful alcohol use. Education about the dangers of alcohol abuse and intervention programs from colleges and schools of pharmacy are recommended to help address this issue.

Keywords: pharmacy students, alcohol abuse, drinking, substance abuse

INTRODUCTION

Alcohol abuse is a complex public health issue that is associated with a variety of destructive social conditions, such as failure in school and lost productivity.¹ Given the prevalence of alcohol abuse and its damaging consequences, the United States Department of Health and Human Services outlined several objectives in its Healthy People 2020 initiative focusing on alcohol consumption, including reducing binge drinking during the past 2 weeks in college students, reducing binge drinking during the past 30 days in adults aged 18 years and older, and reducing average annual alcohol consumption.¹ Binge drinking among college students has received increased attention because college students, when compared to their non-college peers of the same age, exhibited higher rates of alcohol use (60.8% vs 52.0%), binge alcohol use (39.1% vs 35.4%), and heavy alcohol use (13.6% vs 10.5%).² The 21- to 25-year-old group exhibited the highest proportion of past year alcohol use (83.9%), past month use (69.7%),

binge drinking (45.4%), and heavy alcohol use (13.7%). Considering that most pharmacy students are within this age group, it is important to determine whether pharmacy students exhibit similar patterns of abuse.³

Because substance abuse and addiction are major concerns for pharmacy students and pharmacists, the American Association of Colleges of Pharmacy (AACP) Special Committee on Substance Abuse and Pharmacy Education recommends that colleges and schools of pharmacy address these disorders in their curricula.⁴ This AACP committee also recommended an increase in continuing education programs to address the needs of future and current practitioners in addiction and substance abuse. These recommendations are intended to improve the education of students, faculty and staff members, and practitioners to provide them with the necessary tools to identify and assist others who may need help with addiction and substance abuse. Therefore, colleges and schools of pharmacy must develop or modify alcohol abuse education programs to address both short-term and long-term alcohol use issues.

Nearly 1 in 4 pharmacy students has exhibited hazardous alcohol use.^{3,5} These students also exhibited behaviors that negatively affected grades and school work, and

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some even reported participating in patient care under the influence of alcohol. Because substance use by pharmacy students is a strong predictor of future abuse, understanding the prevalence of alcohol use and reasons for using alcohol during a pharmacy program may help prevent students from long-term alcohol abuse.⁶ Long-term alcohol abuse among pharmacists is concerning as pharmacists misuse alcohol at rates that exceed the general population.⁷ Pharmacists who have experienced addiction have indicated that more intensive early education and prevention programs are needed.⁸ Educational programs that address drinking motives should be established in colleges and schools of pharmacy to prevent long-term abuse.

Few publications have reported the motives for drinking among pharmacy students.^{5,9} Because drinking motives have not been primary study objectives or assessed with validated measures, additional research examining drinking motives is still needed. Studies in other student populations have yielded promising data to inform prevention and intervention efforts. Drinking motives represent a subjectively derived decisional framework for alcohol consumption that is based on an individual's personal experience, current environment or situation, and alcohol expectancies.^{10,11} Social enhancement motives are the most commonly indicated reasons for consuming alcohol among college students.^{12,13} Although drinking to enhance social experiences may be common, drinking to cope with negative affect or enhance positive affect is more likely to be associated with increased alcohol consumption and alcohol-related problems.¹³⁻¹⁵ Our study investigated self-reported alcohol use and identified reasons for drinking alcohol among doctor of pharmacy (PharmD) students at 1 institution. The study objectives were to identify reasons for drinking, determine the patterns of alcohol abuse, and explore the relationships between drinking motives and alcohol abuse patterns while controlling for demographic differences.

METHODS

The Auburn University Institutional Review Board approved this study. This cross-sectional study used an anonymous, voluntary, self-administered paper survey. Participants included P1 through P3 students from the Auburn University Harrison School of Pharmacy. Fourth-year students were not included because the study took place during their advanced pharmacy practice experiences off campus, making it difficult to gather appropriate and anonymous data. There were 441 potential participants who were required to attend weekly professional seminars.

The survey instrument was self-administered in-class during a 1-hour weekly professional seminar. On the day of

survey administration, the topic was alcohol abuse among college students and the use of brief interventions to address alcohol abuse. At the beginning of the seminar, the invitation letter approved by the university's Institutional Review Board and the survey instrument were distributed to the students. At that time, the study's benefits, potential risks, and participant rights were explained to the students. They were allowed approximately 15 minutes to complete the survey instrument. An attendance count was taken to assess response rate. The survey instruments were distributed and returned in opaque envelopes to maintain anonymous responses. All envelopes were collected immediately before the speaker started the session.

The survey instrument was separated into 3 sections: participant characteristics, drinking motives (reasons for drinking), and alcohol use patterns. Participant demographics were collected, including age, sex, marital status, race, highest degree attained after high school, current class year, cumulative grade point average, campus (either main or satellite campus), and hours of work per week.

The Drinking Motives Questionnaire-Revised (DMQ-R), a 20-item validated survey instrument, was used to measure reasons why students might be motivated to drink alcoholic beverages.¹⁰ Although originally developed for adolescents, the DMQ-R has been used extensively and validated for use with samples of college-age young adults.¹⁶ The DMQ-R measures reasons in 4 primary areas: social, coping, conformity, and enhancement.¹⁰ The DMQ-R asks participants to remember all the times they used alcohol and how often they used alcohol for each of the 20 items. Response categories include "almost never or never," "some of the time," "half of the time," "most of the time," and "almost always or always." Examples of items included, "I use alcohol so I won't feel left out," and "I use alcohol to get high."

The alcohol use patterns were assessed using the Alcohol Use Disorders Identification Test (AUDIT), a standardized tool developed by the World Health Organization.^{17,18} The AUDIT consists of 10 questions which ask about the quantity and frequency of alcohol use as well as the consequences of alcohol use, eg, "How many drinks do you have on a typical day?" "Do you have 6 or more on 1 occasion?" "Have you or someone else been injured as a result of your drinking?" Each of the questions has a set of responses to choose from, and each response has a score ranging from 0 to 4. Based on participants' responses, they were categorized into presence or absence of hazardous or harmful alcohol use, hazardous alcohol use, dependence symptoms, and alcohol-related harm experienced. For example, out of a possible 40 points, students with an AUDIT score of 8 or greater would be categorized as having hazardous or harmful alcohol use.^{17,18}

Data were analyzed using SPSS for Mac, version 21 (SPSS Inc, Cary, NC). Descriptive statistics were used to describe participant characteristics, drinking motives, and patterns of alcohol use. Psychometric properties of DMQ-R were assessed; reliability coefficients and item and scale statistics were calculated. Bivariate analyses were conducted to examine relationships between participant characteristics and the dependent variable (hazardous or harmful alcohol use); this was to determine what characteristics were associated with presence of hazardous or harmful alcohol use. Relationships between drinking motives and presence of hazardous or harmful alcohol use were explored using logistic regression analysis. In the logistic regression model, participant characteristics that had significant relationships with hazardous or harmful alcohol use were entered as control variables. An *a priori* alpha of <0.05 was chosen for significance testing.

RESULTS

On the day the survey was administered, there were 364 pharmacy students present on both campuses. Of those students, 349 completed the survey instrument, which gave an overall response rate of 82.5% and a cooperation rate of 95.9%. No data were collected from students who were absent or who refused to participate.

The largest percentages of participants were within the age range of 23 to 24 years of age (43.3%), female (68.9%), single (82.5%), and white (81.8%) (Table 1). Most students held a bachelor's degree (65.7%) and most participants were from the main campus (80.8%) vs the satellite campus (19.2%).

Participants who reported drinking during the last year answered 20 questions from the DMQ-R (Table 2). The mean score for social motives (2.7) was greater than enhancement motives (2.0), coping motives (1.7), and conformity motives (1.2). Each motive scale had 5 items and all scales had an acceptable reliability coefficient (>0.75).

In terms of alcohol use patterns, of the students who completed the survey instrument, 23.2% had a total AUDIT score ≥ 8 , which indicated hazardous or harmful alcohol use (Table 3). During the previous 12 months, 67.2% of respondents had consumed alcohol at hazardous levels, 29.5% had experienced symptoms suggestive of alcohol dependence, and 46.7% had experienced alcohol-related harm.

The associations between participant characteristics and status of hazardous or harmful alcohol use were assessed (Table 4). Students who were male, single, and attended classes on the main campus were more likely than their counterparts to report hazardous or harmful alcohol

Table 1. Characteristics of Pharmacy Students Who Participated in a Survey of Alcohol Use Behaviors (N=349)

Participant Characteristics	No. (%)
Age	
22 or younger	72 (20.6)
23 to 24	151 (43.3)
25 to 27	93 (26.6)
28 or older	33 (9.5)
Sex	
Male	108 (31.1)
Female	239 (68.9)
Marital status	
Single	288 (82.5)
Married	56 (16.0)
Divorced or separated	5 (1.4)
Race	
White	284 (81.8)
Non-white	63 (18.2)
Previous highest degree after high school	
None	110 (31.7)
Bachelor's	228 (65.7)
Master's or doctor of philosophy	9 (2.6)
Current class	
First year	128 (36.8)
Second year	117 (33.6)
Third year	103 (29.6)
Cumulative grade point average	
2.5 or less	32 (9.4)
2.51 – 2.85	69 (20.2)
2.86 – 3.25	126 (37.0)
Greater than 3.25	114 (33.4)
Campus location	
Main campus	282 (80.8)
Satellite campus	67 (19.2)
Hours of work per week	
None	200 (57.8)
1 – 10 hours	93 (26.9)
11 - 20 hours	39 (11.3)
More than 20 hours	14 (4.0)

use. These 3 variables were later entered into the logistic regression model as control variables.

Next, a multiple logistic regression model was used to identify which drinking motives were associated with hazardous or harmful alcohol use when controlling for sex, marital status, and campus location (Table 5). The model indicated that the 4 drinking motives and 3 control variables accounted for 26.2% of variance in the harmful or hazardous alcohol use. The odds of a male student reporting harmful or hazardous alcohol use were 3.2 times greater than for a female student. However, marital status and campus location were not significant in the model. When examining the effect of drinking motives, coping

Table 2. Frequency of Drinking Motives^a of Pharmacy Students (N=302)

How often do you use alcohol for the following reasons? ^b	Response, Mean (SD)	Reliability
Social	2.7 (1.0)	0.9
Because it helps me enjoy a party.	2.4 (1.1)	
To be sociable.	2.8 (1.2)	
Because it makes social gatherings more fun.	2.7 (1.2)	
Because it improves parties and celebrations.	2.5 (1.3)	
To celebrate a special occasion with friends.	3.0 (1.2)	
Coping	1.7 (0.7)	0.8
To forget my worries.	1.6 (1.0)	
Because it helps me when I feel depressed or nervous.	1.5 (0.8)	
To cheer up when I am in a bad mood.	1.8 (0.9)	
Because I feel more self-confident and sure of myself.	1.8 (1.1)	
To forget about my problems.	1.6 (0.9)	
Enhancement	2.0 (0.9)	0.8
Because I like the feeling.	2.2 (1.2)	
Because it's exciting.	1.8 (1.2)	
To get high.	1.2 (0.7)	
Because it gives me a pleasant feeling.	2.2 (1.2)	
Because it's fun.	2.7 (1.4)	
Conformity	1.2 (0.4)	0.8
Because my friends pressure me to use alcohol.	1.3 (0.7)	
So that others won't kid me about not using alcohol.	1.1 (0.3)	
To fit in with the group I like.	1.2 (0.6)	
To be liked.	1.2 (0.5)	
So I won't feel left out.	1.2 (0.6)	

^a Only participants who used alcohol completed this section of the survey instrument.

^b Response categories included 1=almost never/never, 2=some of the time, 3=half of the time, 4=most of the time, 5=almost always/always.

and enhancement motives were significantly associated with hazardous or harmful alcohol use. A 1-unit change in coping motives or enhancement motives increased the odds of self-reported hazardous or harmful alcohol use by 2.3 and 2.0 times, respectively. Social and conformity motives neither significantly increased nor decreased the odds of hazardous or harmful alcohol use.

DISCUSSION

Using a standardized tool (AUDIT) to assess and categorize hazardous and harmful patterns of alcohol consumption strengthened our study. Approximately 1 in 4 students (23.2%) had hazardous or harmful alcohol use, which was similar to the 25.2% of students among 9 colleges and schools of pharmacy reported by English and colleagues.³ Comparing this rate with other existing studies posed some challenges because other studies did not use the AUDIT tool. Most studies conducted in colleges and schools of pharmacy reported binge drinking percentage (5 or more drinks in 1 occasion) with varying reference timeframes. For example, 29% of students reported binge drinking in the preceding 2 weeks in the study by Baldwin and colleagues;⁵ 36% of students reported binge drinking in the previous 2 weeks in the study by Kenna

and Wood;⁶ and 29% to 44% of students reported binge drinking in the past year in the study by Murawski and colleagues.¹⁹ One theme is consistent across all of these studies: alcohol use among pharmacy students is concerning. Because of this, it is important to identify reasons for drinking, as it may allow colleges and schools of pharmacy to design interventions to focus on the areas affecting hazardous or harmful alcohol use.

Our study also intended to identify key reasons for harmful or hazardous alcohol use by using the DMQ-R, a validated questionnaire, to assess drinking motives. All 4 motives scales were internally reliable. Social motives were reported as the most frequently endorsed reasons for drinking. After controlling for demographics, coping and enhancement motives were found to increase the odds of harmful or hazardous alcohol use. These results were consistent with studies that investigated the role drinking motives play in alcohol use and alcohol-related problems. This suggests that the DMQ-R is suitable for use with pharmacy students, and that drinking motives play a similar role with this population of students.

Our findings have implications related to screening pharmacy students for potential alcohol problems and, when indicated, matching students to an appropriate

Table 3. Patterns of Alcohol Use Based on Alcohol Use Disorders Identification Test Scores (N=349)

Pattern	No. (%)
Total AUDIT score	
0-7	268 (76.8)
8-15	76 (21.8)
16-19	3 (0.90)
20 or more	2 (0.60)
Hazardous or harmful alcohol use ^a	
Presence	81 (23.2)
Absence	268 (76.8)
Hazardous alcohol use ^b	
Presence	205 (67.2)
Absence	100 (32.8)
Dependence symptoms ^c	
Presence	90 (29.5)
Absence	215 (70.5)
Alcohol-related harm experienced ^d	
Presence	162 (46.7)
Absence	185 (53.3)

Abbreviations: AUDIT=Alcohol Use Disorders Identification Test.
^a Total AUDIT score ≥ 8 represents presence of hazardous or harmful alcohol use.
^b AUDIT score ≥ 1 on questions 2 and 3 represents consumption of alcohol at a hazardous level.
^c AUDIT score ≥ 1 on questions 4 to 6 represents presence/incipience of alcohol dependence.
^d AUDIT score ≥ 1 on questions 7 to 10 represents alcohol-related harm has been experienced.

intervention. Given the prevalence of alcohol use and misuse among pharmacy students, each college and school of pharmacy should have a system in place that can readily detect alcohol use problems and offer treatment recommendations. The AUDIT is designed to serve this purpose. Students with an AUDIT score of 8 to 15 are recommended to receive simple advice and alcohol education, those with an AUDIT score of 16 to 19 are recommended to receive simple advice plus brief counseling and continued monitoring, and those with an AUDIT score of ≥ 20 are recommended for referral to a specialist for diagnostic evaluation and treatment.¹⁰

A large percentage of students exhibiting hazardous alcohol use are recommended for simple advice and alcohol education. Therefore, improving the alcohol abuse education within colleges and schools of pharmacy could be sufficient to decrease the hazardous alcohol use behaviors in some of these students. Topics to be discussed in the alcohol educational programs should include, but are not limited to, drinking norms among pharmacy students, alcohol abuse among healthcare professionals, and consequences of binge drinking.^{9,20-22} Programs that offer information tailored to an individual student are more effective than general educational seminars and

Table 4. Relationship Between Pharmacy Student Characteristics and Hazardous or Harmful Alcohol Use (N=349)

Participant Characteristics	Hazardous/Harmful Alcohol Use		P
	Absence, No. (%) ^a	Presence, No. (%) ^b	
Age			
22 or younger	49 (68.1)	23 (31.9)	0.137
23-24	118 (78.1)	33 (21.9)	
25-27	72 (77.4)	21 (22.6)	
28 or older	29 (87.9)	4 (12.1)	
Sex			
Male	68 (63.0)	40 (37.0)	< 0.001
Female	198 (82.8)	41 (17.2)	
Marital status ^c			
Single	215 (74.7)	73 (25.3)	0.039
Married	49 (87.5)	7 (12.5)	
Race			
White	215 (75.7)	69 (24.3)	0.415
Non-White	51 (81.0)	12 (19.0)	
Highest degree after high school ^d			
None	80 (72.7)	30 (27.3)	0.239
Bachelor's	179 (78.5)	49 (21.5)	
Current class			
First year	94 (73.4)	34 (26.6)	0.239
Second year	88 (75.2)	29 (24.8)	
Third year	85 (82.5)	18 (17.5)	
Cumulative grade point average			
2.5 or less	27 (84.4)	5 (15.6)	0.671
2.51-2.85	54 (78.3)	15 (21.7)	
2.86-3.25	95 (75.4)	31 (24.6)	
Greater than 3.25	85 (74.6)	29 (25.4)	
Campus			
Main campus	208 (73.8)	74 (26.2)	0.006
Satellite campus	60 (89.6)	7 (10.4)	
Hours of work per week			
None	149 (74.5)	51 (25.5)	0.230
1-10 hours	77 (82.8)	16 (17.2)	
11-20 hours	27 (69.2)	12 (30.8)	
More than 20 hours	12 (85.7)	2 (14.3)	

^a AUDIT score < 8 .
^b AUDIT score ≥ 8 .
^c Divorced/separated category was not included in the analysis because of the small number of participants with this characteristic.
^d Master's or doctor of philosophy category was not included in the analysis because of the small number of participants with this characteristic.

programs.^{23,24} Strategies for delivering alcohol education have been identified and garnered empirical support when used with college students. Examples include a variety of commercially available computer-delivered interventions

Table 5. Odds Ratio and 95% Confidence Interval From Logistic Regression Analysis With Presence/Absence of Hazardous or Harmful Alcohol Use as the Dependent Variable (N=295)^a

Variable	β	OR	95% CI
Male ^b	1.16	3.20 ^c	1.65-6.21
Single ^c	0.74	2.10	0.75-5.89
Main campus ^d	0.80	2.22	0.82-6.00
Social	0.29	1.33	0.89-1.99
Coping	0.82	2.27 ^c	1.40-3.70
Enhancement	0.69	1.99 ^c	1.25-3.15
Conformity	0.14	1.15	0.56-2.38

Abbreviations: OR=odds ratio; CI=confidence interval.

^a Cox and Snell R square=0.262.

^b The comparison group was females.

^c The comparison group was married students.

^d The comparison group was students in satellite campus.

^e $p < 0.01$.

(eg, AlcoholEdu (EVERFI, Washington, DC) and College Drinker's Check-up (Behavior Therapy Associates, LLC, Albuquerque, NM)) and brief motivational interventions (eg, Brief Alcohol Screening Interventions for College Student Drinkers [BASICS]).²⁴⁻²⁶ Both interventions use personalized feedback on quantity and/or frequency of alcohol use, perceptions of normative behaviors among peer groups, and the personal and social consequences of alcohol use. These interventions may already be available on campus for pharmacy students. Because these interventions have not been tested among pharmacy students, additional research is needed to determine how effective these interventions will be when used with pharmacy students. Once effective strategies have been identified, colleges and schools of pharmacy will need to determine how to make these services available to students. Students with more severe problems and in need of more intensive interventions should be referred to pharmacy recovery networks, which operate in many states to assist pharmacists and pharmacy students. These networks typically provide treatment and recovery services that are directed toward the needs of healthcare professionals. In states without pharmacy recovery networks, colleges and schools of pharmacy will need to partner with mental health and substance abuse practitioners with the requisite training to provide for the needs of health professions students.

This study has several limitations. Recall bias may have occurred because of the 12-month time period over which students were asked to recall their alcohol use behavior. Also, first-year pharmacy students were asked to recall behaviors during the time they were in undergraduate studies; thus, alcohol use behaviors during undergraduate studies could have been included. Next, social desirability bias may have underestimated the true alcohol

use. Given that the survey was anonymous in nature and opaque envelopes were used to return completed survey instruments, this bias may have been reduced. There may have also been differences in alcohol consumption among survey participants, those who refused to participate, and those who were absent from the seminar. Specifically, refusals and absent students may have consumed more alcohol than survey participants, which would have biased the results. It is unclear as to why the response rate among P3 students was lower than that for other classes. Fewer P3 students could have been in attendance or many of them who were in attendance could have chosen not to complete the survey instrument. Given the anonymous nature of the survey, the reason for lower response among the P3 students remains unclear. Lastly, the study was conducted at a single institution, making it difficult to generalize results to all pharmacy students, especially colleges and schools of pharmacy in different environments or other regions of the country.

CONCLUSION

Pharmacy students reported that social motives were the most common reasons for drinking, while coping and enhancement motives were more predictive of hazardous alcohol use. General alcohol education and tailored programs should be implemented in colleges and schools of pharmacy. Use of a standardized questionnaire like the DMQ-R is a simple way for colleges and schools to identify those students who need help and begin a dialogue about the dangers of alcohol abuse the role of pharmacists as health promoters/advocates.

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