

Original Research

Prevalence of hazardous alcohol use among pharmacy students at nine U.S. schools of pharmacy

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ABSTRACT*

Hazardous use of alcohol continues to be recognized as a problem at the university level. Knowledge regarding alcohol consumption in healthcare professional students is limited, especially in regards to pharmacy students. Much of the information available focuses on pharmacy student drinking patterns in specific geographic regions or is simply outdated.

Objectives: This study was designed to assess levels of alcohol consumption and estimate the level of hazardous drinking among pharmacy students in a larger sample size that is representative of US pharmacy schools.

Methods: An anonymous survey regarding alcohol usage was offered to students at nine schools of pharmacy across the United States. The survey consisted of demographic questions, the World Health Organization Alcohol Use Disorders Identification Test (AUDIT), and questions that assess particular alcohol-induced behaviors.

Results: More than 25% of 1161 respondents had a total AUDIT score ≥ 8 , which indicates a risk of alcohol-related problems. Students that were male, in their first or second professional year of school, not married, and without children were statistically more likely to have AUDIT scores in the hazardous drinking range. Grade point average and student housing did not statistically affect student's AUDIT scores.

Conclusion: These results indicate that over one-fourth of pharmacy students surveyed have indicators of harmful alcohol use. Pharmacy schools should continue to address and confront hazardous alcohol use on campuses in order to curtail heavy alcohol consumption and reduce the risk of alcohol-related problems in pharmacy students.

Keywords: Alcohol Drinking. Students, Pharmacy. United States.

PREVALENCIA DEL USO PELIGROSO DE ALCOHOL ENTRE ESTUDIANTES DE FARMACIA EN NUEVE FACULTADES DE FARMACIA EN LOS ESTADOS UNIDOS

RESUMEN

El uso peligroso de alcohol continua siendo reconocido como un problema de salud pública en las Universidades. El conocimiento sobre el uso de alcohol entre los profesionales de la salud es limitado, especialmente en relación a los estudiantes de farmacia. Mucha de la información disponible se centra en los patrones de consumo en estudiantes de farmacia en determinadas regiones geográficas o simplemente esté obsoleta.

Objetivos: Este estudio fue diseñado para evaluar los niveles de consumo de alcohol y estimar el nivel de consumo peligroso entre estudiantes de farmacia en una gran tamaño de muestra que es representativo de las facultades de farmacia de los Estados Unidos.

Métodos: Se ofreció un cuestionario anónimo sobre el consumo de alcohol a estudiantes de nueve facultades de farmacia de los Estados Unidos. El estudio consistió en preguntas demográficas, el World Health Organization Alcohol Use Disorders Identification Test (AUDIT), y preguntas que evaluaban comportamientos particulares sobre el alcohol.

Resultados: Más del 25% de los 1161 respondientes tenían una puntuación en el AUDIT de 8 o más, lo que indica un riesgo de problemas relacionados con el alcohol. Los estudiantes hombres, en su tercer o cuarto año de facultad, no casados, y sin hijos tenían más probabilidad de puntuaciones AUDIT en la zona de consumo peligroso. Las calificaciones y el alojamiento no afectaron estadísticamente a las puntuaciones AUDIT.

Conclusión: Estos resultados indican que más de uno de cada cuatro estudiantes de farmacia encuestados tienen indicadores de uso peligroso de alcohol. Las Facultades de Farmacia deberían seguir afrontando el uso peligroso de alcohol en sus campus para restringir el consumo intenso de alcohol y reducir el riesgo de problemas relacionados con el alcohol en los estudiantes de farmacia.

Palabras clave: Consumo de alcohol. Estudiantes de farmacia. Estados Unidos.

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INTRODUCTION

The hazardous use and abuse of alcohol has long been recognized as a potential danger to the well-being of adults for many years. In recent years, concerns about alcohol consumption among college students have garnered the public interest due to media reports of the high levels of alcohol consumed on university campuses and its potential negative impact. According to the National Survey on Drug Use and Health in 2009, 63.9% of college students age 18 to 22 were current drinkers, with 43.5% classified as binge drinkers. Even higher alcohol consumption rates are seen among young adults age 21-25, with 70.2% being current drinkers and 41.7% are classified as binge drinkers.¹ Although hazardous alcohol consumption rates peak during the college age range and gradually taper with increased age, there are still concerns regarding the rate of hazardous alcohol consumption among college students since many negative consequences can result from misuse.^{1,2}

The college environment itself may contribute to the dynamics of hazardous drinking among peers in the 18-24 age range. Eighteen percent of US college students that participated in the 2001 National Household Survey on Drug Abuse³ (n=6352) experienced clinically significant alcohol-related problems, compared with 15% of their peers of the same age who did not attend college.⁴ College students were also more likely to meet criteria for a diagnosis of alcohol abuse based on the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV)⁵ criteria, than their non-college attending counterparts.^{3,4} Similar results were also found in a 2007 publication which analyzed drinking patterns among adolescents in a longitudinal study. Investigators followed students in their teens through their mid 20s and found that, compared with their peers who never attended college, current college students were less likely to binge drink prior to entering college but more likely to binge drink once they entered college. This finding is attributed to the college environment.⁶ Since 2002, college students have consistently had higher rates of current alcohol use and binge alcohol use compared to their peers that did not attend college.¹

Current information regarding hazardous alcohol use specifically among health-care professional students in the university setting is scarce, especially in regards to students enrolled in pharmacy schools. A recent study published in 2011, assessed the use of alcohol and other drug use behaviors among pharmacy students at three schools of pharmacy.⁷ The pharmacy schools consisted of two Midwestern universities and one university in the southwest. Of the respondents, 82.8% (566/864) reported alcohol use within the last year, with 18.2% of students reporting a blackout secondary to drinking in the past year. Pharmacy students within this study also reported that alcohol had the potential to negatively affect their school grades and job performance, with 5.8% of respondents stating alcohol use over the past year had cause them to perform lower in school or work. Although this is the most recent study specifically

assessing alcohol use behaviors among pharmacy students published in the literature, it may not precisely reflect current alcohol use trends among pharmacy students because the survey was actually administered in the spring of 1999. Other studies have been conducted to assess alcohol use in student pharmacists, however the majority of these studies were published in the 1990s or used data obtained from student populations over a decade ago.⁸⁻¹⁵

The overall purpose of this study was to assess levels of alcohol consumption and gauge the degree of hazardous drinking among pharmacy students in a larger sample size that is representative of US pharmacy schools. Secondary objectives include: (1) assessing alcohol-induced behaviors that could negatively impact pharmacy students on the academic and professional level, (2) profile pharmacy student attitudes regarding drinking in comparison to smoking cigarettes, and (3) identify specific subgroups of pharmacy students that are significantly more in jeopardy of having alcohol-related problems based on scores from the Alcohol Use Disorders Identification Test.

METHODS

Study Population

The data from this study was obtained by a prospective 32-item questionnaire that was administered to nine pharmacy schools across the United States. The study had at least one pharmacy school participating in each US region as defined by the United States Census Bureau.¹⁶ The pharmacy schools participating in the study consisted of the following: one public northeast pharmacy school, one private northeast pharmacy school, one private south pharmacy school, two private midwest pharmacy schools, one public midwest pharmacy school, one public west pharmacy school, and two public south pharmacy schools. The only geographical divisional region not represented in the study was the mountain division of the west region.

The study population included full-time students enrolled in the Doctor of Pharmacy (PharmD) professional program of each pharmacy school. The only pharmacy students excluded from the study were those not deemed an adult in the participating state. The study was approved by Institutional Review Boards (IRB) at all participating schools of pharmacy, unless not required at the participating institution.

Procedures and Measurements

The questionnaire was conducted during the 2009-2010 academic year at 8 of the universities and during the 2010-2011 academic year at 1 university. The questionnaire consisted of basic demographic information, questions regarding specific alcohol-induced behaviors, a question regarding the risks of smoking cigarettes versus drinking alcohol, and the 10 question assessment from the Alcohol Use Disorders Identification Test (AUDIT).

The questionnaire was offered as an anonymous web-based survey, a paper-based survey, or a mix of both formats, depending on each individual institution's preference. Institutions that issued the survey via both methods issued paper-surveys to subjects enrolled in the first 3 years of pharmacy school and only used the web-based survey to target students in the fourth professional year who were not easily accessible due to advanced pharmacy practice experiences.

The scale used to assess levels of alcohol consumption and gauge the degree of hazardous drinking among pharmacy students in the study was the Alcohol Use Disorders Identification Test (AUDIT). The AUDIT, developed by the World Health Organization, is a 10-item screening tool (available at: http://whqlibdoc.who.int/hq/2001/who_msd_msb_01_6a.pdf) that assesses alcohol usage over the past 12 months and assesses three domains of alcohol usage: hazardous alcohol use, dependence symptoms, and harmful alcohol use. The AUDIT includes 3 questions on frequency and amount of drinking (questions 1-3), 3 questions on alcohol dependence (questions 4-6), and 4 questions on problems related to alcohol usage (questions 6-10). Each question is scored from 0-4, with higher scores signifying a higher level of alcohol-related problems. Composite scores were calculated for each returned questionnaire.¹⁷ Composite scores of 8 or higher on the AUDIT specify that subjects are at risk for alcohol-related problems, including dependence. Scores ranging from 16-19 suggest a higher degree of alcohol-related problems and scores greater than or equal to 20 represent drinkers who are at the most risk and should be evaluated by a clinical specialist. The use of a score ≥ 8 as the cutoff was chosen because it has been validated and produces sensitivity in the mid ninetieth percentile range.¹⁸ The AUDIT screening also performs as accurately as other alcohol-use screening test including the Michigan Alcohol Screening Test (MAST) and CAGE questionnaire and it is one of the four recommended screening tools to assess alcohol related problems at colleges and universities.^{17,19-21} A positive score (1 or greater) on any of the 3 questions regarding alcohol dependence in the AUDIT may represent signs of alcohol dependence.

Other questions regarding alcohol-consumption on the questionnaire included: (1) Has drinking alcohol ever caused you to get behind in your school work? (2) Has drinking alcohol ever caused you to be late for school or work? (3) Has drinking alcohol ever caused you to get poor grades in school? (4) Has drinking alcohol ever caused you to engage in inappropriate sexual activities? The survey included a question asking the age when the respondent was first intoxicated. Students were also asked about their perception of drinking with the question: Do you feel that other students drink more than you do? Response options included: "yes", "no", and "maybe". Lastly students were asked about whether they thought drinking alcohol was worse than smoking cigarettes.

Data Analysis

Due to institutional IRB restrictions, all of the data was pooled and assessed as an aggregate to prevent any identification of subjects. Upon completion of the study, descriptive statistics were performed for the demographic data and other questions on alcohol-related use, followed by Chi-squared analysis. AUDIT scores were calculated for all respondents. As recommended by the World Health Organization, scores of 8-15 were considered consistent with a medium level alcohol problem and scores greater than or equal to 16 will be considered a high level alcohol problem. To determine if certain demographic factors significantly impacted AUDIT scores, Chi-squared analysis was performed with statistical significance defined as an alpha level of 0.5.

RESULTS

The questionnaire obtained data from a total of 1161 pharmacy students enrolled at nine different schools of pharmacy. Demographic characteristics are reported in Table 1. There was a significant higher ratio of females (64.1%) responding to the study than males ($p=0.005$). Students in their twenties accounted for the largest portion of respondents ($>80\%$), with students in the age range of 21-23 holding the majority (45.7%). Most students participating in the study were single (81.7%), lived off campus (84.6%), and did not have children (91.5%). Over 82% of respondents reported having a grade point average (GPA) >3.0 on a scale of 0-4. More survey respondents were in their second year of professional study (35.7%), which was significantly higher than other professional years ($p<0.0005$). Student respondents who did not have a prior bachelor, masters, or doctorate degree represented 53.8% of the survey population.

Of the 1161 student respondents, 86.4% currently consume alcohol based on the first question of the AUDIT survey. The mean AUDIT score was 5.2, with scores ranging from 0 to 28. The median score among survey respondents was 4, with a score of 1 being the most common score. Consumption of hazardous amounts of alcohol, as defined by an AUDIT score greater than 8, was seen in 25.2% of respondents. (Figure 1) Nearly 3% of respondents had an AUDIT score between the ranges of 16-19, whereas 1.6% of respondents had a score greater than or equal to 20. Over 25% of student respondents may show signs of alcohol dependence based on the AUDIT specific questions for dependence (Questions 4-6). A score of 1 or greater on these questions may represent signs of dependence.

Seventy-nine percent of respondents reported being intoxicated at some time in their life, with 5.5% reporting being intoxicated the first time when they were less than 14 years old. The majority of respondents (41.8%) reported being intoxicated the first time when they were between the ages of 14-18. Students who became intoxicated at an earlier age (<14 years old) were statistically more likely to

Characteristic		Number (%)
Graduation Year	Professional Year 1	297 (25.6%)
	Professional Year 2	414 (35.7%)
	Professional Year 3	286 (24.6%)
	Professional Year 4	156 (13.4%)
	No Response	8 (0.7%)
Gender	Male	401 (34.5%)
	Female	744 (64.1%)
	No Response	16 (1.4%)
Age Range	18-20	87 (7.5%)
	21-23	530 (45.7%)
	24-25	260 (22.4%)
	26-29	178 (15.3%)
	≥ 30	97 (8.4%)
	No Response	9 (0.8%)
Previous non-pharmacy degree	Yes	501 (43.2%)
	No	625 (53.8%)
	No Response	34 (3.0%)
GPA	2.0-2.5	29 (2.5%)
	2.51-3.0	144 (12.4%)
	3.01-3.5	526 (45.3%)
	3.51-4.0	428 (36.9%)
	No Response	34 (2.9%)
Housing	On-Campus	169 (14.6%)
	Off-Campus	982 (84.6%)
	No Response	10 (0.9%)
Marital Status	Married/Partnership	187 (16.1%)
	Single, Never Married	948 (81.7%)
	Divorced/Separated	16 (1.4%)
	Widowed	1 (0.1%)
	No Response	9 (0.8%)
Children	Yes	92 (7.9%)
	No	1062 (91.5%)
	No Response	7 (0.6%)

have AUDIT scores that represented hazardous use (scores ≥ 8) compared to students who first became intoxicated when they were ≥ 14 years of age ($p < 0.0005$). Students who became intoxicated for the first time during their adolescence or childhood (≤ 18 years old) were also more likely to have an AUDIT score ≥ 8 compared to students who did not become intoxicated until after turning 19 years old ($p < 0.0005$).

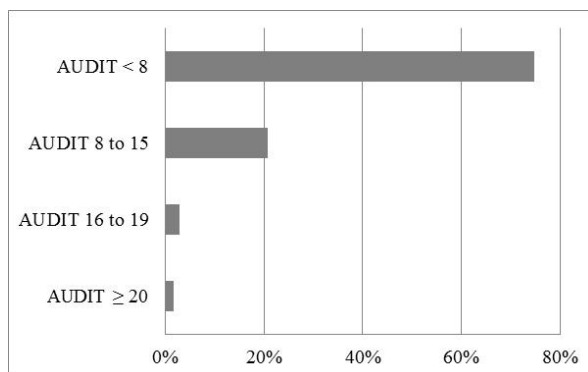


Figure 1. Hazardous levels of drinking among pharmacy students.

Students in their first or second professional year were statistically more likely to have AUDIT scores in the hazardous drinking range versus students in their third or fourth professional year ($p < 0.0005$). Compared to female survey respondents, male respondents were statistically more likely to have an AUDIT score ≥ 8 ($p < 0.0005$). Student respondents that were not married were more likely to have an AUDIT score ≥ 8 compared to student respondents

that were married or in partnerships ($p < 0.0005$). Pharmacy students without children were also more likely to have AUDIT scores in the hazardous drinking range versus students with children ($p = 0.001$). GPA and housing did not statistically affect student's AUDIT scores.

Nearly a quarter of student respondents (24.2%) reported having engaged in inappropriate sexual activities secondary to alcohol use. Students reporting alcohol behaviors having a negative effect on school grades represented 6.5% of the population surveyed, however 15.4% stated that alcohol use had led them to falling behind in their academic work. Tardiness to work or school because of alcohol was reported in 17.3% of the respondents.

Eighty percent of students who completed the survey thought other students definitely consumed more alcohol than they did, while 13% of the survey population said that other students might drink more than they do. Four percent of students thought they drank more alcohol than other subjects. As for which vice student respondents thought was worse, 77% of student respondents thought smoking cigarettes was worse than drinking alcohol.

DISCUSSION

This study represents the most recent evaluation of alcohol usage among student pharmacists. The AUDIT screening within the survey provided us with a standardized scale to assess hazardous drinking behaviors in pharmacy students. Utilizing the self-questionnaire approach with the AUDIT screening,

rather than administered by an interviewer, may prove a limitation of the study. Using the AUDIT as an interview helps clarify ambiguous answers and may reduce errors in composite scores. The self-questionnaire creates the possibility that some students may over-report or under-report their alcohol usage.

Although the AUDIT screening has been validated in both genders and all age groups, to the best of our knowledge this scale has not been used in studies assessing alcohol-related behaviors in student pharmacists before. By using this tool we found more than 25% of pharmacy students had AUDIT scores indicative of hazardous use of alcohol. Due to their high AUDIT scores, many pharmacy students in this study may also be "at risk" for alcohol dependence. Although the AUDIT scale does not formally diagnose individuals with particular alcohol problems, it does serve as screening tool to detect potential individuals who may be "at risk". As future health professionals with stressful jobs and easy access to alcohol, prescription, and over-the-counter medications, this high incidence of misuse and risky behavior is concerning. The risks associated with alcohol misuse needs to be addressed with pharmacy students.

Regardless of their AUDIT scores, our findings also show a high percentage of pharmacy students consume alcohol (86.4%). This percentage rate is higher compared to college students evaluated in the 2009 National Drug Survey on Drug Use and Health which showed that 63.9% of college students consume alcohol.¹ The percentage of students drinking in the past year is also similar when compared to past studies that analyzed drinking patterns among pharmacy students at individual institutions. Studies with data from the 1990s showed that the percentage of pharmacy students who currently drank alcohol ranged from 81.2% to 90.5%, which is comparable to results from this study.^{8,9} It was hypothesized by the authors that alcohol usage among pharmacy students would be less than other college students due to the rigorous academic workload required in pharmacy schools. The incidence of high AUDIT scores in students without a previous degree or in their first two professional years may be indicative of the fact that they are technically still undergraduates. Maturity may be a contributor to seeing lower scores in upper classmen since alcohol consumption tends to decrease as students progress out of their undergraduate years.²² The majority of pharmacy schools included in the survey are located directly on campuses with a large undergraduate presence instead of being located at an academic medical center. This could have also contributed to similar usage levels of alcohol between pharmacy students and undergraduate students.

Although there is a lack of studies using the AUDIT as a screen for alcohol use in pharmacy students, the AUDIT screening has been employed to assess at risk drinking in students in other healthcare professionals. A recent study evaluated the prevalence of at-risk drinking across 36 schools of

medicine in the United States.²³ This study included a larger sample of schools and students (n=2710) compared to our study. Of the medical students surveyed, 15.4% had AUDIT scores greater than 8. Due to the similarities in length and rigor between pharmacy and medical schools, it is concerning that pharmacy students had a higher percentage of students with AUDIT scores indicative of hazardous alcohol use compared to medical students. Since medical school attendees have a previous academic degree and medical school enrollees tend to be older, they may have a higher level of maturity compared to entering pharmacy students who may only be a few years out of high school.

Some findings in our study were not surprising. The higher average AUDIT score in males, compared to females, was expected as alcohol abuse and dependence is commonly higher in males.²⁴ AUDIT scores were higher among pharmacy students who became intoxicated at a younger age. These results are similar to a previous study which showed that individuals who became intoxicated for the first time prior to the age of 19 were at a greater risk for heavy drinking and alcohol-related problems.²⁵ Alcohol influencing grades or work was also similar to previous studies that analyzed alcohol-induced behaviors. Baldwin and colleagues reported that 6.3% of pharmacy students received a lower grade or job evaluation because of alcohol.⁸ In our study, 6.5% reported receiving poor grades due to alcohol intake. Inappropriate sexual activity secondary to alcohol use was seen in almost one-fourth of respondents. The investigators did not specify what was considered inappropriate. Unintended sex after binge drinking was reported to range from 13%-26% of pharmacy students at three pharmacy schools in 1998.¹⁰ Our finding in this study may actually be lower and more comparable to the 1998 study, since the question used in our survey was not as specific and may include responses that reflect a more broad inclusion of various sexual activities.

A limitation of this study was the inability to calculate a precise response rate for the questionnaire. Due to logistical challenges with administering the survey at 9 different schools, not all students at every school were provided the opportunity to take the survey. For schools offering only the online version, emails were sent to all students. Some schools offering the paper version were able to offer the survey to all professional years while other schools were only able to reach a smaller percentage of their student population. The principal investigators were unable to determine the exact number of students offered the opportunity to participate, making calculation of response rate impossible.

CONCLUSIONS

In conclusion, more than 25% of pharmacy students at nine different pharmacy schools have markers of dangerous and harmful alcohol use. The usage of alcohol among pharmacy students is similar to students in undergraduate degree programs, but hazardous usage is greater than students enrolled in medical schools. Male students, those without a

previous degree, and those with intoxication before the age of 19 show the greatest risk. Schools of pharmacy should continue to address and combat alcohol use and misuse in order to reduce the risk of alcohol-related problems in pharmacy students and future pharmacists.

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CONFLICT OF INTEREST

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The AUDIT Questionnaire™ is a trademark of the World Health Organization

SurveyMonkey™ is a trademark of SurveyMonkey.com, LLC.

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