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Alcohol Use in Students Seeking Primary Care Treatment at University Health Services

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Abstract

OBJECTIVE—Given the high rate of at-risk drinking in college students, the authors examined drinking behaviors and associated factors in students being seen in student health services for primary care visits from October 30, 2004 to February 15, 2007.

METHOD—Analyses were based on a Health Screening Survey (HSS) completed by 10,234 college students seeking general medical treatment.

RESULTS—Alcohol use was similar to other studies with 57% (n=5840) meeting the NIAAA criteria for at-risk drinking. Twenty-six percent of the students reported smoking at least once in the last 3 months. Risk factors for at-risk drinking included young age, white males, drinking at a fraternity/sorority house, and use of tobacco.

CONCLUSIONS—Our findings support the widespread implementation of alcohol screening and intervention in university health services.

Keywords

College drinking; alcohol; student health services; alcohol intervention

Heavy alcohol use is the norm at many college campuses. Studies consistently show that roughly half of college students engage in binge drinking and that approximately a quarter of college students are frequent binge drinkers¹. Binge drinking has been originally characterized as 5 drinks in a row for men and 4 drinks in a row for women. The NIAAA has defined “binge” as a pattern of drinking that brings blood alcohol concentration (BAC) to 0.08 gram percent or above. This typically occurs when men consume 5 or more drinks, and when women consume 4 or more drinks, in about 2 hours.²

Alcohol abuse is an underlying root of morbidity and mortality on college campuses.^{3–5} It is estimated that in 2005 approximately 5 million out of roughly 10 million U.S.-based college students consumed 5 or more drinks during a single drinking occasion. In addition, in 2005 there were 1,825 alcohol-related student deaths, 696,000 students were assaulted because of alcohol, and 599,000 students suffered alcohol-induced unintentional injuries.¹ With high prevalence rates of binge drinking and associated negative consequences, there is a growing concern to reduce alcohol overuse on college campuses.⁶ University health centers were

identified as a viable place for alcohol screening and intervention among college students.⁷ Notably, however, only limited information exists on the make-up of alcohol drinkers who present themselves at university health centers. All college alcohol epidemiological studies have been conducted with a general student population. It would be prudent to elucidate who among college students may benefit the most from alcohol interventions at university health services.

The primary objective of this paper is twofold: (1) to characterize a group of students who present themselves to university health centers for primary care visits and are screened for alcohol use; (2) to compare college drinkers seen at university health centers to the general student population. The present study analyzes the data collected as part of the College Health Intervention Project Study (CHIPS), a randomized controlled trial of brief alcohol interventions delivered by clinicians at university health services in the U.S. and Canada. More than 10,000 college students were screened for alcohol consumption and associated factors as they waited for primary care visits at university health services. This is the largest college alcohol epidemiological study conducted in a clinical setting.

Methods

Data Collection

The data reported were derived from a cross-sectional survey of 10,400 college students who received primary care medical treatments at university health services. Students were recruited from one medium-size (<12,000 students) and one large public university in the Midwest (>40,000 students), one large public university on the West Coast (>40,000 students), and one large public university in Western Canada (>40,000). University sites were identified based on their willingness to participate in the study. Available literature suggests that US and Canadian students may behave fairly similarly in regards to alcohol, 1·4·8⁹ so an effort was made to include medium-size and large universities in different geographical regions. All enrolled students over the age of 18 with regularly scheduled appointments or non-urgent walk-in appointments at the university health services between October 30, 2004 and February 15, 2007, were invited to participate in the study. Receptionists or student research assistants approached students when they entered university health services for a primary care visit during the academic year. Participation at all sites was voluntary. Respondents filled out the health screening survey (HSS) which, on average, took 5–10 minutes to complete.¹⁰

The HSS contained questions on exercise patterns, smoking habits, the frequency and quantity of drinking in the last three months, the number of heavy episodic drinking occasions in the last 30 days, CAGE questions, drinking location, year in school, living arrangement, and demographic variables. The outcome variables in the HSS were chosen a priori and based on the outcomes of previous studies of alcohol use among college students. 1·11 The survey instrument used a beverage-specific quantity-frequency measure of alcohol consumption which was validated by prior studies.¹² Students were asked to complete the screening tool while waiting for their appointment and returned the completed questionnaire to a locked box. Subjects were volunteers and were not compensated for participation. Response rates were high, with fewer than 10% of students declining to complete the screening survey. The Institutional Review Boards (IRB) for each participating institution reviewed and approved the research protocol at each site.

Alcohol use measures

Figure 1 illustrates the questions asked to evaluate frequency and quantity of alcohol consumed by the study subjects.

Frequency of binge drinking was measured with the question: “In the last 30 days, how many times have you had 5 or more regular drinks (average size glass of beer, small glass of wine, shot of gin, vodka, rum, brandy, whiskey or other hard liquor) on one occasion?”. Possible responses ranged from 0 to 5 times or more.

Alcohol abuse/dependency was measured with 3 CAGE questions: “In the last 3 months have you felt you should cut down or stop drinking?”; “In the last 3 months has anyone annoyed or gotten on your nerves by telling you to cut down or stop drinking?”; “In the last 3 months, have you been waking up in the morning wanting to have a drink containing alcohol?”. Possible responses were “No,” “Sometimes,” “Quite often,” “Very often.”

Statistical Analysis

Health screening surveys were checked for completeness and scanned at the UW-Madison Scanning Lab. The scanned data were imported into an Oracle database (Oracle Corporation, Redwood Shores, CA) and checked for incongruencies. The demographic and environmental variables and alcohol use outcomes were described by way of frequencies (%) and mean values. Mean and median tests were executed separately for the male and female subjects.

We have modeled the covariates of the most extreme drinkers in our sample, who would be most at risk for alcohol-related harm. A multivariate logistic regression estimated the odds ratios for excessive alcohol use, defined as consuming 5 or more drinks in a row on five or more occasions in the last 30 days. The model adjusted for known determinants of binge drinking (e.g. gender, age, race, year in school, smoking). All analyses were performed with SAS version 9.1 for Linux.

Results

The study sample (N=10,234) included more women (66%) than men (34%). Non-Hispanic white students (75%) and Asian students (14%) were the dominant ethnicities. The ages of the study participants were evenly distributed between three age ranges: 18–20 year olds (35%), 21–23 year olds (32%), and 24 years and older (33%). Notably, the present sample percentages are similar to the national average student composition of U.S. universities in 2006.¹³

Students’ year in school was evenly distributed among freshmen (13%), sophomore (13%), and junior (18%) classes. A higher percentage of participants reported being seniors (24%). Also included in the sample were graduate and professional students (31%). The majority of the subjects reported living off-campus (70%). Twenty-six percent of the respondents acknowledged smoking at least once in the past three months.

Drinking patterns are presented in Table 1. Sixteen percent of the students reported abstaining from alcohol. Over half (57%) of students met the NIAAA criteria for at-risk drinking, defined as 7 or more drinks per week for women, 14 or more drinks per week for men, or 5 or more drinks in a row on single occasion. Both men and women under the age of 24 reported the greatest percentage of at-risk drinking. Estimates of alcohol misuse found that one-third of the sample had one or more positive responses to CAGE items, primarily to the question “felt you should cut down” on drinking. Fewer than one percent affirmed all 3 CAGE items and may have been alcohol dependent. Alcohol use was moderated by gender.

Fifty-five percent of students reported binge drinking in the past 30 days. Twenty-nine percent of subjects acknowledged 3 or more episodes of 5 or more drinks in a row. Similar to other studies of college drinking, binge drinking rates were highest among younger male

students. Thirty percent of the men age 18–20 reported five or more heavy drinking episodes in the past 30 days, compared to 14% of young women in the same age group and 12% of males age 24 or older.

Table 2 shows the relationships between demographic variables and excessive alcohol drinking, defined here as drinking 5 or more drinks in a row on five or more occasions in the past 30 days. Students at highest risk for alcohol abuse were 18–20 year olds (OR=1.74; 95% CI: 1.31, 2.33), non-Hispanic whites (OR=1.59; 95% CI: 1.19, 2.13) and current smokers (OR=3.15; 95% CI: 2.78, 3.56). Students at lowest risk for alcohol misuse were of Asian descent (OR=0.44; 95% CI: 0.31, 0.64), drinking at their parents' or relatives' home (OR=0.42; 95% CI: 0.29, 0.60), and those living with a spouse or partner (OR=0.47; 95% CI: 0.25, 0.89).

Table 3 compares three studies of college drinking to the present study of a clinical college sample. Despite variations in data collection methods (interview, mailed survey, or questionnaire in clinic), different groups of college students surveyed (freshman only or all students, including graduate students), and varying definitions for excessive drinking (binge drinking in the last 2 weeks or in the last month), the reviewed studies and the present study report similar results. Roughly half of all college students are using alcohol at levels that place them at-risk for alcohol-related problems.

Comment

This paper provides insights on alcohol use among college students receiving primary care at student health services. Prior studies have been limited to student samples from non-clinical settings. Our results show that 57% of students seen at university health services are at-risk alcohol drinkers. These findings suggest that if college health clinicians see 20 students per day, they can expect to identify 11 at-risk drinkers. The exact number will depend on the age and gender of the students seen. In addition, similar to other college drinking studies, this investigation demonstrates that white males under the age of 24, who smoke and drink at bars or fraternities/sororities, expose themselves to increased risk for binge drinking. College health providers may wish to screen these college students more vigorously for heavy alcohol use. University Health Clinics have been overlooked as potential venues for alcohol interventions on college campuses. Our findings suggest that they may be a potential resource for combating alcohol abuse among college students.

Interestingly, our alcohol use prevalence rates are in line with other college drinking studies, such as Monitoring the Future⁴, White et al.,¹⁴ and the College Alcohol Study.¹ Roughly half of the clinical student population engages in binge drinking. Our findings demonstrate that college students at university health services are forthcoming about their alcohol consumption and do not hide information about their excessive drinking. This evidence offers support to the need for rigorous alcohol screening and intervention at university health services.

Our findings also are in line with the National Institute of Alcohol Abuse and Alcoholism (NIAAA) College Drinking Task Force¹⁵ recommendation to implement routine alcohol screening and intervention as part of standard practice in student health services. The adoption of universal alcohol screening and intervention as part of the primary care visit at university health services may be key for a successful alcohol harm reduction approach to college alcohol abuse. Future research may wish to explore the efficacy of alcohol interventions delivered at university health services.

The study has a number of strengths, including a large sample, a non-alcohol treatment-seeking population, state-of-the-art research procedures, and a high response rate.

Limitations

Limitations of the study include cross-sectional data collection, lack of information on comorbid factors, and a limited number of questions on alcohol use. Furthermore, self-report of alcohol use outcome is another methodological issue, but a number of studies indicate that self-reported alcohol use information is reliable.¹⁶ Methods utilized in this study to minimize self-report bias included: 1) reassuring subjects that their responses would be kept confidential; 2) employing Health Screening Surveys with parallel questions regarding weight, exercise, sleeping patterns, alcohol use and smoking to mask the focus on the alcohol questions.

In addition, more than 66% of the study participants were females, while just over 50% of the student body at the participating Universities is female, indicating a potential gender bias toward women in the study.

Conclusions

In summary, university health clinics have been overlooked in efforts to identify and intervene with college drinkers at highest risk for alcohol harm. Most college alcohol prevention initiatives have focused on environmental interventions (e.g. changing drinking norms, compliance checks at local bars/taverns).¹⁷ This study suggests that students will report binge drinking in a clinical setting. This fact offers promise that students may also be open to a “teachable moment” at university health services.

Our results support the allocation of limited resources to widespread alcohol screening of all students seen at university health services. Since college students utilize student health services approximately 2 times per year on average,¹⁸ this is a missed opportunity to identify and intervene with the students at greatest risk for alcohol abuse. It is time to try new ideas, such as universal alcohol screening and interventions at university health services.

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IN THE LAST THREE MONTHS, on average, how many DAYS PER WEEK have you been drinking BEER OR WINE COOLERS?
 Zero less than 1 1 2 3 4 5 6 7

On a day when you have had beer or wine coolers to drink, how many REGULAR (12oz) CANS, BOTTLES, OR GLASSES have you been drinking?
 less than one drink 1-2 drinks 3-4 5-6 7-8 9-10 11-12 13+

IN THE LAST THREE MONTHS, on average, how many DAYS PER WEEK have you been drinking WINE?
 Zero less than 1 1 2 3 4 5 6 7

On a day when you have had wine to drink, how many REGULAR (5oz) GLASSES have you been drinking? (For example, an 8-10 oz glass of wine is considered two regular drinks.)
 less than one drink 1-2 drinks 3-4 5-6 7-8 9-10 11-12 13+

IN THE LAST THREE MONTHS, on average, how many DAYS PER WEEK have you been drinking LIQUOR (mixed drinks or shots of gin, vodka, rum, brandy, whiskey or other hard liquor)?
 Zero less than 1 1 2 3 4 5 6 7

On a day when you have had liquor to drink, how many REGULAR (1½ oz) SHOTS have you been drinking (mixed drinks or shots of gin, vodka, rum, brandy, whiskey or other hard liquor)? Many mixed drinks contain more than one shot; e.g., Long Island Iced Tea may have 3-4 shots.
 less than one drink 1-2 drinks 3-4 5-6 7-8 9-10 11-12 13+

Figure 1.
Quantity-Frequency Alcohol Measure

Table 1
Alcohol use among college students seen for primary care visits at four student health services

	Male n=3492		Female n=6742		Total n=10234 No. (%)
	18-20 years old n=1087 No. (%)	21-23 years old n=1127 No. (%)	18-20 years old n=2484 No. (%)	21-23 years old n=2139 No. (%)	
Abstainers	217 (20)	106 (9)	564 (23)	250 (12)	1682 (16)
Low-risk^a	143 (13)	179 (16)	515 (21)	605 (29)	2712 (27)
At-Risk^b	727 (67)	842 (75)	1405 (57)	1284 (60)	5840 (57)
Alcohol Abuse^c	403 (37)	464 (41)	871 (35)	694 (33)	3338 (33)
Alcohol Dependence^d	11 (1)	18 (2)	27 (1)	21 (1)	94 (1)
Heavy episodic drinking in the last 30 days					
None	357 (33)	293 (26)	1101 (44)	892 (42)	4556 (45)
1-2 times	218 (20)	285 (25)	676 (27)	651 (30)	2754 (27)
3-4 times	184 (17)	218 (19)	358 (14)	310 (15)	1395 (14)
5 or more times	328 (30)	331 (29)	349 (14)	286 (13)	1529 (15)

^aLow risk is defined as 7 or fewer drinks per week for women and 14 or fewer drinks per week for men or <5 drinks per drinking occasion

^bAt-risk is defined by NIAAA as >7 drinks/week for women, >14 drinks per week of men and 5 or more drinks per drinking occasion

^cAlcohol abuse is defined as 1 or 2 positive CAGE questions (note we only used the cut down, annoyed and eye opener question. The guilty question has too many false positives in populations of young women to use to estimate the frequency of abuse and dependence)

^dAlcohol dependence is defined as 3 positive CAGE questions

Table 2

Adjusted odds ratios (OR) and 95% confidence intervals for correlates of excessive alcohol drinking defined here as 5 or more times in the past 30 days (n=10,127)

Variables	OR	95% CI	<i>p</i>	
Age				
18–20 years old	1.74	1.31	2.33	<.001**
21–23 years old	1.52	1.21	1.90	<.001**
24 or older	.	.	.	.
Gender				
Male	2.63	2.33	2.98	<.001**
Female	.	.	.	.
Ethnicity				
Hispanic origin	1.18	0.83	1.69	0.361
Non-Hispanic white	1.59	1.19	2.13	0.002**
Black	0.78	0.45	1.36	0.383
Native American	1.38	0.81	2.35	0.233
Asian	0.44	0.31	0.64	<.001**
Hawaiian	0.87	0.41	1.86	0.717
Year in School				
Freshman	1.78	0.88	3.58	0.108
Sophomore	1.88	0.95	3.75	0.072
Junior	1.74	0.89	3.39	0.105
Senior	1.72	0.89	3.33	0.107
Masters or PhD program	0.95	0.49	1.85	0.882
Other	.	.	.	.
Drinking Location				
Off-campus residence	0.99	0.79	1.25	0.948
Greek house	1.58	1.15	2.17	0.004**
Bar	1.40	1.10	1.78	0.006**
Parents house or other	0.42	0.29	0.60	<.001**
N/A (abstainers)	0.03	0.01	0.06	<.001**
On-campus residence	.	.	.	.
Residence				
Off-campus	0.98	0.83	1.15	0.757
On-campus	.	.	.	.
Living Arrangement				
With roommates or friends	1.23	0.69	2.21	0.486

Variables	OR	95% CI		<i>p</i>
Alone	0.71	0.39	1.29	0.258
With parents	0.62	0.31	1.24	0.180
With spouse/partner	0.47	0.25	0.89	0.020*
Other	.	.	.	.
Current Smoker	3.15	2.78	3.56	<.001**

*
p<0.05

**
p<0.01

Note: Model $\chi^2=1887.72$, $df=25$, $p<0.001$

Hosmer and Lemeshow Goodness-of-Fit $\chi^2=9.42$, $p=0.308$

Table 3

Comparison studies on college alcohol use prevalence rates

	White et al. (2006)			College Alcohol Study Wechsler et al. (2002)			Monitoring the Future Johnson et al. (2003)			College Health Intervention Projects (CHIPS) –Our Study		
	US college freshmen sample			2001 US college students			US full-time college students age 19–22			US and Canada college students seen for primary care visit at student health services		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
	n=5003 No. (%) ^a	n=5421 No. (%) ^a	n=10424 No. (%)	n=3925 No. (%) ^a	n=6979 No. (%) ^a	n=10904 No. (%)	n=490 No. (%) ^a	n=770 No. (%) ^a	n=1260 No. (%)	n=3492 No. (%) ^a	n=6742 No. (%) ^a	n=10234 No. (%)
Abstainers (%)	44.7	46.8	45.8	20.1	18.7	19.3	n/a	n/a	n/a	15.5	16.9	16.4
Non binge drinkers (%)	14.7	19.5	17.2	31.3	40.4	36.3	n/a	n/a	n/a	20.5	32.7	28.5
Binge drinkers (%)	40.6 ^b	33.7 ^b	37.0 ^b	48.6 ^b	40.9	44.4 ^b	50.7 ^c	33.4 ^c	40.1 ^c	64.1 ^d	50.4 ^d	55.1 ^d

^aEach percentage value is relative to the total sample of males and females^bBinge drinking is defined as 5 or more drinks for men and 4 or more drinks for women in a row in the past 2 weeks^cBinge drinking is defined as 5 or more drinks in a row in the past 2 weeks^dBinge drinking is defined as 5 or more drinks in a row in the past 30 days