

Screening and Brief Intervention for Alcohol Problems Among College Students Treated in a University Hospital Emergency Department

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Abstract. The authors evaluated a protocol to screen and provide brief interventions for alcohol problems to college students treated at a university hospital emergency department (ED). Of 2,372 drinkers they approached, 87% gave informed consent. Of those, 54% screened positive for alcohol problems (Alcohol Use Disorders Identification Test score ≤ 6). One half to two thirds of the students who screened positive drank 2 to 3 times a week, drank 7 or more drinks per typical drinking day, or had experienced alcohol dependence symptoms within the past year. Ninety-six percent of screen-positive students accepted counseling during their ED visit. Three quarters of those questioned at 3-month follow-up reported that counseling had been helpful and that they had decreased their alcohol consumption. The prevalence of alcohol problems, high rates of informed consent and acceptance of counseling, and improved outcomes suggest that the ED is an appropriate venue for engaging students at high risk for alcohol problems.

Key Words: alcohol-related problems, binge drinking, brief intervention, college students, emergency department, screening

During the 1990s, 3 national surveys confirmed that binge drinking is a pervasive problem on college campuses, reported by 41% to 47% of college students.¹⁻⁴ Binge drinking, usually defined as consumption of 5 or more drinks on at least one occasion during the 2 weeks before the survey,¹ is one of the most commonly used proxies for excessive or heavy episodic drinking.⁴ Some surveys lower the threshold for binge drinking to 4 or

more drinks for women.⁴ By either definition, binge drinking can set the stage for alcohol dependence and conveys an increased risk for alcohol-related harm, including injuries, illness, and loss of educational and occupational opportunities.^{4,5} On college campuses, binge drinkers create problems for other students—interrupting study and sleep, making unwanted sexual advances, and provoking fights.^{6,7} The highest prevalence of binge drinking is found among men, younger students, college athletes, and members of Greek organizations.^{2-4,8-14} Although binge drinkers represent less than half of the student body, they drink more than 90% of the alcohol consumed by college students.¹⁰ Moreover, the overall prevalence of binge drinking on college campuses remained constant during the 1990s.⁴

Because drinking problems represent such a significant medical and social burden for students, their parents, surrounding communities, and college administrators, programs to moderate drinking behavior and prevent alcohol-related harm are in high demand. Many campuses have primary prevention programs that attempt to influence drinking behavior by changing policies and student attitudes.¹⁵ However, such efforts do not identify and help the highest risk students, the ones who drink so much that they are already experiencing alcohol-related harm. In one national study of college students, frequent binge drinkers (≥ 3 binges within 2 weeks of the survey) represented 19% of the college population but accounted for 68% of the alcohol consumed by college students and about half of those who reported experiencing any of 12 different alcohol-related consequences.¹⁰

One strategy for helping these students is provided in a landmark report from the Institute of Medicine.¹⁶ It promotes the use of the term *alcohol problems*, which

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embraces the traditional diagnoses of alcohol abuse and alcohol dependence, but also includes milder harmful consequences and regular, excessive alcohol consumption as worthy of treatment. The authors of that report recommended that individuals who go to medical settings for treatment be screened for alcohol problems and that screen-positive patients be provided brief, on-site interventions and appropriate referral for additional treatment. This approach has been evaluated in primary care settings and inpatient trauma centers, with controlled research demonstrating reduced emergency room and hospital use^{17,18} and a decrease in the amount that patients drink.^{17,19} Preliminary research in emergency departments (EDs) shows similar results.²⁰⁻²² On college campuses, the efficacy of brief interventions has been demonstrated among students in psychology classes and incoming freshmen.²³⁻²⁵ However, no studies have been published on such clinical preventive services in medical settings that serve college campuses.

In this study, we present analyses of data from all 4-year college students enrolled in a larger prospective study of all patients aged 18 through 39 years who seek medical treatment at a university hospital ED.²² The larger study focused on the feasibility of screening ED patients for alcohol problems and providing brief on-site counseling. The analytic objectives of the present study were to (1) estimate the prevalence of alcohol problems among college students seeking medical treatment, (2) estimate the prevalence of various proxies for excessive drinking, alcohol-related harm, and alcohol dependence symptoms in this group, (3)

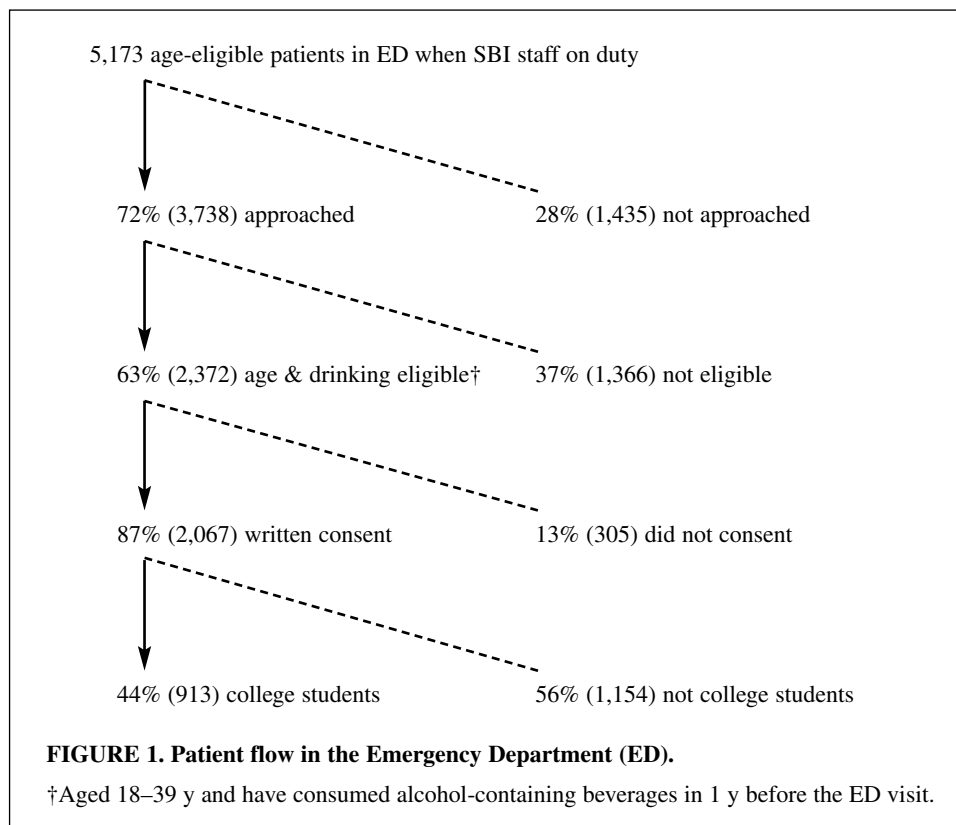
evaluate the acceptability of ED-based alcohol-problem counseling, (4) evaluate students' readiness to change their drinking behavior, and (5) evaluate drinking-related outcomes 3 months after the students' ED visit.

METHOD

Procedures and Measures

The study group comprised all college students who participated in a larger prospective intervention study²² between August 1998 and June 1999 (Figure 1). For that study, project staff identified all patients aged 18 to 39 years from ED charts (*n* = 5,173) and approached as many as time allowed (*n* = 3,738) to verify their basic eligibility for the study—their ages and that they had consumed beverage alcohol in the previous 12 months (*n* = 2,372). During the consent procedure, we assured the patients that they could refuse to answer any question or drop out of the study at any time and that refusal to participate would not interfere with their access to medical treatment during their visit. Consenting patients (*n* = 2,067) signed and were provided a copy of the institutional review board (IRB)-approved consent form. Of the original sample, 913 were college students.

During the study period, 6 project staff members with undergraduate and master's degrees in public health, social work, and psychology screened and intervened with the patients. They interviewed patients and recorded study data by using standardized scripts and forms rather than by having patients fill out questionnaires. The research staff (DWH,



WGM) trained project personnel to understand the sequence of clinical operations in the ED so that they could avoid interrupting medical treatment. During the training period, new staff members worked with experienced staff; later, daily debriefing and chart reviews maintained consent standards, data quality, and consistent intervention procedures. The same staff members conducted follow-up telephone interviews. To ensure that they remained blinded to baseline outcome measurements, we assigned them only to patients with whom they had not interacted at baseline, and they never had access to baseline records for those patients.

The participants' college-student status was determined by self-reports during the baseline interview before they were screened for alcohol problems. At the same time, we asked questions about basic demographic and personal information, including age, gender, race, marital status,

employment, smoking status, attempts to cut down or stop drinking, and participation in alcohol treatment programs. Patients were also asked why they came to the ED. If they reported it was for a sprain, fracture, laceration, cut, bite, or sting, the visit was classified as an injury visit for analytic purposes. Patients were not asked whether they considered the injury or their visit to be alcohol related.

Next, we administered the 10-question Alcohol Use Disorders Identification Test (AUDIT)²⁶ to assess the risk for alcohol problems during the past year (Figure 2). The AUDIT was developed by the World Health Organization as a multiculturally sensitive self-report screening instrument to identify individuals experiencing a broad range of alcohol problems. Like well-known screening instruments such as the CAGE,²⁷ the AUDIT asks questions that explore patients' experiences with alcohol-dependence symptoms

1. In the past year, how many drinks containing alcohol do you have on a typical day when you are drinking?
 1 or 2 (0) 3 or 4 (1) 5 or 6 (2) 7 to 9 (3) 10 or more (4)

2. How often do you drink that amount?
 ≤ 1 month (1) 2–4 times/month (2) 2–3 times/week (3) ≥ 4 times/week (4)

3. How often in the past year have you had 5 (male) / 4 (female) or more drinks on one occasion?
 Never (0) < monthly (1) Monthly (2) Weekly (3) Daily/almost daily (4)

†3a. How often in the past two weeks have you had 5 (male)/4 (female) or more drinks on one occasion?
 ___ Not at all ___ 1–2 times ___ 3–4 times ___ 5 or more times

4. How often during the past year have you found that you were not able to stop drinking once you had started?
 Never (0) < monthly (1) Monthly (2) Weekly (3) Daily/almost daily (4)

5. How often during the past year have you not done what was normally expected from you because of drinking?
 Never (0) < monthly (1) Monthly (2) Weekly (3) Daily/almost daily (4)

6. How often during the past year have you needed a drink first thing in the morning to get yourself going after a heavy drinking session?
 Never (0) < monthly (1) Monthly (2) Weekly (3) Daily/almost daily (4)

7. How often during the past year have you had a feeling of guilt or remorse after drinking?
 Never (0) < monthly (1) Monthly (2) Weekly (3) Daily/almost daily (4)

8. How often during the past year have you been unable to remember what happened the night before because you had been drinking?
 Never (0) < monthly (1) Monthly (2) Weekly (3) Daily/almost daily (4)

9. Has your drinking contributed to an injury to yourself or anyone else?
 Never (0) Yes, but not in the last year (2) Yes, during the last year (4)

10. Has a relative, friend, doctor, or other healthcare worker been concerned about your drinking or suggested that you should cut down?
 Never (0) Yes, but not in the last year (2) Yes, during the last year (4)

FIGURE 2. Alcohol Use Disorders Identification Test (AUDIT).
 AUDIT scores range from 0 to 40. In this study, scores ≥ 6 were considered a positive screening result for alcohol problems.
 †Question 3a was added for this study and was not used in calculating AUDIT scores.

(Q4–Q6) and alcohol-related harm (Q7–Q10). However, the response categories capture greater detail. Moreover, the AUDIT also asks questions about alcohol intake (eg, usual amount, usual frequency of drinking, and frequency of binge drinking) (Figure 2, Q1–Q3). This added domain allowed the researchers to use AUDIT to identify patients at high risk who have not already experienced alcohol-related harm. Therefore, it is particularly well suited for prevention efforts that attempt to identify patients during the early stages of problem drinking.

The AUDIT has been extensively studied^{28–30} in EDs^{22,31} and collegiate settings.^{8,32–34} The most recent exhaustive review deems it reliable, valid, and practical, and also urges broader use in clinical and research applications.²⁹ Many studies use a score of ≥ 8 , out of a possible total of 40, as the threshold for a positive screening result, indicating the presence of a potential alcohol problem. However, research indicates that lower thresholds increase the instrument's sensitivity when screening women, various ethnic groups, or college students.^{29,31,32} Therefore, to identify patients before or soon after the onset of alcohol-related harm and to increase the sensitivity of the instrument, we considered a score of ≥ 6 a positive screening result. To achieve comparability with other college studies, we defined binge drinking as 5 or more drinks on one occasion during the past 2 weeks for men and 4 or more in the same period for women (Figure 2, Q3a).

We asked screen-positive students an additional 16 questions about their experience of alcohol-related harm.³⁵ We also asked about over-the-counter, prescription, and illicit drug use. Research staff members also recorded the age at which students had their first drunken experience and whether anyone in their family had a history of heavy drinking. Novice drinkers generally require only 1 or 2 drinks to feel the effects of alcohol. However, as they drink larger amounts and more frequently, they build a tolerance to alcohol, requiring more drinks before they feel its effects. To measure tolerance, we asked screen-positive students how many drinks it took for them to feel the first effects of alcohol.

To evaluate participants' readiness to change drinking behavior, we asked them to place themselves on the following scale: (1) I have no thoughts of changing; (2) I need to consider changing someday; (3) I think I should change, but I am not quite ready; (4) I am thinking about how to change my drinking; or (5) I am taking action to change.³⁶ To further assess motivation, we asked students how important it was to them to cut down on their drinking and if they decided to cut down, how confident they were that they could do so. We recorded responses for the importance and confidence measures on a 10-point Likert-type scale, with higher scores indicating greater importance or confidence.³⁷

The readiness-to-change questions marked the point at which the interaction with the patient segued from a scripted interview to an open-ended counseling session that lasted from 5 to 25 minutes, depending on patients' readiness to change and the severity of their problems. The screening and baseline interview provided specific information about

the patients' health and social concerns, which helped project staff determine counseling goals. As appropriate, staff members highlighted the relationship of alcohol use to those concerns. For patients who were ready to change, the session focused on setting goals (eg, to decrease or stop drinking) and creating a menu of strategies for achieving them. For patients who were less ready to change, our staff members used motivational interviewing techniques that highlighted empathy instead of confrontation and developed discrepancy between beliefs and actions.³⁸ We referred patients who had more severe problems or desired additional treatment to specialized services separate from the ED. Both screen-positive and screen-negative patients were given brochures about sensible drinking and the warning signs of a drinking problem. At the conclusion of each patient interaction, the staff member reported that participant's level of cooperation and whether screen-positive patients had set a goal to stop their drinking or moderate it or had requested a referral for additional help.

Starting 3 months after the baseline ED visit, project staff made up to 6 attempts to contact screen-positive participants by telephone. We readministered the AUDIT to evaluate whether alcohol problems had improved. The participants were also asked the following questions: (1) How helpful was the alcohol information you received in the ED? (2) Were you treated with respect by the project staff? (3) Was the ED a good place to hear this kind of information? Response categories were presented on a 5-point Likert-type scale from *strongly agree* to *strongly disagree*.

Data Analysis

We considered that the proportion of students who screened positive represented the prevalence of alcohol problems in this clinical population. Variables that represented patients' history of alcohol problems as well as the 3 domains of alcohol problems—alcohol intake, alcohol-related harm, and alcohol dependence symptoms—were dichotomized and presented by screening status.

We considered several process measures as proxies for the acceptability of this protocol—rates at which patients consented to participate, received positive screening results, received counseling, set a goal of changing their drinking behavior, or requested a referral. Reports of alcohol-related harm and alcohol dependence symptoms were also considered as proxies for the acceptability of the protocol because patients had to trust us not to misuse this information to report such experiences. We used chi-square methods to evaluate whether equal proportions of younger students (who drank illegally) and older students reported such experiences.

On the basis of answers to AUDIT questions about alcohol intake and experiences of alcohol-related harm or dependence symptoms, we divided screen-positive students into 3 exhaustive, mutually exclusive categories. Our goal was to achieve categories that were clinically meaningful (had face validity) and represented increasing levels of alcohol-problem severity. One category (intake only) consisted of students who received positive screen-

ing results on the basis of their alcohol intake alone (ie, they received no score from alcohol-related harm or alcohol dependence-symptom AUDIT questions). We expected this group to have the least severe alcohol problems. Another category (harm adequate) was composed of students who received enough score from harm and dependence-symptom questions to qualify for positive screening results without considering their alcohol intake score. We expected this group would have the most severe alcohol problems. We also expected that the severity of alcohol problems in the final category (both required) to fall between the other 2 groups. This group required scores from both alcohol intake questions and harm or dependence questions to be classified as screen positive. We compared the 3 groups' answers to individual AUDIT questions and mean total AUDIT score to confirm that we had achieved our goal. However, we did not test these results statistically because answers to AUDIT questions had been used to construct the 3 categories. We used the Cochran-Armitage trend test³⁹ to evaluate whether proxies for baseline alcohol-related risk not derived from AUDIT questions were associated with the 3 categories.

To evaluate whether students' drinking behavior had changed at follow-up, we subtracted each patient's follow-up AUDIT scores from his or her baseline score to create a difference score. We repeated this process for summed scores for the AUDIT questions in the intake, harm, and dependence domains. In all cases, a positive difference score reflected an increase in risk over the follow-up period; a negative score reflected a decrease in risk. We used the Statistical Analysis System⁴⁰ to calculate 95% confidence intervals (CIs) to test whether changes in mean scores were significantly different statistically from zero (no change).

RESULTS

Just over half of this sample of college student drinkers screened positive for alcohol problems (Table 1). This group was demographically different from the total sample, significantly more likely to be male or White, to smoke, and significantly less likely to be employed, married, or living with a partner. More than 80% of the screen-positive group reported binge drinking at least once in the 2 weeks before the baseline ED visit, and more than 40% reported binge drinking 3 or more times in that period (Table 2). From 17% to 61% of screen-positive students reported experiencing harm in the previous year that they attributed to their drinking; nearly three quarters (71.8%) reported at least one of the 4 AUDIT harm experiences in the last year (Figure 2, Q7-Q10), and 15.9% reported at least one of those occurred monthly or more often during that period. From 3% to 44% reported experiencing alcohol dependence symptoms in the previous year. In the past year, about half (47.8%) of the screen-positive students reported at least one of the 3 AUDIT dependence symptoms (Q4-Q6), and 12.0% experienced at least one symptom monthly or more often.

We found that students for whom drinking was illegal

TABLE 1. Percentage of Positive Screening Results, by Characteristics of Consenting Students

Variable	Consenting students		Screen %
	n	%	
Overall	913	100.0	53.7
Age (y)***			
18	138	15.1	50.8
19	173	18.9	61.7
20	164	18.0	58.6
21	131	14.4	58.7
22	108	11.8	55.8
23-39	199	21.8	40.1
Class status***			
Freshman	255	27.9	53.4
Sophomore	182	19.9	54.9
Junior	197	21.6	56.0
Senior	143	15.7	58.6
Graduate students	136	14.9	44.0
Gender***			
Female	509	55.8	44.8
Male	404	44.2	64.9
Race**			
White	829	90.8	55.4
African American	51	5.6	31.7
Other	33	3.6	43.1
Employment*			
Not employed	526	57.6	56.6
Employed	387	42.4	49.6
Cohabitation***			
Alone or with friends	782	85.7	57.5
With spouse or significant other	131	14.3	30.7
Smoking***			
Smokers	373	50.8	66.7
Nonsmokers	540	49.2	44.6
Chief complaint at ED visit***			
Noninjury	585	64.1	50.1
Injury	328	35.9	60.1

Note. ED = emergency department.
p* < .05. *p* < .01. ****p* < .001.

were more likely to report binge drinking 3 or more times in the 2 weeks before the baseline ED visit than students who were aged 21 years or older (48.5% vs 37.5%, *p* < .05). However, we found no statistically significant differences between these 2 groups in the percentage who reported 11 different types of harm and alcohol dependence symptoms.

About 40% of screen-positive students (41.2% of women and 37.1% of men) reported they had to drink at a binge level to feel the first effects of alcohol. This indicated a tolerance to alcohol, a principal criterion for physiological dependence, and suggested that drinking large quantities at a sitting was not a new phenomenon for these students. Although only 9% of the screen-positive students indicated they had received some type of help for their alcohol problems in the

TABLE 2. Percentage of Screened Students Experiencing Alcohol-Related Risk at Baseline, by Screening Status

Question	Overall (<i>n</i> = 913)	Screen negative (<i>n</i> = 423)	Screen positive (<i>n</i> = 490)
AUDIT questions*			
1. ≥ 7 drinks/typical drinking d	25.3	0.9	46.3
2. Usually drank			
≥ 1 times/wk	69.0	96.2	45.5
2–3 times/wk	29.2	3.8	51.2
≥ 4 times/wk	1.8	0.0	3.3
3. Binged ≥ 3 times past 2 wk†	23.8	0.7	43.7
4. Not able to stop drinking once started‡	6.6	0.9	11.4
5. Failed to fulfill normal expectations‡	25.6	5.0	43.5
6. Needs drink in morning to get going‡	1.6	0.0	3.1
7. Feels guilt or remorse after drinking‡	23.8	10.9	34.9
8. Amnesia because of drinking‡	30.8	5.7	52.5
9. Injury to self or others‡	10.1	0.0	18.8
10. Relatives, friends, or healthcare providers express concern about drinking‡	9.3	0.0	17.4
Other harm-related interview questions			
Taken foolish risks when drinking‡§	NA	NA	61.0
Done impulsive things later regretted‡§	NA	NA	58.0
Spent too much or lost a lot of money‡§	NA	NA	45.9
Been in a physical fight‡§	NA	NA	13.7
History of alcohol problems			
Ever tried to cut back on drinking	19.8	12.8	25.9
Family history of heavy drinking	NA	NA	25.7
First intoxication at age 13 or younger	NA	NA	14.9
Ever in alcohol treatment or self-help programs	5.3	1.4	8.6

Note. ED = emergency department. NA = data not obtained for screen-negative patients. AUDIT = Alcohol Use Disorders Identification Test. For each table line with data for both screen-negative and screen-positive students, the attribute proportion among screen-negative students is significantly different ($*p < .001$) from the proportion among screen-positive students.

† ≥ 5 drinks for men, ≥ 4 drinks for women on 1 occasion.

‡ At least once during the 12 mo before the baseline ED visit.

§ Questions from Drinker Inventory of Consequences.³⁵

past year, about one quarter had tried to cut back on their drinking (Table 2). Nearly one fifth (18.2%) reported using marijuana at least weekly in the past year, and 13.3% had also used other illegal drugs in the past.

The Cochran-Armitage³⁹ trend test indicates a positive association between the 3 categories of screen-positive students and levels of alcohol-related risk (Table 3). Compared with students in the intake-only group, for example, those in the harm-adequate group were about 5 times as likely to have received alcohol treatment and 12 times as likely to have been in an alcohol-related physical fight. Although students in the intake-only group reported less alcohol-related harm than those in the other 2 groups, about one third reported spending too much money on their drinking or taking foolish risks as a result of their drinking.

Both process measures and interview results indicated that this screening protocol was acceptable to student drinkers who went to this ED. Eighty-seven percent of age

and drinking-eligible patients consented to participate in the parent study (Figure 1). Project staff members indicated that the vast majority (96%) of screened students were cooperative or very cooperative. Of the 54% who screened positive, 96% (469/490) completed the entire counseling session. During the follow-up period, staff members were able to recontact and interview 296 students, 60% (296/490) of all screen-positive students. Students we followed-up with were positive about the study; they had been treated with respect by the project staff (99.3%); they found the alcohol information somewhat or very helpful (77.2%); and they perceived the ED as a good place for this type of intervention (67.6%). About 1 in 3 (30.1%) reported that he or she would not have gotten this information anywhere else.

Although a majority of students accepted the screening and counseling, a smaller proportion were ready to take action to change their drinking behavior. During the counseling session, screen-positive students were asked to

TABLE 3. Percentage of Screen-Positive Students Who Experienced Alcohol-Related Risk at Baseline, by Problem-Severity Categories

Question	Overall (n = 490) 100.0%	Intake only (n = 100) 20.4%	Both required (n = 282) 57.6%	Harm adequate (n = 108) 22.0%
Median AUDIT score ^(see note)	10	7	10	17
AUDIT questions ^(see note)				
1. ≥ 7 drinks/typical drinking d	46.3	36.0	41.5	68.5
2. Usually drank				
≤ 1 times/wk	45.5	61.0	45.8	30.6
2–3 times/wk	51.2	37.0	52.8	60.2
≥ 4 times/wk	3.3	2.0	1.4	9.3
3. Binged ≥ 3 times past 2 wk [†]	43.7	32.0	42.2	58.3
4. Not able to stop drinking once started [‡]	11.4	0.0	7.5	32.4
5. Failed to fulfill normal expectations [‡]	43.5	0.0	47.5	73.2
6. Needs drink in morning to get going [‡]	3.1	0.0	1.4	10.2
7. Feels guilt or remorse after drinking [‡]	34.9	0.0	34.8	67.6
8. Amnesia because of drinking [‡]	52.5	0.0	59.2	83.3
9. Injury to self or others [‡]	18.8	0.0	9.9	59.3
10. Relatives, friends, or healthcare providers express concern about drinking [‡]	17.4	0.0	5.7	63.9
Other harm-related interview questions [§]				
Taken foolish risks when drinking	61.0	33.0	61.7	85.2
Done impulsive things later regretted	58.0	33.0	58.5	79.6
Spent too much or lost a lot of money	45.9	24.0	45.7	66.7
Been in a physical fight	13.7	3.0	8.9	36.1
History of alcohol problems [§]				
Ever tried to cut back on drinking	25.9	15.0	23.1	43.5
Family history of heavy drinking	25.7	20.0	23.5	36.9
First intoxication at age ≥ 13	14.9	11.6	12.1	24.3
Ever in alcohol treatment or self-help programs	8.6	4.0	5.7	20.4

Note. AUDIT = Alcohol Use Disorders Identification Test. No statistical tests were performed for these variables because they were used to construct the 3 screen-positive categories—intake only, both required, and harm adequate.

[†] ≥ 5 drinks for men, ≥ 4 drinks for women on 1 occasion.

[‡]At least once during the 12 mo before the baseline ED visit.

[§]Percentages for these variables show a significant positive relationship with the 3 screen-positive categories (Cochran-Armitage trend test (p value $< .01$)).

Data from Drinker Inventory of Consequences.³⁵

describe their attitude toward changing their drinking behavior. More than half (51.4%, 244/475) reported that they had no thought of changing; only 5.5% were thinking about ways to change their drinking, and 10.6% were taking action to change. Students reported that it was not very important to them to cut down on their drinking: of a possible maximum score of 10, which indicated a high level of importance, this measure received a mean score of 3.4 ($SD = 2.7$). However, the students were quite confident about their ability to moderate their drinking if they chose to do so, giving this measure a mean score of 9.2 ($SD = 1.6$) out of a possible maximum of 10. Although few students (1.9%) accepted a referral for further evaluation or treatment, by the end of the counseling session about one third (31.4%) had set a goal of changing their drinking behavior.

Of the students who received complete counseling, nearly two thirds (296/469) were successfully reached at the 3-month follow-up. As a group, these screen-positive students experienced statistically significant positive changes in all 4 outcome measures—the domains of alcohol intake, alcohol-related harm, alcohol dependence symptoms, and total AUDIT score. Alcohol intake measures decreased for 65% of the followed-up students; mean baseline scores of 7.6 decreased to 6.2, a mean decrease of 1.4 points (95% CI: 1.2–1.6). Scores for alcohol-related harm decreased for 54% of followed-up students, with mean baseline scores of 2.5 decreasing to 1.3, a mean decrease of 1.2 points (95% CI: 0.9–1.4). Dependence symptom scores decreased for 40%. Mean baseline scores of 0.8 decreased to 0.4, a mean decrease of 0.4 points (95% CI: 0.3–0.6). These changes were reflected in a decrease in total AUDIT scores for 78%

of the students on whom we were able to follow-up. Mean baseline scores of 10.9 decreased to 7.9, a mean difference of 3.0 points (95% CI: 2.6–3.5).

COMMENT

A number of measures indicated that the screening and brief intervention (SBI) protocol we developed is feasible for use with college students who visited this ED for treatment. Despite a consent process that explicitly revealed the alcohol-behavior focus of the study, most eligible students consented to participate and were screened. A majority received positive screening results because they divulged high levels of alcohol consumption, alcohol-related harm, or dependence symptoms, an indication that they were comfortable with the process. Subsequently, almost all screen-positive students received counseling. Moreover, the project staff concluded that almost all of these students were cooperative during the SBI process. High-risk behaviors and experiences were reported by similar proportions of older students and younger students whose drinking was illegal, further confirming broad acceptability. At follow-up, participants indicated that the intervention was helpful and that similar information would probably not have been available to them elsewhere. Outcome results also provided evidence that the intervention was associated with the intended effect on alcohol-intake levels and alcohol-related consequences, further substantiating acceptability in this clinical population and setting.

College student drinkers treated at this ED had a higher prevalence of alcohol problems than adult drinkers sampled in other ED-based studies. Prevalence estimates from those studies were 24%,⁴¹ 22%,⁴² and 37%,²¹ yielding a weighted pooled prevalence estimate of 24.1%, which is 29.6 percentage points (95% CI: 24.1%–35.1%) lower than the prevalence estimate in the present study (53.7%). This difference could be attributed to the negative association between age and alcohol consumption or alcohol-related problems found in the general US population.⁵

Earlier ED-based studies have already shown that SBI procedures are feasible among adult and adolescent ED patients and are associated with decreased alcohol consumption or alcohol-related risk.^{20–22,43–45} This present study extends these findings to college students. At the same time, it demonstrated that this ED provided access to many college students with relatively severe alcohol problems. Among the entire screened sample, more than one quarter were consuming 7 or more drinks on a typical drinking day. One fifth had already tried to cut back on drinking, and almost one third had already experienced amnesia or blackouts from drinking. Among screen-positive students, 80% had already experienced alcohol-related harm or alcohol-dependence symptoms. Despite this prevalence of elevated risk, almost all screen-positive patients were willing to have their alcohol problems addressed as part of their ED visit.

According to the Institute of Medicine recommendations,¹⁶ these high-risk students need individual attention. However, most college programs highlight primary prevention strategies that target groups of students or the whole stu-

dent population. The majority of programs attempt to limit access to alcohol, institute educational programs, and restrict alcohol-related advertising or sponsorship at sports events.¹⁵ Some mandate alcohol-free residence halls or floors or require special programs for athletes and Greek association members. Foundations, professional organizations, government agencies, and advocacy groups also promote primary prevention strategies, such as media blitzes, town-gown coalitions to change campus and community regulations, server training, and enforcement of local underage drinking laws.^{46–49} Although primary prevention strategies may, over time, help change the culture of drinking on college campuses, they do not systematically identify and help individual high-risk students, those who are drinking excessively and have already experienced alcohol-related harm.

Some colleges have implemented secondary prevention programs, such as referring violators of campus alcohol policies to health clinics or asking students who attend health clinics about their drinking and assuring them access to needed alcohol treatment.^{47,48} However, such programs are not common, and none, to our knowledge, have integrated SBI into ED-based clinical services. Such clinic-based prevention services complement the universal nature of primary prevention programs by focusing scarce clinical resources on high-risk students, the ones generating most of the problems.

Over the last 2 decades, a great deal of evidence from general medical settings has demonstrated that SBI works. It reduces emergency room or hospital use^{17,18} and decreases the amount that patients drink.^{17,19,50–52} Among college students, controlled research in nonclinical settings has achieved similar results.^{24,25,53} Enough evidence has accumulated so that consensus panels and professional bodies have endorsed SBI methods.^{16,54}

SBI also appears to work in EDs, with research showing decreased levels of alcohol consumption, driving while drinking, dependence symptoms, and increased numbers of referrals for alcohol treatment.^{20–22,45,47,48} Because studies have delivered relatively consistent results across different clinical settings, many emergency physicians support the use of SBI in EDs.^{55–57} To date, however, very few ED-based reports have described controlled studies.^{43,45} Because the main goal of our current study was to demonstrate feasibility, we did not randomize patients to experimental and control groups. Therefore, the encouraging outcome results cannot be attributed to the intervention.

Our study design also limited generalization of study results in several important ways. For one, we cannot compare the prevalence of alcohol problems in this university ED-based sample with estimates from national surveys of drinking behavior on college campuses because the samples and the proxies for alcohol problems are not comparable.^{2,4} We used a convenience sample of drinkers from one ED whereas the national surveys drew probability samples of both drinkers and nondrinkers from hundreds of college campuses. Our prevalence estimate used a summative score from a recognized screening instrument to categorize patients. However, there are no accepted ways to use questions from

the national surveys to calculate a comparable proxy for alcohol problems. Another limitation of the present study is that it did not help identify which campus settings are most appropriate for SBI. Because only ED patients were enrolled in this study, we could not compare the prevalence and severity of alcohol problems among ED patients with those for students accessible in other campus settings.

Other study limitations involve the validity of students' answers to follow-up questions and the proportion of students who were not interviewed at follow-up. Research on socially sensitive issues has long been bedeviled by the potential bias produced when respondents feel the need to provide socially acceptable answers to follow-up questions. However, studies on alcohol behavior show that when respondents perceive that their answers will result in neither gain nor harm, group measures tend not to be biased.⁵⁸⁻⁶¹ Another potential source of bias is patient loss to follow-up. Despite the fact that the research staff members followed up on more than half of the screen-positive patients, a relatively large proportion for an ED-based study, nearly 40% of counseled students were lost to follow-up.

The present study raises a series of issues that should be addressed in future research. First, studies should evaluate the extent to which information and follow-up biases compromise fundamental study results. Second, they should determine which settings on college campuses offer access to student populations with (1) severe alcohol problems as well as more moderate ones, (2) a willingness to accept an intervention, and (3) a high overall prevalence of alcohol problems. At this university, the ED is a major source of medical services for college students. However, it treats only about one fifth as many students as the student health service. Research is needed to determine how much the efficacy and cost effectiveness of SBI programs vary across different campus settings. Such comparative research can set the stage for more efficient and effective preventive programs. Finally, the present study establishes that the necessary preconditions for an ED-based clinical trial among college students already exist—a protocol with efficacy proved in other medical settings, demonstrated feasibility in the ED, and an accessible high-risk population of college students willing to participate. Clearly, efficacy trials of ED-based SBIs for college students are warranted. It makes sense to implement a range of preventive activities on college campuses—from primary prevention efforts that change policies and the culture of drinking to secondary prevention efforts that identify and help individual high-risk students. Because more than half of the students who sought treatment at this ED had alcohol problems and almost all were willing to address those problems, EDs appear to be a promising venue for focusing scarce clinical resources on students who are at the highest risk for future harm.

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NOTE

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