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Emergency Department Detection of Adolescents With a History of Alcohol Abuse and Alcohol Problems

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Abstract

Objective—To compare the characteristics of adolescents with and without a history of problematic alcohol use, who are treated in the emergency department (ED) for an alcohol-related problem.

Methods—Three hundred seventeen adolescents presenting to the ED after an alcohol-related incident were divided into 2 groups based on whether their score on the Adolescent Drinking Inventory reached the clinical cutoff on problematic drinking, and compared regarding current drinking, depression, and risk-taking behaviors.

Results—Adolescents who reached the clinical cutoff on the Adolescent Drinking Inventory were older and reported more frequent drinking, greater depressed mood, and more risk-taking behaviors.

Conclusions—Of the adolescents presenting to the ED with an alcohol-related incident, those with a positive history of problematic drinking represent a particularly high-risk subgroup.

Keywords

adolescents; alcohol; screening

More than 25% Of High School Students Report Initiation of alcohol use and 9% report initiation of cannabis use before age 13 years.¹ By the time teenagers reach the 12th grade, 58% report having been drunk, 37% report binge drinking (5+ drinks once or twice each weekend in the last 30 days), and 45% report cannabis use.^{1,2} Furthermore, only approximately half of high school students perceive harm in binge drinking or regular cannabis use.²

A number of studies have found strong relationships between alcohol and other drug use and problem behaviors such as sex without contraception, delinquency, school failure, and school dropout.³ For example, in one study of 10th graders, alcohol use was highly correlated with other drug use, cigarette use, trouble with police, school misbehavior, and poor academic performance.⁴ With respect to the impact of adolescent alcohol abuse on the American health care system, a recent review indicated that alcohol is involved in 4% to

15% of adolescent emergency department (ED) admissions and between 32% and 45% of adolescent trauma admissions.⁵

The American College of Emergency Physicians has recently placed a greater emphasis on the management of adult alcohol problems, as exemplified by a Continuing Medical Education program on this topic (see the ACEP Web site, <http://acepeducation.org/561/>). Management, which may be improved by instruments that help in identifying those adolescents in need of intervention or referral for their alcohol use, is important in the ED, where time generally does not allow for an extensive interview or assessment. Quantitative measures of alcohol use, blood, saliva, and urine tests are one important way to identify alcohol use at the time of the ED visit.⁶ However, not all alcohol-positive adolescents seen in the ED are alike. For example, some adolescents without any significant psychosocial problems arrive for ED treatment after initial experimentation, with alcohol results in extreme intoxication. Still others arrive after moderate alcohol use resulting in a minor injury but with a history of psychosocial problems. These different types of presentations should result in different ED counseling strategies and aftercare recommendations. Relying solely on biochemical testing does not allow ED physicians to identify adolescents with problematic patterns of alcohol use who present to the ED for treatment of non-alcohol-related illnesses or injuries.⁷

Recent research suggests that health care providers' clinical impressions of adolescent alcohol and drug involvement often underestimate the true rate of substance use problems and disorders. Wilson et al⁸ asked medical care providers in an adolescent clinic to provide clinical impressions of 12- to 18-year-old patients' alcohol and drug use at the conclusion of a regular office visit, which was then compared with the adolescents' self-report data on a diagnostic interview. Although the medical providers correctly identified 63% of adolescents who were using alcohol or drugs, their ability to gauge the severity of the adolescents' use was limited. Providers correctly classified only 14% of those adolescents with substance use problems or negative consequences, 10% of those with an abuse diagnosis, and none of the adolescents were diagnosed as dependents. Taken together, these findings indicate that reliance on biochemical testing, medical chart review, and/or the clinical impression of health care personnel is likely to result in a high Type II classification error rate, adolescents with drinking problems not being identified as in need of further evaluation or treatment.

A number of studies have tested various screening methods with adolescents and young adults to identify problematic drinking or the presence of an alcohol-use disorder.^{9–13} These studies rely solely on adolescent self-report. The purpose of the present study was to compare the profiles of adolescents with and without problematic alcohol use across multiple sources of information, that is, biochemical, demographic, adolescent self-report, and parent report. Based on prior research,^{6,14} we hypothesized that recent alcohol use patterns and general problem behavior data would differentiate adolescents with and without problematic alcohol use patterns.

METHODS

Participants

Study participants included 317 adolescents (201 boys) aged 13 to 19 years (mean, 17.1 years, SD = 1.7), who were treated at the pediatric or adult ED of a level I regional trauma center in northeastern United States for treatment of an alcohol-related incident. Most of the sample was white (75.1%), 12% Hispanic, 7.9% black, 3.2% Asian, and 1.9% unknown. As previously reported,¹⁴ younger participants (aged 13–17 years) were most often treated for intoxication with no injury (54%), followed by intoxication in conjunction with a motor

vehicle crash (15%), assault (9%), fall (9%), other injury (5%) or illness (1%), with 7% unknown. Among older participants (aged 18–19 years),¹⁵ intoxication was also the most frequent reason for treatment (45%), followed by intoxication in conjunction with a motor vehicle crash (27%), assault (14%), fall (6%), or other injury (9%). A total of 73% were in school, the large majority in high school, and 75.9% were living at home with a parent or relative. Participants were eligible for the study if they had biochemical evidence of alcohol ingestion via blood, breath, or saliva, as ordered by the attending physician, if they self-reported drinking alcohol within 6 hours of the event or injury that led to their treatment in the ED, and a parent/guardian was available to consent to study participation. Exclusion criteria included non-English speaking, in police custody, treatment for suicidal ideation or behavior, or having sustained a serious traumatic injury.

Procedure

Participants were recruited as part of a larger clinical trial evaluating the use of a brief intervention, adapted from Miller and Rollnick's Motivational Interview,^{14,15} for adolescent alcohol use in the ED.^{16,17} Patients were referred to the study by the ED or biochemistry laboratory staff, who were instructed to send an electronic page to research staff when an adolescent was identified in the ED either as having consumed any alcohol within 6 hours of their admission (in the case of ED staff) or as having tested positive (ie, blood alcohol concentration [BAC] > 0.0) for alcohol via medical staff–drawn blood test (in the case of the biochemistry laboratory). Participants were required to pass a brief mental status examination before being interviewed. The mental status examination consisted of questions tapping temporal orientation, spatial orientation, memory, attention, and immediate and delayed recall. The data reported here were collected as part of the baseline adolescent assessment in the ED and occurred before the randomization of participants to the intervention being tested in the larger trial. All procedures were approved by the overseeing university and hospital institutional review boards.

Measures

Several different measures of alcohol use were administered during the baseline adolescent assessment as part of the larger clinical trial.^{16,17} Only those measures examined in this study are described. The Adolescent Drinking Inventory (ADI) is a 24-item measure of the severity of alcohol involvement with items scored on either a three-point (“not like me at all” to “like me a lot”) or a four-point (“never” to “four or more times”) frequency scale. Sample items include drinking to relax, reduce anger, and when lonely. Problems when drinking include fighting, accident, trouble with the law, and hangover after drinking. The ADI has been shown to have good internal consistency (>0.80) and construct validity in a sample of adolescents (aged 12–17 years) referred for evaluation for either inpatient or outpatient mental health or substance abuse treatment.¹⁸ A clinical cutoff score of 16 has been established as indicating a need for further evaluation. In this study, two groups were formed based on ADI scores above and below 16. The Adolescent Drinking Questionnaire consists of 4 items from the Adolescent Health Behavior Questionnaire¹⁹ assessing drinking frequency (days per week), quantity (drinks per occasion), frequency of high-volume drinking (5 or more drinks per occasion), and frequency of self-defined “drunkenness” for the past 3 months. This measure was administered at baseline enrollment. The measure was repeated at a 12-month follow-up assessment, at which time alcohol use was assessed over the preceding 6 months. The Adolescent Injury Checklist²⁰ is a 14-item true/false self-report measure of injuries (eg, motor vehicle accident, cut, nearly drown, fall, burn) experienced in the past year and whether the injuries required medical attention or alcohol was involved in the injury. Drinking and Driving was measured by items from the Young Adult Drinking and Driving Questionnaire.²¹ The Center for Epidemiologic Studies–Depression Scale²² is a 20-item measure of depressive symptoms reported in the prior week. Items are answered on

a four-point scale. The Reckless Behavior Questionnaire (RBQ)²³ is a 10-item measure that asks the respondent to report how frequently he or she engaged in a variety of risk-taking behaviors (such as sex without contraception, shoplifting, driving over the speed limit, riding in a car with a dangerous driver) over the previous year and how often alcohol was involved. Smoking status was determined by asking participants how many cigarettes they had smoked per day in the preceding month.

Analyses

All dependent variables were first checked for distributional assumptions. A correlation matrix was also constructed to identify potential variables for use in the regression models. A linear regression model was created to determine the relationship between risk factors and adolescent ADI scores at baseline. All statistical calculations were performed using SPSS software (version 14.0; SPSS Inc, Chicago, Ill).

RESULTS

Results of group comparisons can be seen in Table 1. Because of multiple statistical comparisons, significance level was consistently set at $P < 0.01$. Slightly more than half of the sample ($n = 175$; 55%) scored above the clinical cutoff on the ADI. Furthermore, a mean ADI score of 26 among those teenagers who screened positive for problematic alcohol use falls well above the recommended cutoff score of 16, indicating a significant degree of alcohol abuse and problems in this portion of the study sample. Teenagers scoring above the cutoff were more likely to be white but did not differ by gender or school dropout rate. There was a trend for the ADI-positive group to be older than the ADI-negative group.

Biochemical/Incident Data

Teenagers scoring above the ADI cutoff did not have a higher alcohol level in the ED and were no more likely than those below the cutoff to have sustained an injury as part of their alcohol-related ED admission.

Substance Use and Problem Behavior Data

Teenagers scoring above the ADI cutoff reported a higher level of drinking frequency, heavy drinking frequency, getting “drunk,” and riding with a drinking driver. They also were more likely to smoke, report depressive symptoms, engage in reckless behaviors (with and without alcohol), and report more pros related to drinking than teenagers scoring below the clinical cutoff.

Parenting Data

Although teenagers above and below the ADI cutoff were equally likely to report that their parents asked where they were going when they went out, there was a trend for teenagers scoring above the cutoff to be less likely to report that their parents actually checked where they were going.

Regression Analyses

A linear regression analysis was conducted to determine what factors predicted problematic drinking on the ADI. As can be seen in Table 2, drinking frequency accounted for the most variance (24%), with depressed mood and risky behaviors accounting for statistically significant additional variance (10% and 8%, respectively).

DISCUSSION

This study found that information most readily available to ED medical staff, such as biochemical testing and demographic profiles, was not sufficient for the identification of teenagers with a pattern of problematic alcohol use. Although adolescents with a history of drinking problem were slightly older, no other demographic information distinguished them from adolescents without drinking problem histories. In addition, adolescents who scored in the clinical range on the ADI were no more likely to have a higher BAC on admission to the ED than adolescents without a history of problematic drinking.

Prior research demonstrated that the Alcohol Use Disorders Identification Test,²⁴ which has items analyzing consumption, dependence, and problems experienced when using alcohol at an age-adjusted cut score,⁷ is reasonably sensitive and specific for screening alcohol-negative adolescents for alcohol use problems. An assessment of recent alcohol use frequency also has been shown to be useful.¹⁰ This study suggests that another way to identify alcohol-positive adolescents in need of further evaluation is to determine if they have a clinically significant score on the ADI. The results of this study suggest that the ADI items may also provide referring ED clinicians more information about the nature of an adolescent's drinking problems than the Alcohol Use Disorders Identification Test.

This article also examined those factors that were most highly related to ADI scores. The results of the regression analyses indicated that being older and more frequent drinking were associated with higher ADI scores. In addition, depressed mood and risk-taking behaviors were also strongly related to ADI scores. These findings suggest that adolescents who are alcohol positive and score in the clinical range on the ADI are likely to have significant substance use and mental health problems, which in turn suggests the need for a referral for a more complete evaluation.

This study has several limitations. First, the ADI-positive group had a higher percentage of white adolescents than the ADI-negative group, and this may have been related to some of the differences detected. Second, most data were collected by self-report. Other sources of data about adolescent drinking and other behaviors would strengthen future studies. Third, because of time constraints of conducting research in the ED, a criterion standard diagnostic interview was not feasible for identifying problematic alcohol use. The ADI, however, represents a more realistic approach for use in ED settings. Although parent consent was required for minor participants, parent participation was voluntary, and parent enrollment was inconsistent. Nonetheless, research has shown that parents underestimate the extent of their teenager's alcohol use.²⁵ Teenagers in this study were assured that the information they provided would remain confidential. It is unknown how limits to confidentiality would affect the honesty of adolescent self-report in a clinical setting.

One other limitation of this study is that certain eligible ED patients were excluded from participation. Non-English-speaking adolescents were excluded because of the lack of availability of research measures in other languages and limitations in multilingual research staff availability. Adolescents presenting to the ED in the custody of police were excluded because of concerns regarding the validity of self-report data collected from these adolescents. Adolescents presenting to the ED for treatment of alcohol use in conjunction with suicidal ideation, suicide attempt, or a serious traumatic injury also were not approached for study recruitment given the medically and/or clinically emergent nature of their treatment needs in the ED. It is unclear how the inclusion of these adolescent patients would have impacted the results, and as such, results and conclusions reported here cannot be generalized to these types of adolescent patients.

In conclusion, this study found that the use of biomedical testing and demographic profile data was not sufficient in identifying alcohol-positive adolescents with problematic drinking, as defined by a clinically significant score on the ADI. That is, although participants in this study were referred to the study because they had an alcohol-related incident, only slightly more than half of the sample (55%) reported a pattern of use that was defined as problematic on a screening tool. Therefore, additional screening measures seem warranted in the ED to identify those adolescents presenting with an alcohol-related incident who also have a history of problematic drinking. This subgroup also demonstrates other significant mental health and psychosocial problems of concern. As treatment effectiveness of such comorbid adolescents has some preliminary support in the literature,²⁶ this group may warrant additional attention in the ED, and greater emphasis is placed on referral for further substance abuse and/or mental health evaluation and treatment.

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TABLE 1

Differences Between Teenagers With and Without a History of Problematic Drinking

	ADI Negative (n = 142)			ADI Positive (n = 175)			Statistic
	Mean	SD	%	Mean	SD	%	
Age, yrs	16.8	1.8		17.3	1.6		$t = 2.79^*$
Boys			61			64	$\chi^2 = 0.42$
White			64			84	$\chi^2 = 17.03^{\ddagger}$
School dropouts			14			20	$\chi^2 = 2.51$
BAC in ED	0.15	0.08		0.15	0.08		$t = 0.47$
Treated in ED for injury (vs intoxication only)			7			7	$\chi^2 = 0.00$
No. days drank (past mo)	2.6	4.0		8.5	6.9		$t = 9.24^{\ddagger}$
No. days drank 5 drinks (past mo)	0.9	1.9		5.5	5.2		$t = 10.15^{\ddagger}$
No. days drunk (past mo)	0.7	1.4		4.6	4.7		$t = 9.75^{\ddagger}$
Alcohol-related injury (past yr)			7			40	$\chi^2 = 45.91^{\ddagger}$
Drank and drive (past yr) [‡]			39			54	$\chi^2 = 5.39^*$
Rode with a drinking driver (past yr)			54			79	$\chi^2 = 23.38^{\ddagger}$
Smokers			41			64	$\chi^2 = 17.33^{\ddagger}$
CES-D total score	14.2	12.4		19.8	13.4		$t = 3.86^{\ddagger}$
No. behaviors on RBQ	2.6	1.9		5.0	2.4		$t = 9.76^{\ddagger}$
No. behaviors on RBQ w/ alcohol	0.9	1.1		2.7	2.1		$t = 9.01^{\ddagger}$
Pros of drinking (sum score)	8.0	3.4		10.6	4.1		$t = 6.10^{\ddagger}$
Cons of drinking (sum score)	11.5	4.9		13.1	4.9		$t = 3.03^*$
Whose parents ask them where they're going when they go out [§]			96			95	$\chi^2 = 0.21$
Whose parents check where they're going when they go out [§]			71			55	$\chi^2 = 6.42^*$

* $P < 0.05$.

[‡] $P < 0.01$.

[§] Drivers only (n = 254).

[§]If lives at home (n = 234).

CES-D indicates Center for Epidemiologic Studies—Depression Scale.

TABLE 2

Hierarchical Regression Analysis Predicting Baseline ADI Score

Variable	B	SEB	β	R ²	ΔR^2
Step 1				0.07	0.07 [*]
Age	1.33	0.62	0.21 [*]		
Race	3.26	2.41	0.13		
Step 2				0.31	0.24 [†]
Baseline drinking frequency [‡]	0.84	0.14	0.51 [†]		
Step 3				0.41	0.10 [†]
Baseline depressive symptoms	0.25	0.06	0.31 [†]		
Step 4				0.48	0.08 [†]
Baseline risky behaviors	1.40	0.37	0.33 [†]		
Step 5				0.49	0.01
Parents check where you're going? [§]	0.04	0.60	0.01		
House rules (parent)	4.70	7.25	0.05		
Penalties for violating rules (parent)	2.06	1.98	0.08		
House rules (teenager)	0.03	0.97	0.00		
Penalties for violating rules (teenager)	0.92	1.89	0.04		

^{*} $P < 0.05$.

[†] $P < 0.01$.

[‡]No. days.

[§]Log transformed.

SEB indicates standard error of B.