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Alcohol Use History Differentiates Adolescents Treated in the Emergency Department After an Alcohol-Related Incident

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Abstract

Objectives—The current study compared 3 groups of adolescents identified in an emergency department (ED) following an alcohol-related event: (1) alcohol-positive adolescents scoring at or above the clinical cutoff on a measure of problematic drinking, the Adolescent Drinking Inventory (ADI) (n = 45); (2) alcohol-positive adolescents scoring below the clinical cutoff on the ADI (n = 68), and (3) alcohol-negative adolescents (n = 64). We examined whether these 3 groups of adolescents differed on measures of substance use as well as psychosocial factors.

Methods—Participants were recruited as part of a larger clinical trial. Alcohol-positive adolescents were recruited from a level I regional trauma center for treatment related to an alcohol-related incident. Alcohol-negative adolescents were recruited from the ED and the community. The data reported here were from the baseline adolescent and parent assessments. Before completing assessments, adolescents were required to pass a brief mental status examination.

Results—Adolescents in the alcohol-positive, high-ADI group reported significantly more substance use, peer substance use, and peer tolerance of substance use than adolescents in the alcohol-positive, low-ADI group followed by adolescents in the alcohol-negative group. Adolescents in the alcohol-positive, high-ADI group reported significantly less parental supervision than adolescents in the other 2 groups.

Conclusions—These findings underscore that alcohol-positive adolescents being treated in an ED are a heterogeneous group with respect to substance use as well as parent and peer risk factors. Physicians need to consider relevant background factors when making individualized discharge recommendations.

Keywords

adolescent; alcohol; substance use

Adolescent alcohol use continues to be an area of public health concern, given the high rates of alcohol use and, specifically, heavy episodic drinking (ie, binge drinking) among secondary school students. According to results from the Monitoring the Future survey,¹ the percentages of students who reported consuming alcohol in the prior 30 days were 15.9%, 33.4%, and 44.4% for 8th, 10th, and 12th graders, respectively. Furthermore, Johnston et al¹ reported that 10.3%, 21.9%, and 25.9% of 8th, 10th, and 12th graders, respectively, reported consuming 5 or more drinks in a row in the last 2 weeks.

Adolescent alcohol use has been associated with a variety of negative consequences, including doing something later regretted, fighting or arguing with a stranger, suicidal behavior, drinking and driving, and risky sexual activity.² Importantly, research has found that adolescents aged 12 to 17 years who reported heavy alcohol use or heavy episodic drinking in the last month were more likely to report delinquent behavior in the past year, including fighting, stealing or trying to steal something worth more than \$50, and carrying a handgun.³

Heavy episodic drinking puts adolescents at a greater risk of passing out or overdosing, which may require care in an emergency department (ED). Sindelar et al⁴ reported a 5% prevalence estimate for adolescents with a positive blood alcohol level being treated in the ED. Alcohol-positive adolescents may receive treatment in an ED as a result of their alcohol consumption and/or alcohol-related negative consequences. Accordingly, there is a growing body of research on the efficacy of interventions designed to reduce alcohol use and consequences among adolescents treated in the ED for an alcohol-related incident,⁵ with the goal of reducing future episodes of heavy drinking and related consequences. However, all adolescents being treated for an alcohol-related incident are not alike; they may differ in important ways regarding their pattern of substance use and psychosocial factors, particularly peer and parental influences.

There is an extensive body of literature supporting the influence of peers as well as parents on adolescent alcohol use, using both nonclinical samples^{6–8} and clinical or high-risk samples.^{9,10} Using a general population sample, Barnes and colleagues⁶ assessed adolescents (13–16 years at wave 1) into young adulthood (18–22 years at wave 6). Results showed that higher parental monitoring predicted lower rates of increase in alcohol use, illicit drug use, and delinquency, whereas higher levels of peer deviance predicted higher rates of increase in alcohol use, illicit drug use, and delinquency. Importantly, these findings support the influence of peers as well as parents through adolescence, suggesting that parents continue to exert an influence on their teens' behaviors into early adulthood. Nation and Heflinger⁹ examined adolescents (12–18 years old) being treated for substance use in either an outpatient or inpatient program and found that delinquent behavior and anxiety/depression positively predicted alcohol use, whereas antisocial peers and delinquent behavior positively predicted heavy episodic drinking. However, no support was found for family cohesion or family conflict. As suggested by the authors, additional work is needed to examine psychosocial factors among clinical samples, given the implications it has for developing treatment plans.

The goal of the current study was to better understand the population of adolescents being treated in the ED for an alcohol-related incident by examining 3 groups of adolescents: (1) alcohol-positive adolescents who reported problematic alcohol use and associated problems, suggesting the need for further evaluation; (2) alcohol-positive adolescents who reported less severe alcohol use and associated problems; and (3) alcohol-negative adolescents. We examined whether these 3 groups of adolescents differed on measures of substance use as well as psychosocial factors. We hypothesized that alcohol-positive adolescents reporting alcohol use and problems indicative of further evaluation would report higher levels of

substance use and more negative psychosocial factors, followed by alcohol-positive adolescents who reported less severe alcohol involvement, and then alcohol-negative adolescents.

METHODS

Procedure

Participants were consecutively recruited between May 2003 and November 2007 for a larger clinical trial evaluating the efficacy of a brief individual intervention compared with a brief family-based intervention. Data reported here were collected as part of the baseline adolescent and parent assessments. Baseline assessments were completed before randomization to the intervention conditions being tested in the larger clinical trial. Alcohol-negative adolescents completed only baseline assessments to serve as a normative comparison group.

Adolescents had to be 13 to 17 years of age (inclusive) to participate in the study. Adolescents were excluded if they did not have a parent present at the ED, were in police custody, had attempted suicide, were admitted for psychiatric evaluation, were non-English speaking, attended college, or did not live with a parent or guardian. Three groups of adolescents were compared: alcohol-positive adolescents who scored at or above the clinical cutoff on the Adolescent Drinking Inventory (ADI, Measures section) (≥ 16), alcohol-positive adolescents who scored below the clinical cutoff on the ADI (<16), and alcohol-negative adolescents.

Alcohol-positive adolescents were treated at the pediatric or adult ED of a level I regional trauma center in the northeastern United States for treatment related to an alcohol-related incident. Alcohol-positive adolescents 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, >0.0) for alcohol via medical staff-drawn blood test (in the case of the biochemistry laboratory). Alcohol-negative adolescents were treated at the pediatric or adult ED for a non-alcohol-related injury or were recruited from the local community. Adolescents were considered alcohol-negative if they did not report consuming any alcohol within 6 hours of their admission, did not have a positive blood test or breathalyzer reading (if administered), and scored 3 or lower on the Alcohol Use Disorders Identification Test (Measures section).

All adolescent participants were required to pass a brief mental status examination before assenting to the project and completing the assessments. The mental status examination assessed temporal orientation, spatial orientation, memory, attention, and immediate and delayed recall. Most adolescents recruited in the ED (73.8%, $n = 110$) were unable to complete the assessment battery during the ED visit because of fatigue, length of stay in the ED, and availability of transportation home from the ED. Consequently, families scheduled a subsequent meeting with research staff either at the research study office or at the family's home. All families who were recruited in the community met with research staff at their homes or in the research study office to complete the baseline assessments. Upon completion of the baseline appointment, adolescents received a \$20 gift certificate, and parents received a \$50 money order.

Parents provided consent for their own study participation as well as parental consent for their child's study participation. Adolescent assent was also obtained. Adolescents and their parents or guardians were told that the adolescents' reports of substance use would not be

provided to parents or medical providers. A certificate of confidentiality was obtained from the National Institutes of Health to further protect the confidentiality of the data obtained for study purposes. The overseeing university and hospital institutional review boards approved all procedures.

Measures

The assessment battery, which was read aloud to adolescents and self-administered by parents, took approximately 45 minutes to complete. Only the measures used for this study are described. All measures are adolescent self-report unless otherwise specified. We collected information from the adolescents on age, race, and ethnicity.

Screening Measures

The ADI,¹¹ a 24-item self-report measure, was used to categorize the alcohol-positive adolescents into 2 groups based on the severity of their alcohol involvement. Questions focus on social, psychological, and physical symptoms of alcohol problems. Items are scored on either a 3-point scale from 0 (not like me at all) to 2 (like me a lot) or on a 4-point scale from 0 (never) to 3 (4 times). A clinical cutoff score of 16 or greater has been established as indicating a need for further evaluation.

The Alcohol Use Disorders Identification Test was developed by the World Health Organization as a way to identify preliminary signs of hazardous drinking.¹² Adolescents were scored on 10 items assessing alcohol dependence symptoms or alcohol-related problems. A score of 3 or below was used to classify adolescents as alcohol-negative.¹³

Substance Use and Related Measures

Three items were administered from the Adolescent Drinking Questionnaire.¹⁴ We measured recent drinking frequency (days per month), quantity (drinks per occasion), and frequency of high-volume drinking (≥ 5 drinks per occasion) over the prior 3 months. Each item is scored on an 8-point scale.

One open-ended item from the Young Adult Drinking and Driving Questionnaire¹⁵ was administered to assess the number of times participants rode with a driver who had been drinking or using drugs. Three open-ended items assessed the number of days participants had used marijuana and tobacco in the past month as well as the maximum number of drinks participants had consumed on a given occasion.

Teen Behavior Measures

Depressive Symptoms—The Center for Epidemiologic Studies–Depression Scale (CES-D)¹⁶ is a 20-item measure of depressive symptoms. Items were rated on a 4-point scale, ranging from 0 (rarely or none of the time) to 3 (most or all of the time), and summed for a total score. The CES-D has been used with adult and adolescent populations and among racial/ethnic minority individuals, and it has demonstrated good internal consistency and test-retest reliability.^{17,18} The Cronbach α observed in the current study was 0.91.

Externalizing and Internalizing Symptoms—The Behavioral Assessment System for Children (BASC)¹⁹ Parent Rating Scale is an instrument designed to evaluate adaptive and problem behaviors of children and adolescents aged 14 to 18 years in community and home settings. We generated 2 composite scores: externalizing problems (aggression, hyperactivity, conduct problems) and internalizing problems (anxiety, depression, somatization). The BASC provides nonnormalized t scores (mean, 50 [SD, 10]) and

percentiles for all composites and subscales. Scores 70 or greater were considered to be in the clinical range. The adolescents' parents completed the BASC.

Peer Influences

Peer Substance Use and Tolerance—The Peer Substance Use and Peer Tolerance of Substance Use²⁰ scales include 6 items to assess peer substance use by asking adolescents to estimate how many of their friends used alcohol, marijuana, and other drugs occasionally and regularly. Participants responded on a 6-point scale, ranging from 0 (none) to 5 (all). Adolescents were asked 7 items to assess how their close friends would feel about their using marijuana, alcohol, and other drugs occasionally and regularly. Participants responded on a 5-point scale, ranging from 1 (strongly disapprove) to 5 (strongly approve). Cronbach α in the current study was 0.84 for Peer Substance Use and 0.92 for Peer Tolerance of Substance Use.

Deviant and Prosocial Peers—Self-reports of the adolescents' peer relationships were collected using the Child's Peer Ratings and Social Skills and the Parent's Peer Ratings and Social Skills inventories.^{21,22} A 5-point scale, ranging from 1 (very few, <25%) to 5 (almost all, >75%), was used to rate items reflecting the extent to which adolescents interacted with deviant peers and prosocial peers. Deviant peer scores were calculated with 4 items examining the percentage of friends who experimented with smoking and other substances, misbehaved in school, broke rules, and dressed like gang members. Prosocial peer scores were calculated with 2 items examining the percentage of friends who took school seriously and were involved in positive school or community activities. Separate scores on each scale were derived for parents and adolescents. We report Cronbach α 's in the current study for adolescents' reports (deviant peers = 0.74, prosocial peers = 0.68) and parents' reports (deviant peers = 0.80, prosocial peers = 0.88).

Parenting Behaviors

Parental monitoring was examined using 3 scales. Four questions from the Strictness/Supervision Scale (SSS)^{23,24} asked parents and adolescents to what extent the parent knew where the adolescent went at night, how the adolescent spent his/her time, where the adolescent went after school, and who the adolescent's friends were. Each item was rated on a 4-point scale, ranging from 1 (doesn't know at all) to 4 (always knows). Cronbach α 's were 0.70 for the adolescents' report and 0.86 for the parents' report.

The Parental Monitoring Scale was used to examine adolescents' perceptions of parental monitoring.²⁵ Adolescents were asked 6 questions regarding their parent's knowledge and control over their whereabouts using a 4-point scale, ranging from 1 (very often) to 4 (never). Certain items were reverse scored so that higher scores reflected greater monitoring. Cronbach α for the current study was 0.63 and has ranged between 0.61 and 0.71 in previous studies.^{25,26}

Students completed the Student Self-check,²¹ which assessed the adolescents' perceptions of their parents' family management including parental monitoring. Adolescents completed 14 items regarding the parental figure of their choosing (eg, mother, father). Cronbach α in the current study was 0.92.

Parental Involvement in Schooling—Parental involvement in schooling was examined using 6 items derived from the Parental Involvement Scale.²⁷ Adolescents were asked to report the frequency with which their parents were involved in their educational activities. Items focused on parents' involvement with homework, requirements of household chores, control over time spent watching television and on the Internet, and limits on whether the

adolescent can go out on school nights. Responses ranged from 1 (never) to 4 (often), and Cronbach α in the current study was 0.66.

Parenting Practices—Parents completed the Parent Self-check,²¹ which includes a 6-item Parenting Satisfaction Scale. Parents are asked to rate the extent to which they engage in a variety of practices with their teen. For example, parents report the extent to which they were able to (1) negotiate emotional conflicts and work toward a solution and (2) calmly set limits with defiant or disrespectful behavior. Parents responded on a 10-point scale, ranging from 1 (not at all/major change needed) to 10 (okay as is/area of strength). Cronbach α observed in the current study was 0.88.

RESULTS

Recruitment

Of the 242 alcohol-positive adolescents screened, 113 adolescents (46.7%) were successfully recruited. Among the remaining 129 adolescents, 53 adolescents (41.1%) were ineligible, 45 families (34.9%) refused to participate, and 31 families (24.0%) had incomplete recruitment. The alcohol-negative adolescents were recruited as a convenience sample because alcohol-negative adolescents were recruited when no alcohol-positive adolescents were being treated in the ED. Therefore, only a subset of the 1277 alcohol-negative adolescents presenting in the ED over the period for this study was approached for recruitment. Of the 566 families approached, 36 alcohol-negative adolescents were successfully recruited, 44 adolescents were ineligible, 53 adolescents left the ED before recruitment had been completed, and 433 adolescents refused to participate. The primary reasons for refusal were not being interested, not wanting to participate in research, not being willing to stay or return to the ED, being in too much pain, and thinking it will take too much time. Among the adolescents being treated in the ED, adolescents who were recruited into the study were significantly older (mean, 15.2 [SD, 1.2] years) than adolescents who refused to participate (mean, 14.7 [SD, 1.3] years, $t_{625} = 4.97$, $P < 0.001$). There was no significant difference between the groups by sex. Of the 34 families from the community who were recruited via advertisements, 30 families were eligible, and 28 families were recruited.

Participants

Study participants included 177 adolescents (48% males), ranging in age from 13 to 17 years (mean, 15.1 [SD, 1.3] years). Alcohol-positive adolescents ($n = 113$) were subdivided into 2 groups based on their scores on the ADI: alcohol-positive, high-ADI group ($n = 45$) and alcohol-positive, low-ADI group ($n = 68$). Most (83.2%, $n = 94$) of the alcohol-positive adolescents were being treated in the ED for intoxication only without an injury. Motor vehicle crashes was the second most common reason for the ED visit (3.5%, $n = 4$).

Alcohol-negative adolescents were recruited from both the ED ($n = 36$) and the community ($n = 28$), yielding a total of 64 alcohol-negative adolescents. Among the 36 alcohol-negative adolescents treated in the ED, almost half were being treated for illness (44.4%, $n = 16$) followed by falls (16.7%, $n = 6$), sports injuries (13.9%, $n = 5$), and motor vehicle crashes (11.1%, $n = 4$).

Preliminary Analyses and Overview of Primary Analyses

All dependent variables were checked for distributional assumptions, and data transformations were made as necessary. All statistical analyses were performed using SPSS software (version 15.0; SPSS Inc, Chicago, Ill). First, we compared the alcohol-negative adolescents recruited from the ED with the alcohol-negative adolescents recruited from the

community on demographic variables. No differences were observed between alcohol-negative adolescents recruited from the ED and those from community on total ADI score, age, household income, sex, or race (dichotomized to non-Hispanic white versus “other” because of the low number of adolescents who reported minority status).

After combining the participants in the alcohol-negative group, the adolescents in each of the 3 subgroups were then compared on several demographic variables. χ^2 Tests found no differences among the groups on sex or race (dichotomized to non-Hispanic white versus other). A 1-way analysis of variance revealed that the adolescents in each of the 3 subgroups did not differ on household income (as reported by the parent). A 1-way analysis of variance on age revealed a significant difference among the groups, $F_{2,174} = 6.53$, $P < 0.01$, indicating that adolescents in the alcohol-positive, high-ADI group were significantly older (mean, 15.62 [SD, 1.23] years) than the adolescents in the alcohol-negative group (mean, 14.77 [SD, 1.28] years). Neither group was significantly different in age from the adolescents in the alcohol-positive, low-ADI group (mean, 15.15 [SD, 1.15] years).

The primary analyses consisted of 1-way analyses of covariance (ANCOVAs), controlling for age, to test for group differences on substance use and related variables, teen behavior, peer influences, and parental influences. A Bonferroni correction was used to control the type I error rate. A χ^2 test was performed to determine whether there were any group differences on smoking status.

Substance Use and Related Variables

The ANCOVAs were significant for all 6 of the substance use variables (Table 1). Results revealed that all 3 groups were significantly different from one another on (1) the number of days per month adolescents reported drinking alcohol, (2) the number of days per month adolescents reported consuming 5 or more drinks in a row, (3) the maximum number of drinks consumed on one occasion, and (4) the number of days in the past month adolescents reported using marijuana. As expected, for each of the 4 outcomes listed above, adolescents in the alcohol-positive, high-ADI group reported significantly more substance use than adolescents in the alcohol-positive, low-ADI group followed by the adolescents in the alcohol-negative group.

Adolescents in the alcohol-negative group reported consuming significantly fewer drinks per occasion than did adolescents in both alcohol-positive groups; however, alcohol-positive adolescents in the high-ADI group and low-ADI group did not significantly differ. Alcohol-positive adolescents in the high-ADI group reported riding with a drinking or drugged driver significantly more than did adolescents in either of the other 2 groups.

A χ^2 test revealed that the proportion of adolescents who smoked cigarettes in the past 30 days differed by group, χ^2_2 ($n = 177$) = 24.48, $P < 0.001$. Fifty-one percent of the adolescents in the alcohol-positive, high-ADI group reported smoking cigarettes compared with 23% of the adolescents in the alcohol-positive, low-ADI group and 9% of the adolescents in the alcohol-negative group.

Teen Behavior

One-way ANCOVAs revealed that parents' reports of externalizing and internalizing symptoms differed significantly across the 3 groups (Table 1). Parents of the adolescents in the alcohol-negative group reported significantly fewer symptoms than parents of the adolescents in both alcohol-positive groups. The 3 groups did not significantly differ on CES-D scores.

Peer Influences

Five of the six 1-way ANCOVAs examining group differences in peer influences were significant (Table 2). For peer substance use and peer tolerance of substance use, all 3 groups were significantly different from one another. As expected, adolescents in the alcohol-positive, high-ADI group reported significantly higher scores than adolescents in the alcohol-positive, low-ADI group followed by the adolescents in the alcohol-negative group.

For adolescents' reports of deviant peers, adolescents in the alcohol-positive, high-ADI group reported significantly more deviant peers than either of the other 2 groups. However, for parents' reports of deviant peers, parents of the adolescents in both alcohol-positive groups reported significantly more deviant peers than did parents of the adolescents in the alcohol-negative group. Results of the parents' reports of prosocial peers revealed that parents' reports of prosocial peers for the alcohol-negative group were significantly higher than parents' reports of prosocial peers for either alcohol-positive group. Adolescents' reports of prosocial peers did not significantly differ across the 3 groups.

Parental Influences

Five of the six 1-way ANCOVAs examining parental influences revealed significant differences among the 3 groups (Table 2). Adolescents in the alcohol-positive, high-ADI group reported significantly lower scores on the SSS than the adolescents in the other 2 groups. For parents' reports of the SSS, parents of the adolescents in the alcohol-negative group reported significantly higher scores than did the parents of the adolescents in the other 2 groups. For parental monitoring and family management scores, the scores for all 3 groups significantly differed from one another. Specifically, adolescents in the alcohol-negative group reported significantly higher scores than did adolescents in the alcohol-positive, low-ADI group followed by adolescents in the alcohol-positive, high-ADI group. For parents' reports of parenting practices, the parents of adolescents in the alcohol-negative group viewed their parenting practices as a greater strength than did the parents of the adolescents in both alcohol-positive groups. Parental involvement in schooling did not significantly differ across the 3 groups.

DISCUSSION

The current findings underscore the notion that adolescents treated in the ED for an alcohol-related incident comprised a heterogeneous group. Adolescents with a history of drinking problems (ie, the high-ADI group) reported drinking more days per month, more heavy drinking days per month, and using marijuana more days per month than did the alcohol-positive adolescents without problematic drinking involvement (ie, the low-ADI group). This suggests that alcohol-positive adolescents treated in the ED exhibit different typologies of substance use.

Although the current study examined group differences based on history of alcohol use, our findings support the broader literature showing that parental and peer influences predict alcohol use among adolescents.²⁸ In particular, the current study suggests that adolescents seen in the ED for a binge-drinking episode who also have an alcohol use history have lower levels of parental monitoring and family management as well as greater peer substance use and peer tolerance of substance use. Thus, overall, this group has a significant range of risk factors for both substance use and other problem behaviors.

We found that adolescents in the alcohol-positive, low-ADI group reported consuming a significantly smaller maximum number of drinks on a single occasion than did the adolescents in the alcohol-positive, high-ADI group. Although the average maximum number of drinks consumed for both groups is higher than the typical cutoff of 5 drinks or

more to be considered heavy episodic drinking, the large SDs for both groups suggest that there is a great deal of heterogeneity within the groups. As such, given that parental factors, including parental monitoring, and friends' drinking have been associated with the onset of heavy drinking among adolescents,^{29,30} it is particularly important to consider not just alcohol status when alcohol-positive adolescents present to the ED, but also the broader array of parental and peer risk factors that increase risk for future alcohol problems as well as other psychological and behavioral problems.

These findings also have implications for discharge planning and recommendations given to parents. Parents can be informed that they directly and indirectly influence adolescent alcohol and other drug use by overt modeling, advising against experimentation, imposing punishment for experimentation, influencing their adolescent's substance use beliefs, and affecting peer selection.³¹ Poor parental monitoring, low parental availability, low warmth and support, coercive family exchanges, high parental criticism/hostility, poor family communication, and parent-adolescent conflict are other factors affecting adolescent substance use that can be related to parents.²¹

Limitations

Several limitations of the current study should be considered. First, patients were being recruited for an intervention study, and a high percentage of alcohol-positive families refused to participate, which introduces the potential for response bias. It is possible that refusal to participate or noncompletion of the baseline assessment among alcohol-positive families was systematically related to adolescent substance use and psychosocial risk factors. For instance, adolescents or parents might have been more likely to decline participation if parents were already aware of their adolescent's alcohol use and had already sought treatment for their child. Alternatively, parents of adolescents presenting to the ED for an alcohol-related incident may feel embarrassed about the incident and feel that it is a 1-time event not in need of an intervention, thus choosing not to enroll. Second, the adolescents in the alcohol-negative group were drawn from a convenience sample, because all alcohol-negative adolescents were not approached to participate in the current study. Once again, refusal to participate might have been related to adolescent substance use or psychosocial factors, resulting in potentially more or less pronounced differences among the 3 groups of adolescents, depending on the direction of the bias. Unfortunately, it cannot be determined whether this method of recruitment systemically biased the representativeness of the sample on measures of substance use and psychosocial factors. Third, most adolescents in our sample identified as non-Hispanic white, which inhibits our ability to generalize the findings to adolescents from various racial and ethnic backgrounds. Research is needed to examine racial differences among adolescents being treated in the ED for an alcohol-related incident to further inform discharge planning and outpatient recommendations. Fourth, the study measures relied on adolescent and parent self-report. It is possible that the responses were not accurate or that the participants provided socially desirable answers. However, if this occurred, it is likely that this study's results underestimate the true differences among alcohol-positive and alcohol-negative adolescents. Another possibility is that how truthfully patients answered the questions may have been influenced by having been recruited in the pediatric ED. The adolescent may have feared repercussions if he/she admitted to further substance use, aside from alcohol-positive status. However, most of the baseline assessments occurred after discharge from the pediatric ED, which may have limited this potential problem. Finally, the data are cross-sectional, and therefore, longitudinal relationships cannot be examined. There are likely reciprocal relationships among substance use, teen behavior, and peer and parental influences. These relationships may differ over time among the 3 groups of adolescents examined in the current study.

Future Directions and Implications

Future studies should continue to examine the heterogeneity in substance use and psychosocial factors among alcohol-positive adolescents treated in the ED to replicate and expand the current findings. These findings underscore that alcohol-positive adolescents being treated in an ED report significant substance use as well as parent and peer risk factors but are also a heterogeneous group.²⁸ Attention should be given to the broader clinical picture (ie, history of drinking and peer and parental influences), not just presentation as alcohol-positive, to ensure adequate evaluation and disposition planning. Furthermore, by examining the heterogeneity of alcohol-positive adolescents treated in the ED, interventions could then be refined in an effort to maximize their efficacy by addressing these different subgroups to reduce further alcohol use and negative consequences among this population. For example, alcohol-positive adolescents with a history of significant alcohol use before the ED visit should receive greater attention in the discharge planning process, especially with the parents. Follow-up with outpatient recommendations should also be a higher priority in this group of adolescents than in those alcohol-positive adolescents without such a positive history. Additional research on this high-risk population is warranted.

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TABLE 1
Substance Use and Teen Behavior Across the 2 Alcohol-Positive Groups and the Alcohol-Negative Group

Outcome	Alcohol-Negative		ETOH ⁺ Low ADI		ETOH ⁺ High ADI	
	Mean (SD)	n	Mean (SD)	n	Mean (SD)	n
Substance use and related variables						
Days/month drank alcohol	0.13 (0.46) ^a	64	0.94 (1.36) ^b	68	5.28 (5.30) ^c	45
Days/month drank 5+ drinks	0.00 (0.00) ^a	64	0.48 (0.43) ^b	68	3.02 (5.51) ^c	45
Drinks consumed per occasion	1.22 (0.58) ^a	64	5.37 (1.83) ^b	68	5.04 (1.59) ^b	45
Maximum no. drinks	0.31 (0.85) ^a	64	8.00 (5.28) ^b	68	11.56 (5.75) ^c	45
Days past month used marijuana	0.33 (1.53) ^a	64	1.76 (4.45) ^b	68	5.80 (8.49) ^c	45
Rode with drinking/drugged driver	0.86 (3.35) ^a	64	0.71 (2.07) ^a	68	3.78 (7.25) ^b	45
Teen behavior						
CES-D total score	9.73 (8.48)	63	9.56 (9.25)	68	15.36 (10.49)	45
BASC externalizing (parent report)	47.51 (12.30) ^a	63	59.06 (17.81) ^b	64	61.98 (14.06) ^b	44
BASC internalizing (parent report)	46.46 (10.07) ^a	63	51.95 (11.34) ^b	64	53.09 (12.42) ^b	44

For the substance use variables, with exception of drinks consumed per occasion and maximum number of drinks, analyses were conducted using transformed variables; however, means and SDs are in the original metric. Unless otherwise noted, measures were teen report.

* $P < 0.006$ using a Bonferroni correction for the overall F test. Means with different superscripts are significantly different at $P < 0.05$. ETOH⁺ indicates alcohol-positive.

TABLE 2
Peer and Parental Influences Across the 2 Alcohol-Positive Groups and the Alcohol-Negative Group

Outcome	Alcohol-Negative		ETOH ⁺ High ADI		ETOH ⁺ High ADI		F
	Mean (SD)	n	Mean (SD)	n	Mean (SD)	n	
Peers							
Peer substance use	0.46 (0.70) ^a	64	0.79 (0.66) ^b	68	1.63 (0.90) ^c	45	26.36 [*]
Peer tolerance of substance use	1.57 (0.68) ^a	64	2.00 (0.71) ^b	68	2.59 (0.82) ^c	45	19.89 [*]
Deviant peers	1.79 (0.89) ^a	64	2.01 (0.72) ^a	68	2.57 (0.89) ^b	45	9.98 [*]
Prosocial peers	3.79 (0.84)	64	3.44 (0.75)	68	3.28 (0.66)	45	5.80
Deviant peers (parent report)	1.39 (0.46) ^a	63	2.08 (1.10) ^b	65	2.19 (0.89) ^b	43	14.15 [*]
Prosocial peers (parent report)	3.96 (0.81) ^a	63	3.18 (1.10) ^b	66	3.05 (0.97) ^b	43	15.92 [*]
Parents							
SSS	3.41 (0.58) ^a	64	3.34 (0.52) ^a	68	2.83 (0.49) ^b	45	16.96 [*]
SSS (parent report)	3.59 (0.47) ^a	63	3.23 (0.65) ^b	65	3.09 (0.75) ^b	44	8.51 [*]
Parental monitoring	3.39 (0.48) ^a	64	3.18 (0.44) ^b	68	2.98 (0.37) ^c	45	9.46 [*]
Family management	8.25 (1.36) ^a	64	7.58 (1.72) ^b	67	6.52 (1.50) ^c	45	14.81 [*]
Parental involvement in schooling	2.79 (0.62)	64	2.63 (0.60)	68	2.36 (0.58)	45	3.65
Parenting practices (parent report)	7.63 (2.18) ^a	63	6.90 (1.95) ^b	56	6.12 (1.60) ^b	36	6.24 [*]

Unless otherwise noted, measures were teen report.

* $P < 0.004$ using a Bonferroni correction for the overall F test; means with different superscripts are significantly different at $P < 0.05$. ETOH⁺ indicates alcohol-positive.