

Pediatric SBIRT: Understanding the Magnitude of the Problem

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■ ABSTRACT

Screening and brief intervention with referral to treatment (SBIRT) have recently been instituted for the adult and older adolescent trauma populations. However, questions persist regarding prevalence in the younger than 18-year population, youngest age for providing alcohol and drug screening, and whether an opportunity is being missed for this population. This article provides a review of literature for the 12- to 17-year-old population regarding alcohol and drug use, adolescent brain maturation, specific adolescent risk considerations, and results of a national survey regarding the frequency and methodology of providing SBIRT for the 12- to 17-year-old population.

■ KEY WORDS

Adolescent alcohol use, Alcohol screening, Pediatrics, SBIRT

Alcohol usage and drug usage are leading risk factors for injury and death, especially for the adolescent population. As trauma systems have dramatically improved across the United States, trauma experts now believe that focusing on substance abuse disorders, using a public healthcare model, is one method of reducing morbidity and mortality. Historically, healthcare professionals have addressed only those individuals with hard-core substance abuse problems. Using the public healthcare approach, early intervention efforts are designed to identify and manage those patients at risk for developing substance abuse disorders.

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Recent literature supporting the efficacy of screening and brief intervention with referral to treatment (SBIRT) for alcohol and drugs is compelling. Expert and consensus group panels have documented scientific evidence that trauma centers should routinely incorporate SBIRT into their clinical practice.¹⁻³ To educate individuals on the process of implementing SBIRT in the trauma setting, the American College of Surgeons, the US Department of Health & Human Services, and the Department of Transportation collaborated on the development of an educational document.⁴ This 3-step process includes the following: (1) screening patient's drinking practices and risk of drug and/or illicit drug usage; (2) conducting a brief intervention to either reduce or eliminate risk; and (3) providing follow-up and/or referral to specific treatment when appropriate. This process, simple in concept, continues to challenge healthcare professionals regarding implementation.

Many organizations and scientific publications support mandated national implementation of an SBIRT program. As most of the SBIRT research literature centers on adults or adolescents, the question arises as to whether an opportunity is being missed for our younger population. Would the SBIRT program, revamped in some capacity, benefit the pediatric population? Second, how vigorously does the trauma community want to respond to adolescent substance use? The first step to answering these questions and treating this issue is to better understand the problem that is before us. It is no surprise that both alcohol usage and drug usage are present in the adolescent population. However, questions persist regarding the degree of prevalence and age at which the use of drugs and alcohol becomes an issue.

■ ALCOHOL USE

According to the 2007 National Survey on Drug Use and Health, on an average day, 7,970 youths aged 12 to 17 years drink alcohol for the first time and more than 4,300 youths per day use at least 1 kind of illicit drug, primarily marijuana, for the first time.⁵ Overall, the current drinking rate in the United States for the age group 12 to

17 years, defined as drinking within the previous 30 days, is 15.9% in 2007, down from 18.0% in 2002.⁵ As alcohol usage is significantly different according to age, national data on alcohol usage in adolescents are frequently divided into age categories, with emphasis on the high school rather than the elementary school child.

Data from the 2008 *Monitoring the Future* study, an annual survey of US youth, reveals that nearly three-quarters of students (72%) have consumed alcohol (more than just a few sips) by the end of high school and two-fifths (39%) have done so by eighth grade. In fact, more than half (55%) of 12th graders and nearly a fifth (18%) of 8th graders in 2008 report that they have been drunk at least once in their life.⁶ Very gradual declines in alcohol use have continued each year in this high school age group, well below their peak levels in the early 1980s.

Binge drinking increases dramatically during adolescence because adolescents drink less frequently than adults but have more intake per occasion.⁷ Rates of *binge drinking*, defined as more than 5 drinks on 1 occasion in the last 30 days, is currently at 7.8% for 8th graders, increasing to 19.4% for 12th graders.⁸ The good news is that rate of binge drinking leveled off around 2002.

Consumption of alcohol is not just confined to the high school population but also extends to elementary school children. However, the prevalence and distribution of alcohol in this population are not well studied at the national level. Pride Surveys, a nonfederally funded survey, was developed in 1982 to aid local schools in measuring student alcohol, tobacco, and drug use for fourth-grade and older children and is published annually for trending purposes. According to the sample size of almost 30,000 fourth- to sixth-grade students across 39 states, almost 4% of fourth graders have used alcohol within the past year, increasing to more than 10% by sixth grade.⁹ When asked about the frequency, a small, yet startling, 3% of the total number surveyed cited that they use alcohol at least monthly.

Typically, alcohol use begins somewhere in the early adolescent years, usually around 13 years of age,¹⁰ with adolescent boys starting at a slightly younger age than adolescent girls.⁷ In a 2003 study, 74% of adults 21 years or older reported that they started drinking alcohol before the current legal drinking age of 21 years, with 4% starting to drink before age 12 years, 14% between ages 12 and 14 years, and 33% between ages 15 and 17 years.

When comparing the statistics from the 3 national surveys on alcohol and drug use, similar trends exist in the area of alcohol usage for the population younger than 18 years. All 3 surveys are consistent over the past 10 to 12 years in indicating an improved situation with regard to the age of drinking initiation. This means that fewer youths have started drinking before age 13 years. Even with this improvement, the data clearly indicate that

underage drinking continues to exist as a serious public health problem in the United States. With all this information, the US Surgeon General's office recognized this continuing issue and recently issued a national call to action to put a stop to underage drinking.⁷

■ ILLICIT DRUG USE

Monitoring trends for illicit drug use in the adolescent population is becoming increasingly complex. For example, eighth graders were the first grade to show decreasing rates in illicit drug usage and have gradually shown the greatest decline from the peak levels in the 1990s. However, one must also consider how changing both availability and popularity of different drugs affect usage rates. All these factors paint a very multifaceted picture for monitoring drug usage in adolescents.

Statistics indicate that nearly half of the students (47%) have tried an illicit drug by the time they finished high school. If inhalant use is included in the definition of illicit drug use, more than a quarter of students (28%) have tried an illicit drug by the eighth grade.⁶ With this, research has shown that exposure to alcohol and illicit drugs prior to age 15 years statistically predicts substance use disorders in adulthood.^{11,12} The use of marijuana, the most common drug of choice by adolescents and most prevalent than any other illicit drug,⁶ has decreased from 2002 to the most recent survey in 2007.⁵ In addition, illicit drugs, such as LSD, cocaine, and methamphetamine, also decreased from 2002 to 2006; however, the usage of these drugs has remained stable from 2006.⁵

■ ADOLESCENT BRAIN MATURATION

Statistical trending data have often failed to consider the reasons why younger adolescents may be more susceptible to substance abuse. New research over the past decade shows that major changes that occur in brain structure and functioning during adolescence have gained increasing acceptance in the scientific community. Recent studies indicate that the adolescent's brain does not develop uniformly and is not completely mature until after 12 years of age.¹³⁻¹⁵ Research continues to investigate the variation in brain development, with correlation to specific behaviors commonly associated with adolescence. For example, the limbic system, often referred to as the emotional brain and buried within the cerebrum, is associated with an adolescent's lower sensitivity to risk taking and inclination for novelty seeking activities. The limbic system develops much earlier than the prefrontal cortex, the outer layer of the prefrontal region. The prefrontal cortex, the last brain region to develop, is thought to be responsible for impulse control, judgment, reasoning, rule learning, and problem solving.¹⁴⁻¹⁶ Therefore, adolescents' risk-taking thoughts, such as drinking alcohol and partaking in novel activities, are not synchronized with the advanced thought process

to control this activity. Another feature impacting the adolescent brain anatomy is the decreasing amount of gray matter and increasing amount of white matter as the adolescent matures.¹³ With increased white matter, neural signals are transmitted more rapidly because of increased density and organization, which allows greater capacity for more complex, higher-order reasoning and processing as the adolescent progresses to increasing independence and adulthood.¹³

This ongoing development makes the adolescent brain cognitively react differently than the adult brain to the effects of alcohol. Animal studies indicate that alcohol has an adverse effect on memory-related brain functions and learning, more so for adolescents than for adults.¹⁶ A study in humans shows that these adolescents who abuse alcohol had impaired cognitive functioning, even after they stopped using alcohol.¹⁷ For example, the hippocampus is critical to intact memory functioning and actively develops during adolescence. Recent imaging studies suggest that adolescents who abuse alcohol may have a reduction in the size of the hippocampus as a result of the alcohol use,^{18,19} which, in turn, may be a sign of impaired function.

In contrast, although memory-related functions appear to be more impaired for adolescents than for adults, there are other aspects that appear to be less sensitive to alcohol. Animal studies indicate that adolescent rats appear to be less sensitive to alcohol's effects on motor coordination²⁰ and sedating effect.²¹ Although these studies are not clinically investigated in the human population, these implications support the rationale for the increased incidence for binge drinking in the adolescent population.

■ ADOLESCENT RISK CONSIDERATIONS

Underage drinking by children and younger adolescents may be related to a mixture of factors, such as the adolescent environment, cultural issues, social expectations, and inherent personality characteristics. Strongly embedded in our American culture, underage drinking on an experimental basis during high school years is frequently considered a rite of passage for many adolescents by their parents. This behavior of underage drinking may sound nonthreatening for our youth; however, research of risky adolescent behaviors shows that alcohol use and abuse do not happen in isolation but can frequently lead to other adolescent behaviors such as tobacco and illicit drug use, early sexual behavior,^{22,23} and poor academic progress.^{24,25} A constellation of risk factors is present; however, one single risk factor has not emerged as the supreme predictor for which a child will fall vulnerable to alcohol and/or illicit drugs.

Age

A long-standing question is whether drinking at an early age causes alcoholic dependence or whether younger

adolescents who start using alcohol are more vulnerable. The question is not yet fully answered. What we do know is that early and heavy drinking by younger adolescents is associated with an increased risk for lifetime alcohol-related consequences^{11,26-34} and drug dependency/usage.¹²

Recent long-term epidemiological studies support the concept that preventing early underage drinking should be a public health priority. DeWit et al²⁷ studied almost 5,900 long-term drinkers to find a correlation between the initiation of drinking with alcohol abuse and alcoholic dependency. Results revealed an inverse linear effect in which participants who began to drink at ages 11 and 12 years had a 13% diagnosis of abuse and 16% diagnosis of dependency in contrast with abuse and dependency rates for those who started drinking at ages 19 years and older of 2% and 1%, respectively. Specifically, results from this study found an elevated risk of developing an alcohol abuse disorder among subjects aged between 11 and 14 years.²⁷ Grant et al¹¹ examined data from the National Longitudinal Alcohol Epidemiologic Survey, in which more than 27,000 individuals were surveyed. Analysis indicated that after adjusting for potential confounders, the odds of dependence decreased by 14% with each increasing year of age of alcohol initiation and the odds of abuse decreased by 8%.¹¹ With these statistics, efforts to reduce or delay early substance exposure should be a priority and may prevent a wide range of adult health problems if there is a concerted effort for all ages of adolescents.

Societal Factors

Community characteristics have also been examined to predict adolescent alcohol usage. According to *Monitoring the Future* statistics, prevalence rate for adolescent alcohol usage is higher for adolescent boys than for adolescent girls, higher for white and Hispanics than for African Americans, and higher for those living in the north and north central US regions than for those living in the south and west.⁸ Overall, there is a higher binge drinking rate in communities with a greater percentage of white population.³⁵ One study reported that youth from communities with a greater proportion of grandparents as caregivers, larger numbers of married couple families, and higher employment rates were significantly less likely to report 30-day alcohol usage.³⁵ Parental approval of adolescent alcohol use,^{36,37} provision of alcohol by parents,³⁸ parents' attitude toward alcohol,^{39,40} and low parental involvement and/or monitoring^{41,42} have been shown to influence adolescent alcohol use.

The influence of socioeconomic status on adolescent alcohol usage is a complex issue, often with mixed outcomes. *Monitoring the Future* statistics indicated that during high school, adolescent alcohol use is inversely related to socioeconomic status and parent education.^{6,43-45} This

national research demonstrates that by the end of high school and during the transition to adulthood, this relationship reverses with college-aged children from higher socioeconomic status having increased alcohol consumption. However, other studies contradict this information, concluding that youths from communities with higher median household income were significantly more likely to report alcoholic intake^{35,46} and youth who live in disadvantaged urban communities are not the individuals who demonstrate all the risky behaviors.⁴⁷ Clearly, more research is needed on the various risk and protective factors, especially for young adolescents.

■ ALCOHOL AND ILLICIT DRUG USE IN TRAUMA PATIENTS

Adolescents who test positive for alcohol are frequently seen in the emergency department because alcohol is a leading contributor to injury and death. Experimentation with drinking and illicit drugs may represent a temporary phase in the lives of many adolescents; for others, it can have a profound and life-altering effect. Each year, approximately 5,000 young people, younger than 21 years, die as a result of underage drinking. This includes 1,900 deaths from motor vehicle crashes, 1,600 from homicides, and 300 from suicides, with the remaining deaths a combination of falls, burns, and drowning.⁴⁸ Estimates of adolescent trauma patients who test positive for alcohol seen in the emergency department vary between 3% and 40%.⁴⁹⁻⁵⁵ Rationale for the varying statistics centers on the inconsistent definition of pediatric age used for monitoring and possible selection bias. For the pediatric trauma patient, healthcare professionals subjectively select which adolescent to test for the presence of alcohol and drugs, encountering an estimated miss rate of 33%.⁵⁶

Nevertheless, validation exists that substance abuse, whether alcohol or illicit drugs, is present in a specific percentage for the pediatric population; however, uncertainty exists on whether trauma centers are providing adequate proactive SBIRT treatment. The challenge in the pediatric arena is to balance the need for finding adolescents with alcohol/drugs in their system while not over-drawing for blood levels. In addition, consideration needs to be given to those adolescents who also participate in risk-taking behaviors that could eventually lead to injury and harm.

■ NATIONAL INVESTIGATION ON PEDIATRIC SBIRT

Methods

To begin addressing these issues, the SBIRT Subcommittee of the Society of Trauma Nurses Pediatric Special Interest Group developed a survey to assess SBIRT for the pediatric trauma patient. Survey questions

were developed with multiple revisions by the SBIRT subcommittee members. Validation of the survey was provided by a sample of trauma program managers who critiqued content and provided written input to the subcommittee. A cross-sample of trauma program managers was identified by the level of trauma center, experience with pediatric trauma patients, and location within the country.

The 2008 survey, directed toward US hospitals that treated injured adolescents, specifically sought to determine whether the hospital screened the 12- to 17-year-old population for risk factors related to substance abuse, using consistent methodology, regarding age, indicators, and measurement tool.

This survey was administered to members of the Society of Trauma Nurses and the National Association of Children's Hospitals and Related Institutions via their respective listservs. Members of these organizations represent either trauma centers or pediatric hospitals in the United States. Responses were collected via SurveyMonkey. Hospitals with multiple respondents were filtered to ensure that only 1 response per hospital was included in the analysis. Priority of response was ordered to (1) trauma program managers/trauma coordinators; (2) personnel from trauma service, such as trauma clinical nurse specialist, trauma nurse practitioner, or trauma educator; (3) emergency department personnel; and finally (4) hospital administrator.

Results

Representatives from 242 hospitals, representing 44 states, responded. Because this survey was directed via 2 listservs, it is unknown how many individuals received this survey; therefore, no response rate can be identified. Of these 242 hospitals, 177 (65%) provide trauma care for trauma patients younger than 18 years. Only 18% of these hospitals screen all emergency department adolescents, whereas 26% screen injured patients admitted to the trauma service. More than half (52%) of these hospitals use blood alcohol levels as an indicator for providing SBIRT services; however, subjective decision making, instead of definite criteria, on who requires a blood draw is the norm.

Regarding a general assessment tool to use for this 12- to 17-year-old age group, 61% (96/157) utilized a specific measurement tool to assess for SBIRT. Of these 61%, there was a fairly even distribution between CRAFFT, AUDIT, CAGE, and a self-developed tool (range = 15%–30%). The remaining hospitals (31%) had no specific tool but, instead, incorporated these questions into the general hospital assessment.

Questions were directed at the lowest age range that adolescents were screened. Only 54% (85/157) have a lower-age level established. Most frequent lowest age that

was measured was 12 years, with 41% of hospitals using age 12 years or younger as a cutoff age. The remainder of the hospitals (46%) utilized subjective decision making on which adolescents to screen.

Research Conclusion

Although many healthcare professionals believe that SBIRT is required in the pediatric population, there is significant variability related to indicators of whom to screen, the lowest age limit to screen, and the specific measurement tool to use for the pediatric population. This lack of evidence-based research on pediatric SBIRT programs makes the decision on program difficult to implement and possibly ineffective. There is a strong influence of subjective decision making during patients' hospitalization; unfortunately, this subjectivity potentially allows bias selection to determine whether or not some children utilizing alcohol/drugs will have the issue addressed. Healthcare professionals decide who is at possible risk through clinical observation, although this has been deemed an ineffective method of detection. This omission is not intentional but rather a possible lack of protocol/guidelines regarding the best treatment methodology. Many institutions appear to provide only the SBIRT program when a positive blood alcohol count is present. This omits the large group of children who present with risk-taking behaviors in whom a teachable moment for SBIRT education could be utilized. Finally, it is unknown what age is most appropriate for adolescent SBIRT implementation, balancing the need of adolescents with the appropriate hospital resources required.

As with most surveys, the main limitation may be selection bias because only individuals interested in the topic chose to respond. However, those individuals who did not respond may be less likely to participate in a pediatric SBIRT program, thus potentially escalating the inconsistency of the research data. Another limitation of online surveys is that collected information is self-reported and may lead to inaccurate data. No confirmation of information was sought in this research study. Finally, the response rate for this survey is unknown because it is impossible to identify the extent to which one received this survey and chose not to respond. As previously mentioned, this limitation has the potential to add validity for inconsistency of the pediatric SBIRT data. Nonetheless, good regional distribution exists because hospital representatives from 44 various states across the country responded to this survey.

■ FUTURE IMPLICATIONS/ RECOMMENDATIONS

Problematic alcohol usage is not a benign condition that affects only the older adolescent and adult populations. Younger adolescents are frequently involved with alcohol

and illicit drugs; however, without good epidemiological data, it is difficult to establish the magnitude of the problem. We do know that adolescents react in a manner different from that of adults and that alcohol can be a powerful attraction to adolescents, with very unpredictable and potentially devastating outcomes. The fact remains that underage drinking is a complex issue, deeply imbedded in a variety of developmental and societal factors. Trauma centers, both pediatric and adult, provide care for younger adolescents and should invest resources into developing an SBIRT program that is both pertinent and effective.

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