

Review

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Alcohol and drug use among adolescents: an educational overview

Abstract: Alcohol and drug use continues to be a significant global problem with many health and economic consequences. Multiple studies have shown that the majority of adults who end up with an alcohol/drug use disorder have their first contact with these substances as adolescents. This article aims to briefly summarize current prevalence and impact on society, as well as its etiology, comorbid psychiatric disorders, and treatment and prevention of adolescent drug and alcohol use. Alcohol and substance use impacts both the user and society at large, from health risks to the user to increased early pregnancies, car accidents, financial cost, and productivity cost. Substance use and abuse results from intricate interactions between genetic and environmental influences. Also, substance abuse along with a comorbid psychiatric disorder is more common than a solitary substance use disorder in adolescents. Current options for the treatment of substance abuse disorders range from various therapy-based strategies, including behavioral and family-based therapies, to the use of medications. More attention must be placed on the importance of prevention of use, as well as progression of use to dependence. Successful prevention requires a comprehensive plan that needs to include, but should not be limited to, increasing education of all gatekeepers and limiting access of substances and alcohol through policy and reinforcement of those policies. Education of parents, pediatricians, school nurses, teachers, and mental health workers is essential to ensure that children at risk are identified in time to provide appropriate interventions.

Keywords: adolescents; alcohol; drugs; prevention; substance; treatment.

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Introduction

Alcohol and drug use continues to be a significant global problem with many health and economic consequences. Multiple studies have shown that the majority of adults who end up with an alcohol/drug use disorder had their first contact with substances as adolescents. This article aims to briefly summarize current prevalence and impact on society, as well as its etiology, comorbid psychiatric disorders, and treatment and prevention of adolescent drug and alcohol use.

Prevalence

Most recent data show that cigarette smoking has been steadily decreasing since the middle of the 1990s and has reached the lowest prevalence among adolescents since data first started being collected in the 1970s (1). Unfortunately, the trend for marijuana use is the opposite and is now exceeding that of cigarette smoking (1). For example, when 12th grade students were polled, 22.7% reported smoking marijuana in the last 30 days compared to 16.3% who reported smoking cigarettes. Accordingly, it seems that the perceived risk of harm and disapproval of marijuana use has decreased, making it a more acceptable substance in adolescents' minds (1). Alcohol and binge drinking has also decreased in the last couple of years, with current alcohol use reported in 12.9% of 12–17 years of age adolescents (2). Use of illicit drugs in this age group was reported by 9.5%. Even more telling is that 61.1% of current cigarette or alcohol users reported using illicit drugs vs. 4% in those that did not report either cigarette or alcohol use.

When looking at the variance of drug use among different ethnic groups of adolescents, White adolescents tend to have higher rates of drug use than minority groups (1). One reason for the difference in this base rate of drug use has been attributed to elements of culture in the minority youths that end up being protective influences. The exceptions to this trend are American-Indian adolescents who have a higher rate of drug use, especially high

school dropouts (3). Despite the difference in rates, there seems to be a similar pattern of drug use among all adolescents, even minority youths (4).

Generally, drug use tends to be more common in urban vs. rural counties (2). However, New York City is actually the exception, as prevalence of alcohol and drug use among adolescents is lower than the national average. It still remains a significant concern, as 93,000 of 280,000 public high school students have reported using alcohol within the last month, and 30,000 reported using marijuana. Similar to the previously mentioned nationwide statistics, the students that report smoking tobacco are twice as likely to use alcohol, seven times as likely to use marijuana and 10 times as likely to use cocaine compared to students that do not report smoking (5).

Impact on society

Alcohol and substance use impacts both the user and society at large, from health risks to the user, to increased early pregnancies, car accidents, financial cost, and productivity cost. The primary health risk behavior that contributes to leading causes of death in those from the ages of 1–24 is the use of alcohol and other drugs. The three main causes are motor vehicle accidents (38%), homicide (13%), and suicide (12%) (2).

Adolescence is the age at which many first begin to drive, which already places these youths at increased risk for unsafe driving, so it is remarkable that 28% of high school seniors have stated that in the last two weeks they have either driven under the influence or been riding in a car where the driver had used alcohol or an illicit drug (6). The students who report either driving after drinking more than five drinks, driving after using marijuana, or both are more likely to get warnings or tickets and are more likely to have been in a car accident (6). The likelihood of driving unsafely increases with the frequency of substance use, and the concurrent use of alcohol with marijuana further increases this risk (7).

Most recent data show that by the time adolescents graduate from high school more than 64% reported being sexually active (8). Adolescents who binge drink and are treated for substance use disorders are more likely to engage in high risk sexual behavior including having larger numbers of sex partners and more inconsistent use of condoms (9, 10). This trend seems to continue into young adulthood. Even more significant is that 25% of substance abuse treated adolescent females reported pregnancies, a number that is in serious contrast to the reported 7% national average during the time of the study (10).

A significant amount of doctor visits and hospitalizations are attributable to alcohol and illicit drug use. In 2011, 78,667 emergency room visits in the United States by adolescents between 12 and 17 years of age were due to illicit drug use, of which the most common were marijuana, cocaine, stimulants, and ecstasy (11). An important note to make about these visits is that they do not necessarily relate to substance use disorders, and use does not have to be frequent in order to increase health risk due to increase in impulsive behaviors, even with single use. In 2005 in New York City, alcohol and other drugs use in youths between the ages of 13–20 was found to be responsible for 544 hospitalizations and 16 deaths (11).

Use of substances in adolescence puts this population at increased risk for continued use into adulthood and continued lifetime health risk. According to WHO, globally, 34 deaths per 100,000 population are the result of alcohol use and five deaths per 100,000 population are due to illicit drug use (12).

Higher rates of marijuana use are associated with students who dropped out of school or were at risk of dropping out, compared to students who remained in school or graduated (2, 3). This may be due to findings that adolescents seem to be more vulnerable to detrimental cognitive effects of chronic marijuana use, specifically disadvantages have been seen in attention, verbal learning, memory, and processing speed (13). Alcohol intoxications are also associated with school dropout as a result of an increase in truancy (14).

Alcohol and drug use and their comorbidities

Substance abuse, along with comorbid psychiatric disorders, is more common than a solitary substance use disorder in adolescents. Most commonly, the comorbid psychiatric disorders are depression, anxiety disorder, bipolar, and conduct disorders, and these tend to precede the substance use disorder (15–17). Furthermore, comorbidity of affective disorder and substance use disorders significantly increases the risk of suicide in adolescence regardless of which came first (18). More specifically, when looking at adolescents who have attempted suicide, substance abuse and depression have been found to be comorbid conditions (19). A diagnosis of substance or alcohol abuse is almost always seen with a mood or disruptive disorder in male adolescent suicides (20).

ADHD has been implicated in adolescent substance use; however, it has not been found to be independently

associated with substance abuse (15). In the absence of conduct disorder, oppositional disorder does not predict substance use. Of further interest, even though ADHD is not an increased risk for adolescent substance abuse, ADHD without the comorbidities of conduct or bipolar disorder is associated with young adulthood onset substance abuse, even if it does not happen during adolescence (15).

Etiology

Many factors independently and in combination result in increased risk of developing a substance or alcohol use disorder in adolescence. Substance use and abuse result from intricate interactions between genetic and environmental influences (21). Childhood exposure to violence, both experienced and observed, leads to higher risk of substance use (22). The amount of childhood emotional, physical, and sexual abuse also makes a difference. As the quantity of abuse increases, so does the risk and prevalence of alcoholism, illicit drug use, and injection of drugs (23). Those children will also begin using substances at an earlier age than youths who have not been victims (22).

Exposure to substances during childhood increases the risk of adolescent substance use. The risk is doubled in children whose family members abuse alcohol (22). Teens with peers engaging in substance use are more likely to use substances due to increased availability, modeling of the behavior, and enhanced perceptions of substance use as a social acceptable act (24). Use of one substance leads to the use of other substances as confirmed by many studies and usually described as the gateway hypothesis (24, 25). The progressive course has been shown to start with a legal substance, followed by marijuana, and then moving on to illicit drug use. Some studies have found that alcohol is more commonly the first step in this course (26).

Two forms of alcoholism with specific clinical features and modes of inheritance have previously been described; of particular interest in this discussion is type 2 alcoholism (27). This form of alcoholism has a teenage onset of recurrent social and legal problems from alcohol abuse and was found to be 90% heritable in males regardless of their environment. Adoption studies have also been able to find two genetic pathways that lead to substance abuse, one in which there is a direct link between alcoholism in a biologic parent leading to substance abuse in offspring and one in which children of parents with antisocial personality have higher levels of conduct disorder, leading to eventual antisocial personality and then drug use, abuse, and dependence (28).

Treatment

Options for the treatment of substance abuse disorders range from various therapy-based strategies, including behavioral and family-based therapies to the use of medications. As described previously, psychiatric comorbidities tend to be the rule rather than the exception, so treatment of those conditions must be part of the overall treatment plan. The behavioral interventions, which have been studied, include the following:

- Adolescent Community Reinforcement Approach where therapists first assess the adolescent's needs and levels of functioning and then select a set of procedures with the aim to replace influences that reinforce substance use with other healthier habits and influences.
- Cognitive Behavioral Therapy that aims to arm adolescents with coping skills, which the adolescents can use when faced by situations and feelings that provoke a return to drinking or drug use.
- Contingency Management that aims to reduce influence of reinforcement of substance use by providing immediate and tangible rewards for participation, progress, and achievements in drug treatment.
- Motivational Enhancement Therapy that aims to engage adolescents to become more active participants in their treatment by resolving their ambivalence.
- Twelve-Step Facilitation Therapy that aims to connect adolescents with a 12-step program so that they will become actively involved in one of these programs as adults (29).

The family-based interventions include the following:

- Brief Strategic Family Therapy where a negative behavior in one member of the family is seen as arising from poor interaction among the family members, so this therapy aims at assisting the family in changing these unhealthy interactions.
- Family Behavior Therapy is a mixture of behavioral contracts with contingency management aimed at substance use and risky behaviors by providing goals and rewarding these accomplishments at each session.
- Also, Functional Family Therapy, Multidimensional Family Therapy, and Multisystemic Therapy are options (29).

Use of medications in treatment of adolescent substance use disorders is still undergoing review and requires further studies. However, some medications have been found to be safe and effective, for example, buprenorphine and methadone for opioid use disorders:

- Buprenorphine, a partial opioid agonist, has been found to significantly improve outcomes in adolescents when compared with short-term detox. Furthermore, combining it with behavioral treatment has been found to be a highly efficacious and safe treatment in adolescents with opioid dependence (30, 31). However, it has not been FDA approved in patients <16 years of age.
- Methadone, a full opioid agonist, is another option in certain states, although it is also only for adolescents aged 16 and up (29).
- Naltrexone, an opioid antagonist, is also approved for use in adults and has the advantage of having a once-monthly form available. Some small case studies have demonstrated good outcomes and good tolerance of the medication in adolescents and young adults (32).

and for alcohol use disorder:

- Naltrexone, acamprosate and topiramate have been shown to be effective in decreasing alcohol intake in adults (33, 34). The use of these medications in adolescents is not common; however, some preliminary studies have found naltrexone to significantly decrease alcohol intake in adolescents, as well as reduce cravings (35).
- Nalmefene is a medication approved in 2013 for use by countries in the European Union for the reduction of alcohol consumption and is taken as needed on a day patients believe they will be at risk for drinking alcohol (36). Currently, there is no data available regarding its use in children and adolescents <18 years of age. However, it may have a better safety profile than naltrexone.

Although there have been no FDA-approved medications for cocaine abuse, topiramate has been shown to be significantly more effective in increasing the amount of days with no cocaine use in adults who use cocaine (37).

Prevention

One way to organize the different types of preventive interventions available is by their target audience. These can be broken down to universal, selective, and indicated interventions, and these correlate both with the level at which these interventions are implemented and what audience they target.

Universal prevention programs target all audiences and are seen as the first level of prevention. Universal

prevention has been shown to be most effective with younger adolescents before initiation of substance use. However, studies have shown that universal prevention programs can be effective for youths at different levels of risk (24).

Selective interventions are aimed at adolescents who are deemed as high risk, and indicated interventions target adolescents that are already engaged in substance use. Indicated interventions aim to decrease or at a minimum maintain current substance use without progression in frequency of use or in types of substances used.

Early recognition and treatment of mood and conduct disorders will prevent the population of adolescents who use substances as a result of these psychiatric conditions. As the infrastructure already exists for adolescents to more commonly see pediatricians, the American Academy of Pediatrics currently recommends screening of all adolescents using a formal and validated screening tool at every health visit, both at annual and acute care visits with appropriate brief intervention if applicable (38). Pediatricians and school nurses should also be knowledgeable about the spectrum of substance use, in particular alcohol and nicotine use. This will allow them to make the appropriate referral for treatment, so they must also be aware of those treatment options. This is based on the screening, brief intervention, and referral to treatment (SBIRT) model. This model hopes to identify youths before substance use becomes a problem and further specialized treatment is needed (24).

Limiting access to alcohol and all substances is crucial to prevention. Access to drugs and cigarettes in the home is associated with ever using drugs and smoking regularly (39). Legalization of marijuana is expected to lead to initiation of use by non-cannabis using students and to increased use by those already using cannabis (40). Limiting access can be accomplished through enforcement of current policies, increasing price of the alcohol and substances, and restricting advertisement with special focus on alcohol and tobacco, as these are usually what lead to further illicit drug use (41).

The role of police work in reducing drug trafficking is another means of preventing adolescent substance use. There were more than 1.6 million drug arrests in 2009 in the United States, i.e., there was a drug arrest every 19 s (42). Each police department differs in the specific strategy it uses to combat drug trafficking; however, by focusing on youths, police can prevent the spread of drug use to a new round of adolescents. This can be accomplished by suppressing drug trafficking around and within schools, coordinating police-sponsored drug education, and creating a relationship with the schools and parents

to coordinate prevention at all levels (43). For example, police in Tallahassee, Florida, designed the Drug Education For Youth (DEFY) program, which is a prevention program for children 9–12 years of age (44). DEFY deters at risk behaviors by giving children the tools they need to resist drug use and develop positive social skills.

Conclusions

As mentioned previously, alcohol and substance use still remains a considerable obstacle faced by adolescents. And it is a problem that will not only impact them during these very important developmental and transitional years but will likely plague them throughout their adult-hoods as well. More attention must be placed on importance of prevention of use, as well as progression of use to dependence. In order to accomplish this, there must be a comprehensive plan, which needs to include, but should not be limited to, increasing education of all gatekeepers and limiting access of substances and alcohol through policy and reinforcement of those policies. Education of parents, pediatricians, school nurses, teachers, and mental health workers is essential to ensure that children at risk are identified in time to provide appropriate interventions.

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