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Alcohol abuse among adolescents and suicide risk - is there a correlation?

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Abstract

Introduction:

Adolescent alcohol abuse is a critical public health issue with far-reaching consequences for individual development and societal well-being. Adolescent alcohol consumption poses significant health risks, particularly due to its effects on brain development and its association with increased suicide risk.

Purpose of the work: This study aims to investigate the relationship between alcohol abuse and suicide risk in adolescents.

Materials and methods: A comprehensive analysis of research papers available on PubMed and Google Scholar was undertaken using the search terms including the following keywords: alcohol abuse/ alcohol abuse in adolescence/ alcohol consumption in adolescence/ alcohol abuse and suicide risk in adolescence/ suicide risk factors in adolescence/ suicidal tendencies among teenagers.

Conclusions:

Adolescent alcohol abuse has profound implications for brain development and mental health, significantly increasing the risk of suicide. Effective public health strategies, including early intervention, education, and strong support systems, are essential to mitigate these risks and promote healthier environments for young individuals. Addressing the underlying causes of alcohol abuse and providing targeted support can reduce its long-term consequences and improve adolescent well-being.

Keywords: alcohol abuse; adolescence; suicide; suicide risk

1. Introduction

Alcohol abuse among adolescents is a significant public health concern, with profound implications for both individual and societal well-being. Alcoholic beverages contain ethanol, a psychoactive and toxic substance that can cause dependence. Despite its widespread cultural acceptance and use, alcohol consumption, even at low levels, poses serious health risks. The majority of alcohol-related harms are linked to heavy episodic or continuous alcohol consumption, which is particularly prevalent among adolescents. [1,2]. Consequently, adopting a developmental perspective is crucial for understanding the diagnosis, progression, and evaluation of adolescent alcohol use disorders (AUDs). [3]

1.1. How alcohol affects human body?

Alcohol consumption during adolescence can be detrimental to the physical development of young individuals, especially their brain development. The teenage years are crucial for a young person's growth into adulthood. During adolescence, the brain undergoes significant changes and is still maturing, making it more susceptible to the effects of alcohol. Specific areas of the brain, such as the frontal and temporal lobes, prefrontal cortex, cerebellum, and hippocampus, are particularly vulnerable. The hippocampus, located deep within the cerebral hemispheres, is crucial for learning and memory formation. (Tab. 1) Heavy drinking during adolescence can cause a reduction in hippocampal volume, leading to memory and learning challenges.

Alcohol consumption at an early age can hinder a teenager's social development. Instead of engaging in sports or other recreational activities, they might choose to spend their time drinking. This can lead them to use alcohol as a coping mechanism for their problems and increase their likelihood of experimenting with other substances. The learning difficulties associated with teenage drinking can result in poor academic performance and heighten the risk of social issues, depression, suicidal thoughts, and violent behavior. [4]

Pre-Frontal Cortex	rational thinking, memory, personality, behaviour
Frontal Lobe	speech, emotions,
Cerebellum	movement and balance
Hippocampus	memory, learning
Temporal Lobe	interpretation of sounds and spoken language
Occipital Lobe	visual information
Parietal Lobe	senses e.g. touch, pain

Table 1. Areas of brain and functions affected by alcohol. [4]

1.2. Why teenagers drink?

Alcohol is harmful and significantly contributes to the global burden of diseases. It is the third leading risk factor for premature deaths and disabilities worldwide. In 2012, over 3.3 million people died from alcohol-related causes, including more than 6% of young people aged 15 to 29 years. Alcohol consumption by children and adolescents is an ongoing concern in modern Polish society. Understanding the scale of this phenomenon is crucial both nationally and within school communities.[5]

Robert O. Hawkins has marked out few primary causes of adolescent drinking which are peer influence, searching for adult status and sexuality.[1] Wojtyła A. et al. identify three common categories of drinking motives:

1. **"Escape" Motives:** Consuming alcohol to forget problems, alleviate stress, enhance mood, and unwind.
2. **"Social" Motives:** Drinking for companionship, out of politeness, or for social occasions.
3. **"Pleasure-Seeking" Motives:** Drinking for the flavor of alcohol or believing in its health benefits.

Adolescents experience a transformative period as they prepare for adulthood. They start drinking for various reasons: to fit in with peers and be part of a group. The allure of the forbidden is strong, and teenagers are willing to go to great lengths to avoid being outsiders.

Teenagers want to feel mature. This motive can be reinforced by influential adults. In households where parents drink heavily, children are more likely to try alcohol earlier. Media often depict alcohol as a symbol of adulthood, adventure, masculinity, and relaxation. Adolescents use alcohol to feel relaxed, reduce anxiety, and be more comfortable in social situations, especially with the opposite sex. Some of them believe alcohol helps them forget their troubles. Sometimes, children find it challenging to manage their shyness without alcohol. Others want to be rebellious, to break rules and test boundaries with themselves and their family. Believing that enjoyment and good times require alcohol, which is understandable given the lack of alternative recreational models in Polish culture.[6] María Prieto-Ursúa et al. report also some drinking motives as enhancement and conformity [7].

Based on the ESPAD 2019 Report alcohol is the most commonly consumed psychoactive substance among youth. According to the report, 80% of students aged 15-16 and 92.8% of students aged 17-18 have consumed alcohol at least once in their lives. In the 30 days preceding the survey, 46.7% of the younger cohort and 76.1% of the older cohort reported

drinking alcohol. [8] Beer is the most frequently consumed alcoholic beverage among both younger and older cohorts. In the younger group, 47.5% drank beer in the last 30 days, while in the older group, this figure was 72.2%. Vodka is the second most popular choice, followed by wine. Public places such as pubs, bars, cafes, restaurants, and discos are where youth most commonly consume beer, followed by vodka, and least frequently, wine. The proportion of youth drinking alcohol in these public places is higher compared to those who purchase alcohol for take-away consumption. A significant proportion of youth experiences intoxication. In the 30 days preceding the survey, 11.3% of the younger cohort and 18.8% of the older cohort admitted to getting drunk. Comparing the 2019 survey results with previous surveys shows a continued downward trend in alcohol consumption among youth. However, for illegal psychoactive substances like marijuana, 2019 marked a break in the previously observed upward trend. [8]

1.3. Threats connected with alcohol consumption.

Alcohol use during adolescence can interfere with brain development, potentially leading to long-term cognitive impairments. This period is crucial for brain maturation, and alcohol exposure can disrupt the development of brain regions involved in memory, attention, and decision-making [9,10]. Adolescents who consume alcohol are at a higher risk of developing mental health issues such as depression, anxiety, and other mood disorders. These conditions can be both a cause and a consequence of alcohol use, creating a vicious cycle that exacerbates both problems. [11,12] Alcohol consumption is associated with an increase in risky behaviors, including unsafe sexual practices, driving under the influence, and violent activities. These behaviors not only endanger the adolescents themselves but also pose a risk to others around them . [13,14] Alcohol use can negatively impact academic performance due to decreased attention, memory problems, and increased absenteeism. Additionally, it can lead to social issues such as conflicts with peers and family members, as well as social isolation [15] Early alcohol use is a significant predictor of later substance abuse and addiction. Adolescents who begin drinking at a young age are more likely to develop alcohol dependence and abuse other substances in the future. [16,17] Alcohol use in adolescence can lead to various physical health issues, including liver damage, cardiovascular problems, and a weakened immune system. The developing body is more vulnerable to the toxic effects of alcohol, leading to long-term health

complications. [18,19] Underage drinking can result in legal consequences, including fines, community service, and even incarceration. Additionally, involvement in alcohol-related incidents can lead to a criminal record, impacting future educational and employment opportunities. [20,21]

2. Suicide in adolescence

Suicide is a leading cause of death among adolescents worldwide. According to the World Health Organization (WHO), it is the third leading cause of death for individuals aged 15-19 years. In the United States, the Centers for Disease Control and Prevention (CDC) reports that suicide is the second leading cause of death among individuals aged 10-24 years, with rates increasing over the past decade. [22,23] Death by suicide is still more common in male than female patients with rates of 17.9 per 100 000 male patients aged 15–19 years and 5.4 per 100 000 female patients aged 15–19 years [24]. According to Polish society, police data for 2021 show a sharp increase in suicidal behaviour among young people. In 2021, 1,496 children and adolescents under the age of 18 attempted suicide, and 127 of these attempts resulted in death. Compared to 2020, this represents an increase of 77% in suicidal behaviour and 19% in suicides. [25] The presence of mental health disorders, particularly depression, anxiety, and bipolar disorder, significantly increases the risk of suicide in adolescents. Approximately 90% of adolescents who die by suicide have a diagnosable mental health condition. [26,27] Substance abuse, including alcohol and drug use, is strongly linked to suicidal behaviour. Adolescents with substance use disorders are at a higher risk of suicide attempts and completions. [28] A family history of suicide or mental illness is a significant risk factor. Genetic predispositions and exposure to suicidal behaviours within the family can increase the risk. [29] Victims of bullying, both online (cyber bullying) and in-person, are more likely to experience suicidal thoughts and attempts. Social isolation and lack of support networks exacerbate these risks [15,30,31].

3. What are correlations between alcohol abuse in adolescence and suicidal risk?

Alcohol use has consistently been implicated in adolescent suicide. It is generally assumed that alcohol use leads to an increased risk of suicidality, suicide attempts, and completed suicides. Adolescents who engage in alcohol use increase their risk of ill health, family and school problems, antisocial behavior, unprotected sexual intercourse, deliberate self-harm, and deliberate suicide. Alcohol use during adolescence is a significant risk factor for suicide, with multiple pathways contributing to this association. [32,33]. Swahn et al. underscores a

clear correlation between heavy episodic drinking among adolescents—commonly known as binge drinking—and elevated rates of suicidal thoughts and attempts. This association highlights a critical intersection where alcohol consumption exacerbates emotional distress and impulsive behaviors, predisposing individuals to act on suicidal impulses [34]. The neurobiological effects of alcohol on the developing adolescent brain further compound this risk. Studies documented by Spear et al. detail how alcohol disrupts crucial brain regions responsible for decision-making and impulse control. Such disruptions can impair an adolescent's ability to assess risks adequately and inhibit impulsive actions, including suicidal behaviours [35]. Psychosocial factors also play a pivotal role in this complex relationship. A comprehensive review by Boden&Fergusson identifies family dysfunction, peer influences, and social isolation as key environmental stressors that interact synergistically with alcohol abuse. These factors not only contribute to the onset of alcohol use but also exacerbate emotional turmoil and decrease resilience against suicidal thoughts [36]. Moreover, the co-occurrence of alcohol use disorders and mental health conditions such as depression and anxiety amplifies suicide risk among adolescents. Pompili et al. highlighted emphasize how these conditions mutually reinforce each other, creating a heightened vulnerability to suicidal behaviors that persists over time [37]. Longitudinal research published by Maimaris et al. underscores the enduring impact of early-onset alcohol use on mental health outcomes. This research reveals that adolescents who initiate alcohol use early are at a significantly increased risk of prolonged and severe suicidal behavior, spanning from adolescence into adulthood. Such findings underscore the importance of early intervention and prevention strategies aimed at mitigating the long-term consequences of alcohol abuse on suicide risk.[38]

3.1. Mechanisms linking alcohol abuse and suicide.

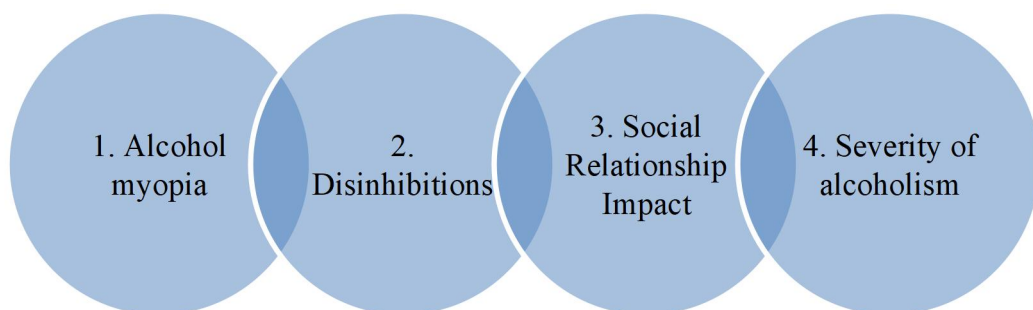


Fig. 2. Mechanisms linking alcohol abuse and suicide [32]

1. When adolescents consume alcohol, their cognitive focus narrows. This narrow focus leads to excessive dwelling on their problems, exacerbating feelings of anxiety and depression. Additionally, it hampers their ability to cope and solve problems effectively, increasing their risk of suicidal behaviour.
2. Alcohol consumption reduces judgment and lowers inhibitions. With impaired judgment, adolescents become more prone to impulsive actions and more likely to imitate suicidal behaviours they see in the media.
3. Prolonged alcohol misuse can erode social relationships and support networks. This deterioration in social connections can increase feelings of isolation and hopelessness, thereby heightening suicidal thoughts and behaviours.
4. The risk of suicidal behaviour escalates with higher levels of alcohol consumption. The likelihood of suicide is significantly higher in intoxicated adolescents, with the risk increasing up to 90 times compared to those who abstain from alcohol. [32]

4. What can be done?

Early identification and treatment of mental health disorders are essential in preventing adolescent suicide. Implementing regular screenings for depression and other mental health issues in schools and primary care settings can help detect individuals who are at risk.[39,40]

Support systems, including family, friends, and community resources, are crucial in suicide prevention. Programs that enhance connectedness and provide emotional support can significantly reduce the risk of suicide.[41]

Education and awareness are also vital. Teaching adolescents, parents, and educators about the warning signs and risk factors of suicide is crucial. Awareness campaigns and training programs can empower individuals with the knowledge needed to identify and respond to potential suicide risks.[42,43]

5. Conclusions

Alcohol abuse among adolescents is a pervasive issue with far-reaching consequences for individual development and societal well-being. The toxic and psychoactive properties of alcohol can severely disrupt the physical and mental development of young individuals, particularly affecting critical brain areas like the prefrontal cortex, hippocampus, and cerebellum. These disruptions can lead to significant cognitive impairments, poor academic performance, and increased risk of social issues, depression, and violent behavior.

The motives behind adolescent drinking - such as peer influence, a desire for adult status, and escapism - highlight the complex socio-cultural and psychological landscape that drives this behaviour. Understanding these motives is essential for developing effective prevention and intervention strategies. The statistics presented, including those from the ESPAD 2019 report, underscore the prevalence of alcohol consumption among youth and the associated risky behaviours.

Furthermore, the correlation between alcohol abuse and increased suicide risk among adolescents is alarming. Alcohol consumption exacerbates mental health issues, impairs judgment, and leads to social isolation, all of which contribute to suicidal thoughts and behaviours. The mechanisms linking alcohol abuse to suicide highlight the urgent need for comprehensive public health strategies that address both alcohol abuse and mental health.

Early intervention and prevention are critical in mitigating the long-term consequences of adolescent alcohol abuse. Educational initiatives, supportive family environments, and robust public health policies are vital in reducing the incidence of alcohol abuse and suicide among adolescents. By addressing the underlying causes and providing targeted support, we can foster healthier, safer environments for young individuals to grow and thrive. Strong support systems that foster connectedness and provide emotional support significantly reduce suicide risk. By equipping individuals with the necessary knowledge and resources, we can effectively address and mitigate the risk of adolescent suicide.

Disclosure

Author's contribution

Conceptualization, Kinga Szopińska, Agata Szostak, Karolina Korta;
methodology, Magdalena Graca, Konrad Wawszkiewicz;

software, Agata Szostak, Maria Janina Śmigielska-Mikołajczyk;
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formal analysis, Karolina Korta, Liliana Dyląg;
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resources, Anna Szeliga, Maria Janina Śmigielska-Mikołajczyk, Konrad Wawszkiewicz;
data curation, Liliana Dyląg, Weronika Łowicka, Anna Szeliga,;
writing-rough preparation, Karolina Oluszcak, Magdalena Graca, Weronika Łowicka;
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supervision, Karolina Korta, Maria Janina Śmigielska-Mikołajczyk;
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