

## DELIBERATE SELF-POISONING IN ADOLESCENTS: A 3-YEAR SINGLE CENTRE STUDY

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Adolescence represents a period during which a child, in a transition period to adulthood, undergoes significant changes, often accompanied by risky behaviors such as intentional self-poisoning. This study aimed to identify the sociodemographic characteristics of adolescents, substance distribution and the impact of school success and completeness of the nuclear family on self-poisoning incidents. A retrospective study examined the records of 412 patients treated at the Institute for Child and Youth Health Care of Vojvodina over a three-year period. The average age of the patients was  $15.7 \pm 1.8$  years. The most commonly used substances were alcohol (67%), benzodiazepines (23.6%), and cannabis (5.8%). One-fifth of the subjects took at least two substances simultaneously, with a higher frequency among female adolescents who experienced more frequent episodes of repeated self-poisoning. Half of the subjects (51%) lived in complete nuclear families, and a significant difference was found regarding alcohol consumption compared to other subjects. There is a significant difference in the consumption of benzodiazepines and alcohol concerning academic success. Alcohol and benzodiazepine medications were most commonly used for self-poisoning, with a significant gender difference. Due to the widespread availability of benzodiazepine medications, they were the most frequently used drugs. Girls were at a higher risk of repeated self-poisoning. Adolescents living in complete nuclear families with excellent academic success more often consumed alcohol, while those from incomplete families with poor success more frequently consumed benzodiazepines.

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**Key words:** *deliberate self-poisoning, adolescence, puberty, alcohol, benzodiazepines*

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### Introduction

The World Health Organization (WHO) defines adolescents as individuals aged 10 to 19 years old (1). Adolescence represents the transition from childhood to adulthood, during which a child is expected to achieve maturity and functionality as an adult (2). During this period, there are changes in school relationships and social integration, resulting in less time spent with parents and more time with friends, increasing their autonomy (3). Adolescents undergo significant physical, mental and emotional changes during this period, which make them susceptible to risky behaviors, including deliberate self-

poisoning. According to the WHO, deliberate self-poisoning is defined as an act with a non-fatal outcome in which an individual deliberately ingests a substance in doses exceeding therapeutic ones, resulting in harm to the body (4–8). The most common substances involved in poisoning are medications, alcohol and drugs. These incidents often stem from conflicts in school and family (9). Adolescent self-poisoning has a low mortality rate but is often a predictive factor for mental health disorders. Acute poisonings are a significant cause of morbidity and mortality among adolescents, representing one of the most common urgent conditions (10–14). According to WHO data, acute poisonings result in over 45,000 deaths annually in individuals under 20 years old (15). Poisonings, along with injuries, are ranked third in the most common causes of hospitalization among adolescents in Vojvodina, after respiratory and digestive diseases. Acute poisoning accounts for 2.35% of hospital morbidity in children in Vojvodina, with a mortality rate of 0.19% (16). The objectives of this study were to determine the demographic characteristics of adolescents who committed intentional self-poisoning, to identify

the most commonly consumed substances and reasons for self-poisoning, to determine the incidence of repeated self-poisoning, as well as the role of school success in relation to the type of substance ingested and the role of family nuclear completeness.

### Materials and Methods

A retrospective study was conducted analyzing data from the medical records of 412 patients treated at the Institute for Child and Youth Health Care of Vojvodina from January 1<sup>st</sup> 2016, to January 1<sup>st</sup> 2019, aged 10 to 18 years and diagnosed with acute poisonings and self-poisonings. Out of 412 patients diagnosed with acute poisoning, 364 were identified as intentional self-poisoning cases. Data from patients' medical records, including physician reports, psychologist reports, medical history, laboratory results and other tests were used. Data on the number of patients admitted to the institute, demographic data, laboratory and toxicological analysis results, anamnestic data on reasons for self-poisoning, suicidal intent, family nuclear completeness and school success were analyzed. Statistical analysis was performed using Microsoft Office Excel 2010, presenting data as means and percentages. The chi-square test and Student's t-test were used to

determine statistical significance. The study was approved by the Ethics Committee of the Institute for Child and Youth Health Care of Vojvodina.

### Results

Reviewing the medical records of 412 patients aged 10 to 18 years treated at the Institute for Child and Youth Health Care of Vojvodina from January 1<sup>st</sup> 2016, to January 1<sup>st</sup> 2019, who were diagnosed with acute poisoning and self-poisoning, 364 patients were found to have actively and intentionally committed self-poisoning. There were 184 male patients (50.55%) and 180 female patients (49.45%) with an average age of 15.75 years. The distribution of self-poisoning by gender and age is shown in Figure 1.

According to the chi-square test results, there was a statistically significant difference between boys' and girls' self-poisoning regarding the poisoning agent ( $p < 0.01$ ). Boys/men more frequently used alcohol for self-poisoning, while girls/women used benzodiazepine, antipyretic and analgesic medications for poisoning more often. Figure 2 shows the most commonly used substances for intentional self-poisoning and their distribution by gender.

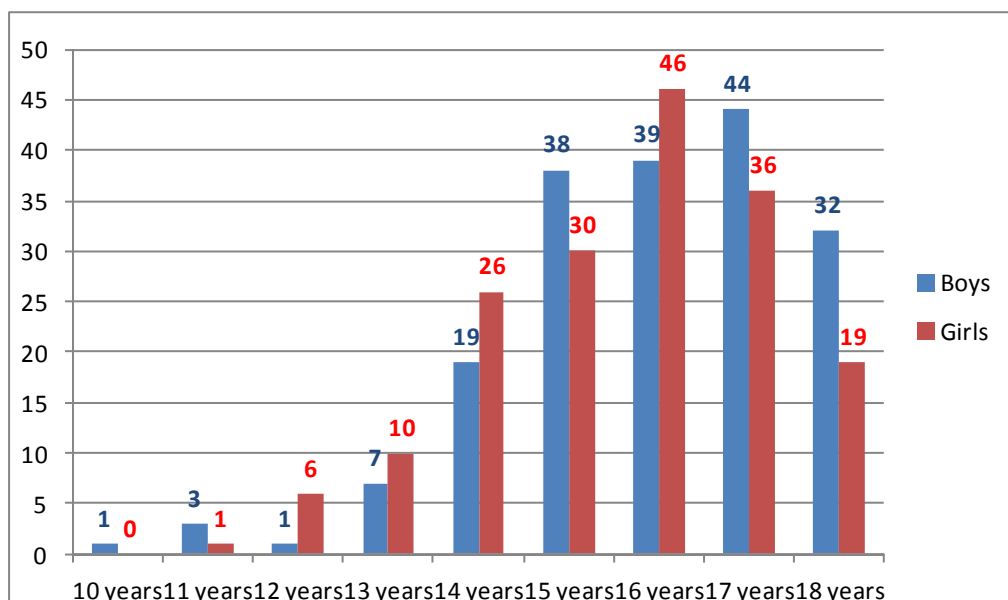
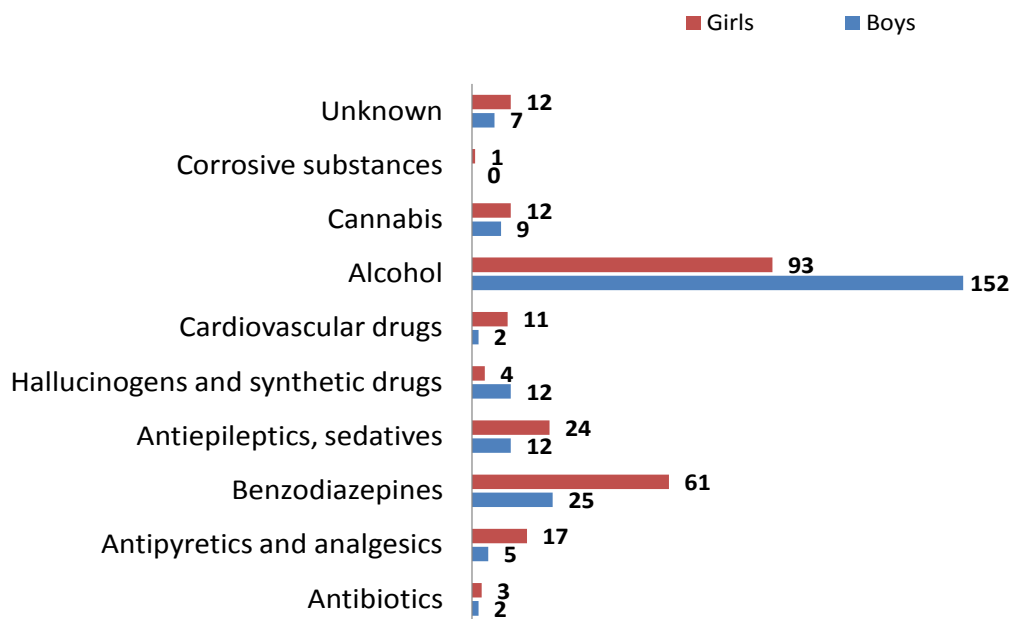


Figure 1. Distribution of self-poisoning by gender and age

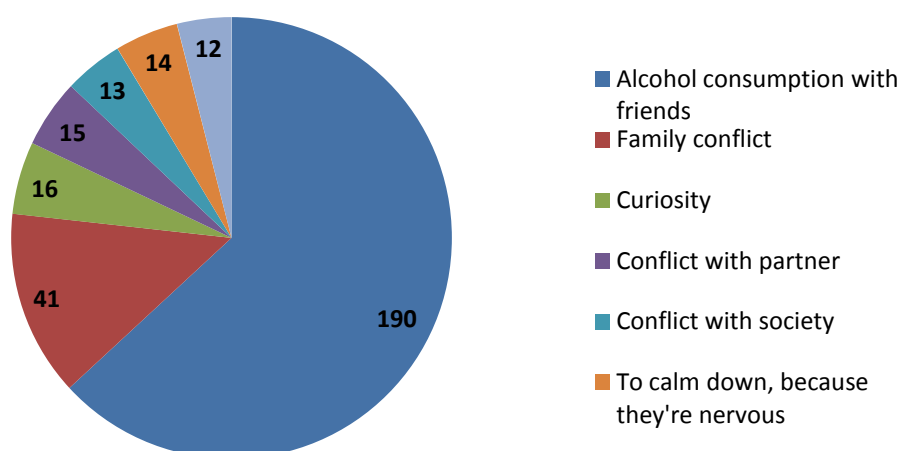


**Figure 2.** Gender distribution of self-poisoning by causes

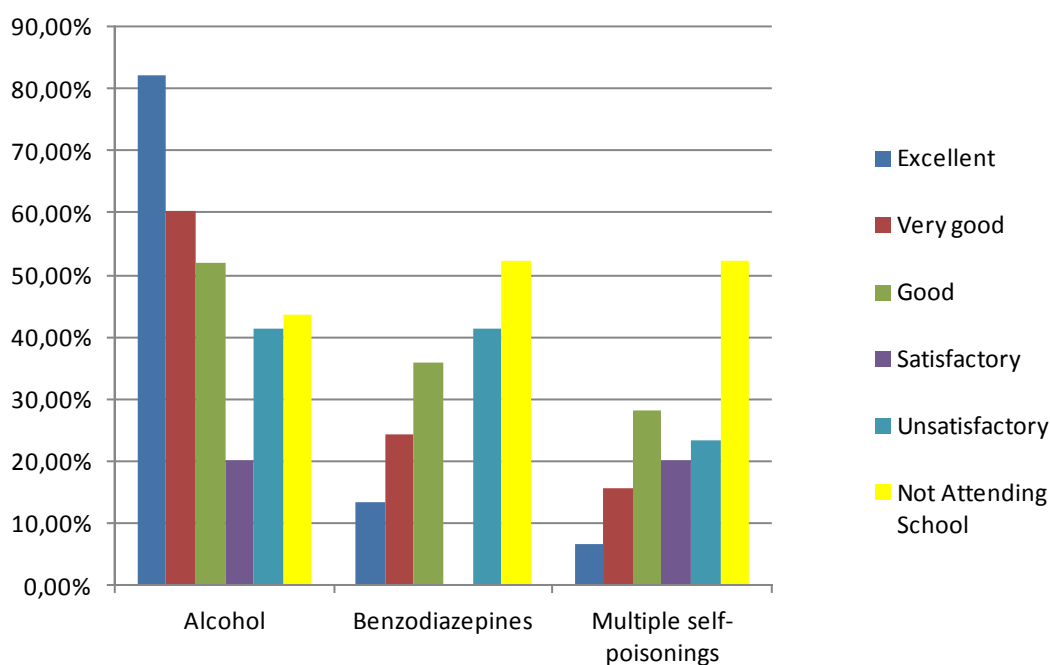
Out of the total number of subjects (364), 79 subjects consumed more than one substance (21.4%), including 29 boys/men (36.71%) and 50 girls/women (63.29%). Adolescents most commonly combined benzodiazepines with other substances, 48 subjects in total (60.76%). The most common among those substances were antiepileptic, sedative and antiparkinsonian drugs, 15 subjects in total (31.25%) and alcohol, 13 subjects in total (27.08%). The second most frequent combination was alcohol with other substances, 30 subjects in total (37.97%), most usually in combination with benzodiazepines, 13 subjects in total (43.33%). Student's t-test results showed a statistically significant difference between the number of self-poisoning boys and girls regarding the number of ingested substances ( $p < 0.05$ ). Girls consumed multiple substances simultaneously more often. Anamnestic data on previous self-poisoning attempts were obtained for 340 subjects (93.4%). Out of these, 295 subjects had data on their first self-poisoning attempt (86.76%), with 151 male subjects (51.19%) and 144 female subjects (48.8%). Student's t-test results showed no statistically significant difference in the frequency of first self-poisoning attempts between boys/men and girls/women. Using the chi-square test, a statistically significant difference was found by gender regarding repeated self-poisoning attempts, with girls/women having more repeated self-poisoning attempts than boys/men ( $p < 0.05$ ). Data on the reasons for self-poisoning were obtained for 304 subjects and are presented in Figure 3.

Anamnestic data on family structure were obtained for 122 subjects (33.52%). Out of these, 63 subjects confirmed living in a complete nuclear family (51.64%), while 59 subjects lived in an incomplete nuclear family (48.36%). According to the T-test results, there is a statistically significant difference between adolescents living in complete nuclear families and those living in incomplete nuclear families in terms of alcohol consumption ( $p < 0.05$ ) and benzodiazepine consumption ( $p < 0.05$ ), with patients from complete families more frequently having alcohol poisoning and those from incomplete families more frequently having benzodiazepine poisoning. Data on school success were found for 173 subjects (47.53%). Out of these, 45 were excellent students (26.01%), 58 were very good (33.53%), 25 were good (14.45%), 5 were sufficient (2.89%), 17 were insufficient (9.83%), and 23 adolescents dropped out of school (13.29%). The relationship between consumed substances and school success is shown in Figure 4.

Chi-square test results showed a statistically significant difference ( $p < 0.05$ ) in benzodiazepine and alcohol consumption according to school success. Students achieving excellent and very good grades more frequently consumed alcohol for self-poisoning purposes, while students with insufficient grades or those who dropped out of school more frequently consumed benzodiazepines.



**Figure 3.** Distribution of self-poisoning according to the intent of self-poisoning



**Figure 4.** Distribution of substance use leading to self-poisoning in relation to school success

## Discussion

There was no statistically significant difference between boys and girls who committed self-poisoning, although according to the literature (17–20), girls more frequently attempt self-poisoning. In this study, the majority of adolescents were 16 and 17 years old. Le Valliant (20) found that the children diagnosed with intentional self-poisoning were most often aged 10 to 14 years. The results of this study may differ from Le Valliant's results because his study

included individuals under 10 years of age. The results of this study are consistent with the results of Nistor, Zakharov, and Navratil (9, 21, 22). The most commonly used substances leading to self-poisoning were alcohol, benzodiazepines, antipyretics, analgesics and drugs from the antiepileptic, sedative and antiparkinsonian groups. Similar results were obtained by other authors (9, 14). The most common cause of self-poisoning in adolescence was alcohol, with boys more frequently being consumers, consistent with other authors' results (9, 14). The most common

drugs used for self-poisoning were benzodiazepines. This differs from other authors' results, where acetaminophen was most commonly used for poisoning. However, in this study, analgesics and antipyretics were third in frequency (9, 20). This could be explained by the fact that benzodiazepines are much more commonly prescribed and abused in Serbia than in Western countries, making them more accessible to adolescents (21). Zakharov and Navratil (22) found that 30% of subjects consumed more than one substance, with more girls doing so than boys. Results are consistent with the results of this study, in which a statistically significant difference in favor of girls was observed. The majority of subjects (86%) had their first self-poisoning attempt as other authors concluded (22, 23). This study found a statistically significant difference between boys and girls who self-poisoned multiple times, with results indicating that girls more frequently had repeated self-poisoning attempts. In a Canadian study, the percentage of adolescents re-exposed to self-poisoning over a five-year observation period was around 16% (11). Boys more frequently consume alcohol during adolescence, and intoxication most often results from alcohol consumption (9, 14, 24). Conflicts within the family as well as partners, and conflicts within society were more often triggers for self-poisoning in girls (67.5%) than in boys (32.5%), consistent with Nistor's research (9). This could be explained by the fact that girls are more empathetic during adolescence than boys (25). Family structure and relationships within it are significant factors in developing self-harm ideation among children (26). Divorce, poor economic and social relationships within the family, as well as living with only one parent, also represent risk factors for developing self-harm ideation (27). The results show a statistically significant difference between adolescents living in complete nuclear families and those living in incomplete nuclear families in terms of alcohol and benzodiazepine consumption. Adolescents from complete nuclear families more frequently had alcohol poisoning as a cause of self-poisoning, while those from incomplete families more frequently consumed benzodiazepines for self-poisoning. There is a statistically significant difference in benzodiazepine and alcohol consumption according to school success.

Students achieving excellent and very good grades more frequently poisoned themselves with alcohol, while students with insufficient grades or those who dropped out of school more frequently consumed benzodiazepines. In his study, Blair (27) demonstrated that students who achieve very good and excellent results in school have a lower tendency towards risky and delinquent behavior compared to poor-performing students, but alcohol use is equal among them. However, the use of psychoactive substances is slightly more common among adolescents with poorer school performance.

### Conclusion

Based on the study results and objectives, the following conclusions can be drawn. The average age of adolescents who committed self-poisoning was 16 years. Alcohol was the most common substance consumed for self-poisoning, more often among boys/men than girls/women, while benzodiazepines were the most commonly consumed pharmacologically active substances, more often among girls/women than boys/men. Girls/women statistically significantly more frequently used multiple substances simultaneously for self-poisoning. The most common reason for self-poisoning was "enjoyment" of alcohol in social settings, more often among boys/men than girls/women, while the most common reasons for self-poisoning among girls/women were "family conflict" and "social conflict." The results showed that girls/women more frequently had repeated episodes of self-poisoning compared to boys/men. Adolescents from complete nuclear families more frequently consumed alcohol for self-poisoning, while those from incomplete nuclear families more frequently consumed benzodiazepines for self-poisoning. There is a statistically significant difference in benzodiazepine and alcohol consumption according to school success, whereas students achieving excellent and very good grades more frequently poisoned themselves with alcohol, while students with insufficient grades or those who dropped out of school more frequently consumed benzodiazepines.

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## Originalni rad

UDC: 616-099:616-053.6  
doi: 10.5633/amm.2025.0308**NAMERNA SAMOTROVANJA ADOLESCENATA:  
TROGODIŠNJE ISKUSTVO JEDNOG ZDRAVSTVENOG  
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Adolescencija je period u kojem dete doživljava važne promene i u kojem je podložno rizičnom ponašanju. Jedan oblik takvog ponašanja čine namerna samotrovanja, koja nisu retka pojava. Cilj ovog rada bio je da se utvrde sociodemografske karakteristike adolescenata, distribucija korišćenih supstanci, kao i uticaj koji uspeh u školi i kompletnost nuklearne porodice imaju na čin samotrovanja.

Sprovedena je retrospektivna studija uvidom u dokumentaciju 412 pacijenata koji su lečeni u Institutu za zdravstvenu zaštitu dece i omladine Vojvodine u trogodišnjem periodu.

Prosečna starost ispitanika bila je 15,7 godina. Najčešće korišćene supstance bile su alkohol (67%), lekovi iz grupe benzodijazepina (23,6%) i kanabis (5,8%). Petina ispitanika je uzimala najmanje dve supstance istovremeno; to je bilo češće kod adolescentkinja, kod kojih su zabeležene i češće epizode ponovljenih samotrovanja. Polovina ispitanika (51%) živela je u kompletnoj nuklearnoj porodici. Kada je reč o konzumiranju alkohola, utvrđena je značajna razlika između ispitanika iz pomenute grupe i ostalih ispitanika. Postoji značajna razlika u konzumiranju benzodijazepina i alkohola i kada se u obzir uzme uspeh u školi.

Za samotrovanje su najčešće korišćeni alkohol i lekovi iz grupe benzodijazepina, s tim što postoji značajna razlika među polovima. Zbog činjenice da se lekovi iz grupe benzodijazepina lako mogu nabaviti, oni se u najvećoj meri koriste za samotrovanje. Kod devojaka postoji veći rizik od ponovne epizode samotrovanja. Adolescenti koji žive u kompletnim nuklearnim porodicama i imaju odličan uspeh u školi češće su konzumirali alkohol, dok su se adolescenti iz porodica koje nisu kompletne nuklearne porodice i koji imaju loš uspeh u školi uglavnom odlučivali za benzodijazepine.

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**Ključne reči:** namerno samotrovanje, adolescencija, pubertet, alkohol, benzodijazepini

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