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## Poisoning and suicide attempts in adolescent girls-a problem we need to be aware of

Maria Tomkiewicz

<https://orcid.org/0009-0001-6110-7034>

mariaaa.srodon@gmail.com

Provincial Hospital of Podkarpackie John Paul II in Krosno, Poland.

Maciej Tomkiewicz

<https://orcid.org/0009-0009-7618-7768>

maciektomkiewicz202@gmail.com

Provincial Hospital of Podkarpackie them. John Paul II in Krosno, Poland.

Weronika Sosnowska

<https://orcid.org/0009-0003-4608-5521>

weronika.sosnowska07@gmail.com

Stefan Wyszyński Regional Specialist Hospital, Lublin, Poland.

Aleksandra Brzozowska

<https://orcid.org/0009-0008-7687-1140>

brzozola@onet.eu

Stefan Wyszyński Regional Specialist Hospital, Lublin, Poland.

Michał Tchórz

<https://orcid.org/0000-0002-1308-099X>

tchorz.michal@gmail.com

Toxicology Clinic, Medical University, Lublin, Poland.

Kalina Taracha

<https://orcid.org/0009-0002-3707-9376>

tarachakalina@gmail.com

Stefan Wyszyński Regional Specialist Hospital, Lublin, Poland.

Rafał Tkaczyk

<https://orcid.org/0009-0001-0542-3374>

rafaltkaczyk@wp.pl

District Specialist Hospital in Stalowa Wola, Poland.

Jakub Tomczyk

<https://orcid.org/0009-0008-0586-5798>

jtomczyk15@gmail.com

Stefan Wyszyński Regional Specialist Hospital, Lublin, Poland.

Gabriela Świątek

<https://orcid.org/0009-0004-8537-6249>

gabriela.swiatek21@gmail.com

District Specialist Hospital in Stalowa Wola, Poland.

## ABSTRACT

**Introduction and purpose:** Poisoning among children and adolescents is occurring on an ever-increasing scale. Women are particularly susceptible to intentional poisoning, and they predominate in the statistics of self-poisoning. The aim of the study is to analyze cases of poisoning in girls under 18 years of age hospitalized in the Clinical Toxicology and Cardiology Department of the Stefan Cardinal Wyszyński Regional Hospital in Lublin in 2022, taking into account the type of substance ingested, the place of residence of the patients and comorbidities.

**Material and methods:** The study was retrospective in nature. It used the analysis of medical records of 84 cases of intoxication in girls under 18 years of age.

**Results:** During the time period studied, 84 girls aged 13-18 were hospitalized for poisoning. Most of the cases were urban residents (64.3%). The toxic substances causing poisoning were mainly drugs (63.1%), narcotics (17.9%) and ethanol (17.8%). Poisoning of an intentional nature involved 80 (95.2%) cases, 37 (44%) cases were suicide attempts. In 54 (64.3%) cases, the patient was burdened with a mental illness, the most common being depressive disorders. There were no deaths in the study group.

**Conclusions:** Due to the increasing phenomenon of mental disorders, as well as intentional poisoning among adolescent girls, special emphasis should be placed on psychological care, pedagogical care, of girls in adolescence. This is the time when girls have problems with acceptance of their bodies, with acceptance among peers. Parents and teachers should be made aware of this.

**Key words:** suicide attempts; adolescents; girls; poisoning; alcohol; drugs.

## **Introduction and purpose of the study**

Acute poisoning in children and adolescents remains an important medical and public health problem. According to the Polish National Institute of Public Health/State Institute of Hygiene (NIZP-PZH), in Poland in 2010 the total number of hospitalizations due to poisonings was 46,574, of which 30% were patients under 19 years of age. [1]

Poisonings are an increasingly common cause of hospitalization in pediatric patients, both among children and adolescents. They are medical conditions caused by the entry of a toxic substance from the external environment into the body [2]. The scale of this phenomenon is steadily increasing, and it poses a challenge to medical professionals as well as psychologists, psychotherapists and sociologists.

Adolescence is a crucial period in life, characterized by many social, physical, physiological and psychological changes that can make adolescents particularly vulnerable to the adverse consequences of risky behavior, including alcohol use [3] as well as drugs, smoking and drug poisoning. Poisoning is divided into accidental and intentional. As for accidental poisonings, young children usually succumb to accidental exposures [4], and by the age of 5, poisonings are 100% accidental [5,6]. Given that our analysis involved a group of girls between the ages of 13 and 18, the vast majority will be intentional poisonings. The fact is that nowadays it is no longer only alcohol that is the cause of these poisonings, teenagers are now turning to drugs, as well as a wide range of drugs, including powerful psychostimulants. The problem of suicide attempts by way of intoxication is also an issue to be addressed. Suicide, as well as suicide attempts, is also, as it were, an indicator of mental health assessment in various social groups. This disturbing phenomenon, with an increasing trend, occurs in all age groups in communities, although most of its incidence is observed in the age group of 15-30 years [15,16] A disturbing phenomenon is the increase in suicide attempts among adolescents, increasingly by way of drug overdose, medication. The purpose of our work is to analyze poisonings in girls under 18 years of age, taking into account the cause of these poisonings, the origin, socioeconomic status of the patients, comorbidities, psychiatric history.

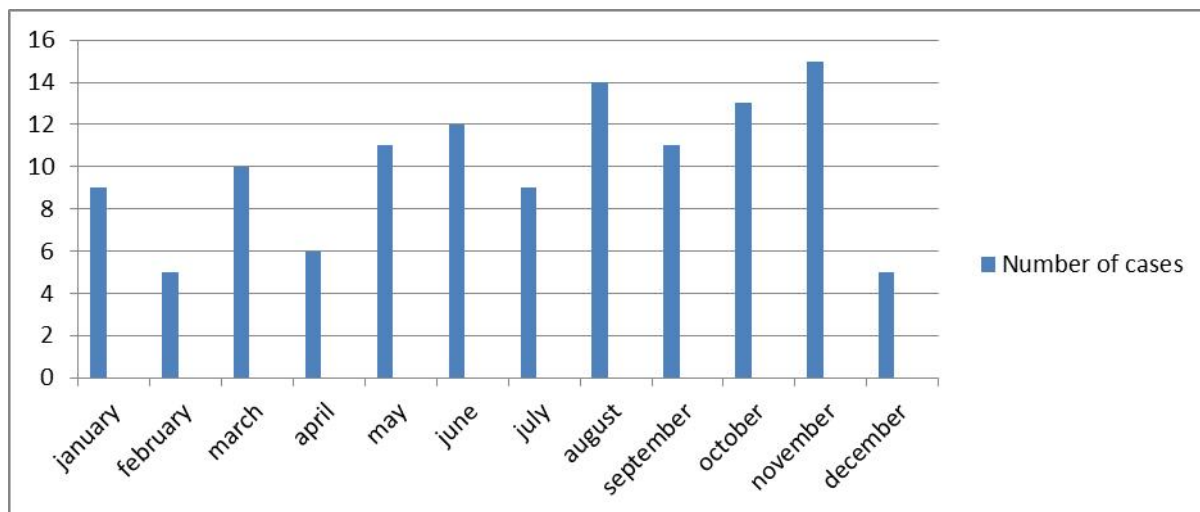
## **Material and methods**

We analyzed the medical histories of girls from 13 to 18 years of age hospitalized in 2022 for poisoning in the Clinical Toxicology and Cardiology Department of the Stefan Cardinal Wyszyński Regional Hospital in Lublin. The study was retrospective in nature. On the basis of the analysis of the medical records of female patients, the necessary data for the preparation of the paper were collected. Of the 2932 hospitalizations that took place during the study period, the target group of toxicology patients was selected, which includes 84 female patients under 18 years of age. When analyzing medical histories, patient data such as age, place of residence, type of agent causing poisoning, severity of poisoning, time of hospitalization, purpose of poisoning including suicide attempts, comorbid somatic diseases and mental disorders, psychological and psychiatric consultations were used.

## **Results**

In the period from January 1 to December 31, 2022, 84 toxicological hospitalizations were recorded in the Clinical Toxicology and Cardiology Department of the Stefan Cardinal Wyszyński Regional Hospital in Lublin. The study involved female patients up to the age of 18, of which two girls were hospitalized twice. In the study group, the age of the patients was within the range of 13-18 years. Toxic substances that mainly caused poisoning were drugs (64.3%, n=54), narcotics (17.9, n=15) and ethanol (17.9, n=15). There were 5 cases of simultaneous ingestion of drugs and ethanol (6%, n=5), and 1 case of drug-drug combination was also reported (1.2%). One of the hospitalized girls took medication, alcohol and drugs simultaneously. Ethanol consumption affected 20 girls, with 19 of them under the age of 18. During their stay at the Department, ethanol levels in the patients' blood were determined in 77 of the 84 subjects. The presence of ethanol in the blood was detected in (23.8%, n=20), the average level was 0.43 g/l, while the highest value was recorded in a girl with a result of 2.43 g/l. The groups of drugs that were the cause of intoxication are placed in Table 1.

Taking into account the place of residence of the patients, the predominant group was those living in urban areas (64.3%, n=54). Intoxications most often occurred in the fourth quarter of the year (28.6, n=24), while the month during which the most patients were hospitalized was November (15.5%, n=13), (Figure 1), and the day of the week noteworthy was Monday (21.4%, n=18).



**Figure S1:** Monthly distribution of poisonings in girls.

Drugs were consumed by  $n=17$  of all the subjects, of which the vast majority of the girls as many as  $n=13$  came from urban areas, and only  $n=4$  from rural areas, which should be noted. Of the patients who consumed ethanol,  $n=13$  of them were from the city, and  $n=7$  lived in rural areas. Drugs, on the other hand, were the most common cause of intoxication for patients coming from urban areas ( $n=31$ ), while among rural residents, 23 girls took them.

In the group analyzed, as many as (95.2%,  $n=80$ ) were poisonings of an intentional nature of which (44%,  $n=37$ ) were cases were suicide attempts. Among the cases classified as suicide attempts, one person consumed drugs for this purpose, 2 people consumed ethanol, and the remaining cases were due to consumption of drugs ( $n=34$ ). Thus, drugs are the main cause of suicide attempts in young people, which is also confirmed in the work of other authors.[ 17] The reason for the frequency of suicide by means of drugs may be their availability and awareness of safer consequences compared to more invasive methods. [17] Suicide attempts among adolescents, and their growing number, are an alarming problem. The reasons for undertaking them are varied: failing in school, lack of acceptance among peers, love disappointments, problems defining sexual orientation, perhaps a desire to impress peers. The easy availability of intoxicants, especially in cities, probably makes it easier for young people to turn to stimulants. Noteworthy, children and adolescents with mental illness have a 3 to 12 times higher risk of suicide. [11] The majority of girls making a suicide attempt resided in urban areas (59.5%,  $n=22$ ) with as many as 20 of them having a history of mental disorders (depressive disorders, bulimia, adjustment disorder, paranoid schizophrenia). Patients making a suicide attempt and living in rural areas, on the other hand, were (40.5%,  $n=15$ ), 10 of whom had a history of mental illness (depressive disorders, Asperger's syndrome, behavioral

disorders) or somatic illness (celiac disease, hypothyroidism). Of the cases reviewed (64.3%, n=54) were those struggling with mental disorders, most often in the form of depressive disorders (72.2%, n=39). Above that, patients had adjustment disorders, anxiety disorders, dissociative disorders, gender orientation disorders, neurotic disorders, Asperger's syndrome, substance abuse, schizophrenia, bipolar affective disorder, anorexia, bulimia. Psychiatric consultation was performed in (81%, n=68), while o psychological consultation was performed in (79.7%, n=67). (11.9%, n=10) hospitalizations were for people suffering from somatic chronic diseases, i.e.: epilepsy, celiac disease, hypothyroidism, asthma, psoriasis, recurrent syncope, cardiac problems. The highest score on the poisoning severity scale was achieved by a patient with a score of 7. There were (6%, n=5) patients in severe condition during admission to the Ward. There were 6 girls (7.1%) discharged on the first day of hospitalization, while the longest stay in the Ward was 7 days. The average length of stay in the Unit was 2 days. There were no deaths due to exposure to toxic substances, which is remarkable considering that the average mortality rate due to poisoning is 1% in developed countries, 3-5% in developing countries. [12] 8 people were hospitalized in the Department on several occasions, including 7 people twice during the period under study. The highest number of hospitalizations in the Department in a single person was 4.

Groups of drugs	n	%
Non-opioid painkillers and antipyretics	21	39,6
Antidepressants	11	20,75
Antiepileptic drugs, sedative-sleeping drugs and drugs against Parkinson's disease	9	17
Other psychotropic drugs	10	18,9
B-blockers	2	3,8
Cardiac stimulant glycosides and drugs with similar effects	0	0
Cough suppressants	0	0
<b>Total number of drug poisoning cases</b>	<b>53</b>	<b>100</b>

**Table S1:** Groups of drugs causing poisoning according to diagnoses from medical histories of hospitalized patients.

## Discussion

Poisoning is a serious cause of hospitalization of pediatric patients. Only female adolescents from 13 to 18 years of age were analyzed, due to the significant problem of intentional

poisoning in adolescent girls. Adolescence is particularly difficult for adolescent girls, who at this time often do not cope with their emotions, experience changes in physical appearance more strongly than boys, and often do not accept the changing body. Adolescence is a special period for proper development, not only physically, but also mentally and socially, and often causes emotional lability, crying, problems with acceptance among peers, or first love disappointments in teenagers. Disorders in dealing with emotions promote the use of stimulants in the form of alcohol, drugs, but also increasingly drugs.

Girls from urban areas are most likely to be poisoned, which is probably due to the greater availability of stimulants, the easier possibility of buying drugs, alcohol and drugs. It can be assumed that among girls from the city, the pressure among peers related to appearance, material status, the desire for acceptance by the environment is greater, hence more often adolescent girls, do not cope.

As for the type of stimulants chosen, by far the most common among girls is drug poisoning, while alcohol and drug poisoning occur with similar frequency. It should be noted that drugs are the main group of drugs taken by adolescents for suicidal purposes, such a result was also obtained by authors of other works [6,7]. The most common drugs taken were non-opioid analgesics and antipyretics.

Antidepressants rank second in the ranking of the most popular drugs. This fact, clearly indicates that the availability of OTC analgesics and antipyretics is too easy, and it would be appropriate to limit their availability, especially to minors. Ethyl alcohol is a fairly common cause of poisoning among pediatric patients. Unfortunately, underage consumption of this substance is on the rise.[8] Starting to drink alcohol at a young age carries a number of specific health risks, especially for brain development. In addition, early alcohol consumption, compared to initiation in later adolescence, is associated with an increase in the frequency and amount of alcohol consumed and with more frequent alcohol-related problems in later adolescence and early adulthood. In contrast, it appears to be a stimulant more readily chosen in the boy population. [13,14]

As for the reasons for turning to these stimulants, it would be appropriate to look more deeply into the issue of suicide among young people. According to the analysis, poisoning of an intentional nature involved (95.2%, n=80) cases, (44%, n=37) cases were suicide attempts. In fact, as the study suggests, suicide attempts are more common among young women [17]. According to statistics published in this area, the rate of suicide attempts in women is 3 to 4

times higher than in men. [17] It should be noted that these trends are pronounced among Latin Americans and Northern Europeans in particular. The most common method of attempted suicide in the general population is drug poisoning. [11,20,21]] Since the number of suicides among children and adolescents is steadily increasing, it would be appropriate to ensure that all patients arriving at the ward with intentional poisoning, regardless of the cause, receive consultation with a psychologist and/or psychiatrist. According to the analysis, almost 90% of female patients received such assistance.

Among the study group of female patients, more than half (56%, n=47) suffered from mental disorders, of which depressive disorders predominated. It was noted that in the population of girls from rural areas, more than half (56%, n=47) of the girls suffer from mental disorders- mostly depressive disorders), but also CHAD, adjustment disorders, Asperger's syndrome, personality disorders, dissociative disorders, anxiety disorders.

In the urban population, as many as (68.5%, n=57) of the surveyed girls had concomitant mental disorders, including again predominantly depressive disorders, but also in individual cases bulimia, neurotic disorders, adaptive disorders, SPA addiction, anorexia, personality disorders. It seems that the spectrum of mental disorders in the urban population, is somewhat broader, more often intentional poisoning is accompanied by eating disorders, neurotic disorders and addiction to psychoactive drugs.

In both urban and rural populations, suicide attempts most often involved patients with depressive disorders. Patients with depression typically experience low self-confidence, guilt with self-blame and suicidal thoughts. Depression is therefore known to be a major psychiatric disorder associated with suicidal behavior or suicide attempts [18,19].

It is also interesting to note the trend of reaching for stimulants for poisoning, by season, month and even day of the week. It was shown that the highest number of intentional poisonings occurred in the 4th decade of the year, in November. This may be influenced by, worsening weather, less sunlight, shortening of the day. [9,10] It also coincides with the beginning of the school year, which often causes children difficulties in getting used to the new rhythm, emotional problems.

## **Conclusions**

1. Poisoning is an increasingly serious problem in pediatrics.



2.Prevention of suicide is an important task for society, both for child psychiatrists, psychologists, as well as educators and parents.

3.Given the increasing trend of suicide attempts, suicide prevention programs should be considered among adolescents, especially those living in rural areas, as well as those suffering from mental and somatic disorders.

4.Girls are more likely to self-harm, due to emotional problems and lack of acceptance of their own bodies during puberty, it is necessary to make this age group aware of the psycho-physical changes occurring in the body and self-acceptance.

5. It is necessary to make parents aware that depressive disorders also affect children and adolescents, and what is increasingly common in this age group. Education and increased awareness of parents in this regard is necessary.

6. The availability of OTC painkillers and antipyretics to minors should be restricted, since, as the analysis shows, they are very often used outside the indications.

#### **Statement of the author's contribution**

Conceptualization, Maria Tomkiewicz, Maciej Tomkiewicz and Michał Tchórz

Methodology, Maciej Tomkiewicz and Gabriela Świątek

Software, Jakub Tomczyk

Check, Michał Tchórz, Rafał Tkaczyk and Kalina Taracha

Formal analysis, Maria Tomkiewicz

Investigation, Aleksandra Brzozowska

Resources, Weronika Sosnowska

Data curation, Weronika Sosnowska

Writing - rough preparation, Gabriela Świątek

Writing - review and editing, Maria Tomkiewicz and Maciej Tomkiewicz

Visualization, Rafał Tkaczyk

Supervision, Michał Tchórz

Project administration, Michał Tchórz

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### **References:**

1. Pac-Kożuchowska E, Krawiec P, Mroczkowska-Juchkiewicz A, Mełges B, Pawłowska-Kamieniak A, Kominek K, Golyska D. Patterns of Poisoning in Urban and Rural Children: A Single-Center Study. *Adv Clin Exp Med*. 2016 Mar-Apr;25(2):335-40. doi: 10.17219/acem/36142. PMID: 27627568.
- 2 Kózka MJ, Perek M, Kruszecka-Krówka A, Miller E. Analysis of poisonings in children and adolescents hospitalized at the University Children's Hospital in Krakow in 2009-2012. *Nursing and Public Health*. 2018;8:5-9. DOI 10.17219/pzp/75488.
3. Steinberg L. Cognitive and affective development in adolescence. *Trends Cogn Sci*. 2005 Feb;9(2):69-74. doi: 10.1016/j.tics.2004.12.005. PMID: 15668099
4. Zielińska-Duda H, Koszczyńska J, Czerwionka-Szaflarska M. Analysis of chemical poisoning in children and adolescents. *Ped Współ Gastroenterol Hepatol Żyw Dziecka*. 2011;13(4):218-223.
5. Ziółkowska H. Acute poisonings in children. *Borgis - New Pediatrics*. 2009; 2:39-49.
6. Sierakowska-Urbanska G, Szczaniecka A, Waszak-Mroczynska T. Analysis of cases of intentional poisonings among children and adolescents hospitalized in 1991-1995. *Med. Prakt. Pediatr*. 1995;3(4):323-331.
7. Mordasewicz-Goliszevska M, Albrant-Kuzia G, Slowikowska R, Paszko J, Stąpel P, Grygalewicz J. Intentional poisoning in children and adolescents in the material of the general pediatric clinic. *Pol. Merkur. Lekarski*. 2006;21(121):24-28.

8. Pawlowska-Kamieniak A, Mroczkowska-Juchkiewicz A, Golyska D, Pac-Kożuchowska E. Socioclinical analysis of cases of alcohol intoxication in children. *Probl Hig Epidemiol.* 2011;92(3): 688-691
9. Krawczyk P, Swiecicki Ł. Seasonality of hospitalization in mood disorders - a review of the literature. <https://podyplomie.pl/psychiatria/17591,sezonowosc-hospitalizacji-w-zaburzeniach-nastroju-przeglad-pismiennictwa> (accessed 2023.05.15).
10. McCartney JL. Seasonal variation in psychiatric illness. *Psychosomatics* 1962;3(4):312-6
11. Becker M, Correll CU. Suicidality in Childhood and Adolescence. *Dtsch Arztebl Int.* 2020 Apr 10;117(15):261-267. doi: 10.3238/arztebl.2020.0261. PMID: 32449889; PMCID: PMC7268098.
12. Lee J, Fan NC, Yao TC, Hsia SH, Lee EP, Huang JL, Wu HP. Clinical spectrum of acute poisoning in children admitted to the pediatric emergency department. *Pediatr Neonatol.* 2019 Feb;60(1):59-67. doi: 10.1016/j.pedneo.2018.04.001. epub 2018 Apr 19. PMID: 29748113.
13. Pedroni C, Dujeu M, Lebacq T, Desnouck V, Holmberg E, Castetbon K. Alcohol consumption in early adolescence: Associations with sociodemographic and psychosocial factors according to gender. *PLoS One.* 2021 Jan 15;16(1):e0245597. doi: 10.1371/journal.pone.0245597. PMID: 33449956; PMCID: PMC7810307.
14. Squeglia LM, Jacobus J, Tapert SF. The effect of alcohol use on human adolescent brain structures and systems. *Handb Clin Neurol.* 2014;125:501-10. doi: 10.1016/B978-0-444-62619-6.00028-8. PMID: 25307592; PMCID: PMC4321715.
15. Sinyor M, Tse R, Pirkis J. Global trends in suicide epidemiology. *Curr Opin Psychiatry.* 2017 Jan;30(1):1-6. doi: 10.1097/YCO.0000000000000296. PMID: 27845946.
16. Mozafari A, Sahebi A, Adibi A, Saatchi M, Sayehmiri K. Evaluation of Suicide Attempt due to Drug Poisoning in a 7-Year-Old Girl: A Case Report. *Iran J Psychiatry.* 2020 Apr;15(2):169-171. PMID: 32426013; PMCID: PMC7215250.
17. Alami A, Nejatian M, Lael-Monfared E, Jafari A. Epidemiology of Suicide/Suicide Attempt and Its Association with Individual, Family, and Social Factors in Eastern Part of Iran: A Historical Cohort Study. *Iran J Public Health.* 2019 Aug;48(8):1469-1477. PMID: 32292730; PMCID: PMC7145930.

18. Harnod D, Harnod T, Lin CL, Shen WC, Kao CH. Increased Risks of Suicide Attempt and Suicidal Drug Overdose Following Admission for Head Injury in Patients with Depression. *Int J Environ Res Public Health*. 2019 Sep 20;16(19):3524. doi: 10.3390/ijerph16193524. PMID: 31547202; PMCID: PMC6801720.
19. Hegerl U. Prevention of suicidal behavior. *Dialogues Clin Neurosci*. 2016 Jun;18(2):183-90. doi: 10.31887/DCNS.2016.18.2/uhegerl. PMID: 27489458; PMCID: PMC4969705.
20. SABERI, ZAFARGHANDI MB, R. Ghorbani, and SHAHROKH MOUSAVI. "Epidemiologic study on suicide attempt in affiliated hospitals of Semnan University of medical sciences." (2005): 311-317.
21. Moradi, Ali Reza, RAHIM MORADI, and EHSAN MOSTAFAVI. "A survey of the rate and effective factors on suicide in Bahar." (2012): 50-58.