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## **Intoxication-related teenagers' suicide attempts - an analysis of the issue**

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## **ABSTRACT**

**Introduction and Aim:** Adolescent suicide attempts are a significant clinical and social issue. Often, young people resort to medications, alcohol, or psychoactive substances in their suicide attempts. The aim of this study was to analyze the factors contributing to suicidal behaviors and the characteristics of substances used by adolescents for suicidal purposes.

**Materials and Methods:** In this retrospective study, medical documentation analysis was used. The study included the medical records of 45 individuals up to 18 years of age who were admitted to the Clinical Toxicology-Cardiology Department due to poisoning for the purpose of suicide in the year 2022.

**Results:** The study group consisted of 45 individuals aged 15 to 18 years. Suicide attempts accounted for 37.5% of toxicology hospitalizations in the under 18 age group. The dominant group consisted of females (82.2%) and urban residents (62.2%). Those hospitalized following a suicide attempt primarily used medications, often over-the-counter analgesics. The majority (71.1%) suffered from mental disorders, predominantly depressive disorders (81.2%).

**Conclusions:** Among suicide attempts involving intoxication, those utilizing medications are dominant. A concerning phenomenon is the use of over-the-counter (OTC) medications, commonly considered safe. Girls are particularly vulnerable to emotional difficulties that can lead to suicide. Mental disorders pose a suicidal risk, and patients with such disorders have access to psychiatric medications that can become tools for self-harm.

**Keywords:** children; adolescents; suicide; poisoning

## **Introduction and Aim**

The World Health Organization (WHO) reports that approximately one million people worldwide die by suicide each year [1]. It is alarming to note that suicide is the fourth leading cause of death among children aged 5 to 14 years and the third leading cause in the 15-24 age group [2]. Suicide attempt is defined as a self-initiated and potentially lethal action with the intention to cause one's own death, but which does not result in death [3]. The incidence of suicide attempts is estimated to be about twenty times higher than completed suicides (WHO data). Unfortunately, this issue is becoming increasingly noticeable in the modern world. Police data for the year 2021 show a significant increase in suicidal behaviors among young individuals [4]. The aim of this study is to analyze the structure of suicide attempts made by patients up to 18 years of age. The research examines the associations between suicidal behaviors and existing mental disorders, somatic illnesses, or other chronic conditions. It also explores the gender, age, and residential environment of children who attempt to take their own lives. The suicidal attempts made by the adolescent population forming the research group involved the ingestion of substances/medications commonly recognized as life-threatening and harmful to health.

## **Materials and Methods**

The study had a retrospective design. It included patients up to 18 years of age who were hospitalized due to poisoning as a suicide attempt in the Clinical Toxicology-Cardiology Department of the Stefan Cardinal Wyszyński Provincial Specialist Hospital in Lublin, Poland, in 2022. Data was collected based on the analysis of medical records of the patients. Out of 1095 toxicology hospitalizations that occurred during the study period, a group of individuals up to 18 years of age, comprising 120 cases, was selected. Ultimately, 45 individuals who had attempted suicide were identified. Data such as gender, age, place of residence, substances ingested, coexisting somatic illnesses, and mental disorders, as well as psychological and psychiatric consultations, were analyzed.

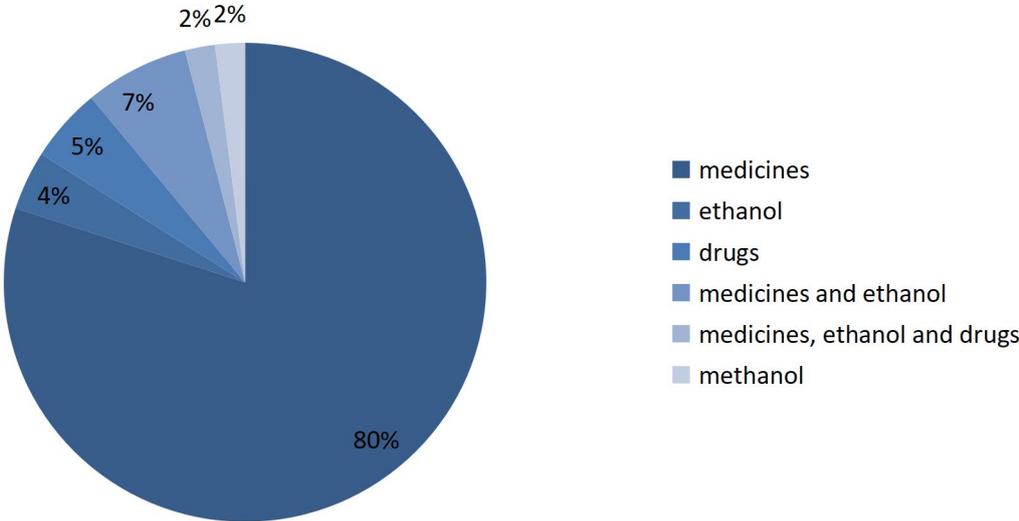
## **Results**

In the Clinical Toxicology-Cardiology Department in 2022, 45 individuals aged 15 to 18 years were hospitalized following a suicide attempt. These cases accounted for 37.5% of all toxicology hospitalizations in this age group. The majority of patients in the identified group

were females - 37 cases (82.2%). Suicide attempts occurred more frequently among individuals residing in urban areas - 28 cases (62.2%) compared to rural areas - 17 cases (37.8%). The highest number of suicide attempts took place in the second quarter of the year (31.1%), followed by the fourth quarter (28.9%).

The predominant group of substances used by the patients were medications (86.7%), including 3 individuals who combined them with ethanol, and 1 individual who combined them with both ethanol and drugs. Two individuals consumed ethanol as a suicide attempt, 2 individuals used drugs, 1 individual used both ethanol and drugs, and in 1 case, methanol was consumed. The percentage distribution is presented in Diagram 1. The use of medications was dominant both among females, with 34 out of 37 girls (91.9%) using medications, and among males, with 5 out of 8 boys (62.5%) using medications. Among the identified group, 24 individuals (85.7%) residing in urban areas and 15 individuals (88.2%) from rural areas used medications. The medications used in the study group are presented in Table 1.

**Diagram 1. Percentage distribution of substances taken during a suicide attempt.**



**Table 1. Drugs taken by patients for suicidal purposes according to primary and secondary diagnoses on the discharge card.**

<b>GROUP OF MEDICINES</b>	<b>NUMBER OF DIAGNOSES</b>
<b>Non-opioid analgesics and antipyretics</b>	18
<b>Antidepressants</b>	8
<b>Antiepileptic drugs, sedative-sleeping drugs and drugs used in Parkinson's disease</b>	7
<b>Other psychotropic drugs</b>	5
<b>Drugs that exhibit beta adrenergic receptor antagonist activity</b>	2

Psychiatric disorders were documented in 32 patients (71.1%) admitted to the department. The majority of them (81.2%) had depressive disorders, with 26 individuals affected. Among the psychiatric disorders in the study group, there were also gender identity disorders, transient psychotic disorders, mild intellectual disability, bulimia, paranoid schizophrenia, obsessive-compulsive disorders, anxiety disorders, social phobia, Asperger's syndrome, adjustment disorders, and borderline personality disorders. Six individuals (13.3%) had comorbid somatic illnesses, including diagnoses such as asthma, hypothyroidism, psoriasis, and epilepsy under diagnosis. No deaths were recorded in this study group.

## **Discussion**

The group of adolescent patients who attempted suicide, analyzed by the authors, falls within the age range of 15 to 18 years. This age corresponds to the period of emotional and sexual maturation [5]. Adolescents, in the midst of their still unstable and evolving system of emotions and feelings, often exhibit tendencies towards anger and aggression. Underlying such behaviors is usually frustration resulting from difficulties in achieving desired goals [6]. Sometimes, this frustration can overwhelm a young individual and transform into a sense of

helplessness, which in some cases leads to a suicide attempt. Certain personality traits characteristic of adolescence, including susceptibility to the opinions and criticism of others, contribute to suicidal behaviors [7]. Moreover, the awareness of one's actions in this age group is a contentious issue, mainly due to a lack of life experience and a full understanding of what taking the decision to end one's life truly entails [8].

In the context of this information, the concerning issue is the difficult accessibility of psychologists and psychiatrists specializing in children and adolescents in Poland. The sexuality of teenage girls differs significantly from that of boys. Girls usually engage in sexual initiation due to the need for emotional connection and closeness [9]. For boys, the priority is often the release of emotional tension. These differences can lead to unmet expectations among growing women, often resulting in romantic disappointments and nervous breakdowns. The specificity of the sexuality of adolescent girls appears to be a significant factor influencing the predominant representation of girls in the group of patients attempting suicide. The dominance of females among attempted suicide cases has also been observed by other authors [10, 11, 12, 13]. Individuals with eating disorders are also at high risk of suicide, with the majority of such patients being women/girls [14]. Most of the research group consisted of urban residents. Perhaps the greater number of social contacts, facilitating the formation of new relationships, creates potential risks of emotional difficulties, including those related to sexuality, as described above. Apart from the reasons why adolescents attempt suicide, in urban areas, access to substances used as tools for suicide attempts, as examined in this study, is easier compared to rural areas [15]. Data from the Central Statistical Office (GUS) in 2016 confirms the increased risk of suicidal behaviors among urban residents.

The highest number of suicide attempts occurred during the spring months (2nd quarter of the year). Interestingly, many Western countries also experience an increase in the number of suicides during spring [16]. Similar results were found by Karnecki, who analyzed long-term autopsy data from the Medical University of Gdańsk. Hypothetically, this could be due to neurobiological fluctuations in the serotonergic system [17]. For young individuals, access to medications is no longer a difficulty, which makes the phenomenon of suicidal poisonings with pharmaceuticals a significant clinical problem when adolescents experience strong stress and difficult-to-process emotions [18].

Young people who attempted suicide often used non-opioid analgesics and antipyretics. The high prevalence of using these substances for suicidal purposes among adolescents is

influenced by their wide availability as over-the-counter (OTC) medications [19]. An important clinical issue in this regard is paracetamol poisoning [20, 21, 22, 28]. The widespread availability of this medication leads to its frequent use for suicidal purposes [22]. An overdose of acetaminophen always carries the risk of acute liver failure, which can lead to death. In the studied group of individuals poisoned by pharmaceuticals, it is worth noting the predominance of girls. Due to painful menstruation, which is not uncommon at this age, young female patients have fairly common access to non-opioid analgesics, including paracetamol.

Medications with anxiolytic, sedative, or antidepressant effects are still frequently used for suicidal purposes, possibly due to the coexistence of pre-existing mental disorders with the intention of attempting suicide [18]. The majority of patients analyzed in our study had pre-existing diagnosed mental disorders prior to their suicide attempt. The dominance of depression in this context makes it the most predisposing factor for suicidal behaviors [22, 23, 25]. Associated cognitive difficulties with depression can lead to academic challenges, further exacerbating the young person's existing problems. Affective disorders and substance abuse also play a significant role in assessing the risk of suicide [24]. Importantly, it appears that many young individuals who attempt suicide have a positive family history of psychiatric disorders (in their parents) [23, 26]. Anxiety disorders, personality disorders (mainly borderline personality disorder), and eating disorders (with anorexia nervosa leading the way) also contribute significantly to suicidal tendencies.

It is important to note the prevalent misconceptions about suicide, not only within the studied age group but also in general. It is commonly believed that someone who truly intends to commit suicide does not talk about it. However, it has been found that most individuals who die by suicide actually mentioned their suicidal plans to their loved ones [27]. Another misconception is that a temporary improvement in mood following a suicidal crisis signifies the end of the threat. This is not true. The perceived improvement in mood may be associated with the resolution of the internal struggle between life and death, indicating a release from the personal dilemma of "to be or not to be" and the ultimate decision of self-destruction [27].

## **Conclusions**

1. Suicide attempts among adolescents are a disturbingly prevalent phenomenon.

2. Girls are more likely to attempt suicide, which can be attributed, among other factors, to the complex emotional nature of adolescent girls.
3. Suicidal attempts are most commonly carried out using medications. The availability of over-the-counter (OTC) medications should be limited due to the life-threatening consequences of their overdose.
4. There is a need to increase accessibility of psychiatrists and psychologists specializing in children and adolescents due to the high correlation between mental disorders and suicide attempts.
5. Signs of emotional difficulties in young people should not be trivialized, as they lack the coping mechanisms of adults.

### **Author Contributions**

Conceptualization and methodology: W.S., A.B. and M.T.; formal analysis, data curation , writing: W.S., A.B., J.T., K.W., K.S.; supervision M.T. All authors have read and agreed to the published version of the manuscript.

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### **Conflicts of Interest**

The authors declare no conflict of interest.

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