

## Evaluation of attempted suicide events through oral intake among children in a metropolitan city: A single-center study

Sema Yıldırım<sup>1</sup>✉, Ayşe Aşık<sup>2</sup>✉, Muhterem Duyu<sup>2</sup>✉

<sup>1</sup>Department of Pediatrics, Göztepe Prof. Dr. Süleyman Yalçın City Hospital, İstanbul, Türkiye

<sup>2</sup>Department of Pediatric Intensive Care, Göztepe Prof. Dr. Süleyman Yalçın City Hospital, İstanbul, Türkiye

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### ABSTRACT

**Objective:** Suicide remains one of the leading causes of death worldwide, according to the World Health Organization's latest estimates. This study aims to evaluate sociodemographic data, the causes of suicide attempts, the methods employed in suicide attempts, and the factors that increase the likelihood of the recurrence of suicide attempts.

**Method:** This retrospective study was conducted among children who were hospitalized for attempting suicide between 2017 and 2022. Sociodemographic data, presence of a chronic illness or psychiatric disorder, substance abuse, reasons for suicide attempts, and the methods of suicide attempts were documented in the patients' files.

**Results:** 114 children who attempted suicide (mean age 15.7 ±1.6 years, 93 female) had been enrolled in the study. Most of those children were high school graduates (n=75, 65.8%). Almost all of the children attempted suicide by drug overdose, and 51.8% of them consumed multiple drugs. The most common drugs used for suicide attempts were antipsychotics (35.1%), antidepressants (32.5%), and analgesics/antipyretics (29.8%). Arguing with a family member was the most frequent reason for suicide attempts. Psychiatric disorder diagnosis was detected in 38.6% of the children, and depression was the most common prevalent psychiatric disorder. Important risk factors for the recurrence of suicide attempts were determined to be the presence of diagnosed psychiatric disorders (95%CI, 1.289-9.657; p=0.014) and a family history of attempted suicide (95% CI, 2.559-92.781; p=0.003).

**Conclusion:** Identifying the factors that contribute to suicide attempts in children and providing appropriate support and treatment are crucial for preventing suicide attempts, which are a serious health concern.

**Keywords:** causes, children, methods, risk factors, suicide attempt

### INTRODUCTION

As per the World Health Organization's (WHO) most recent estimates, published in "Suicide Worldwide in 2019", suicide continues to be one of the major causes of death globally. Worldwide, the annual number of suicide deaths is estimated to be 703000. In 2019, suicide accounted for around one in every 100 deaths (1.3%), and it was the fourth most common cause of

death for individuals aged 15 to 29.<sup>1</sup> The term suicide, consists of suicidal thoughts, suicide attempts (SA), and completed suicides. As per the Turkish Statistical Institute, 3161 people in Turkey committed suicide in 2018, with 75.6% of those casualties being men.<sup>2</sup> Male suicide rates are more than twice as high as female suicide rates worldwide.<sup>1</sup> SAs are more common among women, despite the fact that men have a higher completed suicide rate.<sup>3-5</sup> In a recent large series from Iran, it was reported that



**Correspondence:** Sema Yıldırım **E-mail:** yldrsm@gmail.com

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49.88% of SAs were observed among the population aged 16 to 26.<sup>6</sup> Researchers emphasized that suicidality may be related to depression and family environment.<sup>7-10</sup> The types of SAs, such as drug overdose, chemical poisoning, hanging, firearms, and self-harm, vary according to personal traits and geographical regions.<sup>11</sup>

This study aimed to evaluate sociodemographic data, the reasons for SAs, the methods used in SAs, and the risk factors for the recurrence of SAs.

## MATERIALS AND METHODS

This retrospective study was conducted among children who attempted suicide and were hospitalized in the Department of Pediatrics and/or Pediatric Intensive Care Unit (PICU) between 2017-2022. In our hospital, approximately 5800 patients are admitted to the pediatric clinic and 480 to the PICU annually. According to a thorough anamnesis completed by pediatricians and psychiatrists, the patients admitted to having taken drugs with the intention of a SA. Patients who accidentally took medication were not included in the study. Patients were admitted to the pediatric department if they had taken long half-life drugs overdose, multiple drugs with uncertain count, or if their blood drug level was above the toxic dose and/or an antidote treatment was necessary. Patients who displayed central nervous system depression, systemic symptoms such as hypotension and arrhythmia, and those who needed plasmapheresis treatment for drug overdose were admitted to the PICU. In patients' files, sociodemographic data such as gender, age, educational attainment, presence of a sibling, parents' marital status, presence of a chronic illness or psychiatric disorder, substance abuse, clinical findings, reasons, and methods for the SAs were documented. All patients admitted to the pediatric department were provided with a consultation by a pediatric psychiatrist. The patients admitted to the PICU were provided consultation by a pediatric psychiatrist once their stay in the PICU was no longer necessary. Furthermore, a pediatric psychiatrist conducted a separate evaluation of their parents.

### Statistical analysis

Statistical data analysis was evaluated with the SPSS-22 (Chicago, IL, USA) program. The compatibility of continuous variables with normal distribution was analyzed using the Kolmogorov-Smirnov test. Normally distributed continuous variables were stated as mean  $\pm$  standard deviation (SD), non-normally distributed continuous variables as median (minimum, maximum), and categorical variables as percentage (%). The Chi-Square test was used for the analysis of categorical variables. The Student

T-test was used for comparison of categorical variables. Logistic regression analysis was used for age, sex, and parameters with  $p$ -value  $< 0.050$ . In multivariate analysis, independent predictors in predicting outcomes using probable factors were examined by logistic regression analysis  $p < 0.050$  was considered significant.

Approval was obtained from the local university Ethics Committee (approval date:05.10.2022, approval number: 2022/0461) before the experiment was started and was conducted in accordance with the principles set forth in the Helsinki Declaration.

## RESULTS

A total of 114 children who attempted suicide (female/male = 93/21) had been enrolled in the study. The mean age of the children was  $15.7 \pm 1.6$  years old. Most of those were high school graduates ( $n=75$ , 65.8%), and 7 (6.1%) had no siblings. Almost all of the children attempted suicide through drug overdose, with only one using rat poison and another using bleach. Fifty-nine out of 114 children (51.8%) attempted suicide using multiple drugs. The three most common detectable drugs used for SAs were antipsychotics ( $n=40$ , 35.1%), antidepressants ( $n=37$ , 32.5%), and analgesics/antipyretics ( $n=34$ , 29.8%). SAs were shown to most frequently occur as a result of arguments with family members. The childrens' demographic and clinical data is presented in Table 1.

Four of the adolescents who were admitted were substance users. Alcohol, marijuana, ecstasy, and amphetamine were the reported substances. Prior to their SAs, 44 of the children were diagnosed with a psychiatric disorder and were on antidepressant and/or antipsychotic medications. Furthermore, 13 patients began receiving treatment following the SAs. Five patients who continued to have suicidal thoughts were hospitalized in the psychiatry clinic. A patient who had attempted suicide with high doses of colchicine was successfully treated with plasmapheresis. No patient died or developed chronic organ damage.

The rate of recurrence of SAs was 24.6% in this study. Recurrent SA subjects displayed a significantly higher occurrence of psychiatric disorders in both themselves (67.9% vs. 36%;  $p=0.003$ ) and their families (42.9% vs. 16.3%;  $p=0.004$ ), as well as a higher incidence of suicide within the family (32.1% vs. 2.3%;  $p<0.001$ ) when compared to those with a single SA (Table 2). The presence of a diagnosed psychiatric disorder (95%CI, 1.289-9.657;  $p=0.014$ ) and a history of SAs in the family (95% CI, 2.559-92.781;  $p=0.003$ ) were found to be significant factors for recurrence (Table 3).

**Table 1. Demographic characteristics of children who attempted suicide**

	n (%)
Age	15.7±1.6 (10.3-17.9)
Sex (female/male)	93/21 (81.6/18.4)
Season of suicide attempt	
Spring	36 (31.6)
Summer	33 (28.9)
Winter	27 (23.7)
Autumn	18 (15.8)
Education	
Primary school	12 (10.5)
High school	75 (65.8)
School dropout	27 (23.7)
Number of siblings	
Only child	7 (6.1)
2	42 (36.8)
3	32 (28.1)
>3	33 (29)
Marital status of parients	
Married	97 (85.1)
Divorced	11 (9.6)
Mother and/or father passed away	6 (5.3)
Suicide attempt in the family	11 (9.6)
Psychiatric disorder in the family	26 (22.8)
Diagnosed psychiatric disorder*	50 (43.9)
Depression	25 (21.9)
ADHD	6 (5.3)
Dissociative disorder	5 (4.4)
Schizophrenia	4 (3.5)
Bipolar disorder	4 (3.5)
Anorexia nervosa	3 (2.6)
Anxiety disorder	3 (2.6)
Anger managment disorder	3 (2.6)
PTSD	3 (2.6)
OCD	1 (0.9)
None	64 (56.1)

**Table 1. Continued**

	n (%)
Presence of chronic disease	
Epilepsy	4 (4.5)
Familial mediterranean fever	1 (0.9)
Chronic renal failer	1 (0.9)
None	97 (94.8)
First suicide attempt	86 (75.4)
Recurrent suicide attempt	28 (24.6)
Suicide attempts	
Impulsive	109 (95.6)
Planned	5 (4.4)
GKS 15	85 (74.6)
<15-8	13 (11.4)
<8	16 (14)
PICU	70 (61.4)
Number of hospitalized to psychiatry clinic	5 (4.4)
The drugs have taken for SA	
Antipsychotic	40 (35.1)
Antidepressant	37 (32.5)
Analgesic/antipyretic	34 (29.8)
Antiepileptic	15 (13.2)
Antihypertensive	10 (8.8)
Antibiotic	7 (6.1)
Antidiabetic	7 (6.1)
Vitamin/mineral	6 (5.3)
Other**	30 (26.3)
The causes leading to SA	
Family argument	43 (37.7)
Partner argument	18 (15.8)
Drawing attention	13 (11.4)
Exam stress	12 (10.5)
Sexual abuse	6 (5.3)
Lose one's relative	5 (4.4)
Immigrant problems	3 (2.6)
Peer victimization	1 (0.9)
None	13 (11.4)

\*Some patients had more than one disorder, Other\*\* anticholinergic, colchicine, antihistamine, rat poison, bleach, ADHD: Attention- deficit hyperactivity disorder, PTSD:Post-traumatic stress disorder, OCD: Obsessive-compulsive disorder, PICU: Pediatric intensive care unit, SA: Suicide attempt

		Single SA (n=86) (n/%)	Recurrent SA (n=28) (n/%)	p
Age		15.87±1.24	15.70±1.70	0.614*
Sex	Female (n=93)	71 (82.6)	22(78.6)	0.636
	Male (n=21)	15 (17.4))	6 (21.4)	
Education	Primary education (n=12)	10 (11.6)	2 (7.1)	0,434
	High school (n=75)	58 (67.4)	17 (60.7)	
	Dropout (n=27)	18 (20.9)	9 (32.1)	
Marital status of parents	Married (n=97)	76 (88.4)	21 (75)	0.194
	Divorced (n=11)	6 (7)	5 (17.9)	
	Loss of parent (n=6)	4 (4.7)	2 (7.1)	
Patients with psychiatric disorder (n=50)		31 (36)	19 (67.9)	<b>0.003</b>
Diagnosed psychiatric disorder in the family (n=26)		14 (16.3)	12 (42.9)	<b>0.004</b>
Suicide history in the family (n=11)		2 (2.3)	9 (32.1)	<b>&lt;0.001</b>

p: Chi Square Test or Fisher 's Exact Test \*Student's t-test

Risk factors	B	S.E	RR (95% CI)		Exp (B)	p
			Min	Max		
Sex	-0.255	0.541	0.268	2.237	0.775	0.637
Presence of diagnosed psychiatric disorder	1.261	0.514	1.289	9.657	3.528	<b>0.014</b>
Presence of diagnosed psychiatric disorder in the family	0.426	0.612	0.461	5.081	1.531	0.487
Presence of history of suicide attempt in the family	2.735	0.916	2.559	92.781	15.409	<b>0.003</b>

RR, Relative Risk; CI, Confidence Interval

## DISCUSSION

According to this study, the majority of patients who attempted suicide were female, and nearly half of the patients were diagnosed with psychiatric disorders. The most frequent reason for SAs was family arguments. The majority of SAs were impulsive, and almost all cases involved drug overdoses. The most commonly used drugs for SAs were antipsychotic/antidepressant drugs. Furthermore, the presence of psychiatric disorders and a family history of SA were shown to be risk factors for recurrent SA.

In a recent multicenter study conducted in 27 German PICUs, it was reported that the mean age of children who attempted suicide was 14.8 (12-17.9), and 55.3% of those were female.<sup>12</sup> In Turkey, Özsoylu et al.<sup>13</sup> reported that the mean age of SAs among children was 14.5±1.2 (10.5-17), and 88.5% were female. Our study's findings were consistent with the literature. Previous

studies have suggested that gender is an important risk factor in SAs in adolescents, and females have a higher risk of SAs compared to males.<sup>8,14,15</sup>

Researchers have mentioned that there is a seasonal pattern in SAs, and the rate of SAs tend to peak in spring.<sup>13,16-18</sup> However, Hryciuk et al.<sup>19</sup> reported that the number of suicide-related deaths increased in October. Studies conducted in our country have reported that the highest number of SAs were observed in May and June.<sup>13,20</sup> According to our study, spring was the period during which SAs were most frequently observed. In Türkiye, the academic calendar concludes in June, with all major exams scheduled during this time, such as the university and high school entrance exams. As a result, students go through the most intense period of exam stress during April and May. Those results suggest that stressors related to school success could be associated with SAs.

Researchers have pointed out the connection between mood disorders, personality disorders, and suicidality in adolescence.<sup>8,21-25</sup> Mood disorders are commonly associated with increased rates of suicidal behavior, particularly among adolescents. Previous studies have shown that depression is an important risk factor for suicide.<sup>8,21,22</sup> Furthermore, it was reported that SAs had more severe depressive symptoms than non-SAs and that the strongest independent risk factor for SAs was the degree of depression.<sup>8,26</sup> Additionally, researchers emphasized that adolescents with suicidal thoughts and SAs frequently suffer from personality disorders.<sup>23,24</sup> Furthermore, according to reports, the most important predictor of SAs and SA numbers is Borderline Personality Disorder.<sup>24</sup> Recent findings from a meta-analysis conducted with 27 articles revealed a positive correlation between suicidality and attention-deficit hyperactivity disorder (ADHD) across all age groups and genders.<sup>27</sup> It has been suggested that the impulsive behavior commonly seen in individuals with ADHD could be a factor in this connection. The fact that two-thirds of ADHD patients had at least one comorbid psychiatric disorder, such as a major depressive disorder, behavioral disorder, or substance abuse, is another factor contributing to the positive correlation between ADHD and suicidality.<sup>27</sup> In a study conducted in Turkey, Özsoylu et al.<sup>13</sup> found that among patients who attempted suicide, 28.8% had major depressive disorder, 11.5% had conduct disorder, 7.6% had adjustment disorder, and 3.8% had ADHD. In our study, 43.9% of patients had a psychiatric disorder that had been diagnosed prior to the SAs, with major depressive disorder (21.9%) being the most frequent co-existing psychiatric disorder and ADHD the second most frequent psychiatric disorder in children who attempted suicide. Furthermore, 95.6% of the SAs were impulsive.

Relationship problems with family members and friends were identified as the primary risk factors for SAs among children in earlier research.<sup>5,13</sup> Mete et al.<sup>28</sup> reported that the most common leading cause of SAs among children is relationship problems with family (60.6%). Doğan et al.<sup>5</sup> found that the leading causes of SAs were relationship problems with family (56.9%), relationship problems with a partner (30%), anxiety about academic failure (18%), and relationship problems with friends. Similar to the literature, family and partner arguments were the most common causes of SAs in our study. More frequent SAs in the spring may suggest that academic success is a significant cause of family arguments.

In the literature, it was mentioned that the death of a family member of suicide or SA increased suicidal ideation or attempts.<sup>29,30</sup> In a previous study, it was reported that 40% of

suicidal adolescents had been exposed to suicide or SAs in their surroundings.<sup>31</sup> In another study, it was found that the rate of SAs was higher among the first-degree relatives of adolescents who completed suicide.<sup>32</sup> According to one study, people who witnessed suicide were more likely to have suicidal thoughts and attempted suicide.<sup>33</sup> Our study's results were similar to the literature.

In the literature, it was mentioned that overdose drug intake was the most common method of SAs among children in Turkey.<sup>4,5,13</sup> In our study, almost all patients attempted suicide by overdosing drugs. Studies have reported that analgesic-anti-inflammatory and antidepressant drugs were the most common drugs used for SAs.<sup>13,34,35</sup> Antipsychotic, antidepressant, and analgesic/antipyretic drugs were most commonly used for SAs in our study. Unlike the previous studies, antipsychotic drugs were in the first place among the drugs used in SAs in our study. These drugs were mostly prescribed medications to the patients by their physicians. Consequently, it is critical that families and physicians who prescribe medication exercise greater caution in this regard.

The main limitation of this study is that this study includes suicide cases that required hospitalization, monitoring, and treatment; it does not include all suicide cases that were admitted to our emergency department. The fact that this study is retrospective is another drawback. However, our study's strength lies in the fact that our hospital is one of the important centers to which patients with SAs are referred because it has a dedicated Children's Psychiatry Department, one of just three in Istanbul, a city with a population of 16 million.

## CONCLUSION

In conclusion, our study demonstrates that family issues were the most frequent reason for SAs. We think that it would be helpful for health professionals to enquire about family dynamics in addition to physical examinations to deter SAs. It is crucial to monitor these people more closely since psychiatric disease and a family history of suicide attempts are risk factors for recurrent SAs. Studies with larger cohorts may be beneficial in order to have a better understanding of the primary causes of SAs.

## Ethical approval

This study has been approved by the Göztepe Prof. Dr. Süleyman Yalçın City Hospital Clinical Research Ethics Committee (approval date 05.10.2022, number 2022/0461). Written informed consent was obtained from the participants.

### Author contribution

Surgical and Medical Practices: SY, MD, AA; Concept: SY; Design: SY, AA, MD; Data Collection or Processing: AA; Analysis or Interpretation: SY; Literature Search: SY; Writing: SY. All authors reviewed the results and approved the final version of the article.

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### Conflict of interest

The authors declare that there is no conflict of interest.

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