

## Suicide Attempts and Risk Factors Among Children and Adolescents

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The purpose of this study was to determine the prevalence of suicide attempts, and to identify the risk factors for suicide attempts in Turkish children and adolescents between the ages 10 and 20 years.

Multi-step, stratified, cluster sampling was used. A stratified sample of 4256 students was selected as representative of the city's school children population. Data was obtained with a pair of structured questionnaires designed to evaluate the presence and risk factors of suicide attempts, both in the children and adolescents and their parents. These questionnaires investigated family environment, subject characteristics, and various risk factors for suicide attempts. Child Beck Depression Inventory (CBDI) was administered to all children and adolescents. After the data quality control process, the study sample was reduced to 4143 children and adolescents. Children and adolescents were divided two groups according to the experience or non-experience of suicide attempts: group 1 (n=80) and group 2 (n=4063), respectively. Three categories of independent variables were assessed: adolescent, family, and socioeconomic characteristics. Logistic regression models were based on the children and adolescents and on parent reports.

The prevalence of suicide attempts as reported by the children and adolescents was 1.93% (n=80). The mean age of group 1 was higher than that of group 2 ( $p=0.002$ ,  $t=-3.172$ ), as was the mean score of CBDI ( $p=0.000$ ,  $t=-9.083$ ). Logistic regression analysis indicated that having problems with parents, using illicit drugs, and psychiatric problems in relatives best predicted suicide attempts in Turkish children and adolescents.

**Key Words:** Suicide attempts, children, adolescents, risk factors

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## INTRODUCTION

Suicide among children and young adolescents is a growing health problem in many countries (e.g. Canada, the United States, Norway, Ireland).<sup>1</sup> Rates of both suicide attempts and completions by adolescents have increased since the 1960s,<sup>2</sup> and suicide is currently the third leading cause of mortality among 15- to 24-year-olds in the United States.<sup>3</sup>

Suicide in childhood and early adolescence (up to age 15), however, is uncommon in all countries and societies. The incidence increase markedly in the late teens and continues to rise until the early 20s.<sup>4,5</sup> Recent epidemiological studies suggest that the lifetime rate of suicide attempts among high school students ranges from 3% to 15%.<sup>3,6,7</sup>

With regard to individual and family correlates of suicidal behavior, school-based studies have shown that depression, negative life events, low social support, family dysfunction, having a teenage mother, lower parental education, and a physical disease during adolescence were associated with a higher rate of suicidal ideation and suicide attempts.<sup>1,3,8-11</sup>

One common but problematic diagnosis often assigned to adolescents who attempt suicide is adjustment disorder. In practice, this diagnosis frequently means nothing more than that the suicidal attempt has occurred in apparent reaction to an upsetting event, most often a fight, the breakup of a romance, or a parental separation.<sup>12</sup> Epidemiological and clinical studies suggest no-intact family of origin, grade failure or school

nonattendance, and poor communication with the father were also associated with youthful completed or attempted suicide.<sup>8,13</sup>

Previous studies showed daily use of tobacco and substance use have been associated with adolescent suicidal attempts.<sup>6,14,15</sup> Shaffer and Gould also found significant associations between suicide and mood disorder (depressive disorder, dysthymia, adjustment disorder with depressed features, bipolar disorders and present depression and other variants), prior suicide attempts, substance abuse, antisocial behavior, and family history of suicide in suicide victims younger than age 20.<sup>16</sup>

The objective of this study were to estimate the prevalence of suicidal attempts and to determine the psychosocial risk factors of suicidal attempts in a population of secondary and high school children from the city of Mersin, Turkey.

## MATERIALS AND METHODS

### Subjects and study procedures

#### *Estimation of sample size*

This study was conducted in Mersin which is a city located on the Mediterranean coast of Turkey. Its population is 759 785 and it is the tenth largest city in the country. Commercially it is an important port city and is economically well developed. There are 81676 school children aged 10-20, attending secondary and high school.

A school-based, cross-sectional and selective (ranging from 6<sup>th</sup> to 11<sup>th</sup> grades) study was per-

formed in 2002. It was estimated that to achieve reliability of 99%, 3865 children had to be chosen and included in the study for a total sample size of 81676. The study sample was composed of 4256 children from 18 schools, representing 5.5% of all secondary and high school children in Mersin with 99% confidence. From this a systematic random sample of 18 secondary and high schools was made with EP16 INFO program. The randomisation was weighted according to gender and to each stratum (good, satisfactory, poor) of the population (Table 1).

During the data quality control process 113 children and adolescents were excluded from the study because of missing or unreadable answers. As a result, 4143 children (97.3% of the study sample) were analysed in this study (Table 1).

### Selection of subjects

Multi-step, stratified, and cluster sampling were used. In the first phase, participants in this study were students were selected among the from 18 schools (12 secondary, and 6 high) located in urban, semirural, and rural communities in Mersin. The study population consisted of 4143 students from 18 of the 122 schools in the city. In the second phase, classes were selected randomly according to the number of students in that particular school.

### Study procedures

A prospective, school-based, cross-sectional study was performed. During the in-school time

**Table 1.** The Randomisation of the Study Sample

	Total	Study sample		Available adolescents		Group of applying statistical analyses	
Grade	n	n	%	n	%	n	%
6	18184	1000	5.5	898	89.8	871	87.1
7	16681	920	5.5	890	96.7	885	96.2
8	15578	860	5.5	823	95.7	801	93.1
9	14128	770	5.5	724	94	703	91.2
10	8842	490	5.5	486	99.1	477	97.3
11	8263	460	5.5	435	94.6	406	88.3
Total	81676	4500	5.5	4256	94.6	4143	92.1

interview, all children were administered a detailed, structured questionnaire and Child Beck Depression Inventory (CBDI). This questionnaire included the demographic data, clinical characteristics, and risk factors for suicide in children and adolescents (e.g. substance use such as cigarettes, experiencing bullying, alcohol, break-up of a romantic relationship, school failure, losing loved people, maternal satisfaction with adolescents-peer and adolescents-parents relationship). Another detailed structured questionnaire was submitted to the parents and their written informed consent was obtained. This questionnaire was designed to obtain data on the demographic characteristics of parents (i.e., age, education, occupation, and marital condition), economic status of the family, psychiatric disorders history of the relatives, and other risk factors for depression (e.g., family size, chronic disease of parents, moving to another city) in children and adolescents.

### Diagnosis of depression (measures)

*Frequency of depression was assessed with CBDI.*<sup>17</sup>

CBDI, the most widely used self-assessment scale of depressive symptoms in young adolescents.<sup>18-20</sup> CBDI is a 26-item scale that was developed to measure depressive symptomatology in children and adolescents. The focus is on how the subject has been feeling for the past two weeks, and some items emphasize symptom intensity over frequency or persistence. However, there is a great variability in the cut-off score used, ranging from 12 to 25. No standard cutoff scores are offered for CBDI, as these depend on cases characteristics and the purposes for which the scale is being used. The validity and reliability of CBDI was approved by the Turkish Health Ministry. As a result of investigations in Turkish children, CDI cut-point was designated as 19 for both genders, with scores above 19 considered to indicate high depressive symptoms.<sup>21</sup>

### Statistical analysis

Descriptive statistics of variables were computed as mean  $\pm$  SD and frequencies (count and percentages). The two sample t-test was used to compare the general continuous characteristics

(student age, mother age, father age, mother and father's education, etc) between Groups I and II. Chi-square test was used to determine the relation between general categorical characteristics (sex, mother and father's smoking and alcohol status, etc) of the two groups. Multiple Logistic Regression Analysis with backward elimination method was used to determine which were the risk factors, for suicide attempts. Differences below 5% were accepted as significant.

## RESULTS

Overall, our study sample consisted of 4143 children and adolescents, and 1.93% (n=80) of the sample had attempted suicide during the previous 12 months. Among these, only 9 (11.25%) children and adolescents had also reported a previous attempt in the lifetime survey.

There were no statistically significant differences in gender between Groups 1 and 2 ( $p=.711$ ). The mean age ( $p=.002$ ) and the mean CBDI score of children and adolescents ( $p=.000$ ) were significantly higher in Group 1 than in Group 2. Father's ( $p=.011$ ) and mother's ( $p=.014$ ) education levels were higher in Group 2 than Group 1. In addition, there was a significant difference in father's age between the two groups, being higher in Group 1 than in Group 2. There were no significant differences in family income, having divorced parents, being first child, or having step parent (Table 2).

### Factors affecting on adolescent suicide attempts

Logistic regression analysis of the sample demonstrated in Table 3 and 4 that the following factors have statistically significant effects on the presence of suicide attempts on children and adolescents, illicit drugs use, humiliation at school, regular cigarette use, problems with friends at school, beatings at school, skipping a grade, alcohol use, having a traffic accident, staying at hospital, skipping days at school, problems with parents, psychiatric problems in children and family members, suicide among relatives, the frequency of punishment at home, moving to another city, parental surgery, chronic physical dis-

ease in the parents, sibling death, parental hospitalisation, punishment at home, parental job changing, number of children, number of siblings, number of people living at home, father's age, and mother and father's education levels.

## DISCUSSION

In this study, of the total sample, 80 subjects (1.93%) reported a suicidal attempt within the past 12 months. The results of the current study indicate that attempted suicide is more common in adolescents who have problems with parents, psychiatric problems in relatives, illicit drug use. Attempted suicide children and adolescents also typically have been found to have higher levels of depression than non-suicidal children and adolescents.

Eighty-six percent of all suicides by youth under the age of 20 years occur in the 15-to 19-year-old age group.<sup>5</sup> Guyer and colleagues also observed that there were few self-inflicted injuries in children younger than 13 years of age; 83% of the self-inflicted injuries occurred between the ages of 15 and 19.<sup>22</sup> Recent epidemiological studies suggest that the lifetime rate of suicide attempts among high school students ranges from 1% to 15%.<sup>7,3,23-28</sup> Most such epidemiological studies of risk behaviours are restricted to adolescents, rely

on self-reports and/or school-based populations, and lack systematic diagnostic data and caretaker or parent reports.<sup>29</sup> For instance, the median lifetime prevalence of suicide attempts in the United States and Canada was 9.6% in 14 school-based studies using a self-administered questionnaire but decreased to 4.2% in three home-based studies using face-to-face interviewers. The same difference was observed in seven other countries where the median dropped from 7.2% (n=10) to 2.6% (n=3) in a similar comparison.<sup>30</sup> In our school-based study, the rate of attempted suicide was 1.93% (Table 2).

It was reported that although rates of completed suicide are higher for men in both adolescence and adulthood,<sup>27,31</sup> rates of suicide attempt are two to three times greater for female adolescents than for male adolescents.<sup>3,32,33</sup> However, suicide is more common in males than in females at all ages in several countries in Latin America and Asia, and the sex rates are equal and in some countries, the majority of suicides are committed by women.<sup>34</sup> In our study, there was no difference by gender between the two groups. The gender result may be influenced by sample size, age group, and study procedure (Table 2).

Suicidal behavior is a complex symptom that is markedly influenced by sociocultural factors, stressful life events, poor social adjustment, presence of psychiatric disorders,<sup>35</sup> abuse,<sup>13,36</sup> family

**Table 2.** Demographic Characteristics of Children and Adolescents with Suicidal Attempts (Group 1) versus No Suicidal Attempts (Group 2)

	Group 1 (n=80)	Group 2 (n=4063)	<i>p</i>	<i>t</i>	$\chi^2$
Gender					
Boy (n,%)	40 (50%)	2101	.711		.137
Girls (n,%)	40 (50%)	1962			
Mean age (year)	15.13 ± 1.66	14.53 ± 1.89	.002	-3.172	
Mean scores of CBDI	18.91 ± 7.71	11.02 ± 6.13	.000	-9.083	
Father' age (Mean ± SD)	46.14 ± 7.52	44.56 ± 6.37	.039	-2.07	
Mother' age (Mean ± SD)	39.94 ± 6.34	40.01 ± 5.84	.907	.116	
Mother's education (years)	4.96 ± 4.44	6.23 ± 4.51	.014	2.454	
Father's education (years)	7.13 ± 4.17	8.39 ± 4.17	.011	2.531	
Income (monthly)	420.77 ± 505.88 TL	461.82 ± 545.01	.536	.619	

CBDI, Child Beck Depression Inventory; TL' Turkish Liras.  
*p*<0.05 is a significant.

dysfunction, etc.<sup>14,37,38</sup>

One of the most important correlates for youth suicide is a previous attempt.<sup>39</sup> However, in our study only 9 children and adolescents had made previous suicide attempts. This result may depend on limited number of the suicide attempter and the selected age group, because suicide in childhood and early adolescence (up to age 15) is uncommon in all countries and societies. The incidence increases markedly in the late teens and continues to rise until the early 20s.<sup>4,5</sup> However, children and adolescents having suicide attempts have many more psychiatric disorders than children and adolescents who make no suicide attempts. Previous studies have shown that having psychiatric disorders was a risk factor for suicide attempts in children and adolescents.<sup>1,6,7</sup>

In our study, a statistically significant association was found between suicidal attempt and stressful life events (e.g., having a traffic accident, staying at hospital, moving to another city, parental hospitalization, sibling death, maternal psychiatric disorder, and maternal chronic physical disorders) (Table 3 and 4). Closely related to negative life events and stress are the concepts of early object loss, separation, and negative interaction.<sup>40</sup>

Our study showed that cigarette and substance use are closely associated with suicide attempts in

children and adolescents. Previous studies also showed that alcohol and other substance use, even very low levels of tobacco, and illicit drugs significantly increased the risk for suicidal ideation and attempt.<sup>1,6,14,15</sup> It is plausible that the serious, recurrent forms of disruptive behavior and substance use might exert their deleterious effect by impairing academic, social, and family functioning, by increasing disciplinary and stressful life events, by increasing social isolation and anomie, by drug-induced depression or disinhibition, or by similar mechanisms.<sup>13</sup>

Our study showed that poor school performance, decreased grades, skipping a grade, problems with peers, beatings at school, and humiliation at school are other important risk factors for suicide attempts in children and adolescents. Previous studies indicated that problems at school (e.g., grade failure, school non-attendance) and with peers were associated with youthful completed or attempted suicide.<sup>13,41,42</sup> These findings support a twofold role for schools, proposed by Resnick et al.<sup>42</sup> to nurture both academic proficiency and a sense of connectedness among students. This connectedness includes students' perceptions that teachers care about them and treat them fairly, that they are close to people at school, and feel a sense of belonging, happiness, and safety at school.<sup>43</sup>

**Table 3.** Odds Ratio for Environmental Risk Factors for Attempting Suicide

Characteristics (the presence/absence)	Group 1/Group 2 (Risk group/Reference group)			
	Odds Ratio	<i>p</i>	95% confidence Interval	
			Lower	Upper
Other illicit drugs use	18.3964	.0000	7.3763	45.88
Humiliation at school	3.8576	.0000	2.2206	6.7014
Regular cigarette use	3.2679	.0000	2.092	5.1045
Problems with friends at school	3.0313	.0000	1.8331	5.0127
Physical abuse at school	2.982	.0000	1.8729	4.7477
Skipping a grade (last year)	2.8899	.0058	1.3599	6.1412
Alcohol use	2.4989	.0001	1.5916	3.9234
Having a traffic accident (last year)	2.4262	.0043	1.3196	4.4608
Decreased grades (last year)	2.3001	.0004	1.4546	3.637
Staying at hospital (last year)	1.6311	.0514	0.9971	2.6681
Skipping days at school (last year)	1.0387	.0344	1.0028	1.0758

*p* < 0.05 is a significant.

**Table 4.** Odds Ratio for Familial Risk Factors for Attempting Suicide

Characteristics	Group 1/Group 2 (Risk group/Reference group)			
	Exp B (OR)	<i>p</i>	95% confidence Interval	
			Lower	Upper
Problems with parents	9.087	.0000	5.6859	14.5225
Psychiatric problems in brothers	8.1135	.0002	2.6801	24.562
Suicide in relatives	6.2882	.0000	3.8771	10.1986
Psychiatric disorder in children	5.1217	.0000	2.6879	9.7593
Psychiatric disorder in mothers	3.3927	.0001	1.8663	6.1678
Moving to another city (last year)	3.0631	.0005	1.624	5.7775
Psychiatric disorder in fathers	2.812	.0116	1.2597	6.277
Maternal surgery (last year)	2.2876	.0079	1.2427	4.2112
Paternal surgery (last year)	2.2871	.0239	1.1156	4.6888
Paternal chronic physical disease	2.1728	.0023	1.3192	3.5787
Sibling death	2.1012	.0031	1.2842	3.4379
Parental hospitalization (last year)	2.0776	.0016	1.32	3.27
Punishment at home	2.0348	.0018	1.3034	3.1764
Parental job changing (last year)	1.9394	.0053	1.2178	3.0887
Maternal chronic physical disease	1.8567	.0102	1.1582	2.9764
Number of siblings	1.1417	.0055	1.0397	1.2537
Number of people living at home	1.1099	.0151	1.0204	1.2072
Father's age (years)	1.0353	.0382	1.0019	1.0699
Mother's education (years)	0.9357	.0148	0.8871	0.9871
Father's education (years)	0.9278	.012	0.8752	0.9837

Suicide attempts may result in a range of major physical injuries, pain, alterations in body image, necessity for complex surgical and medical care, and long-term physical disability.<sup>5,44</sup> Our study also showed that physical injuries exert a negative effect to children and adolescents and contribute to suicidal attempts.

In this study, one of the most common risk factors for suicide attempts was problems with parents. Deficits in problem-solving ability have been described as being associated with suicidality; specifically, suicidal individuals often fail to perceive alternatives for solving difficulties, and they narrowly focus on suicide as their only possible solution to problems.<sup>45-47</sup>

Suicidal behavior is associated with a family history of attempted or completed suicide.<sup>12,16,40</sup> In a New York study of adolescents, approximately half of the suicides had a first-degree relative with a history of attempted or completed suicide com-

pared with less than half that proportion in controls. Imitation, identification or contagion may play a role in familial suicide.<sup>4</sup> In this study, we found that suicide attempts between relatives is an important risk factor in children and adolescents with suicide attempts.

The rates of suicide attempt for community samples are significantly lower than those found among psychiatric patients.<sup>35</sup> For example, approximately one-third of preadolescent and young adolescent psychiatric inpatients attempted suicide prior to hospitalisation.<sup>24</sup> A history of mental health predicted suicide attempts among children and adolescents.<sup>40</sup> In addition, suicide attempts among youths have been shown to be associated with high depression level.<sup>16,48</sup> In our study, having psychiatric disorder and high depression level were important risk factors for suicide attempts.

Having a teenage mother, lower parental educa-

tion, and certain functional impairments stemming from a physical disease during adolescence appear to be time-limited risk factors for adolescent suicidal behavior.<sup>3</sup> Parents with lower education level may not have sufficient relationships with their children. Other studies have also shown that poor communication with parents was associated with youthful completed or attempted suicide.<sup>6,13</sup>

## LIMITATIONS

These models should be expanded to evaluate the relationship of risk behaviors with suicide completions in larger populations. Prospective studies are needed to evaluate the sequence of initiation of health impairing behaviors in children and adolescents.

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