



# Risk Factors for Suicidal Ideation and Attempts in Adolescents

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**Objective:** Although suicide is a serious public health concern for adolescents, there is a lack of studies that explore its risk factors in the Republic of Korea. The present study aims to investigate risk factors associated with suicidal behaviors in Korean adolescents.

**Methods:** Participants consisted of 2258 middle and high school students who completed a series of questionnaires regarding suicide ideation or attempts, non-suicidal self-injuries, depression, impulsivity, drinking behaviors, and negative life events, including peer bullying.

**Results:** Among the participants, 8.3% of students reported suicide ideation, while 3.2% reported a history of a suicide attempt in the past 12 months. Depression, peer-victimization, internet-related delinquency, and positive attitudes toward suicide were associated with suicidal ideations and attempts. Adverse life events were also associated with suicide ideation, but not attempts, while not living with both parents and poor family relationships were associated with suicide attempts, but not ideations. Non-suicidal self-injuries were associated with both suicide ideations and attempts. Students with suicidal ideations and attempts can be differentiated depending on the presence of self-injury.

**Conclusion:** In addition to depression or behavioral problems, non-suicidal self-injuries and lack of support from family may also play significant roles in suicide attempts in adolescents. To facilitate the prevention of suicide in adolescents, longitudinal studies should be followed to confirm the risk factors identified in this study.

**Key Words:** Adolescent; Suicidal attempts; Suicide; Risk factors; Non-suicidal self-injury.

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## INTRODUCTION

Despite a steady decrease in the number of suicides in adolescents since a peak in 2009, it is still the most frequent cause of death in this age group.<sup>1)</sup> Suicide in adolescents puts severe psychological stress on their families thereby having a great impact on their lives.<sup>2)</sup> Moreover, thoughts and attempts of suicide at an adolescent age can repeatedly appear in adulthood. Therefore, active nationwide countermeasures to intervene and prevent suicide in adolescents are necessary.

There have been several domestic and international studies to identify the risk factors for suicide in adolescents. For example, depression is known to be the key sole risk factor for suicide.<sup>3)</sup> Nevertheless, considering that development at

the adolescent stage involves a dynamic interaction of different systems, the issue of adolescent suicide must be approached and understood from a more comprehensive view, including the peer group and school.<sup>4)</sup> For instance, the loss of a family member, more specifically, family dissolution, is reported to be associated with suicide.<sup>5-7)</sup> In addition, behavioral issues increase the risk of suicide in adolescents by 3–6-fold, while associations with alcohol consumption and drugs have also been suggested.<sup>8,9)</sup> Furthermore, stressful events are often reported to precede adolescent suicides,<sup>5)</sup> and experiencing separation and rejection in social relationships are thought to increase the risk of suicide as well.<sup>10)</sup> Bullying at school is reported as another key factor associated with suicide, and a report in Korea has demonstrated that experiences of being bullied or harassed at school were significantly associated with suicidal ideation.<sup>11)</sup> Interestingly, not only does exhibit a significant association with suicidal ideation, but

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the perpetrator does as well.<sup>12)</sup>

With numerous empirical studies on suicide in adolescents, researchers have been attempting to identify factors contributing to the development of suicidal ideation and attempts. In other words, the aim was to differentially explore the factors that contribute to the development of suicidal ideation and the factors that turn the ideation into reality. For example, impulsivity and self-harm are being highlighted as factors that lead to suicidal action.<sup>5)</sup> Identification of the factors closely associated with suicidal attempts is crucial since it allows for the identification of individuals who need more direct intervention. Previous studies on suicide in adolescents in Korea have focused on suicidal ideation. Furthermore, very few adolescents who attempt suicide seek help at medical centers,<sup>5)</sup> suggesting the necessity of future studies assessing suicidal actions in a community sample. This study aims to identify the risk factors of suicide through screening of a large-scale community sample, in order to contribute to the prevention of suicides in adolescents in Korea. In addition, by including subjects who had suicidal ideation only and the subjects who actually had suicidal attempts, we aim to distinguish the factors closely associated with suicidal action.

## METHODS

### Subjects and data collection

Two middle and two secondary schools in the city of Seoul and surrounding Gyeonggi province (4 schools in total) were randomly selected for assessment from September to November 2015. With the approval from the school principal to conduct “the survey on emotional behaviors and suicide in students,” the investigators visited the schools and explained the background and purpose of the study to the students and teachers. Students who gave voluntary written consent to participate in the study were asked to complete the survey. There were 3085 students in the 4 selected schools, and 2290 students (74%) participated in the survey. After excluding incomplete responses, responses from 2258 students were used as the final data set for the analysis. The mean age of the subjects was 15.63 years, and 55.1% were male and 44.9% were female subjects. This study was performed with the approval from the Institutional Review Board of Catholic University of Korea (IRB No. UC15QISI0073).

### Assessment tools

The survey form used in this study included questions based on a traditional rating scale for psychological characteristics of adolescents. Selection of the questions in the survey was based on a literature review of domestic and international studies on the risk factors of suicide in adolescents, and the

selected questions were screened and agreed upon by 3 pediatric psychiatrists and 1 clinical psychologist with consideration for the importance and validity of the questions.

### Demographic factors

The basic questionnaire assessed demographic factors, including the subject's gender, age, year in school, and family relationship. Moreover, the subjects were asked to make a subjective assessment of the socioeconomic status of their family and their academic achievement level at school as high, intermediate, or low. The current family relationship was assessed with a question about which family members are currently residing together. Subjects who do not live with both parents (father and mother) were included in the group of single-parent family.

### Questionnaire on the Parenting Behavior Inventory and child trauma

The assessment of family-related factors was based on 4 selected questions regarding the expectations and interventions from the parents perceived by the adolescent subjects (from Parenting Behavior Inventory Questionnaire<sup>13)</sup>) and 4 selected questions regarding physical or emotional harassment from the family (from the Korean Child Trauma Questionnaire<sup>14)</sup>). Each question was on a 4-point Likert scale, with a higher score indicating more severe, negative experiences from the parents and the family. The calculated Cronbach's  $\alpha$  for these questions was 0.76.

### Student Social Support Scale

Nine questions selected from the Korean Student Social Support Scale<sup>15)</sup> were used to assess the supportive system from the parents, teachers, and friends. Each question was on a 4-point Likert scale, with a higher score indicating a greater level of support perceived by the subject. Cronbach's  $\alpha$  for 3 questions regarding the support from parents was 0.80, while Cronbach's  $\alpha$  values for each of the 3 questions regarding the support from teachers and friends were both 0.86.

### Barratt Impulsiveness Scale and Lifestyle Factor Scale

Impulsivity was assessed using 3 questions selected from the Korean version of the Barratt Impulsiveness Scale<sup>16)</sup> that originally contains 11 questions, including “In the past 12 months, I tend to start acting without thinking deeply.” Each question was on a 4-point Likert scale, with a higher score indicating a greater level of impulsivity. The calculated Cronbach's  $\alpha$  for these questions was 0.73. Deviant behaviors were assessed using the questions from the Lifestyle Factor Scale<sup>17)</sup> developed by the National Youth Policy Institute of Korea. The following questions were included in the assessment: 2 ques-

tions on alcohol consumption and drug abuse, 3 questions on experience with being bullied and harassed (including on-line harassment), 3 questions on experience with bullying or harassment, and 2 questions regarding problematic behaviors associated with internet and video games. Each question was on a 5-point Likert scale, with a higher score indicating more frequent problematic behaviors. The calculated Cronbach's  $\alpha$  for these questions was 0.79.

### Stress Scale

The Stress Scale<sup>17)</sup> developed by the National Youth Policy Institute of Korea was used for this assessment. The assessment included 11 questions (4-point Likert scale) asking students about the effects of stress-related factors, including the relationship with parents, physical appearances, and socioeconomic status of the household. A higher score indicated a greater level of stress. The calculated Cronbach's  $\alpha$  for these questions was 0.84.

### Rosenberg Self-Esteem Scale

Five questions from the Korean version of the Rosenberg Self-Esteem Scale<sup>18)</sup> were used. The calculated Cronbach's  $\alpha$  for these questions was 0.84.

### Korean version of Attitudes Toward Suicide

Four questions (on a 5-point Likert scale) from the Korean version of Attitudes Toward Suicide<sup>19)</sup> were included. Among them, only 2 questions with internal consistency—"Humans have the right to commit suicide" and "Suicide may be the only option in certain situations"—were included in the final analysis. A higher score indicated a more permissive attitude toward suicide. The calculated Cronbach's  $\alpha$  for these two questions was 0.64.

### Self-harm, suicidal ideation, and suicide attempts

Self-harm was assessed using 3 questions asking if the subject had cut him or herself with a sharp object, bashed him or herself against a wall, or burnt him or herself in the past 12 months. The subjects were divided into a no self-harm or self-harm group, and if the subject answered yes to any of the 3 questions, he or she was included in the self-harm group. Suicidal ideation was assessed by the question "Have you seriously thought of committing suicide in the past 12 months?" and suicide attempt was assessed by the question of "Have you attempted to commit suicide in the past 12 months?"

### Statistical analysis

The subjects were divided into three groups: a control group that exhibits no tendency toward suicide; the suicidal ideation group that had a serious consideration of committing suicide

but did not attempt it in the past 12 months; and the suicidal attempt group that tried to commit suicide in the past 12 months. To establish comparisons among the groups, subjects who responded yes to both suicidal ideation and the suicidal attempt were included in the suicidal attempt group. To identify any differences in demographic factors and psychosocial factors (including perceived stress, social support, and attitude towards suicide) among the groups, a chi-squared test and one-way analysis of variance (ANOVA) were performed. Moreover, factors that exhibited a significant difference in the frequency from the chi-squared test were assessed using the Pearson's residual to analyze the residual structure and examine which subgroups exhibited the difference. Factors showing significant differences from the ANOVA were assessed with the Scheffe test for post-hoc analysis. Lastly, a multivariate logistic regression was performed to predict the suicidal ideation group and the suicidal attempt group with the control group as a reference. In addition, the comparison between the subjects with suicidal ideation and the subjects with suicidal attempts was thought to be crucial in this study. Therefore, another multivariate logistic regression was performed to predict the suicidal attempt group with the suicidal ideation group as a reference. Statistical significance was defined as  $p < 0.05$ , and all statistical analyses were performed using SPSS version 22.0 (IBM Corp., Armonk, NY, USA).

## RESULTS

### Differences in demographic characteristics among the three groups

From 2258 subjects in the study, 188 subjects (8.3%) had seriously considered committing suicide and 74 subjects (3.2%) had attempted to commit suicide in the past 12 months. Differences in demographic characteristics between the three groups, the control group with no tendency toward suicide, the suicidal ideation group, and the suicidal attempt group, are outlined in Table 1.

There was no significant difference in the gender ratio between the three groups, however, the number of secondary school students was significantly higher in both the suicidal ideation group and the suicidal attempt group compared to the control group. Furthermore, there were significant differences between the three groups in terms of socioeconomic status, academic achievement, and family relationship (whether the subject was living with both parents together). Residual structure analysis showed that the suicidal ideation group and the suicidal attempt group had more subjects that reported a perceived low socioeconomic status. For the academic achievement, the control group had more reports of a high level of achievement compared to the other two groups,

**Table 1.** Sociodemographic data of ideators, attempters, and non-suicidal controls

Characteristics	Non-suicidal controls (n=1996)*	Ideators (n=188)	Attempters (n=74)	$\chi^2$
Gender, n (%)				2.51
Boys	1110 (55.61)	96 (51.06)	36 (48.65)	
Girls	883 (44.24)	92 (48.94)	37 (50.00)	
Age, n (%)				7.24
12-15	909 (45.54)	74 (39.36)	24 (32.43)	
16-19	1087 (54.46)	114 (60.64)	50 (67.57)	
SES, n (%)				34.87 <sup>†</sup>
High	188 (9.42)	11 (5.85)	3 (4.05)	
Middle	1355 (67.89)	105 (55.85)	40 (54.05)	
Low	445 (22.29)	69 (36.70)	31 (41.89)	
Academic achievement, n (%)				18.55 <sup>†</sup>
High	290 (14.53)	11 (5.85)	8 (10.81)	
Middle	1086 (54.41)	100 (53.20)	33 (44.59)	
Low	616 (30.86)	73 (38.83)	33 (44.59)	
Living with both parents, n (%)				11.87 <sup>†</sup>
Yes	1658 (83.06)	149 (79.26)	50 (67.57)	
No	335 (16.78)	39 (20.74)	23 (31.08)	

\*missing values are within the 0.001–0.004% range, <sup>†</sup>p<0.01. SES: socioeconomic status

while the suicidal ideation group had few subjects reporting a high level of achievement. The suicidal attempt group exhibited the highest frequency of a low level of academic achievement among the three groups. Moreover, there were significant differences among the groups regarding the family relationship (whether the subject lived with both parents together). The control group had a significantly lower number of single-parent families compared to the other two groups, while the suicidal attempt group had a significantly higher frequency of single-parent families compared to the other two groups.

### Differences in psychosocial factors among the three groups

The assessment outcome of differences in psychosocial factors among the three groups is outlined in Table 2. There were significant differences among the groups for every factor assessed, while there was no significant difference between the characteristics of the suicidal ideation and the suicidal attempt group. Both the suicidal ideation and attempt groups exhibited a higher frequency of depression and impulsivity, negative feedback on the family relationship, a low level of perceived social support from teachers, a higher level of perceived stress, and a more permissive attitude toward suicide compared to the control group. Meanwhile, social support from the parents was observed at its highest frequency in the control group, followed by the suicidal ideation and the suicidal attempt group. Support from friends was at an equal level for the control group and the suicidal ideation

group, but the suicidal attempt group exhibited the lowest level of perceived support from friends. Furthermore, school violence was observed at similar frequency in both the control group and the suicidal ideation group, while the frequency was highest in the suicidal attempt group. Differences between the three groups were observed in the following factors: self-esteem, self-harm, sexual harassment, school violence, and alcohol consumption or drug abuse. Self-esteem was highest in the control group, followed by the suicidal ideation group and the suicidal attempt group. Self-harm, sexual abuse, victim of school violence, drug abuse, and internet-related problematic behaviors were observed at the lowest frequency in the control group, followed by the suicidal ideation group and highest in the suicidal attempt group.

### Multivariate logistic regression outcome

Table 3 shows the outcome of the multivariate logistic regression analysis with all factors to explore the factors that predict the suicidal ideation group and the suicidal attempt group with the control group as a reference. Compared to controls, the following factors showed a significant association with the suicidal ideation group: depression, stress from daily life, permissive attitude towards suicide, victim of school violence, internet-related problematic behaviors, and self-harm. Meanwhile, factors such as perpetrators of school violence, impulsivity, family dispute, alcohol and drug abuse, socioeconomic status, academic achievement, single-parent family, and sexual assault did not show a significant association with the suicidal ideation group as an independent fac-

tor from the regression analysis.

Similarly, there was no significant difference between the suicidal ideation and the suicidal attempt group. Compared to the control group, factors showing a significant association were depression, permissive attitude towards suicide, self-harm, victim of school violence, and internet-related prob-

lematic behaviors. Stress from daily life showed a significant association with the suicidal ideation group compared to the control group, but did not show a significant association with the suicidal attempt group. Moreover, the suicidal attempt group had a higher frequency of single-parent families and family disputes.

**Table 2.** Psychosocial characteristics of three groups

	1. Non-suicidal controls (n=1996)	2. Ideators (n=188)	3. Attempters (n=74)	F/ $\chi^2$	Post-hoc
	Mean (SD)	Mean (SD)	Mean (SD)		
Depressive symptoms	0.33 (0.59)	0.94 (0.80)	1.26 (0.79)	154.99*	1<2,3
Impulsivity	6.63 (2.46)	7.61 (2.40)	8.18 (2.56)	27.42*	1<2,3
Poor Family relationship	14.44 (3.30)	16.53 (3.61)	17.84 (4.08)	66.01*	1<2,3
Social support_parents	9.69 (1.65)	9.05 (1.67)	8.43 (2.01)	31.52*	1>2>3
Social support_teachers	8.70 (1.90)	7.93 (1.93)	8.32 (2.17)	14.93*	1>2,3
Social support_peers	9.21 (1.67)	8.85 (1.78)	8.25 (2.35)	14.43*	1,2>3
Bullying behavior	3.20 (0.74)	3.40 (0.98)	4.11 (2.38)	43.25*	1,2<3
Peer-victimization	3.13 (0.66)	3.45 (0.99)	4.19 (2.12)	76.03*	1<2<3
Alcohol/drug use	2.50 (1.09)	2.80 (1.26)	3.57 (1.98)	35.04*	1<2<3
Internet related delinquency	2.39 (0.82)	2.80 (1.20)	3.34 (1.88)	54.62*	1,2<3
Life stressors	20.63 (5.28)	25.50 (5.17)	27.18 (5.80)	120.49*	1<2,3
Self-esteems	15.34 (2.70)	13.51 (2.92)	12.34 (3.19)	76.80*	1>2>3
Attitudes towards suicide	9.63 (2.66)	11.71 (2.78)	11.83 (2.28)	73.28*	1<2,3
Non-suicidal self injury (%)	128 (6.4)	57 (30.3)	41 (55.4)	284.07*	1<2<3
Sexual abuse (%)	38 (1.9)	14 (7.4)	13 (17.6)	77.58*	1<2<3

\*p<0.001. SD: standard deviation

**Table 3.** Multinomial analysis of ideators and attempters compared with non-suicidal controls

	Ideators (n=188)		Attempters (n=74)	
	OR	95% CI	OR	95% CI
<b>Demographic variables</b>				
Age	1.33	0.91–1.96	1.30	0.68–2.51
SES (low ses)	1.43	0.91–1.96	3.27	0.58–18.27
Academic achievement (low)	0.53	0.26–1.10	1.26	0.46–3.46
Not living with both parents	1.01	0.64–1.58	2.41*	1.18–4.92
<b>Psychological variables</b>				
Sad/depressed	2.02 <sup>‡</sup>	1.61–2.56	2.57 <sup>‡</sup>	1.75–3.77
Impulsivity	0.98	0.91–1.01	0.98	0.86–1.10
Poor family relationship	1.06	0.99–1.12	1.16 <sup>†</sup>	1.06–1.27
Bullying behavior	0.94	0.76–1.16	0.98	0.76–1.26
Peer-victimization	1.28*	1.05–1.55	1.53 <sup>‡</sup>	1.21–1.94
Alcohol and drug use	1.02	0.87–1.18	1.15	0.94–1.41
Internet related delinquency	1.19*	1.02–1.11	1.26*	1.01–1.57
Social support	1.02	0.97–1.07	0.98	0.91–1.16
Life stressors	1.07 <sup>†</sup>	1.02–1.11	1.05	0.98–1.12
Low Self-esteems	0.97	0.90–1.04	0.91	0.81–1.02
Attitudes towards suicide	1.29 <sup>‡</sup>	1.17–1.42	1.23 <sup>†</sup>	1.06–1.43
Non-suicidal self injury	3.39 <sup>‡</sup>	2.23–5.15	7.79 <sup>‡</sup>	4.27–14.21
Sexual abuse	0.94	0.44–1.99	1.28	0.52–31.57

\*p<0.05, <sup>†</sup>p<0.01, <sup>‡</sup>p<0.001. CI: confidence interval, OR: odds ratios, SES: socioeconomic status

Multivariate logistic regression analysis using the suicidal ideation group as a reference group showed that the suicidal attempt group had a higher frequency of single-parent families, family disputes, and self-harm compared to the suicidal ideation group.

## DISCUSSION

This study aimed to identify the factors associated with suicidal ideation and attempt using a community-level adolescent student sample. From the cohort, 8.3% of the subjects had seriously considered committing suicide in the past 12 months, and 3.2% of the subjects attempted suicide. A previous study on Korean adolescents had reported that 12.2% had seriously considered committing suicide and 2.4% had attempted suicide in the past 12 months.<sup>20</sup> Depression was highly associated with both suicidal ideation and attempt, in agreement with the previous study on adolescent suicide.<sup>5</sup> These results emphasize that an accurate assessment of depression and interventions to relieve depression are priorities in preventing adolescent suicide in general. Furthermore, both victims of school violence and excessive internet usage were significantly associated with both suicidal ideation and attempt, once again supporting the findings in previous studies.<sup>11,21,22</sup> On the other hand, alcohol consumption and smoking, which were identified as important factors in previous studies, were not independently associated with suicidal ideation or attempt.<sup>9</sup> This indicates differences in the risk factors of suicide for adolescents from Western countries and from Korea. These outcomes reflect recently highlighted issues with internet or smartphone usage affecting the quality of life in Korean adolescents,<sup>23</sup> and further studies on the negative effects of not only alcohol abuse or smoking, but also internet addiction, are crucial to understanding the association with suicide in adolescents.

In this study, a permissive attitude toward suicide was independently associated with both suicidal ideation and attempt, in agreement with a previous study in adults.<sup>24</sup> Moreover, another study reported that Korean university students had a more permissive attitude toward suicide than American students.<sup>18</sup> Despite a media guide for suicide reporting which must be followed as a nationwide suicide prevention strategy to prevent copycat suicide and negative influences, Korean public media is still showing detailed reports of suicide cases. Websites for suicide have also been identified as a social issue.<sup>25</sup> Considering that adolescents are more sensitive to the effects of suicidal reporting in the media, a permissive message or beautification of suicide must be prevented. In addition, preventive measures including an educational program at the school level, a strict media guide for suicidal

reporting, and a public campaign must be taken to treat adolescents in danger of suicidal ideation or attempts.

As previously shown in the study by Muehlenkamp and Gutierrez<sup>26</sup> self-harm was significantly associated with both suicidal ideation and attempts. Furthermore, in this study, the degree of self-harm aided in differentiating the adolescents with suicidal ideation from the adolescents with suicidal attempts. The Interpersonal Theory of Suicide<sup>27</sup> suggests that when an individual is repeatedly exposed to physical suffering and fear, he or she obtains suicide potential eventually leading to suicidal attempts. A previous longitudinal study on Taiwanese adolescents showed that predictive factors of self-harm and suicidal attempts are similar, and depression is the key common factor.<sup>28</sup> Considering these findings, a comprehensive analysis of self-harm and suicidal action as well as active interventions against self-harm in adolescents must be performed in order to prevent adolescent suicide.

From the findings of this study, factors that differentiate the subjects with suicidal ideation from the subjects with actual suicide attempts were family relationships and family disputes, in addition to self-harm. Several previous studies have shown that divorced parents and disputes with parents are predictive factors of suicidal attempts in their children.<sup>29-31</sup> Family relationships not only have continuous effects on cognitive and emotional development of adolescents,<sup>32</sup> but are also associated with the recurrence of depressive symptoms.<sup>33</sup> On the other hand, stressful events or impulsivity were not sufficient to distinguish the subjects with suicidal ideation from those with actual suicide attempts. These results suggest that for an adolescent subject to reach the level of suicidal attempt, stable and continuous family-related factors are more important than stressful events or individual characteristics. In addition, the importance of a stable family relationship in the prevention of suicidal ideation developing into a suicidal attempt is highlighted. Therefore, adolescents with a negative family background must be carefully attended to, and preventive interventions, including therapies to reduce the psychological stress from family relationships and to improve family relationships, should be considered as a comprehensive factor of suicide prevention.

There are a few limitations in this study that must be overcome in future studies. First, suicide-related factors in this study were assessed using a single question for both suicidal ideation and attempt, and therefore there were difficulties in the identification of a suicidal action. In addition, the attempt for a comprehensive analysis of various factors allowed only a few questions from each scale to be used for the survey. Second, although we have used a logistic regression to identify the risk factors of suicide in adolescents, the study is limited by its cross-sectional nature. Future studies should focus

on a long-term follow-up to identify a causal relationship between the risk factors and suicidal ideation and attempts. Third, although several factors associated with suicide were identified, their complex interactions could not be explored. Nevertheless, this study included an adolescent sample cohort of a large community and explored risk factors of suicidal ideation and attempt in a comprehensive manner. In addition, family-related factors and self-harm were identified as novel risk factors of suicidal attempts among various factors.

## CONCLUSION

In summary, individual factors, such as depression, stress, high-risk behaviors, internet addiction, and self-harm, and complex psychosocial factors, such as a permissive attitude toward suicide, work together to develop suicidal ideation in adolescents. Furthermore, factors such as the absence of parents, family disputes, and self-harm lead to the progression from suicidal ideation to suicidal attempt. Considering these findings, the assessment of suicidal risk in adolescents should focus on family-related factors, while early-stage intervention against self-harm is crucial for the prevention of suicide. In the future, parents and teachers should recognize and pay attention to these risk factors of suicide, while the establishment and enforcement of preventive measures targeting the key risk factors are required to reduce the suicide rate in Korean adolescents.

### Conflicts of Interest

The authors have no financial conflicts of interest.

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