

## Childhood Predictors of Deliberate Self-Harm Behavior and Suicide Ideation in Korean Adolescents: A Prospective Population-Based Follow-Up Study

The aim of this study was to investigate predictors of adolescence suicidality in a longitudinal study. Additionally, the prevalence of deliberate self-harm behavior and suicide ideation at age 7 and during middle school were examined. Initial assessment data was obtained from 1998 to 2000, and a follow-up assessment was performed in 2006 when the original subjects became middle school students. The addresses and names of 1,857 subjects were located from the original data; they were 910 boys and 947 girls. The subjects were evaluated with the Korean version of the Child Behavior Checklist (K-CBCL), which was administered by the parents of the children, and by various demographic and psychosocial factors. They were reassessed using self reports on the Korea Youth Self Report (K-YSR); in particular, replies to items related to self-harm behavior and suicide ideation were recorded. A logistic regression analysis showed that the factors of gender, economic status, the overall amount of behavior problems, the tendency to internalizing and externalizing problems, somatic problems, thought problems, delinquent behavior, and aggressive behavior were independent predictors of adolescent suicide ideation and self-harm behavior. The importance of total behavior problems suggested that adolescent difficulty is a consequence of an accumulation of various risk factors. Accordingly, clinicians must consider a range of internalizing and externalizing issues, especially overall adaptation, for suicide intervention.

Key Words : Child; Adolescent; Suicide; Longitudinal Studies

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## INTRODUCTION

Suicide is the second cause of death next to car accidents among adolescents in Korea and is a leading cause of death in Western countries as well (1, 2). Most investigators suggest that the rise in suicidality with age in adolescence may be due to the drastic physical and psychological changes that occur during that phase combined with developmental stress, increased social pressures, the increasing drive for individuation and an increase in the number of major psychiatric disorders during adolescence.

Deliberate self harm is an act with a non-fatal outcome in which an individual deliberately behaves in ways that suggest they intend to commit self harm (3). Deliberate self harm is important due to the fact that clinically untreated deliberate self harm behaviors may precede suicide (4). In the same way, suicidal ideation, particularly in adolescence, and its relationship to psychiatric morbidity and completed suicide continue to be a subject of attention (5-8). The seriousness of suicidal ideation as a symptom and indicator of psychiatric illness and a marker of distress and poor functioning has been

confirmed in findings from several studies (9). For this reason, much research concerning deliberate self harm behavior and suicidal ideation in adolescents is required in order to assist in the recognition of those at risk as well as in the design of prevention programs.

Several risk factors are known to be associated with self-harm behavior and suicide ideation. These include dysfunctional behavior at school (10, 11), living in broken families (12), parental psychopathology (13), difficulties in relationships with parents and stressful and traumatic life events (14). Aggressive behavior, depression, impulsivity, anxiety and substance abuse have been repeatedly shown to be associated with suicidal behavior among young people (15, 16).

In spite of the clinical concern and research interest, most Korean studies (17, 18) are performed using a cross-sectional method. There have been few prospective studies regarding possible early childhood psychopathology predictors for deliberate self-harm behavior and suicide ideation in Korean adolescents. Therefore, longitudinal study that identifies the early childhood risk factors related to suicide is necessary. The aim of this study is to investigate early childhood pre-

dictors of adolescent deliberate self-harm behavior and suicide ideation longitudinally. The prevalence of suicide ideation and acts of deliberate self-harm in 7-yr-old boys and girls and in middle school students is also reported.

## MATERIALS AND METHODS

### Subjects

This study was part of a larger epidemiological study on child psychiatric disorders conducted in Osan, a small city southwest of Seoul, Korea. During a periodic health examination, a survey was performed by the Child Mental Health Care Center. The data were collected in two separate instances (1998-2000 and 2006). The first assessment was conducted with the approval from teachers and parents. All of the first grade children in an entire primary school were recruited for the study, resulting in a study group of 3,808 pupils.

A follow-up assessment was performed in 2006 when the original subjects became middle school students. This was composed of two stages. In the first stage, all 14-16-yr-old adolescents who were living in Osan city were requested to complete the questionnaire with parental consent. The total number of subjects was 5,670. After the adolescents completed the questionnaire, their personal information was compared with the data obtained in 1998-2000. As a result, 1,857 matched sets of data originating from the same person at different times were obtained and were enrolled in this study. The retention rate was 48.8% and the mean age of the children at the first time point was 6.85 yr (S.D. 0.41); at the second time point, the mean age was 13.75 yr (S.D. 1.0).

### Methods

At the first time point, children were evaluated by parents using the Korean version of the Child Behavior Checklist (K-CBCL) to investigate behavioral problems. The K-CBCL forms, a frequently used instrument with 119 items providing parent-reported data on problem behavior in children, were sent home with each child, completed by the parents, and were then collected after 3 to 5 days. The K-CBCL score was computed based on Korean normative samples (19), with the total problem behavior score computed by summing the scores obtained for each item. The 90th percentile cut-off point, based on the distribution of the scores in the sample, was considered to depict poor adaptive functioning in each of these life areas.

In addition to the CBCL, the parents also completed a general questionnaire covering family structure, parental education and economic status, and the age and gender of the child. Education level was divided into two categories: parents who had completed a minimum of twelve years of schooling and those with less than twelve years. Economic status was divid-

ed into three categories based on family income.

During the follow-up, the psychopathology and adaptive functioning of the subjects were studied with the Korea Youth Self Report (K-YSR) (20). The YSR was developed for the assessment of psychopathology during the six month in adolescence directly preceding the exam. Self-reports of ideations of suicide during the preceding six months was determined in the YSR using the question: "I think about killing myself" and acts of deliberate self-harm were determined by the question: "I deliberately try to hurt or kill myself" (alternatives 0=not true, 1=somewhat or sometimes true, 2=very true or often true; alternatives 1 and 2 were pooled together).

Similar questions were asked in parent questionnaires for 7-yr-old children on the CBCL. A child was defined as belonging to the deliberate self harm or suicide ideation group if their parents reported ideations or acts of deliberate self harm during the preceding six months.

### Statistical analysis

In this study, a chi-square test was performed to examine the differences in background characteristics that included the family structure as well as the parental income and education levels between the boys and girls. The prevalence of deliberate self-harm behavior and suicide ideation in children and adolescents by gender was calculated, and the level of agreement on deliberate self harm behavior and suicide ideation between boys and girls was analyzed using a proportional agreement test.

Statistically, multiple methods were implemented to analyze predictors of deliberate self-harm behavior and suicide ideation. First, with self-harm behavior and suicide ideation serving as dependent variables and the socio-demographic data and childhood psychopathology serving as independent variables, a logistic regression analysis evaluated the association between the variables. The odds ratio (OR) and 95% confidence intervals (95% CI) were calculated using univariate and multivariate logistic regression analyses for all variables significant at the  $p < 0.05$  level.

Due to the hierarchical relationship of the eight CBCL syndrome scales and the externalizing, internalizing, and total problem scales, regression analyses performed according to three different sets of variables were necessary: the first set included the total problem score, the second set encompassed the externalizing and internalizing scores, and the third set included the eight syndrome scores.

A  $p$  value of less than 0.05 was regarded as statistically significant.

## RESULTS

Of the 1,857 students in total, 910 (49.0%) were boys. While boys were outnumbered by girls 910 (49.0%) to 947 (51.0

%), a comparison of the socio-demographic variables of the family structure ( $\chi^2=0.01, p>0.05$ ), the father's education level ( $\chi^2=0.25, p>0.05$ ), the mother's education level ( $\chi^2=1.41, p>0.05$ ), and the economic status of the family ( $\chi^2=2.13, p>0.05$ ) revealed no statistically significant differences by gender (Table 1).

The prevalence of ideations and acts of deliberate self-harm during childhood and adolescence are presented Table 2. In the parent reports at childhood, 6.76% of the girls and 5.51% of boys reported deliberate self-harm behavior, while in the self-reports at adolescence, 10.51% of girls and 7.85% of boys reported this behavior. According to the parent reports,

4.65% of the girls and 4.40% of boys showed suicide ideation. The self-reports of the adolescents showed that 32.87% of the girls and 17.50% of the boys reported suicide ideation (Table 2). Furthermore, gender was a significant factor for acts ( $\chi^2=3.89, p<0.05$ ) and ideation ( $\chi^2=57.74, p<0.01$ ) in adolescence, as girls were found to have significantly more acts and thoughts related to suicide compared to boys. However, no significant difference related to gender was found in the parent-reported surveys concerning ideations or acts by children.

The factors associated with suicide ideation and deliberate self-harm behavior in school-aged children were investigated. In the univariate regression analysis shown in Table 3, 4, gender (OR 2.31, 95% CI=1.86-2.88) and total problems (OR 1.73, 95% CI=1.14-2.63) in the CBCL were associated with suicide ideation. Additionally, gender (OR 1.8, 95% CI=1.00-1.90) and total problems (OR 1.95, 95% CI=1.12-3.38) in the CBCL were associated with deliberate self-harm behavior.

Demographic variables, family structure, and parent reports of psychopathology were entered into a multivariate analysis. Due to the hierarchical relationship between the CBCL total problems, subscales, and syndrome scales, analyses were performed in three models (Table 5).

As shown in Table 5, female gender (OR 2.44, 95% CI=1.91-3.13) and CBCL total problems (OR 1.90, 95% CI=1.2-2.93) at age 7 independently predicted acts of suicide ideation. Moreover, economic status (OR 2.59, 95% CI=1.21-5.56), CBCL total problems (OR 6.23, 95% CI=3.11-12.48), externalizing problems (OR 10.84, 95% CI=5.75-20.45), internalizing problems (OR 4.33, 95% CI=2.28-8.24), somatic problems (OR 5.59, 95% CI=2.73-12.28), thought problems (OR 4.53, 95% CI=2.16-9.47), delinquent behaviors (OR 2.61, 95% CI=1.06-6.45), and aggressive behaviors (OR

Table 1. Background characteristics of the children by gender

		Boys (%)	Girls (%)	Total	$\chi^2$
Grade	1	377 (51.22)	359 (48.77)	736	4.5
	2	274 (49.81)	276 (50.18)	550	
	3	250 (45.37)	301 (54.62)	551	
	Total	901 (49.04)	936 (50.95)	1,837	
Family	Both parents	881 (48.99)	917 (51.01)	1,798	0.01
	Other	27 (48.21)	29 (51.78)	56	
	Total	908 (48.97)	946 (51.03)	1,854	
Father's education	<13	294 (49.74)	297 (50.25)	591	0.25
	≥12	610 (48.48)	648 (51.51)	1,258	
	Total	904 (48.89)	945 (51.11)	1,849	
Mother's education	<13	163 (49.65)	165 (50.30)	328	0.12
	≥12	738 (48.64)	779 (51.35)	1,517	
	Total	901 (48.83)	944 (51.16)	1,845	
Economic status	High	54 (51.42)	51 (48.57)	105	2.13
	Middle	505 (47.46)	559 (52.53)	1,064	
	Low	337 (50.82)	326 (49.17)	663	
	Total	896 (48.90)	936 (51.09)	1,832	

\* $p<0.05$ ; † $p<0.01$ .

Analyses were performed using the chi-square test.

Table 2. Prevalence of deliberate self-harm behavior and suicide ideation at age 7 and as adolescents by gender

Child		Self-harm behavior		Total	$\chi^2$	Suicide ideation		Total	$\chi^2$
		Boys	Girls			Boys	Girls		
No	N	858	883	1,741	1.25	866	903	1,769	0.06
	%	94.49	93.24	93.85		95.60	95.35	95.46	
Yes	N	50	64	114	6.15	40	44	84	4.53
	%	5.51	6.76	6.15		4.40	4.65	4.53	
Total	N	908	947	1,855		906	947	1,853	

  

Adolescent		Self-harm behavior		Total	$\chi^2$	Suicide ideation		Total	$\chi^2$
		Boys	Girls			Boys	Girls		
No	N	833	843	1,676	3.89*	746	631	1,377	57.74†
	%	92.15	89.49	90.79		82.50	67.13	74.67	
Yes	N	71	99	170	9.21	158	309	467	25.33
	%	7.85	10.51	9.21		17.50	32.87	25.33	
Total	N	904	942	1,846		904	940	1,844	

\* $p<0.05$ ; † $p<0.01$ .

Analyses were performed using the chi-square test.

**Table 3.** Univariate association between suicide ideation and significant variables at age 7

		Total (N)	Ideation (N, %)	OR	95% CI
Gender	Boys	904	158 (17.5)	2.31 <sup>†</sup>	1.86-2.88
	Girls	940	309 (32.9)		
Family	Both parent	1,785	452 (25.3)	0.98	0.53-1.82
	Other	56	14 (25.0)		
Father's education	<13	586	151 (25.8)	0.97	0.78-1.22
	≥12	1,250	315 (25.3)		
Mother's education	<13	326	76 (23.3)	1.15	0.86-1.52
	≥12	1,506	389 (25.8)		
Income (1) (2)	High	102	23 (22.5)	0.86	0.52-1.41
	Middle	1,058	266 (25.1)		
	Low	658	167 (25.4)		
Total behavior problems	<90% ile	1,367	345 (25.2)	1.73 <sup>†</sup>	1.14-2.63
	≥90% ile	103	38 (36.9)		
Internalizing problems	<90% ile	1,596	404 (25.3)	1.11	0.78-1.58
	≥90% ile	172	47 (27.3)		
Externalizing problems	<90% ile	1,588	409 (25.8)	0.89	0.62-1.28
	≥90% ile	174	41 (23.6)		
Withdrawn	<90% ile	1,630	415 (25.5)	0.98	0.69-1.39
	≥90% ile	187	47 (25.1)		
Somatic complaints	<90% ile	1,649	417 (25.3)	1.00	0.70-1.44
	≥90% ile	170	43 (25.3)		
Anxious/depressed	<90% ile	1,620	412 (25.4)	0.96	0.68-1.37
	≥90% ile	186	46 (24.7)		
Social problems	<90% ile	1,635	405 (24.8)	1.30	0.93-1.81
	≥90% ile	187	56 (29.9)		
Thought problems	<90% ile	1,615	404 (25.0)	1.10	0.79-1.53
	≥90% ile	201	54 (26.9)		
Attention problems	<90% ile	1,652	417 (25.2)	1.04	0.73-1.50
	≥90% ile	169	44 (26.0)		
Delinquent behavior	<90% ile	1,665	418 (25.5)	1.10	0.76-1.59
	≥90% ile	156	42 (26.9)		
Aggressive behavior	<90% ile	1,611	418 (25.9)	0.80	0.55-1.17
	≥90% ile	169	37 (21.9)		

\* $p < 0.05$ ; <sup>†</sup> $p < 0.01$ . Analyses were performed using univariate logistic regression analyses.  
CI, confidence interval; OR, odds ratio.

2.97, 95% CI=1.23-7.15) at age 7 predicted acts of deliberate self-harm.

## DISCUSSION

Predictors of adolescence suicidality were investigated in this study. In a univariate analysis, gender and total problems of the CBCL were found to be associated with suicide ideation and deliberate self-harm. In addition, gender and CBCL total problems at age 7 independently predicted acts of suicide ideation according to a multivariate analysis. Economic status, CBCL total problems, externalizing problems, internalizing problems, somatic problems, thought problems, delinquent behaviors, and aggressive behaviors at age 7 predicted acts of deliberate self-harm behavior.

In these results, it was noteworthy that suicide ideation was related to total problems while it was not related to internalizing problems or externalizing problems. As depressive symp-

oms are often found to form a common antecedent to adolescent suicidality and complete suicide (14, 21), it was reasonable that internalizing problems predicted suicidality. But recent investigations have demonstrated that psychopathology were resulted from accumulated problems and that most risk factors are held to predict symptom severity and not directionality (22). According to those studies, the risk factors for internalizing and externalizing problems may be indistinguishable. The results in which children who showed conduct and internalizing problems had the worst outcomes (23) also suggest that the direction of psychopathology might be discontinuous and that combined problems are more serious. The results obtained in our survey are interpreted to be in agreement with those previous studies.

Many risk factors are known to be associated with suicidal behaviors and acts according to previous studies; these include diverse socioeconomic problems, psychiatric disorders such as depression, anxiety disorders, conduct disorders, and alcohol and drug abuse (9, 24, 25). Psychiatric disorders in the

Table 4. Univariate association between deliberate self-harm behavior and significant variables at age 7

		Total (N)	Act (N, %)	OR	95% CI
Gender	Boys	904	71 (7.9)	1.38*	1.01-1.90
	Girls	942	99 (10.5)		
Family	Both parent	1,787	161 (9.0)	1.93	0.93-4.02
	Other	56	10 (17.7)		
Father's education	<13	587	56 (9.5)	0.95	0.68-1.33
	≥12	1,251	114 (9.1)		
Mother's education	<13	327	29 (8.9)	1.06	0.70-1.61
	≤12	1,507	141 (9.4)		
Economic status	High	103	8 (7.8)	0.92	0.43-2.00
	Middle	1,059	102 (9.6)		
	Low	659	55 (8.3)		
Total behavior problems	<90% ile	1,368	126 (9.2)	1.95*	1.12-3.38
	≥90% ile	103	17 (16.5)		
Internalizing problems	<90% ile	1,597	146 (9.1)	1.01	0.59-1.74
	≥90% ile	173	16 (9.2)		
Externalizing problems	<90% ile	1,589	149 (9.4)	1.11	0.66-1.86
	≥90% ile	175	18 (10.2)		
Withdrawn	<90% ile	1,631	155 (9.5)	0.71	0.39-1.27
	≥90% ile	188	13 (6.9)		
Somatic complaints	<90% ile	1,650	151 (9.2)	0.95	0.55-1.66
	≥90% ile	171	15 (8.8)		
Anxious/depressed	<90% ile	1,621	151 (9.3)	0.97	0.58-1.65
	≥90% ile	187	17 (9.1)		
Social problems	<90% ile	1,636	146 (8.9)	1.35	0.84-2.18
	≥90% ile	188	22 (11.7)		
Thought problems	<90% ile	1,615	148 (9.2)	1.02	0.62-1.69
	≥90% ile	203	19 (9.4)		
Attention problems	<90% ile	1,652	152 (9.2)	0.95	0.54-1.65
	≥90% ile	171	15 (8.8)		
Delinquent behavior	<90% ile	1,666	154 (9.2)	1.11	0.65-1.92
	≥90% ile	157	169 (10.2)		
Aggressive behavior	<90% ile	1,612	149 (9.2)	1.16	0.69-1.95
	≥90% ile	170	18 (10.6)		

\* $p < 0.05$ ; <sup>†</sup> $p < 0.01$ . Analyses were performed using univariate logistic regression analyses. CI, confidence interval; OR, odds ratio.

family, separation from parents and sexual abuse are regarded as important factors related to suicide (10, 26, 27). It was generally found that children in families of low economic status showed a high proportion of suicide ideation and self-harm behavior (14). Our result that economic status was related to suicide ideation is consistent with previous findings.

The factors associated with self-harm behavior were greater in number compared to those of suicide ideation; more aggressive, impulsive features such as delinquent behavior were included in this finding. Some research has demonstrated that the continuum from suicidal thoughts to attempts at suicide to completed suicide is not linear (15). Despite the overlap between self-harm attempts and ideations and despite the significant prediction of future attempts from ideations, the fact that the diagnostic profiles of attempters and those who experience suicide ideation are somewhat different was clarified (28). Considering the data from this study, it is presumed that diverse factors including aggressive behaviors, somatic complaints, and thought problems during childhood was pow-

erful factor related to adolescent suicidality. As suicide attempts, self-harm behavior, or completed suicide appear to be determined by various elements, future work needs to focus on the different mechanisms affecting suicide-related acts and ideation.

The prevalence of deliberate self-harm behavior and suicide ideation at age 7 and in middle school age were examined. Whereas most studies in Korea have relied on cross-sectional data (29, 30), a strength of the present study is that longitudinal data was collected. According to parental reports at age 7, 6.76% of girls and 5.51% of boys engaged in deliberate self-harm behavior, while 4.65% of girls and 4.40% of boys reportedly engaged in suicide ideation. In general, the results of the present study are in line with other epidemiologic studies that found reported prevalence rates of suicide ideation and prevalence rates of self-harm behaviors ranging from 2% to 20% (31, 32).

The fact that the ratio of self-harm behavior exceeded suicide ideation was noteworthy. This is believed to relate to the

**Table 5.** Multivariate association between suicide ideation, deliberate self-harm behavior and significant variables at age 7

	Suicide ideation		Self-harm behavior	
	OR	95% CI	OR	95% CI
Model 1 (including CBCL total behavior problems)				
Gender (girls)	2.44 <sup>†</sup>	1.91-3.13	0.76	0.41-1.41
Family (not both parent)	1.10	0.55-2.19	1.05	0.23-4.71
Father's education ( $\geq 12$ )	1.01	0.76-1.36	0.61	0.26-1.39
Mother's education ( $\geq 12$ )	0.82	0.57-1.19	1.35	0.55-3.29
Economic status (middle)	0.75	0.40-1.42	1.38	0.38-4.97
(low)	0.92	0.71-1.19	0.66	0.34-1.27
Total behavior problems ( $\geq 90\%$ ile)	1.90 <sup>†</sup>	1.23-2.93	6.23 <sup>†</sup>	3.11-12.48
Model 2 (including CBCL subscales)				
Gender (girls)	2.40 <sup>†</sup>	1.90-3.02	0.67	0.40-1.12
Family (not both parent)	1.02	0.53-1.97	2.28	0.46-11.25
Father's education ( $\geq 12$ )	1.06	0.80-1.39	0.87	0.44-1.69
Mother's education ( $\geq 12$ )	0.79	0.56-1.11	1.79	0.87-3.67
Economic status (middle)	0.94	0.56-1.60	2.59 <sup>†</sup>	1.21-5.56
(low)	0.95	0.75-1.21	0.43	0.24-0.76
Internalizing problems ( $\geq 90\%$ ile)	1.16	0.74-1.82	4.33 <sup>†</sup>	2.28-8.24
Externalizing problems ( $\geq 90\%$ ile)	0.92	0.58-1.47	10.84 <sup>†</sup>	5.75-20.45
Model 3 (including CBCL syndrome scales)				
Gender (girls)	2.47 <sup>†</sup>	1.94-3.13	0.63	0.35-1.14
Family (not both parent)	1.03	0.54-2.00	1.66	0.33-8.26
Father's education ( $\geq 12$ )	1.07	0.81-1.42	0.75	0.35-1.61
Mother's education ( $\geq 12$ )	0.78	0.55-1.10	1.64	0.72-3.72
Economic status (middle)	0.82	0.47-1.42	1.27	0.48-3.33
(low)	0.94	0.74-1.21	0.55	0.29-1.03
Withdrawn ( $\geq 90\%$ ile)	0.92	0.52-1.59	1.07	0.40-2.86
Somatic complaints ( $\geq 90\%$ ile)	1.11	0.68-1.82	5.79 <sup>†</sup>	2.73-12.28
Anxious/depressed ( $\geq 90\%$ ile)	0.82	0.46-1.45	0.75	0.27-2.05
Social problems ( $\geq 90\%$ ile)	1.70	0.97-2.95	1.78	0.66-4.80
Thought problems ( $\geq 90\%$ ile)	1.32	0.82-2.13	4.53 <sup>†</sup>	2.16-9.47
Attention problems ( $\geq 90\%$ ile)	0.82	0.42-1.62	0.90	0.31-2.64
Delinquent behavior ( $\geq 90\%$ ile)	1.36	0.75-2.46	2.61 <sup>*</sup>	1.06-6.45
Aggressive behavior ( $\geq 90\%$ ile)	0.55	0.30-1.01	2.97 <sup>*</sup>	1.23-7.15

\* $p < 0.05$ ; <sup>†</sup> $p < 0.01$ . Analyses were performed using multivariate multinomial logistic regression analyses. CI, confidence interval; OR, odds ratio; CBCL, child behavior checklist.

data from their parents. Although the prevalence of suicide ideations and self-harm behaviors in children in this study were not clearly lower than this statistic in other studies (31, 33), the possibility of underestimation should be considered. The prevalence of parent-reported suicidal behavior is markedly lower than the self-reported rate from previous research (16, 34). As shown in other studies, in which depressive children were found to show not only negative moods but also deviant behaviors, the patterns of childhood mood symptoms are generally accepted to be unlike those of adults; parents may fail to report the mood and thoughts of their children accurately (35). This result implies that parents are more sensitive to the behaviors of their children than to the thoughts or to affective states of their children.

The results here confirmed that gender was significant for suicidal acts and ideation in adolescence. It was found that girls have significantly more acts and thoughts compared to boys. However, no significant differences in terms of gender

were found in the parent-reported ideations or acts of children. Most Korean studies in this area have shown that suicidal acts and ideations are more common among females (4, 17, 29, 33). In this study, the prevalence rate of self-reported deliberate self-harm and suicide ideation increased dramatically from age 12 to age 15 among girls; however, this was not the case for boys. This result reaffirms that gender is an important factor in the prevention of suicide.

The strength of this longitudinal study lies in the community-based sampling method. The results obtained in the survey are in agreement with those of most previous studies in which adolescent suicide ideation and self-harm behaviors are affected by various factors such as gender, socio-economic environment, and internalizing and externalizing problems. The finding regarding the total behavior problems score has special importance, as this finding supports the accumulative assumption that subjective difficulties, including suicide ideation and acts by a child are the outcome of an accumulation

of earlier family distress factors as well as the child's externalizing and internalizing problems. These results suggest that clinicians must consider various internalizing problems and behavioral problems as important risk factors for the diagnosis of trouble and for the intervention of suicide.

The present study is subject to certain limitations. First, as the duration of the follow-up assessments differed, some students were assessed 6 yr after the first assessment, and others were evaluated 7 or 8 yr later. However, a high proportion of other findings in this area have been reported using various age ranges, and this did not appear to be a central issue.

Second, only a small portion, 48.8%, of original subjects participated in the follow-up survey. This transpired because reassessment data was obtained only from subjects who did not alter their residence.

Third, although the sample in this study was sufficiently large and although well-established instruments were used to interpret the findings, the scale of the investigation prevented the conduction of person-to-person interviews with structured, diagnosing interview forms. This limited access to information regarding psychiatric diagnoses. Thus, a diagnostic formulation should be performed in a further study for further understanding.

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