

# Loneliness as a Risk Factor for Suicidal Ideation and Depressive Mood Among Korean Adolescents in 2020–2021

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## 한국청소년의 자살생각 및 우울감의 위험요인으로서의 외로움, 2020–2021년

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**Abstract** Suicide is the leading cause of death among Korean adolescents. There is a growing interest in the role of loneliness as a risk factor for suicide ideation and depressive symptoms. However, little is known in the Korean context. This study analyzed a total of 109,796 respondents from the Korea Youth Health Behavior Survey in 2020 and 2021. Multiple logistic regression models were implemented to test the association between loneliness and either of suicidal ideation and depressive mood. Covariates included demographic characteristics, school enrolled, household income, living arrangement, self-rated health, and the number of times treated for violence. Adjusted odd ratio (OR) and 95% confidence intervals (CI) were computed. 12.0% of adolescents reported to have felt lonely frequently and 3.0% always. 11.8% and 26.0% had suicidal ideation and depressive mood, respectively. The prevalence of suicidal ideation was higher in the always-lonely adolescents (52.6%) than in the frequently-lonely adolescents (35.1%). The always-lonely adolescents were nearly 30 times more likely to have suicidal ideation (OR=30.7; 95% CI, 27.1 – 34.8) and to feel depressed (OR=32.5; 95% CI, 29.2 – 36.4) than adolescents who felt never lonely. In conclusion, Loneliness was a major risk factor for suicidal ideation and depressive mood among Korean adolescents. Monitoring and addressing the condition of loneliness may help reduce suicidal ideation and depressive mood.

**Key Words** : Loneliness, Suicidal ideation, Depressive mood, Adolescents, Violence

**요약** 자살은 한국 청소년의 주요 사망 원인입니다. 자살 생각과 우울 증상의 위험 요인으로서 외로움의 역할에 대한 관심이 높아지고 있다. 그러나 한국 상황에 대해서는 알려진 바가 거의 없다. 본 연구는 2020년과 2021년 한국청소년건강행태조사에 참가한 총 109,796명의 응답자를 분석하였다. 외로움과 자살 생각 및 우울감 사이의 연관성을 시험하기 위해 다중 로지스틱 회귀 모델을 이용하였다. 공변량으로는 인구학적 특성, 학교, 가계 소득, 생활 방식, 자가 평가 건강, 및 폭력으로 인한 치료 횟수가 포함되었다. 보정 오즈비(OR) 및 95% 신뢰 구간(CI)을 산출하였다. 청소년의 12.0%는 자주, 3.0%는 항상 외로움을 느낀다고 보고하였다. 자살생각과 우울감의 유병률은 각각 11.8%와 26.0%이었다. 자살생각의 유병률은 자주 외로운 청소년(35.1%)보다 항상 외로운 청소년(52.6%)에서 더 높았다. 전혀 외로움을 느끼지 않은 청소년에 비해서 항상 외로운 청소년은 자살 생각(OR=30.7; 95% CI, 27.1 – 34.8)과 우울함(OR=32.5; 95% CI, 29.2 – 36.4)을 가질 위험이 훨씬 더 높았다. 결론적으로 외로움은 한국 청소년의 자살생각과 우울감의 주요 위험요인이다. 외로움의 상태를 모니터링하고 해결하는 것이 자살생각과 우울감을 줄이는데 도움이 될 수도 있다.

**키워드** : 외로움, 자살생각, 우울감, 청소년, 폭력

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## 1. Background

Suicide is the leading cause of death among Korean adolescents [1]. In 2021, five Korean adolescents aged 12 to 14 years (per 100,000 persons) died by suicide, which recorded the highest suicide rate since 2000 [1]. Given the magnitude of the problem in Korea, suicide ideation among adolescents has been monitored as it precedes suicide attempt and behaviors [2]. Various research efforts to predict the risk of suicide ideation and behaviors in youth have been made [3]. Research so far shows that suicidal ideation and behaviors in children and adolescents are predicted by gender [4], socioeconomic status [5], living arrangement (e.g., living with family or not [6] and being placed in the welfare system [7]), health status [8], and experience of violence [9-10].

There is a growing interest in the potential role of loneliness in suicidal ideation and behaviors among adolescents. Loneliness was a significant predictor of suicidal ideation among U.S. adolescents [11]. Loneliness was associated with the indicators of psychological well-being, such as anxiety and sadness, among adolescents in Finland [12]. A meta-analysis revealed that the relationship between loneliness and subsequent suicidal ideation was more likely to be significant among adolescents than young and middle-aged adults [13]. Loneliness predicts not only suicidal ideation but also depressive symptoms [14]. In particular, depression appears to mediate the association between loneliness and later suicidal ideation and behaviors [13].

The COVID-19 pandemic may have exacerbated social isolation and loneliness, which were strongly associated with depressive feelings and suicidal ideation [15]. Adolescent mental health would have been particularly vulnerable to social distancing measures, such as school closures, online classes, and lack of face-to-face contacts with peers. More important than the objective state of living isolated

in increasing the risk of suicidal ideation was the subjective feeling of being alone [16]. Duration of loneliness was a stronger predictor of mental health problems in adolescence than the intensity of loneliness [17]. As the pandemic continues into 2021, it is likely that the extended duration of social isolation and loneliness may have influenced the psychological well-being of adolescents.

Loneliness is a highly prevalent public health issue in Korea [18]. However, little has been known regarding the prevalence of loneliness and its association with mental health problems in Korean adolescents. Therefore, this study aims to examine the prevalence of loneliness and to investigate the relationship of loneliness to suicidal ideation as well as to depressive mood in Korean adolescents using data from a survey conducted in 2020 – 2021.

## 2. Materials and Methods

### 2.1 Data

This study is based on data from the 16th and 17th waves of the Korea Youth Health Behavior Survey (KYHBS) conducted between August and November in 2020 and 2021. The KYHBS presents a unique opportunity to study the link between loneliness and suicidal ideation/depressive moods during the COVID-19 pandemic among Korean adolescents. The Korea Agency for Disease Control and Prevention has conducted the school-based survey since 2005 so as to inform and evaluate health promotion policies for Korean adolescents [2]. The annual survey assesses the health status and behaviors of middle and high school students with a focus on smoking, drinking, weight, diet, and physical activities. A nationally representative sample is selected by using a stratified cluster sampling design. Schools are stratified based on urbanization and school type. All students in selected classes are asked to anonymously complete a self-administered web-based questionnaire in a computer laboratory. Data for 2020 and 2021

surveys were pooled to a combined total of 109,796 respondents for analysis. The survey participants ranged in age from 12 to 18 years, with the mean of 15.09 (SD = 1.75).

## 2.2 Measures

In the KYHBS, suicidal ideation was measured by using a question of “have you thought seriously about suicide in the past 12 months?” Depressive mood was measured by a single item, “during the past 12 months, have you felt sad or hopeless nearly every day for at least two consecutive weeks that would make you stop doing daily activities?” For both questions, respondents were asked to select “yes” or “no.” In 2020 and 2021, the KYHBS introduced a new question to assess adolescents’ experience of loneliness. Self-reported loneliness was assessed by a single item, “how often did you feel lonely in the past 12 months?” In response to the question, the participants were to select “never,” “rarely,” “occasionally,” “frequently,” or “always.” In this study, loneliness was defined as feeling lonely at least “frequently.”

## 2.3 Covariates

Based on a review of the literature [4–10], covariates included demographic characteristics (sex, age), school enrolled (middle, high), household income class, living arrangement, self-rated health, and the number of times treated for violence. Self-assessed household income class ranged from 1 (highest) to 5 (lowest). Living arrangement was measured as one of the following types: living with family, living with relatives, living alone or with friends, and living in a welfare facility. Self-rated health was measured on a 5-point Likert scale, ranging from 1 (very healthy) to 5 (very unhealthy). In the KYHBS, the number of times treated for violence in the past 12 months ranged from none to six times or more. Responses were regrouped into the following categories: none, once, twice, and

three times or more.

## 2.4 Statistical Analysis

The sociodemographic characteristics of the respondents were described by using the frequency and the weighted percentage (%). The weighted % represents the population estimates that are adjusted for sampling weights, which are the inverse of selection probability used in the complex survey design. The prevalence of suicidal ideation and depressive mood was computed as the proportion of adolescents according to the loneliness status. The Rao-Scott chi-square test was used to test if loneliness status was associated with suicidal ideation and depressed mood, respectively.

A multiple logistic regression model was implemented to test the association between loneliness and suicidal ideation as the dependent variable, while controlling for the aforementioned covariates. Another model was run by using depressive mood as the dependent variable. Independent variables comprised of loneliness status and the covariates. In addition, year dummy variables were included to determine if there is a difference in suicide ideation and depressive mood in 2021 over 2020. Adjusted odd ratio (OR) and 95% confidence intervals (CI) were computed. Two measures of model fit were calculated: the Akaike information criterion and  $-2 \text{ Log } L$ . All statistical analyses were performed by using SAS version 9.4 (Cary, NC, USA). The Institutional Review Board of Kongju National University approved the study protocol and waived the requirement for informed consent (reference No. KNU\_IRB\_2022-140).

## 3. Results

In the weighted sample, 51.8% of adolescents were male. The mean age ( $\pm$ SD) was 15.1 ( $\pm$ 1.8) years. 48.2% were from the middle income class. 96.2% lived with a family member or more. 67.2% reported of being either healthy or very healthy.

**Table 1. Characteristics of study participants**

(n=109,796)			
Variables	Categories	N	Weighted %
Sex	Male	56,754	51.8
	Female	53,042	48.2
Mean age ( $\pm$ SD)	15.8 ( $\pm$ 1.8) years		
School enrolled	Middle	58,976	50.3
	High	50,820	49.7
Household income class	Highest	11,983	11.1
	Upper middle	30,924	29.0
	Middle	53,474	48.2
	Lower middle	11,028	9.7
	Lowest	2,387	2.1
Living arrangement	Living with family	104,758	96.2
	Living with relative	523	0.5
	Living alone or with friend	524	0.5
	Living in a dormitory	3,609	2.6
	Living in a welfare facility	382	0.3
Self-rated health	Very healthy	27,333	24.7
	Healthy	46,640	42.5
	Neutral	26,640	24.4
	Unhealthy	8,595	8.0
	Very unhealthy	588	0.5
No. of times treated for violence last year	None	108,302	98.7
	1	747	0.7
	2	264	0.2
	$\geq 3$	483	0.4
Loneliness status	Never	25,568	23.0
	Rarely	29,012	26.5
	Occasionally	38,695	35.4
	Frequently	13,088	12.0
	Always	3,433	3.1

% was estimated for the population by adjusting for sampling weights. Values do not add up to 100% due to rounding.

1.3% were treated at least once for violence in the previous year. 35.4% reported to have felt lonely occasionally, 12.0% frequently, and 3.0% always

(Table 1).

11.8% and 26.0% of adolescents had suicidal ideation and depressive mood, respectively. The prevalence of suicidal ideation was higher in the always-lonely group (52.6%) than in the frequently-lonely group (35.1%). The prevalence of depressive mood was higher in the always-lonely adolescents (76.6%) than in the frequently-lonely ones (59.8%) (Table 2).

The odds of suicidal ideation were higher in 2021 than in 2020 (OR=1.1, 95% CI, 1.1 - 1.2). Females were more likely to have suicidal ideation (OR=1.4, 95% CI, 1.3 - 1.5) and to feel depressed (OR=1.1, 95% CI, 1.3 - 1.4) than males. Older teens aged 17 - 18 years were more likely to feel depressed than 12 years olds (OR=1.3 - 1.4). The likelihood of suicidal ideation and depressed mood was greatest in the lowest income class (OR=1.7, 95% CI, 1.5 - 2.0; OR=1.3, 95% CI, 1.2 - 1.5, respectively). Compared to living with family, living alone or with a friend (OR=1.6; 95% CI, 1.2 - 2.2) and in a welfare facility (OR=2.2; 95% CI, 1.3 - 2.9) significantly increased the odds of suicidal ideation. The risk of suicidal ideation was greater in the unhealthy adolescents than very healthy ones (OR=3.7; 95% CI, 2.9 - 4.6). Adolescents who were treated for 3 times or more for violence were nearly 6 times more likely to have suicidal ideation than those with no treatment (OR=6.1; 95% CI, 4.5 - 8.3). Always-lonely adolescents were nearly 30 times more likely to have suicidal

**Table 2. Prevalence of suicidal ideation and depressive mood by loneliness status**

(n=109,796)

	Loneliness status					Total
	Never	Rarely	Occasionally	Frequently	Always	
Total n (unweighted)	25,568	29,012	38,695	13,088	3,433	109,796
Total n (weighted)	605,316	697,931	931,583	314,936	80,972	2,630,738
Suicidal ideation						
Unweighted n (%)	571 (2.2)	1,305 (4.5)	4,666 (12.1)	4,573 (34.9)	1,820 (53.0)	12,935 (11.8)
Weighted n (%)	14,377 (2.4)	31,501 (4.5)	111,401 (12.0)	110,427 (35.1)	42,620 (52.6)	310,327(11.8)
Rao-Scott $\chi^2$	13,669.2					
p-value	<.001					
Depressive mood						
Unweighted n (%)	1,833(7.2)	3,782(13.0)	12,420 (32.1)	7,863 (60.1)	2,634(76.7)	28,532 (26.0)
Weighted n (%)	44,324 (7.3)	91,029(13.0)	297,768(32.0)	188,480 (59.8)	62,010 (76.6)	683,611 (26.0)
Rao-Scott $\chi^2$	18,089.8					
p-value	<.001					

Unweighted n is obtained from the sample. Weighted n is the population estimate adjusted for sampling weights.

**Table 3. Odds of suicidal ideation and depressive mood according to sociodemographic characteristics, health, and loneliness status**

Variables (reference)	Categories	Suicidal ideation				Depressive mood			
		OR	95% CI		p-value	OR	95% CI		p-value
Year (2020)	2021	1.1	1.0	1.2	<.001	1.0	1.0	1.0	.854
Sex (male)	Female	1.4	1.3	1.5	<.001	1.3	1.3	1.4	<.001
Age (12 years)	13	1.0	0.9	1.1	.919	1.0	0.9	1.1	.945
	14	1.1	0.9	1.2	.334	1.1	1.0	1.2	.016
	15	1.0	0.9	1.1	.639	1.2	1.1	1.3	.002
	16	0.9	0.8	1.1	.475	1.2	1.1	1.3	.007
	17	1.0	0.9	1.2	.943	1.3	1.1	1.5	<.001
18	1.0	0.8	1.2	.861	1.4	1.2	1.6	<.001	
School enrolled (high)	Middle	1.1	1.0	1.3	.039	1.1	1.0	1.2	.089
Household income class (highest)	Upper middle	1.0	0.9	1.1	.525	0.8	0.8	0.9	<.001
	Middle	0.9	0.9	1.0	.081	0.8	0.8	0.8	<.001
	Lower middle	1.3	1.1	1.4	<.001	0.9	0.9	1.0	.143
	Lowest	1.7	1.5	2.0	<.001	1.3	1.2	1.5	<.001
Living arrangement (living with family)	Living with relative	1.4	1.1	1.9	.016	1.0	0.8	1.2	.840
	Living alone or with friend	1.6	1.2	2.2	.004	1.2	1.0	1.6	.106
	Living in a dormitory	1.1	1.0	1.2	.171	0.9	0.8	1.0	.040
	Living in a welfare facility	2.0	1.3	2.9	.001	1.2	0.9	1.7	.275
Self-rated health (very healthy)	Healthy	1.2	1.1	1.3	<.001	1.0	1.0	1.1	.362
	Neutral	1.6	1.5	1.7	<.001	1.3	1.3	1.4	<.001
	Unhealthy	2.7	2.4	2.9	<.001	1.7	1.6	1.9	<.001
	Very unhealthy	3.7	2.9	4.6	<.001	2.2	1.7	2.8	<.001
No. of times treated for violence (none)	1	2.7	2.2	3.3	<.001	2.5	2.1	3.1	<.001
	2	4.4	3.2	6.0	<.001	3.1	2.2	4.3	<.001
	≥3	6.1	4.5	8.3	<.001	3.2	2.4	4.3	<.001
Loneliness status (never)	Rarely	1.8	1.6	2.0	<.001	1.8	1.7	2.0	<.001
	Occasionally	4.8	4.3	5.3	<.001	5.5	5.2	5.8	<.001
	Frequently	17.0	15.3	18.8	<.001	16.1	15.0	17.3	<.001
	Always	30.7	27.1	34.8	<.001	32.6	29.2	36.4	<.001
Observations		109,521				109,521			
AIC		1,540,579				2,493,665			
-2 Log L		1,540,521				2,493,627			

Abbreviations: OR, odds ratio; CI, confidence intervals, AIC, Akaike information criterion.

ideation (OR=30.7; 95% CI, 27.1 – 34.8) and to feel depressed (OR=32.5; 95% CI, 29.2 – 36.4) than adolescents who felt never lonely (Table 3).

#### 4. Discussion

This study estimates that 15.0% of Korean adolescents feel lonely either frequently or always. This prevalence is more or less comparable to that in other countries: 15.6% in Northern Ireland [19] and 15.3% in four Caribbean countries [20]. 12.7% of Australian adolescents reported feeling lonely 3 or more times a week [21]. However, among Danish adolescents, only 6.3% reported feeling lonely,

although the prevalence has increased in recent decades [22]. Exploring why the prevalence is lower in some countries than others would potentially provide clues to the efforts of monitoring and controlling the loneliness epidemic.

This present study further showed that loneliness is strongly associated with an increased risk of suicidal ideation and depressive mood, which is consistent with the findings of earlier research in other countries [11,17,23]. Although evidence on the link between loneliness and mental health is abundant across cultures [17], little has been known among Korean adolescents, especially in the

context of COVID-19 when social distancing measures were strictly imposed. In that regard, the findings of this study contribute to the literature. Moreover, this study showed that the growing intensity of loneliness was associated with an increased risk of suicidal ideation and depressed mood. In other words, as the degree of loneliness increased, the odds of suicidal ideation and depressed mood magnified substantially. This finding suggests the importance of addressing the condition of loneliness in the efforts to improve psychological well-being of adolescents in Korea.

In addition to loneliness, violence victimization appears to play a role in suicidal ideation and depressive mood. In this study, the number of times that adolescents were treated for violence increased the risk of suicidal ideation and depressive mood. Similarly, experiences of bullying and violence were strong risk factors for suicidal ideation and depression among adolescents in many countries [24-27]. The risk of suicidal ideation was increased by being exposed to any violence, sexual or physical, and even just witnessing one in US adolescents [28]. Furthermore, the severity of victimization increased the risk of suicidal ideation and deliberate self-harm among Belgian adolescents [29]. These findings suggest that any incremental efforts to address violence victimization would be beneficial to reduce suicidal ideation in Korean adolescents.

In this study, adolescents living in a welfare facility were at an elevated risk of suicidal ideation than those living with family. This finding is consistent with that of a previous study in Korea [2] and in the United Kingdom [30]. A study reports that Korean adolescents who found it easy to share concerns with a parent were less likely to have depressive mood [31]. These findings suggest that living with family may provide a mental health benefit.

In this present study, additional factor that could predict the risk of suicidal ideation and depressive

mood was shown to be self-rated health. In particular, poor health increased the odds of suicidal ideation nearly four-fold compared to the very healthy state. The potentially significant role of adolescents' subjective general health in their mental well-being was also elucidated in earlier studies [8, 12].

This present study showed that the risks of suicidal ideation and depressive mood among adolescents were influenced by demographic characteristics, such as age, sex, and household income, which was consistent with the findings from studies in the United States [28], Taiwan [25], and beyond [5]. These findings suggest that interventions to prevent suicidal ideation and depressive mood among adolescents should target loneliness as a risk factor. Moreover, in order to develop effective prevention programs, efforts should be directed to identify vulnerable adolescents based on sociodemographic and other factors, such as living arrangement and exposure to violence.

Based on a large sample of adolescents surveyed in 2020 and 2021, this study elucidated the relationship between loneliness and mental health issues, such as suicidal ideation and depressive mood. However, this study also has the following limitations. First, the cross-sectional nature of the study precludes drawing causal inferences between loneliness and the outcome measures. Second, this study relied on retrospective self-reports and thus is susceptible to recall bias. Third, this study used data on one-item loneliness scale. Therefore, this study could not capture the varied dimensions of loneliness that were often reported in the existing literature [17].

## 5. Conclusion

Based on a large sample of data collected in 2020 and 2021, this study revealed that loneliness was a major risk factor for suicidal ideation and

depressive mood among Korean adolescents. Furthermore, exposure to violence and being placed at a welfare facility increased the risk of suicidal ideation and depressive symptoms, suggesting potential areas for interventions to improve mental health among adolescents. Monitoring and addressing the condition of loneliness may help reduce suicidal ideation and depressive mood among Korean adolescents.

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