



# Suicide Attempts and Contributing Factors among South and North Korean-Family Youth Using the Korean Youth Risk Behavior Web-based Survey

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**Objectives:** There is an increasing number of North Korean adolescents in South Korea. These adolescents need clinical attention as they experience a high risk of suicidal behavior because of the childhood adversity and acculturative challenges that they face before and after arriving in South Korea. This study assessed the risk of suicide attempts among North Korean adolescents compared to South Korean adolescents, and investigated the contributing factors for each group.

**Methods:** We used data from the Korean Youth Risk Behavior Web-Based Survey (KYRBS) spanning 2011 to 2018, in which 404 adolescents had a father and/or mother who was a North Korean native. Data on 1,212 propensity-matched South Korean adolescents were extracted from the 2011 to 2018 KYRBS. Prevalence was calculated and compared by group. Separate odds ratios were calculated by group.

**Results:** The North Korean group had a significantly higher suicide attempt rate [unadjusted odds ratio (OR)=8.27; adjusted OR=8.45]. Multivariate analysis indicated that having a low or high socioeconomic status and depressive symptoms were significantly associated with suicide attempts in North Korean adolescents, while being female, having a high socioeconomic status, alcohol use, and depressive symptoms were significantly related to suicide attempts in South Korean adolescents.

**Conclusion:** The results found similarities and differences in the factors associated with the likelihood of suicide attempts in the two groups. From these results, different approaches are needed when planning interventions for each group.

**Key Words:** North Korean-family; Adolescent; Suicide attempt; Contributing factors; KYRBS.

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## INTRODUCTION

Approximately 3,000 North Korean refugees settle in South Korea annually and, as of 2016, the total number of North Korean refugees or former refugees residing in South Korea exceeded 30,000 [1]. In the past, the vast majority of North Korean refugees were men seeking political asylum; however, the numbers of North Korean women and children seeking refuge have been increasing [2]. Recent statistics indicate that approximately 40% of all North Korean refugees in Korea are 10–29 years old [1].

North Korean adolescent refugees have often been exposed to and traumatized by terrible events in their life in North Korea, during their escape, and/or while settling in South Korea. In North Korea, many of them experienced malnutrition and physical or sexual violence [3]. During the escape, they en-

dured the fear of being caught and imprisoned [4]. Since they entered South Korea, these adolescents have faced difficulties in adjusting to and dealing with culture shock, prejudice and discrimination, and poverty, and, consequently, their school dropout rates are high [4]. A considerable number of previous studies [5,6] found that these adolescents have mental health problems, including depression, post-traumatic stress disorder, anxiety, and other emotional and behavioral problems. Moreover, North Korean adolescent refugees have higher rates of suicidal ideation [7] compared to South Korean adolescents. Therefore, the mental health of North Korean adolescent refugees needs to be given greater clinical attention.

One previous study [8] reported that 34% of people with suicidal ideations devise suicide plans and 72% of those who make such plans attempt suicide. Therefore, it is important to develop interventions to prevent suicidal behaviors. As the number of North Korean adolescent refugees in South Korea is increasing annually, it is important to investigate this group and the factors related to their suicide attempts. One recent

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study examined suicidal ideation and related factors among North Korean adolescent refugees [9], and another one [10] investigated the prevalence of suicide attempts among this group. Contributing factors associated with suicide attempts have been separately investigated for North Korean refugee adolescents and South Korean adolescents, since both groups have varied childhood experiences. However, to the best of our knowledge, no studies have jointly investigated suicide attempts and the contributing factors among North Korean adolescents living in South Korea, and compared them to those of their South Korean counterparts. Therefore, this study examined suicide attempts and the related factors among South and North Korean adolescents in families using data from the 2011–2018 Korean Youth Risk Behavior Web-Based Survey (KYRBS) [11].

## METHODS

### Participants

Data for this study were derived from the 2011–2018 KYRBS [11]. Since 2005, the KYRBS has been conducted annually by the national Ministry of Education, the Ministry of Health and Welfare, and the Korea Centers for Disease Control and Prevention. Its main objective is to obtain knowledge about various aspects of the health status of adolescents in South Korea. To ensure the representativeness of the annual samples, the KYRBS uses a stratified sampling and proportional allocation method to collect data from 800 middle and high schools (400 each) at 44 locations. The students voluntarily participate in the self-report web-based survey, which they complete and submit in their schools' computer laboratories. Further, the survey is completed anonymously. Of the 550,221 respondents of the KYRBS from 2011 to 2018, data from 404 adolescents who had a mother and/or father of North Korean origin were pooled. A propensity score matching method was used to balance the two groups' observed demographic covariates (South vs. North Korean-family), and propensity-matched samples were extracted for analysis. Propensity scores were extracted through logistic regression; subsequently, propensity score matching was performed using the nearest neighbor matching method. Three times as many South Korean adolescents as adolescents from North Korean families were sampled using sex, survey year, school year, and place of residence as the matching variables. In total, data from 1,616 students (1,212 adolescents from South Korean families and 404 adolescents from North Korean families, 976 of whom were male and 640 females, with a mean age of  $15.3 \pm 1.74$  years) were used in the analysis. The Institutional Review Board of the Korea Centers for Disease Control and Prevention approved the KYRBS (2014-06EXP-02-P-A).

### Measurements

#### Parents' nativity

This was assessed by "yes" or "no" answers to the question: "Was your father (mother) born in South Korea?" Respondents were grouped into South Korean families (both parents born in South Korea) or North Korean families (at least one parent born in North Korea).

#### Suicide attempts

Suicide attempts were assessed using the responses to the question: "Have you attempted suicide during the past 12 months?" Response options were "yes" or "no."

#### Alcohol use or tobacco use

This was assessed by responses to the questions: "Have you used alcohol during the past 12 months?" and "Have you smoked even one puff of a cigarette, cigar, or pipe during the past 12 months?" Response options to both questions were "yes" or "no."

#### Health status

Health status was measured by three variables (self-perceived global health, satisfaction with sleep, and self-assessed depression). Self-perceived health was assessed using the responses to the following global question: "What do you usually think about your health condition?" Response options were on a five-point scale, where 1=very healthy, 2=healthy, 3=average, 4=unhealthy, and 5=very unhealthy. Self-perceived sleep satisfaction was assessed with the responses to the following question: "In the last week, how satisfactory was your sleep in terms of relieving your fatigue?" and response options were rated on a five-point scale, where 1=very satisfactory, 2=satisfactory, 3=average, 4=unsatisfactory, and 5=very unsatisfactory. Those who chose options "1" or "2" for both questions were identified as "healthy" or "satisfied," respectively. Depressive symptoms were assessed with responses to the following question: "During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more, that you stopped doing some of your usual activities?" and the response options were "yes" or "no."

#### Six sociodemographic characteristics

The sociodemographic variables were sex, school year (from seventh through twelfth year, i.e., middle school first year through high school third year), place of residence (large, small or mid-sized city, or rural area), and household type (has a nuclear family or lives with other relatives, with friends/alone/in a dormitory, or in a facility). Perceived family socioeconomic status and perceived academic achievement were

assessed on five-point Likert-type scales. Responses were categorized as 1=low, 2, 3=middle, and 4, 5=high.

**Statistical analysis**

The South and North Korean respondents were compared according to their personal characteristics using independent t-tests and chi-squared tests for contingency as appropriate. Logistic regression analysis was performed to determine the likelihood of suicide attempts between the groups while and without controlling for the effects of sex, school year, place of residence, and survey year. Bivariate logistic regression was performed to estimate the odds ratios (OR) of the variables associated with suicide attempts for each group, and the OR and 95% confidence intervals (CIs) were calculated. Subse-

quently, to elucidate net relationships of sociodemographic variables to suicide attempts with contributing variables, multivariate logistic regression was performed, with suicide attempts as the dependent variable and each sociodemographic or contributing variable as the main independent variable, while controlling for confounding variables. SAS 9.3 (SAS Institute, Cary, NC, USA) was used for the analyses. Any p-values of less than 0.05 were considered statistically significant.

**RESULTS**

Table 1 shows the distributions of the North and South Korean respondents' personal characteristics. There were no statistically significant group differences in terms of sex, school year, place of residence, or survey year. Table 2 presents the suicide attempt rates of North and South Korean-family adolescents. Seventy-four (18.32%) of the 404 North Korean adolescents and 32 (2.64%) of the 1,212 South Korean adolescents had attempted suicide at least once during the past 12 months, and the difference was statistically significant (unadjusted OR=8.27, 95% CI 5.37–12.74; adjusted OR=8.45, 95% CI 5.47–13.06).

Table 3 presents the ORs of the sociodemographic and contributing variables to the likelihood of suicide attempts among the North Korean adolescents. The statistically significant findings are as follows. The respondents who lived with friends, alone, or in dormitories, and the respondents who lived in facilities exhibited 2.6 times and 3.57 times higher risks of suicide attempts, respectively, compared to those who lived in nuclear families. Respondents who lived with a North Korean father were 3.38 times more likely to attempt suicide compared to those who lived with a North Korean mother. The respondents who reported higher or lower socioeconomic status, and those with higher or lower academic achievement exhibited higher risks of suicide attempts than those in the middle range. Alcohol use, tobacco use, and depressive symptoms increased the risk (3.46, 3.21, and 8.81 times, respectively) of suicide attempt relative to non-users and those without depressive symptoms. Further, low perceived health and sleep dissatisfaction increased the risk of suicide attempt compared to the reference groups. Multivariate analyses indicated that living with friends/alone/in a dormitory, low socioeconomic status, and depressive symptoms significantly increased the risk of suicide attempt (compared

**Table 1.** Personal characteristics of North Korean (N=404) and South Korean (N=1,212) family adolescents

| Variable                | North Korean-family, N (%) | South Korean-family, N (%) | p-value |
|-------------------------|----------------------------|----------------------------|---------|
| Sex*                    |                            |                            | >0.99   |
| Male                    | 244 (60.4)                 | 732 (60.4)                 |         |
| Female                  | 160 (39.6)                 | 480 (39.6)                 |         |
| Age [mean (SD)]†        | 15.7 (1.8)                 | 15.2 (1.7)                 | <0.0001 |
| School year*            |                            |                            | >0.99   |
| Middle school 1st       | 43 (10.64)                 | 129 (10.64)                |         |
| Middle school 2nd       | 66 (16.34)                 | 198 (16.34)                |         |
| Middle school 3rd       | 77 (19.06)                 | 231 (19.06)                |         |
| High school 1st         | 68 (16.83)                 | 204 (16.83)                |         |
| High school 2nd         | 65 (16.09)                 | 195 (16.09)                |         |
| High school 3rd         | 85 (21.04)                 | 255 (21.04)                |         |
| Place of residence*     |                            |                            | >0.99   |
| Large city              | 180 (44.55)                | 540 (44.55)                |         |
| Small or mid-sized city | 195 (48.27)                | 585 (48.27)                |         |
| Rural area              | 29 (7.18)                  | 87 (7.18)                  |         |
| Survey year*            |                            |                            | >0.99   |
| 2011                    | 44 (10.89)                 | 132 (10.89)                |         |
| 2012                    | 38 (9.41)                  | 114 (9.41)                 |         |
| 2013                    | 78 (19.31)                 | 234 (19.31)                |         |
| 2014                    | 46 (11.39)                 | 138 (11.39)                |         |
| 2015                    | 47 (11.63)                 | 141 (11.63)                |         |
| 2016                    | 44 (10.89)                 | 132 (10.89)                |         |
| 2017                    | 52 (12.87)                 | 156 (12.87)                |         |
| 2018                    | 55 (13.61)                 | 165 (13.61)                |         |

\*t-test, †chi-square test

**Table 2.** Proportions and odd ratios of suicide attempts by North Korean (N=404) and South Korean (N=1,212) family adolescents

| Variable        | North Korean-family, N (%) | South Korean-family (reference), N (%) | Unadjusted odds ratio (95% CI) | Adjusted odds ratio* (95% CI) |
|-----------------|----------------------------|--|--------------------------------|-------------------------------|
| Suicide attempt | 74 (18.32)                 | 32 (2.64)                              | 8.27 (5.37–12.74)              | 8.45 (5.47–13.06)             |

\*adjusted for sex, school years, place of residence, and survey year

to the reference groups) among the North Korean-family adolescents. Table 4 presents the results of the identical analysis performed on the South Korean-family adolescents, which found that females exhibited a higher risk of suicide attempt

compared to males, and those having a lower socioeconomic status had a higher risk of suicide attempt than those with a middle socioeconomic status. Alcohol and tobacco use increased the risk of suicide attempt compared to non-users,

**Table 3.** The risk of suicide attempt in the past year among North Korean-family adolescents (N=404)

| Variable                     | Suicide attempt |             | Unadjusted odds ratio<br>(95% CI) | Adjusted odds ratio*<br>(95% CI) |
|------------------------------|-----------------|-------------|-----------------------------------|----------------------------------|
|                              | Yes, N (%)      | No, N (%)   |                                   |                                  |
| School year                  | 74 (18.32)      | 330 (81.68) | 0.96 (0.83–1.12)                  | 0.85 (0.62–1.16)                 |
| Sex                          |                 |             |                                   |                                  |
| Male (reference)             | 45 (11.14)      | 199 (49.26) |                                   |                                  |
| Female                       | 29 (7.18)       | 131 (32.43) | 0.98 (0.58–1.64)                  | 0.91 (0.32–2.57)                 |
| Place of residence           |                 |             |                                   |                                  |
| Rural (reference)            | 9 (2.23)        | 20 (4.95)   |                                   |                                  |
| Small or mid-sized city      | 33 (8.17)       | 162 (40.1)  | 0.45 (0.19–1.08)                  | 0.63 (0.1–4.19)                  |
| Large city                   | 32 (7.92)       | 148 (36.63) | 0.48 (0.2–1.15)                   | 0.17 (0.03–1.15)                 |
| Father's education           |                 |             |                                   |                                  |
| College degree or more (ref) | 19 (4.70)       | 56 (13.86)  |                                   |                                  |
| High school diploma or less  | 34 (8.42)       | 141 (34.9)  | 0.71 (0.37–1.35)                  | 0.32 (0.09–1.08)                 |
| Mother's education           |                 |             |                                   |                                  |
| College degree or more (ref) | 10 (2.48)       | 73 (18.07)  |                                   |                                  |
| High school diploma or less  | 38 (9.41)       | 153 (37.87) | 1.81 (0.86–3.84)                  | 1.92 (0.49–7.47)                 |
| Household type               |                 |             |                                   |                                  |
| Nuclear family (ref)         | 29 (7.18)       | 207 (51.24) |                                   |                                  |
| Other relatives              | 6 (1.49)        | 33 (8.17)   | 1.3 (0.5–3.37)                    | 0.38 (0.05–2.81)                 |
| Friends, alone, or dormitory | 16 (3.96)       | 44 (10.89)  | 2.6 (1.3–5.18) <sup>†</sup>       | 1.58 (0.41–6.14)                 |
| Facility                     | 23 (5.69)       | 46 (11.39)  | 3.57 (1.89–6.73) <sup>‡</sup>     | 1 (0.28–3.62)                    |
| Socioeconomic status         |                 |             |                                   |                                  |
| High                         | 18 (4.46)       | 79 (19.55)  | 2.06 (1.05–4.05) <sup>†</sup>     | 5.42 (1.07–27.33) <sup>†</sup>   |
| Middle (reference)           | 22 (5.45)       | 199 (49.26) |                                   |                                  |
| Low                          | 34 (8.42)       | 52 (12.87)  | 5.91 (3.19–10.96) <sup>‡</sup>    | 15.02 (3.22–69.99) <sup>‡</sup>  |
| Academic achievement         |                 |             |                                   |                                  |
| High                         | 29 (7.18)       | 96 (23.76)  | 2.51 (1.35–4.67) <sup>‡</sup>     | 1.79 (0.36–8.89)                 |
| Middle (reference)           | 20 (4.95)       | 166 (41.09) |                                   |                                  |
| Low                          | 25 (6.19)       | 68 (16.83)  | 3.05 (1.59–5.86) <sup>‡</sup>     | 1.02 (0.21–5.08)                 |
| Alcohol use                  | 61 (15.10)      | 190 (47.03) | 3.46 (1.83–6.54) <sup>‡</sup>     | 1.65 (0.41–6.67)                 |
| Tobacco use                  | 52 (12.87)      | 140 (34.65) | 3.21 (1.86–5.53) <sup>‡</sup>     | 3.34 (0.93–11.98)                |
| Type of family               |                 |             |                                   |                                  |
| North Korean mother (ref)    | 20 (4.95)       | 164 (40.59) |                                   |                                  |
| North Korean father          | 42 (10.40)      | 102 (25.25) | 3.38 (1.88–6.07) <sup>‡</sup>     | 0.78 (0.24–2.58)                 |
| Both North Korean parents    | 12 (2.97)       | 64 (15.84)  | 1.54 (0.71–3.33)                  | 0.51 (0.12–2.14)                 |
| Perceived health             |                 |             |                                   |                                  |
| Not healthy (reference)      | 14 (3.47)       | 25 (6.19)   |                                   |                                  |
| Healthy                      | 60 (14.85)      | 305 (75.5)  | 0.35 (0.17–0.72) <sup>‡</sup>     | 0.54 (0.13–2.18)                 |
| Sleep satisfaction           |                 |             |                                   |                                  |
| Not satisfied (reference)    | 43 (10.64)      | 131 (32.43) |                                   |                                  |
| Satisfied                    | 31 (7.67)       | 199 (49.26) | 0.48 (0.28–0.79) <sup>‡</sup>     | 1.35 (0.48–3.79)                 |
| Depressive symptoms          | 60 (14.85)      | 108 (26.73) | 8.81 (4.71–16.47) <sup>‡</sup>    | 19.13 (5.55–65.96) <sup>‡</sup>  |

\*adjusted for the effects of school year, sex, place of residence, father's education, mother's education, household type, socioeconomic status, academic achievement, alcohol use, tobacco use, family type, perceived health, sleep satisfaction, and depressive symptoms, <sup>†</sup>p<0.05, <sup>‡</sup>p<0.01

and those with depressive symptoms had a higher risk of suicide attempt than those without such symptoms.

## DISCUSSION

We investigated the likelihoods of suicide attempt among North and South Korean adolescents, and the contributing factors using data derived from the 2011–2018 KYRBS. Our

results indicated that youth from North Korean families had higher risk of suicide attempts compared to their South Korean counterparts. This result is consistent with a previous retrospective cohort study [12] reporting that those who experienced childhood adversity had a two to five times higher risk of suicide attempt compared to those without adverse childhood experiences. The distress, maltreatment, and adversity that North Korean youth experience in North Korea,

**Table 4.** The risk of suicide attempt in the past year among South Korean-family adolescents (N=1,212)

| Variable                     | Suicide attempt |               | Unadjusted odds ratio<br>(95% CI) | Adjusted odds ratio*<br>(95% CI) |
|------------------------------|-----------------|---------------|-----------------------------------|----------------------------------|
|                              | Yes, N (%)      | No, N (%)     |                                   |                                  |
| School year                  | 32 (2.64)       | 1,180 (97.36) | 0.97 (0.78–1.20)                  | 0.98 (0.71–1.36)                 |
| Sex                          |                 |               |                                   |                                  |
| Male (ref)                   | 9 (0.74)        | 723 (59.65)   |                                   |                                  |
| Female                       | 23 (1.90)       | 457 (37.71)   | 4.04 (1.85–8.81) <sup>‡</sup>     | 3.76 (1.35–10.49) <sup>‡</sup>   |
| Place of residence           |                 |               |                                   |                                  |
| Rural (ref)                  | 1 (0.08)        | 86 (7.1)      |                                   |                                  |
| Small or mid-sized city      | 20 (1.65)       | 565 (46.62)   | 3.04 (0.4–22.95)                  | 1.93 (0.2–18.24)                 |
| Large city                   | 11 (0.91)       | 529 (43.65)   | 1.79 (0.23–14.01)                 | 2.08 (0.21–20.18)                |
| Father's education           |                 |               |                                   |                                  |
| College degree or more (ref) | 17 (1.40)       | 575 (47.44)   |                                   |                                  |
| High school diploma or less  | 8 (0.66)        | 393 (32.43)   | 0.69 (0.29–1.61)                  | 0.49 (0.14–1.72)                 |
| Mother's education           |                 |               |                                   |                                  |
| College degree or more (ref) | 12 (0.99)       | 486 (40.1)    |                                   |                                  |
| High school diploma or less  | 13 (1.07)       | 481 (39.69)   | 1.10 (0.49–2.42)                  | 1.13 (0.36–3.55)                 |
| Household type               |                 |               |                                   |                                  |
| Nuclear family (ref)         | 32 (2.64)       | 1,135 (93.65) |                                   |                                  |
| Other relatives              | 0 (0)           | 8 (0.66)      |                                   |                                  |
| Friends, alone, or dormitory | 0 (0)           | 35 (2.89)     |                                   |                                  |
| Facility                     | 0 (0)           | 2 (0.17)      |                                   |                                  |
| Socioeconomic status         |                 |               |                                   |                                  |
| High                         | 5 (0.41)        | 99 (8.17)     | 2.39 (0.89–6.46)                  | 4.25 (1.15–15.72) <sup>‡</sup>   |
| Middle (ref)                 | 22 (1.82)       | 1,043 (86.06) |                                   |                                  |
| Low                          | 5 (0.41)        | 38 (3.14)     | 6.24 (2.24–17.36) <sup>‡</sup>    | 5.26 (0.87–31.86)                |
| Academic achievement         |                 |               |                                   |                                  |
| High                         | 6 (0.50)        | 143 (11.8)    | 1.79 (0.71–4.52)                  | 1.46 (0.38–5.56)                 |
| Middle (ref)                 | 21 (1.73)       | 897 (74.01)   |                                   |                                  |
| Low                          | 5 (0.41)        | 140 (11.55)   | 1.53 (0.57–4.11)                  | 0.75 (0.16–3.59)                 |
| Alcohol use                  | 25 (2.06)       | 522 (43.07)   | 4.50 (1.93–10.49) <sup>‡</sup>    | 4.89 (1.39–17.27) <sup>‡</sup>   |
| Tobacco use                  | 14 (1.16)       | 213 (17.57)   | 3.5 (1.73–7.21) <sup>‡</sup>      | 1.56 (0.54–4.53)                 |
| Perceived health             |                 |               |                                   |                                  |
| Not healthy (ref)            | 4 (0.33)        | 58 (4.79)     |                                   |                                  |
| Healthy                      | 28 (2.31)       | 1,122 (92.57) | 0.36 (0.12–1.07)                  | 1.47 (0.22–9.72)                 |
| Sleep satisfaction           |                 |               |                                   |                                  |
| Not healthy (ref)            | 17 (1.40)       | 487 (40.18)   |                                   |                                  |
| Healthy                      | 15 (1.24)       | 693 (57.18)   | 0.62 (0.31–1.25)                  | 1.14 (0.42–3.09)                 |
| Depressive mood              | 24 (1.98)       | 316 (26.07)   | 8.20 (3.65–18.45) <sup>‡</sup>    | 6.85 (2.28–20.58) <sup>‡</sup>   |

\*adjusted for the effects of school year, sex, place of residence, father's education, mother's education, household type, socioeconomic status, academic achievement, alcohol use, tobacco use, family type, perceived health, sleep satisfaction, and depressive symptoms, <sup>‡</sup>p<0.05, <sup>†</sup>p<0.01

during their escape, and after settling in South Korea could be the underlying causes affecting their higher risk of suicide attempt.

We then examined factors that contributed to suicide attempt by family type (North vs. South Korean-family). Some factors were similar in both groups, such as low socioeconomic status, alcohol use, tobacco use, and having depressive symptoms. However, the contributions of other factors were different between the two groups. Specifically, high socioeconomic status, high academic achievement, and household type increased the risk while perceived health and sleep satisfaction decreased the risk of suicide attempt among the North Korean adolescent respondents (compared to the reference groups), whereas South Korean-family female adolescents had higher risk of suicide attempt than males.

A low socioeconomic status has consistently been associated with suicidal behaviors [13]. Our results found that a low socioeconomic status increased the risk of suicide attempt for both groups of adolescents, which could possibly be explained by their social disadvantages. Our data also revealed that alcohol and tobacco use increased the risk of suicide attempt for both groups of adolescents, supporting the results of previous studies, a considerable number of which found that alcohol and tobacco use were associated with suicidal behaviors [14,15]. According to a meta-analysis [15], the ORs of smokers with suicidal behaviors (i.e., suicidal ideation, suicide plans, and suicide attempts) ranged from 2.05 to 2.84. The association between smoking and suicidal behaviors is believed to be explained by unobserved confounding factors between the two variables [16]. A previous study [14] conducted in Korea found that binge drinking was a major factor associated with suicidal behaviors among Korean adolescents. Our results also found a higher risk of suicide attempt among adolescents (in both groups) who had consumed alcohol (at least one time) during the past year, which suggests that even a small amount of alcohol consumption may relate to suicidal behaviors in Korean youth. These results do not necessarily imply a causal relation between tobacco or alcohol use and suicidal behavior, but do show that these behaviors help explain suicidal behavior.

Our analyses found that depressive symptoms increased the risk of suicide attempt for both groups of adolescents. Kerr et al. [17] found that adolescents' depressive symptoms independently influenced suicidal behavior. Arguably, the South Korean respondents' suicide attempts could be related to cultural factors, such as academic stress, psychological distress, and feelings of worthlessness [18]. The North Korean respondents' traumatic experiences, forced repatriation, acculturative stress, and assimilation obstacles have been associated with their poor mental health [5], which might increase

their risk of suicide attempt.

A distinct factor contributing to the risk of suicide attempt for the North Korean respondents was household type (i.e., living with friends, alone, or in a dormitory or living in a facility). Previous studies have also found that household type was associated with the risk of suicidal behaviors; for example, one recent study [19] found that children and adolescents in care settings (e.g., foster care, kinship care, and so on) had higher risk of suicide attempt. This increased risk could be explained by these children's relatively high exposure to risk factors such as physical or sexual abuse, neglect, or family disorganization [20]. Moreover, North Korean refugees living with family members have fewer psychiatric problems than those living separately [21]; family situation may greatly affect North Korean refugee youth's risk of suicide attempt. This finding supports Park et al. [9], who found that weaker family cohesion increased suicidal ideation in North Korean refugee youth in South Korea.

We also found that having a North Korean father (but not mother) was associated with a higher risk of suicide attempt compared to having a North Korean mother (but not father). It is often difficult for North Korean refugees to find employment in Korea because of prejudice against them [20]. Even when they find work, they are paid less than South Koreans for equivalent labor; the average monthly incomes of a North Korean refugee and South Korean national are approximately USD 2,280 and 3,070, respectively [22]. In addition, Korean marriage patterns tend to lean toward women marrying men who have a higher socioeconomic status (i.e., hypergamous) [23]. Therefore, adolescents with North Korean refugee fathers seem relatively likely to have lower family socioeconomic status, which may, in turn, increase their risk of suicide attempt [24] compared to those with a North Korean refugee mother married to a South Korean.

The North Korean respondents with high socioeconomic status and those with low or high academic achievement had higher risks of suicide attempt than those in the middle categories. Socioeconomic status and academic achievement have been inversely related to suicidal behavior [13]. However, our results were not linear, as those with high socioeconomic status and academic achievement had higher risks of suicide attempt than those in the mid-range. One way that North Koreans can improve their social status in South Korea is through educational attainment; however, those who attend school suffer from adaptation difficulties [4]. South Korean adolescents face strong academic pressures and stressors that have been related to suicidal behavior [25], and a major stressor among high socioeconomic status adolescents in Korea seems to be academic pressure [26]. Therefore, along with the other obstacles faced by North Korean-family ado-

lescents as they adapt to South Korea, academic stress could be an additional factor contributing to a higher risk of suicide attempt.

Relatively good perceived health and sleep satisfaction were associated with a lower risk of suicide attempt among the North Korean respondents compared to those with poor perceived health and poor sleep. A previous study by Isaac et al. [27] found that low health-related self-efficacy was associated with lifetime and recent suicidal ideation, attempts, and future intentions. Further, based on the results of a longitudinal study [28], poor perceived sleep quality may correlate with increased risk of suicide after controlling for the effect of depressive symptoms. These previous studies imply that better perceived health and sleep protect North Korean-family adolescents from the risk of suicide attempt. One problem among North Korean-family adolescents is that they are more likely to experience childhood adversity involving malnutrition, leading to their physical condition and growth being lower than that of South Korean adolescents [4]. Therefore, self-perceived health and sleep satisfaction may have more influence on the risk of suicide attempt for them than their South Korean counterparts.

A distinct contributing factor to suicide attempt in the South Korean group was sex such that females had a higher risk of suicide attempt than males. A previous study [29] investigated the trends in suicide among Korean adolescents and found that the suicide rate began increasing among females but not males in 2000. Perhaps female adolescents are more sensitive than male adolescents to the combination of risk factors that they face, such as depressive symptoms, academic stress, and school violence [30].

We performed a multivariate analysis because suicidal behaviors are inter-correlated. This analysis revealed that the confounding variables, socio-economic status (low and high) and depressive symptoms, still influenced the likelihood of suicide attempt (compared to the reference groups) in the North Korean group. Among the South Korean respondents, being female, a high socioeconomic status, alcohol use, and having depressive symptoms were associated with a relatively higher risk of suicide attempt. When the influences of the confounding variables were controlled, a high socio-economic status was significantly associated with a higher risk of suicide attempt. This association could be explained by the academic stress experienced by adolescents who come from families with high socio-economic status in Korea [25]. The factors were clearly different compared to those that physicians and other experts tend to consider when developing interventions against youth suicide in Korea.

Despite its valuable findings, this study had several limitations. First, its data were cross-sectional and hence, we could

not draw causal inferences about the statistical results. Second, a considerable number of the variables were measured using one question, such as the measure of depressive symptoms. Future studies should use other tools or questionnaires and attempt to replicate our findings. Subsequently, our data were self-ratings, and, therefore, the responses might be biased.

## CONCLUSION

This study examined differences in suicide attempt between South and North Korean-family adolescents residing in South Korea. We have found statistically significant factors contributing to the risk of suicide attempt for each group. Some factors were similar, and others were distinctly different between the two groups of adolescents. These similarities and differences need to be integrated into interventions aimed at suicide prevention. In particular, interventions for North Korean-family adolescents should consider their socioeconomic status (particularly low socioeconomic status) along with a focus on depressive symptoms.

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### Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

### Author Contributions

Conceptualization: Subin Park, Soo Jung Rim. Data curation: Subin Park, Min Geu Lee. Formal analysis: Min Geu Lee. Funding acquisition: Subin Park. Investigation: Subin Park, Soo Jung Rim, Min Geu Lee. Methodology: Min Geu Lee. Project administration: Subin Park. Supervision: Subin Park. Validation: Soo Jung Rim. Visualization: Soo Jung Rim. Writing—original draft: Soo Jung Rim. Writing—review & editing: Subin Park.

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