J Korean Med Sci. 2024 Dec 2;39(46):e289
https://doi.org/10.3346/jkms.2024.39.e289
eISSN 1598-6357·pISSN 1011-8934

JKMS

Original Article
Medicine General & Health Policy

Risk Factors for Multiple Suicide Attempts in Adolescents From 10 Years Suicide Repository

Sunghwan Kim [1] **Eun-Young Yang** [2] **Kyoung Ho Choi** [3] **Hae Kook Lee** [2] **Yong-Sil Kweon** [2] and **Kyoung-Uk Lee** [2]

[1]Department of Psychiatry, Yeouido St. Mary's Hospital, The Catholic University of Korea, Seoul, Korea
[2]Department of Psychiatry, Uijeongbu St. Mary's Hospital, The Catholic University of Korea, Seoul, Korea
[3]Department of Emergency Medicine, Uijeongbu St. Mary's Hospital, The Catholic University of Korea, Seoul, Korea

OPEN ACCESS

Received: May 6, 2024
Accepted: Aug 20, 2024
Published online: Sep 9, 2024

Address for Correspondence:
Kyoung-Uk Lee, MD, PhD
Department of Psychiatry, Uijeongbu St. Mary's Hospital, The Catholic University of Korea College of Medicine, 271 Cheonbo-ro, Uijeongbu 11765, Republic of Korea.
Email: mindcure@catholic.ac.kr

© 2024 The Korean Academy of Medical Sciences.
This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (https://creativecommons.org/licenses/by-nc/4.0/) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ORCID iDs
Sunghwan Kim
https://orcid.org/0000-0001-6455-4369
Eun-Young Yang
https://orcid.org/0000-0002-2913-4489
Kyoung Ho Choi
https://orcid.org/0000-0003-2301-2250
Hae Kook Lee
https://orcid.org/0000-0002-3941-2980
Yong-Sil Kweon
https://orcid.org/0000-0001-5638-6350
Kyoung-Uk Lee
https://orcid.org/0000-0002-4505-9722

ABSTRACT

Background: While there are many studies on adolescents' suicide attempts in the western countries, studies on adolescent suicide in South Korea are relatively scarce. We compared demographical and clinical variables between the first and multiple suicide attempters and examined potential risk factors predicting multiple suicide attempts.
Methods: Two hundred forty-eight suicide attempters aged from 11 to 19 years old who visited emergency department of Uijeongbu St. Mary's Hospital, South Korea were recruited and divided into two groups: first attempter (n = 139, 56%) and multiple attempter (n = 109, 44%). A psychiatric interview with the Brief Emergency Room Suicide Risk Assessment were administered to all participants, and univariate analyses to compare characteristics of the two group and a multivariable logistic regression analysis to predict multiple suicidal attempts were performed.
Results: Our results showed multiple suicide attempters were mostly female (78%), more severe in psychopathology (e.g., higher rate of psychiatric family history, diagnosis of axis I history, history of major depressive disorder, higher feeling of hopelessness/helplessness) and suicidality (e.g., repetitive/severe/continuous suicide ideation, lower regret for suicide attempt). Moreover, multiple suicide attempters were lower in psychiatric resources, such as lower personal achievement, lower ability to control emotion, and less insight. Multivariate logistic regression analysis showed that suicide ideation severity (odds ratio [OR], 2.30; $P = 0.004$), past history of axis I diagnosis (especially major depressive disorder; OR, 2.55; $P = 0.002$), and the use of "cutting" (OR, 2.85; $P = 0.001$) predicted multiple suicide attempts.
Conclusion: The present study suggests that multiple suicide attempters tend to have more severe clinical profiles than the first suicide attempters. Intervention for depression and self-mutilation behavior of suicide attempters may be important in preventing multiple suicide attempts of adolescents.

Keywords: Adolescent; Suicide Attempt; Risk Factors; Mood Disorder

Generated by Xmlinkpress

Funding
The author(s) wish(es) to acknowledge the financial support of The Catholic University of Korea Uijeongbu St. Mary's Hospital Clinical Research Laboratory Foundation made in the program year of 2024.

Disclosure
The authors have no potential conflicts of interest to disclose.

Author Contributions
Conceptualization: Kim S, Yang EY, Choi KH, Lee KU. Data curation: Kim S, Yang EY, Choi KH, Lee HK, Kweon YS, Lee KU. Formal analysis: Kim S, Yang EY, Lee KU. Funding acquisition: Lee HK, Kweon YS, Lee KU. Investigation: Kim S, Yang EY, Choi KH, Lee HK, Lee KU. Methodology: Kim S, Yang EY, Choi KH, Lee HK, Lee KU. Project administration: Lee KU. Resources: Kim S, Choi KH, Lee HK, Lee KU. Software: Kim S, Lee HK, Kweon YS. Supervision: Choi KH, Lee HK, Kweon YS, Lee KU. Validation: Kim S, Choi KH, Lee HK, Kweon YS, Lee KU. Visualization: Kim S. Writing - original draft: Kim S, Yang EY. Writing - review & editing: Lee KU.

INTRODUCTION

Suicide is a global epidemic.[1] Due to its seriousness, the World Health Organization has come up with a comprehensive mental health action plan 2013–2020 and the action plan was extended until 2030.[2] South Korea is one of the countries with the highest rate of suicide, and has implemented several suicide prevention programs since the early 2000s.[3] Although the suicide prevention programs seemed to be fruitful as the annual overall suicide rate in 2020 was 4.4% lower than that in 2019, recent statistics show that suicide is still one of the major causes of death in South Korea. Indeed, suicide was the primary leading cause of death among those at age between 10–19, 20–29, and 30–39 with the ratio being 6.5, 21.7, and 27.1 person per 100,000 people, respectively.[4] The suicide rate among adolescents was also higher with an increase of 9.4% in 2020 than in 2019. In these circumstances, understanding the adolescents' suicide risk factors is important to prevent suicide attempts and decrease suicide rates.

In the western countries, there are numbers of studies that examined demographical and clinical features, and risk factors of adolescents' suicide attempts.[5-7] Studies indicated that multiple suicide attempters exhibit higher levels of suicide ideation, more characteristics of psychopathology, more serious suicidal behaviors, higher levels of affect dysregulation, and greater hopelessness than the first suicide attempters.[6,8] On the other hand, studies on adolescent suicide in South Korea are relatively scarce. For instance, a study was conducted on clinical characteristics and precipitating factors of psychiatric inpatient adolescents with suicide attempts.[9] According to Park et al.,[9] adolescents who attempted suicide most commonly used "cutting" as the suicide method and usually were females, raised in a divorced family and have relationship problems and mood disorders. Furthermore, adolescents and younger people outnumbered the number of elderly people in attempting multiple suicide as opposed to western studies' findings.[10-13]

While Park et al.'s study[9] is useful to look at when studying inpatient adolescents and psychosocial stressors of suicide, to the best of the authors' knowledge, there is a lack of the suicide studies that investigated specific risk factors related with multiple suicide attempters when fronting them in initial phase of evaluation such as emergency department (ED). Also, previous studies only used medical charts and self-questionnaires to measure suicide rather than using an established suicide assessment tool.[9,14-16] The limitation also lies in the fact that patients with suicide ideation and actual suicide attempters were not distinguished in the study.

As multiple suicide attempts are linked to suicide completion, higher numbers of suicide attempts lead to higher risks of reattempting, and eventual death.[17] Our previous study comparing clinical profiles showed that lower age increases the risk of multiple attempts, severe psychopathology and suicidality, and lower psychological resources were more common in multiple suicidal attempters than first suicidal attempters.[11] Similar trends in age and severity of psychopathology were also observed in the other study for South Korean adults, with additional features related to multiple suicidal attempts, such as history of early trauma, trait impulsiveness, and stress.[18] Another study represented that multiple attempters had a higher lethality of their last suicide attempt compared to single attempters,[19] and lack of receipt of mental health treatment was associated multiple attempts.[20] Therefore, understanding specific characteristics of multiple suicide attempters and linking to psychiatric treatment setting are crucial for implementing suitable interventions and prevent further reattempts and suicide in general.

https://doi.org/10.3346/jkms.2024.39.e289

In this study, we aimed to examine risk factors for multiple suicide attempters among adolescents who visited ED of a tertiary hospital in Korea. We hypothesized that there are distinct characteristics, which can be identified in ED, in multiple suicidal attempters compared with the first attempters in adolescents.

METHODS

Participants

This cross-sectional observational study initially included 251 adolescents aged from 11 to 19 years old who visited ED of Uijeongbu St. Mary's Hospital, South Korea between January 2009 and August 2018 for suicide attempts. Data of a total of 248 participants were analyzed after excluding 3 participants who denied suicidal attempts with no other complementary information. Patients were eligible to participate the study if they 1) confirmed that they had attempted suicide, or 2) denied making a suicide attempt, but the objective information from the guardians or rescuers confirmed patients had attempted suicide. All participants agreed to be interviewed by a psychiatric resident in the ED.

Materials

A comprehensive psychiatric interview and the Brief Emergency Room Suicide Risk Assessment (BESRA) were administered to all participants by trained psychiatric residents at the emergency room. The BESRA was developed by our research team to aid in the rapid and accurate decision-making of clinicians in the ED by assessing a patient's risks of present suicide attempts and repeated suicide attempts.[11,21,22] This instrument comprehensively identifies the demographic variables and clinical characteristics of the patient, the factors related with the presenting suicide behaviors, and various individual psychiatric resources (**Supplementary Table 1**), based on the information from psychiatric interview with patients and guardians. The medical severity of suicidal attempt was evaluated using the medical risk of death criteria suggested by Linehan et al. (**Supplementary Data 1**).[23] Additionally, this tool assesses detailed information regarding the presenting suicide attempt including established suicide risk factors and the risk/rescue-rating scales, of which the reliability and validity have been confirmed.[24] The risk/rescue-rating scales consist of 10 items; five items assess risk factors and five items assess rescue factors.[25] A higher risk-rating score indicates that the patient's suicide attempt was more serious whereas a higher rescue-rating score indicates that the patient committed a less serious and more rescuable suicide attempt. The suicide plan was judged using a systematic suicide interview performed by trained psychiatry residents. The presence of a will, preparation of method, and planning of the date of the attempt associated with the index attempt were regarded as indicators of a planned suicide attempt. To ensure inter-rater reliability of this measure, psychiatric residents received regular instruction from psychiatry professors and biweekly consensus meetings for all residents were held.

Statistical analysis

Participants were divided into two groups (single vs. multiple attempters) based on their number of suicide attempts. The *t*-tests and χ^2 analyses were performed on all variables comparing the first attempter group and the multi-attempter group. All variables that were statistically significant ($P < 0.05$) from univariate analyses were selected and multivariable logistic regression analysis (MLRA) was then performed. These variables were entered into each MLRA using the forward stepwise method. The final model included all three significant risk factors presented in **Tables 1** and **2**. The statistical analyses were conducted

using the Statistical Package for Social Science (SPSS) software version 26.0 (IBM Corp., Armonk, NY, USA).

Ethics statement

This study was approved by the Institutional Review Board (IRB) of The Catholic University of Korea, Uijeongbu St. Mary's Hospital and the requirement for informed consent was waived (IRB file No. XC12RIME0141).

RESULTS

The comparison of demographic and clinical factors between first and multiple attempters

Table 1 and **Fig. 1** represented comparison of proportion for each demographic and clinical factors investigated. There were 139 participants (56%) who had attempted suicide for the first time (first attempters) and 109 participants (44%) who had at least one past suicide attempt (multiple attempters). The results showed that among demographic characteristics, the proportion of females among multiple attempters was significantly higher than among

Table 1. The comparison of demographic and clinical factors between the first attempters and the multiple attempters

Variables	First attempters (n = 139)	Multiple attempters (n = 109)	Statistics[a]	*P* value
Demographic characteristics				
Mean age, yr, mean ± SD (min–max)	16.6 ± 1.8 (11–19)	16.8 ± 1.9 (11–19)	1.21[a]	0.226
Sex (M:F)	47 (33.8%): 92 (66.2%)	24 (22%):85 (78%)	4.16	0.041*
Socioeconomic status			0.39	0.822
Low	30 (21.7%)	27 (24.8%)		
Middle	106 (76.8%)	80 (73.4%)		
High	2 (1.4%)	2 (1.8%)		
Psychiatric family history			9.46	0.002*
Yes	15 (10.8%)	28 (25.7%)		
No	124 (89.2%)	81 (74.3%)		
Clinical characteristics				
Past history of axis I disorder			22.93	< 0.001*
Yes	48 (34.5%)	71 (65.1%)		
No	91 (65.5%)	38 (34.9%)		
Past history of MDD			4.93	0.048*
Yes	35 (72.9%)	63 (88.7%)		
No	13 (27.1%)	8 (11.3%)		
Severity of depression			4.06	0.132
Mild	33 (23.7%)	17 (15.6%)		
Moderate	69 (49.6%)	52 (47.7%)		
Severity	37 (26.6%)	40 (36.7%)		
Current emotion			0.22	0.638
Optimism	26 (18.7%)	23 (21.1%)		
Intense emotion	113 (81.3%)	86 (78.9%)		
Agitation			3.46	0.063
Present	44 (31.7%)	47 (43.1%)		
Absent	95 (68.3%)	62 (56.9%)		
Hopelessness/helplessness			6.55	0.010*
Yes	64 (46%)	68 (62.4%)		
No	75 (54%)	41 (37.6%)		

MDD = major depressive disorder.
[a]The t-statistics for continuous variable. Others are χ^2 statistics.
*$P < 0.05$.

https://doi.org/10.3346/jkms.2024.39.e289

Table 2. The comparison of factors related with the presenting suicidal behavior between the first attempters and the multiple attempters

Variables	First attempters (n = 139)	Multiple attempters (n = 109)	Statistics[a]	P value
Nature of suicide idea			17.21	< 0.001*
Repetitive/intense/continuous	45 (32.4%)	64 (58.7%)		
Rare/mild/transient	94 (67.6%)	45 (41.3%)		
Planning			1.02	0.313
Planned	7 (5.1%)	9 (8.3%)		
Impulsive	131 (94.9%)	100 (91.7%)		
Will			2.17	0.141
Yes	12 (8.7%)	16 (14.7%)		
No	126 (91.3%)	93 (85.3%)		
Regret			4.76	0.029*
Yes	85 (61.6%)	52 (47.7%)		
No	53 (38.4%)	57 (52.3%)		
Suicide for what			3.85	0.146
Hope to change	120 (86.3%)	87 (80.6%)		
Hope to die	17 (12.2%)	21 (19.4%)		
Direction of reproach			0.33	0.569
Anger outburst/blaming others	107 (77%)	79 (73.8%)		
Self-reproach/guilt	32 (23%)	28 (26.2%)		
Suicide method				
Drug overdose or chemical ingestion	93 (66.9%)	61 (56.0%)	3.11	0.078
Cut	26 (18.7%)	40 (36.7%)	10.13	0.001*
Jump	10 (7.2%)	5 (4.6%)	0.73	0.393
Hanging	3 (2.2%)	2 (1.8%)	0.03	0.857
Traffic accident	1 (0.7%)	0 (0.0%)	0.79	0.375
CO intoxication	3 (2.2%)	0 (0.0%)	2.38	0.123
Others	4 (2.9%)	2 (1.8%)	0.28	0.596
Medical severity	2.75 ± 1.03	2.54 ± 1.01	1.59[a]	0.114
Risk rescue rating scale				
Risk total	7.38 ± 1.92	7.33 ± 1.66	0.24[a]	0.817
Rescue total	13.00 ± 1.95	12.94 ± 2.02	0.25[a]	0.801
Precipitating events				
Interpersonal conflict/stress	99 (71.2%)	81 (74.3%)	0.29	0.588
Interpersonal deficit/loss	8 (5.8%)	5 (4.6%)	0.17	0.682
Financial problems	7 (5.0%)	8 (7.3%)	0.57	0.45
School/work	31 (22.3%)	14 (12.8%)	3.68	0.055
Illness/serious injury	2 (1.4%)	0 (0%)	1.58	0.209
Parental separation/divorce	4 (2.9%)	3 (2.8%)	0.00	0.953
Individual resources				
Achievement			4.83	0.028*
High	23 (16.7%)	8 (7.3%)		
Low	115 (83.3%)	101 (92.7%)		
Insight			4.40	0.036*
Present	29 (21.0%)	12 (11.0%)		
Absent	109 (79.0%)	97 (89.0%)		
Controlling emotion			9.43	< 0.001*
Yes	17 (12.3%)	2 (1.8%)		
No	121 (87.7%)	107 (98.2%)		

[a] t-statistics for continuous variable. Others are χ^2 statistics.
*$P < 0.05$.

single attempters ($\chi^2 = 4.159$, $P = 0.041$). No significant difference was found for age and socioeconomic status between the two groups.

The rate of psychiatric family history was also significantly higher in multiple attempters (n = 28, 25.7%) than in first attempters (n = 15, 10.8%) ($\chi^2 = 9.46$, $P = 0.002$). Among clinical

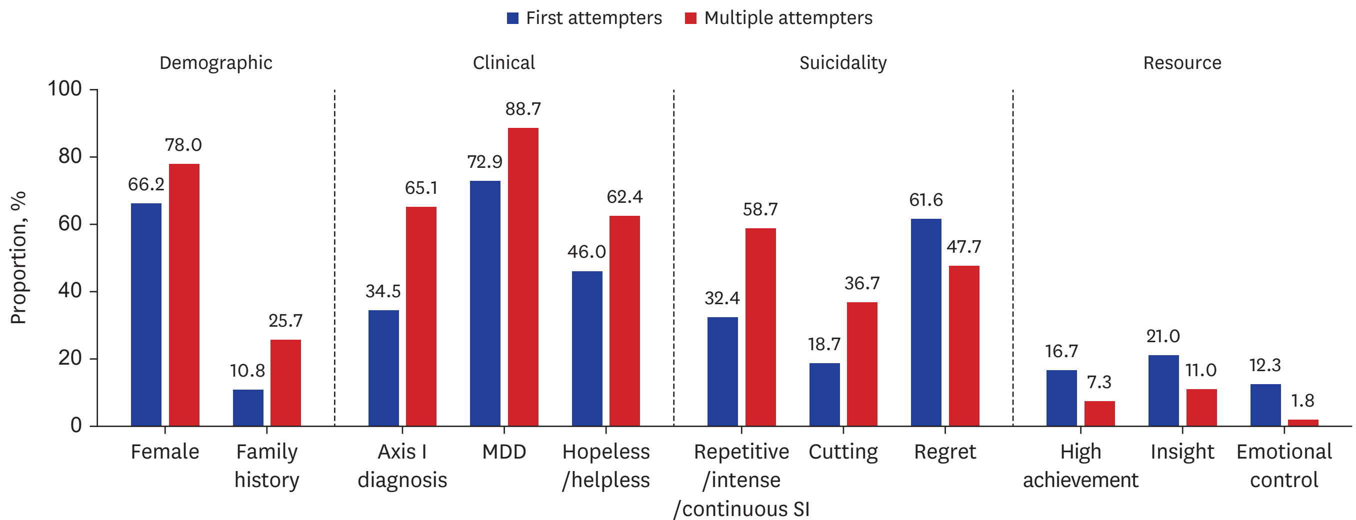

Fig. 1. Significantly different factors between first and multiple suicide attempts in adolescents. All P values < 0.05 (χ^2 test).
MDD = major depressive disorder, SI = suicidal ideation.

characteristics, multiple attempters had significantly higher rate of past history of axis I disorder than first attempters (34.5% vs. 65.1%, for single vs. multiple attempters, χ^2 = 22.93, P < 0.001). Among past psychiatric disorders, the rate of adolescents with past history of major depressive disorder (MDD) was significantly higher in multiple attempters (88.7%) than in first attempters (72.9%) (χ^2 = 4.93, P = 0.048).

Regarding the participants' emotional status at the time of ED arrival, only hopelessness/helplessness showed a significantly different ratio between the two groups (χ^2 = 6.55, P = 0.010). Multiple attempters more frequently had hopelessness/helplessness than the first attempters (62.4% vs. 46%).

The comparison of factors related to presenting suicidal behaviors between first and multiple attempters

In terms of factors related to presenting suicide behavior (**Table 2**), multiple attempters had significantly higher repetitive/severe/continuous suicide ideation (n = 64, 58.7%) than the first attempters (n = 45, 32.4%) (χ^2 = 17.21, P < 0.001). First attempters showed significantly more regret of their suicide attempts (n = 85, 61.6%), whereas only about half of multiple attempters showed regret (n = 52, 47.7%) (χ^2 = 4.76, P = 0.029).

Regarding suicide methods, multiple attempters used significantly higher rates of cutting (n = 40, 36.7%) than the first attempters (n = 26, 18.7%) (χ^2 = 10.13, P = 0.001). Drug overdose or chemical ingestion showed a trend of first attempters (n = 93, 66.9%) to use them more than multiple attempters (n = 61, 56.0%) (χ^2 = 3.11, P = 0.078). Other methods including jumping, hanging, traffic accident, and CO intoxication showed no significant difference between the two groups.

Interpersonal conflict was the most common precipitating event for suicide attempts regardless of the number of attempts. There was no statistically significant group difference between first and multiple attempters in the aspect of precipitating events.

Table 3. Significant risk factors for multiple suicide attempts resulted from multivariable logistic regression analysis

Variables	B	Exp(B)	95% CI for Exp(B)	*P* value
Cut as suicide method	1.047	2.850	1.515–5.362	0.001*
Past history of axis I	0.935	2.548	1.412–4.598	0.002*
Repetitive/intense/continuous suicidal idea	0.832	2.297	1.309–4.033	0.004*

CI = confidence interval.
*$P < 0.05$.

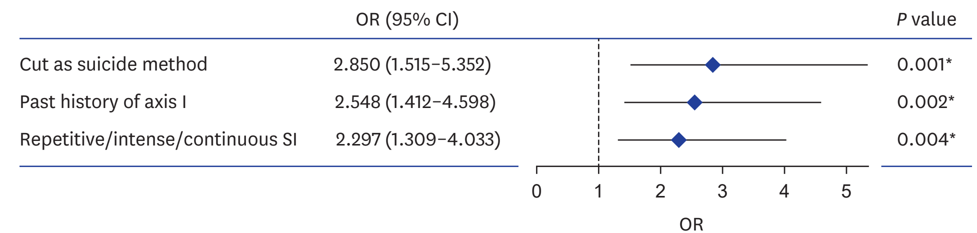

Fig. 2. Significant predictors for multiple suicide attempts in adolescents.
OR = odds ratio, CI = confidence interval, SI = suicidal ideation.
*$P < 0.05$.

Comparison of two groups for various individual resources showed that multiple attempters (n = 8, 7.3%) were less likely to have higher personal achievement than first attempters (n = 23, 16%) ($\chi^2 = 4.83$, $P = 0.03$), and lower ability to control their emotion (12.3% and 1.8% for first attempters and multiple attempters, respectively; $\chi^2 = 9.43$, $P < 0.001$). Multiple attempters also were more likely to have less insight of their situation (21.0% and 11.0% for first attempters and multiple attempters, respectively; $\chi^2 = 4.40$, $P = 0.04$).

Risk factors for multiple suicide attempts

Multivariate logistic regression model including suicide method, past history of axis I, and recurrent suicidal idea as independent variables showed statistical significance (**Table 3**, **Fig. 2**). Among suicide methods, suicide by cutting, which is relatively a nonlethal method, showed significant risk for multiple suicide attempts (odds ratio [OR], 2.850; 95% confidence interval [CI], 1.515–5.362). Other significant risk factors included axis I past history (OR, 2.548; 95% CI, 1.412–4.598), and frequent/severe/continuous nature of suicidal ideation (OR, 2.297; 95% CI, 1.309–4.033).

DISCUSSION

This study aimed to examine risk factors for multiple suicide attempts among Korean adolescents visited ED of a tertiary hospital after suicide attempts. Consistent with previous research from the western countries,[13,26,27] the results showed that female adolescents having psychiatric family history, past history of axis I disorder, especially MDD, are more likely to attempt suicide multiple times. In line with previous studies, hopelessness/helplessness was evident that these emotions are related to higher chance of multiple suicide attempts.[8] While suicide behaviors such as frequent/severe/continuous nature of suicide ideas and no regret for the attempt are risk factors for multiple suicide attempts, it is of particular interest that cutting was distinctive suicide method of multiple attempters compared to first attempters.

Present study showed a gender difference among suicide attempters, which is consistent with previous suicide studies.[5,28-30] The rate of female suicide attempters was distinctively higher

 https://doi.org/10.3346/jkms.2024.39.e289

in adolescent multiple attempters. In addition, past psychiatric history of family and patient oneself is related to higher risk of repetitive attempts.[11,29] Because past psychiatric history is consistently demonstrated as a risk factor for suicide reattempt, adequate treatment for psychiatric disorders to achieve remission and close monitoring of suicide risks are needed. Diagnosis of MDD, among other psychiatric diagnosis, has shown to be the main disorder for the risk of multiple suicide attempts.[29,31] Monitoring MDD patients with prior suicide attempt is another important factor to prevent future suicide attempts. Prevalence rate of MDD in young Korean adults is recently growing fast and the slope is steeper in girls.[32] The suicide risk increases right after being discharged from the hospital, which is the time when change of depressive state is rapid.[33] Thus, it is suggested that this study may provide evidence to support that special care is necessary for those female young adults with MDD who have been recently discharged from the hospital.

As for the precipitating factors of suicide, the most common factor was 'interpersonal conflict,' which indicates that adolescents are vulnerable to relational stress like adults.[34] Academic-related stress is the second most common factor for adolescents' suicide attempts.[35] Therefore, despair from failure of relationships or academic achievement affects risk of suicide and appropriate strategy to cope with those stressors may be trained to reduce adolescent suicide.

Multivariate logistic regression showed that cutting as a suicide method, having a history of axis I diagnosis, and experiencing repetitive/intense/continuous nature of suicide ideation increased the risks for multiple attempts. These predictors provide important information for psychiatrists or other physicians working in ED about which adolescent patients require more caution to prevent further suicide attempts. Among these predictors, the presence of a past history of axis I diagnosis and more repeated and profound suicidal ideation was more prevalent in multiple attempters or significant predictors of multiple attempts, as shown in previous studies.[11,18] However, another predictor, the use of cutting as a suicidal method, represented a contrary pattern compared to previous results; it was less common among multiple attempters in adult psychiatric inpatients.[19] Cutting is one of the most frequent forms of either non-suicidal self-injury (NSSI) or suicidal behavior, especially in teenagers.[36,37] Several researchers have warned that self-cutting could lead to subsequent suicidal attempts regardless of suicidal intent.[38,39] Although our assessment data came from the interviews conducted at the time of visiting the ED, making it hard to generalize for predicting future suicidality, more attention should be given to adolescents who attempted suicide by self-cutting in emergency room settings.

This study has several strengths. In order to minimize recall bias, all participants enrolled in the present study underwent psychiatric interviews and examinations within 48 hours after making a suicide attempt. Furthermore, the study also compared diverse suicide-related factors such as psychiatric resources, risk and rescue factors, and exact intention and lethality of the suicidal behavior between single and multiple suicide attempters.

However, there are several limitations which must be mentioned. Firstly, this was a cross-sectional study in which participants' family history, suicide history, and psychiatric disorder history were based on participants' interview. Thus, recall bias and under-reporting may have affected the results. Secondly, a simple categorization of participants into single and multiple attempters as noted by previous researchers[13,26] may be misleading as some of single suicide attempters may become multiple suicide attempters in the future. Thirdly, all

JKMS

the participants were recruited from one hospital, which might have limited generalization to other general South Korean suicide attempters. Fourthly, selection bias would be introduced because patients who are deceased or comatous in ED could not participate to the interview thus were not included in this study. Lastly, multiple self-injurious behavior using nonlethal method were not be discriminated from NSSI.[40] NSSI in adolescents is a way to reduce negative emotions (i.e., anger or tension) or thoughts which is explained by positive and negative reinforcement,[41,42] but it also can act as a precursor to future suicidal attempts.[43,44] Despite the importance of differentiating NSSI, it was challenging to rule out the possibility of underlying suicidal intention for self-mutilating behavior in a brief interview within ED.

In conclusion, this study demonstrated that multiple suicide attempters tend to have more severe clinical profiles than single suicide attempters. This study also showed frequent severe/continuous suicidal ideation and using cutting as a suicide method with past history of diagnosis of axis I might increase risk for multiple suicide attempts. By replicating and extending previous research conducted in western countries with a South Korean sample, this study provided important data that could increase knowledge about single and multiple suicide attempters in a more culturally diverse setting. Longitudinal studies investigating stability of the single suicide attempters and comparing stable single suicide attempters with multiple suicide attempters are recommended for future studies.

SUPPLEMENTARY MATERIALS

Supplementary Data 1

Supplementary methods

Supplementary Table 1

Brief Emergency Room Suicide Risk Assessment (BESRA)

REFERENCES

1. Naghavi M, Abajobir AA, Abbafati C, Abbas KM, Abd-Allah F, Abera SF, et al. Global, regional, and national age-sex specific mortality for 264 causes of death, 1980-2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet* 2017;390(10100):1151-210. PUBMED | CROSSREF
2. World Health Organization. Comprehensive mental health action plan 2013-2030. https://iris.who.int/bitstream/handle/10665/345301/9789240031029-engpdf?sequence=1. Updated 2021. Accessed May 7, 2024.
3. Paik JW, Jo SJ, Lee S, Ong JY, Park JI. The effect of Korean standardized suicide prevention program on intervention by gatekeepers. *J Korean Neuropsychiatr Assoc* 2014;53(6):358-63. CROSSREF
4. Noh H, Seo J, Lee S, Yi N, Park S, Choi YJ, et al. Cause-of-death statistics in 2020 in the Republic of Korea. *J Korean Med Assoc* 2023;66(2):132-42. CROSSREF
5. Lewinsohn PM, Rohde P, Seeley JR. Psychosocial risk factors for future adolescent suicide attempts. *J Consult Clin Psychol* 1994;62(2):297-305. PUBMED | CROSSREF
6. Miranda R, Scott M, Hicks R, Wilcox HC, Harris Munfakh JL, Shaffer D. Suicide attempt characteristics, diagnoses, and future attempts: comparing multiple attempters to single attempters and ideators. *J Am Acad Child Adolesc Psychiatry* 2008;47(1):32-40. PUBMED | CROSSREF
7. Pompili M, Innamorati M, Szanto K, Di Vittorio C, Conwell Y, Lester D, et al. Life events as precipitants of suicide attempts among first-time suicide attempters, repeaters, and non-attempters. *Psychiatry Res* 2011;186(2-3):300-5. PUBMED | CROSSREF
8. Esposito C, Spirito A, Boergers J, Donaldson D. Affective, behavioral, and cognitive functioning in adolescents with multiple suicide attempts. *Suicide Life Threat Behav* 2003;33(4):389-99. PUBMED | CROSSREF

https://doi.org/10.3346/jkms.2024.39.e289

9. Park S, Kim JW, Kim BN, Bae JH, Shin MS, Yoo HJ, et al. Clinical characteristics and precipitating factors of adolescent suicide attempters admitted for psychiatric inpatient care in South Korea. *Psychiatry Investig* 2015;12(1):29-36. PUBMED | CROSSREF
10. Lee J, Bang YS, Min S, Ahn JS, Kim H, Cha YS, et al. Characteristics of adolescents who visit the emergency department following suicide attempts: comparison study between adolescents and adults. *BMC Psychiatry* 2019;19(1):231. PUBMED | CROSSREF
11. Choi KH, Wang SM, Yeon B, Suh SY, Oh Y, Lee HK, et al. Risk and protective factors predicting multiple suicide attempts. *Psychiatry Res* 2013;210(3):957-61. PUBMED | CROSSREF
12. da Silva Cais CF, Stefanello S, Fabrício Mauro ML, Vaz Scavacini de Freitas G, Botega NJ. Factors associated with repeated suicide attempts. Preliminary results of the WHO Multisite Intervention Study on Suicidal Behavior (SUPRE-MISS) from Campinas, Brazil. *Crisis* 2009;30(2):73-8. PUBMED | CROSSREF
13. Forman EM, Berk MS, Henriques GR, Brown GK, Beck AT. History of multiple suicide attempts as a behavioral marker of severe psychopathology. *Am J Psychiatry* 2004;161(3):437-43. PUBMED | CROSSREF
14. Kim SY, Park YS, Joo HJ, Park EC. Association between stress types and adolescent suicides: findings from the Korea Youth Risk Behavior Survey. *Front Psychiatry* 2024;15:1321925. PUBMED | CROSSREF
15. Kim SM, Jeong YM, Park HS, Choi S. Mental health of South Korean adolescents in the COVID-19 Era: Web-based survey focused on suicide-related factors. *Child Adolesc Psychiatry Ment Health* 2023;17(1):117. PUBMED | CROSSREF
16. Park YS, Park EC. Association between parental marital status and types of suicidal behavior among Korean adolescents: a cross-sectional study. *J Prev Med Public Health* 2020;53(6):419-28. PUBMED | CROSSREF
17. Harris EC, Barraclough B. Suicide as an outcome for mental disorders. A meta-analysis. *Br J Psychiatry* 1997;170(3):205-28. PUBMED | CROSSREF
18. Park CH, Lee JW, Lee SY, Moon J, Jeon DW, Shim SH, et al. Suicide risk factors across suicidal ideators, single suicide attempters, and multiple suicide attempters. *J Psychiatr Res* 2020;131:1-8. PUBMED | CROSSREF
19. Berardelli I, Forte A, Innamorati M, Imbastaro B, Montalbani B, Sarubbi S, et al. Clinical differences between single and multiple suicide attempters, suicide ideators, and non-suicidal inpatients. *Front Psychiatry* 2020;11:605140. PUBMED | CROSSREF
20. Defayette AB, Adams LM, Whitmyre ED, Williams CA, Esposito-Smythers C. Characteristics of a first suicide attempt that distinguish between adolescents who make single versus multiple attempts. *Arch Suicide Res* 2020;24(3):327-41. PUBMED | CROSSREF
21. Kim YR, Choi KH, Oh Y, Lee HK, Kweon YS, Lee CT, et al. Elderly suicide attempters by self-poisoning in Korea. *Int Psychogeriatr* 2011;23(6):979-85. PUBMED | CROSSREF
22. Kweon YS, Hwang S, Yeon B, Choi KH, Oh Y, Lee HK, et al. Characteristics of drug overdose in young suicide attempters. *Clin Psychopharmacol Neurosci* 2012;10(3):180-4. PUBMED | CROSSREF
23. Linehan MM, Comtois KA, Brown MZ, Heard HL, Wagner A. Suicide Attempt Self-Injury Interview (SASII): development, reliability, and validity of a scale to assess suicide attempts and intentional self-injury. *Psychol Assess* 2006;18(3):303-12. PUBMED | CROSSREF
24. Misson H, Mathieu F, Jollant F, Yon L, Guillaume S, Parmentier C, et al. Factor analyses of the Suicidal Intent Scale (SIS) and the Risk-Rescue Rating Scale (RRRS): toward the identification of homogeneous subgroups of suicidal behaviors. *J Affect Disord* 2010;121(1-2):80-7. PUBMED | CROSSREF
25. Weisman AD, Worden JW. Risk-rescue rating in suicide assessment. *Arch Gen Psychiatry* 1972;26(6):553-60. PUBMED | CROSSREF
26. Rudd MD. Warning signs for suicide? *Suicide Life Threat Behav* 2003;33(1):99-100. PUBMED | CROSSREF
27. Reynolds P, Eaton P. Multiple attempters of suicide presenting at an emergency department. *Can J Psychiatry* 1986;31(4):328-30. PUBMED | CROSSREF
28. Hamilton E, Klimes-Dougan B. Gender differences in suicide prevention responses: implications for adolescents based on an illustrative review of the literature. *Int J Environ Res Public Health* 2015;12(3):2359-72. PUBMED | CROSSREF
29. Kwon A, Song J, Yook KH, Jon DI, Jung MH, Hong N, et al. Predictors of suicide attempts in clinically depressed Korean adolescents. *Clin Psychopharmacol Neurosci* 2016;14(4):383-7. PUBMED | CROSSREF
30. Mościcki EK. Gender differences in completed and attempted suicides. *Ann Epidemiol* 1994;4(2):152-8. PUBMED | CROSSREF
31. Zong S. A study on adolescent suicide ideation in South Korea. *Procedia Soc Behav Sci* 2015;174:1949-56. CROSSREF
32. Kim H, Lee YJ, Jung SJ. Trends in depressive symptoms and suicidality of South Korean adolescents: comparison of expected and observed prevalence during the COVID-19 Pandemic. *J Adolesc Health* 2023;73(1):79-87. PUBMED | CROSSREF

33. Angst J, Angst F, Stassen HH. Suicide risk in patients with major depressive disorder. *J Clin Psychiatry* 1999;60(2 Suppl 2):57-62. PUBMED
34. Favril L, Yu R, Uyar A, Sharpe M, Fazel S. Risk factors for suicide in adults: systematic review and meta-analysis of psychological autopsy studies. *Evid Based Ment Health* 2022;25(4):148-55. PUBMED | CROSSREF
35. Kwak CW, Ickovics JR. Adolescent suicide in South Korea: risk factors and proposed multi-dimensional solution. *Asian J Psychiatr* 2019;43:150-3. PUBMED | CROSSREF
36. Brown RC, Fischer T, Goldwich AD, Keller F, Young R, Plener PL. #cutting: non-suicidal self-injury (NSSI) on Instagram. *Psychol Med* 2018;48(2):337-46. PUBMED | CROSSREF
37. Kim SH, Kim HJ, Oh SH, Cha K. Analysis of attempted suicide episodes presenting to the emergency department: comparison of young, middle aged and older people. *Int J Ment Health Syst* 2020;14(1):46. PUBMED | CROSSREF
38. Baer MM, Tull MT, Forbes CN, Richmond JR, Gratz KL. Methods matter: nonsuicidal self-injury in the form of cutting is uniquely associated with suicide attempt severity in patients with substance use disorders. *Suicide Life Threat Behav* 2020;50(2):397-407. PUBMED | CROSSREF
39. Carroll R, Thomas KH, Bramley K, Williams S, Griffin L, Potokar J, et al. Self-cutting and risk of subsequent suicide. *J Affect Disord* 2016;192:8-10. PUBMED | CROSSREF
40. Nock MK, Favazza AR. Nonsuicidal self-injury: definition and classification. In: Nock MK, editor. *Understanding Nonsuicidal Self-Injury: Origins, Assessment, and Treatment*. Washington, D.C., USA: American Psychological Association; 2009, 9-18.
41. Taylor PJ, Jomar K, Dhingra K, Forrester R, Shahmalak U, Dickson JM. A meta-analysis of the prevalence of different functions of non-suicidal self-injury. *J Affect Disord* 2018;227:759-69. PUBMED | CROSSREF
42. Nock MK, Prinstein MJ. A functional approach to the assessment of self-mutilative behavior. *J Consult Clin Psychol* 2004;72(5):885-90. PUBMED | CROSSREF
43. Whitlock J, Muehlenkamp J, Eckenrode J, Purington A, Baral Abrams G, Barreira P, et al. Nonsuicidal self-injury as a gateway to suicide in young adults. *J Adolesc Health* 2013;52(4):486-92. PUBMED | CROSSREF
44. Scott LN, Pilkonis PA, Hipwell AE, Keenan K, Stepp SD. Non-suicidal self-injury and suicidal ideation as predictors of suicide attempts in adolescent girls: a multi-wave prospective study. *Compr Psychiatry* 2015;58:1-10. PUBMED | CROSSREF