

Original Article
Psychiatry & Psychology



Characteristics and Trends of Suicide Attempt or Non-suicidal Self-injury in Children and Adolescents Visiting Emergency Department

Harin Kim ,¹ Jeong Min Ryu ,² and Hyo-Won Kim ¹

¹Department of Psychiatry, Asan Medical Center, University of Ulsan College of Medicine, Seoul, Korea

²Department of Emergency Medicine, Asan Medical Center, University of Ulsan College of Medicine, Seoul, Korea



Received: Apr 22, 2020

Accepted: Jul 3, 2020

Address for Correspondence:

Hyo-Won Kim, MD, PhD

Department of Psychiatry, Asan Medical Center, University of Ulsan College of Medicine, 88 Olympic-ro 43-gil, Songpa-gu, Seoul 05505, Korea.

E-mail: shingubi@gmail.com

© 2020 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

Harin Kim

<https://orcid.org/0000-0002-7304-4616>

Jeong Min Ryu

<https://orcid.org/0000-0002-6854-3090>

Hyo-Won Kim

<https://orcid.org/0000-0002-8744-5138>

Funding

This work was supported by a National Research Foundation of Korea (NRF) grant (No. 2018R1A2B6002216) funded by the Korean Government (Ministry of Science and ICT).

Disclosure

The authors have no potential conflicts of interest to disclose.

ABSTRACT

Background: Non-suicidal self-injury (NSSI) and suicidality are common reasons for child and adolescent psychiatric emergencies. We aimed to investigate the incidence of pediatric emergency department (PED) utilization for psychiatric problems in children and adolescents and to identify demographic and clinical characteristics of youths who visited the PED for suicide attempt (SA) and/or NSSI.

Methods: The medical records of children and adolescents who visited the PED for psychiatric problems from January 2015 to November 2019 were reviewed retrospectively. Demographic and clinical variables including psychiatric disorders were collected. We compared the characteristics of youths who presented to the PED for SA and/or NSSI with those of youths without SA or NSSI. Student's *t*-test, χ^2 test, and multivariate logistic regression were used for statistical analysis.

Results: During 59 months of observation, 194 youths visited the PED and the number of total PED visits was 336. Among them, 46 youths (23.7%) visited the PED for SA and/or NSSI at least once, and the number of visits was 91 (27.1% of PED visits). Youths with SA and/or NSSI were older ($P = 0.001$) and more likely to be a girl ($P = 0.005$) and to report parental absence ($P = 0.023$). Bipolar and related disorders ($P = 0.032$) and depressive disorders ($P = 0.004$) were more common in youths with SA and/or NSSI, while schizophrenia spectrum and other psychotic disorders ($P = 0.030$) and somatic symptom and related disorders ($P = 0.007$) were more common in those without SA and NSSI. After adjusting for age, sex, and parental marital status, bipolar and related disorders (odds ratio [OR], 6.72), depressive disorders (OR, 9.59), and somatic symptom and related disorders (OR, 0.12) were significantly associated with SA and/or NSSI. Youths with SA and/or NSSI also stayed longer in the PED ($P = 0.007$).

Conclusion: SA and NSSI are one of the main reasons for child and adolescent admittance to psychiatric services in the PED and are associated with psychiatric comorbidities. An appropriate risk assessment for suicidality and self-injury and proper management and referral to mental health services at the PED are of the utmost importance.

Keywords: Adolescent; Attempted Suicide; Children; Emergency Department; Self-injurious Behavior

Author Contributions

Conceptualization: Kim HW, Ryu JM.
Methodology: Kim HW. Formal analysis: Kim H.
Data curation: Kim H. Software: Kim H.
Validation: Kim HW. Investigation: Kim HW,
Kim H. Writing - original draft: Kim HR. Writing
- review & editing: Kim HW, Ryu JM.

INTRODUCTION

Suicide attempt (SA) and non-suicidal self-injury (NSSI) in youths are major mental health problems and are steadily increasing.^{1,2} Suicide is the leading cause of death among youths.^{3,4} Korea is among the OECD countries with high teen suicide rates, even when several countries with the highest teen suicide rates including New Zealand or Iceland were excluded.⁵ NSSI is defined as a deliberate destruction of one's own body without suicidal intent, using methods that are not socially sanctioned. This concept was proposed in section 3 of the Diagnostic and Statistical Manual of Mental Disorders-fifth edition (DSM-5) as a "condition for further study."⁶ NSSI is more commonly observed among youths and young adults with an approximate life time prevalence of 18%–24%.^{2,7-9} Although little research on the prevalence of NSSI in the Korean population is present, NSSI is commonly observed among Korean adolescents with a prevalence of at least 8.8% to 9.2%.¹⁰⁻¹² SA and NSSI have a profound impact on families and communities and incur massive societal costs.^{13,14} Hence, considerable clinical attention is warranted to develop preventive strategies.

NSSI and suicidality are common reasons for emergency presentations in child and adolescent psychiatry. In Spain, among 328 mental health emergencies in a pediatric emergency department (PED), self-harm behavior, irrespective of degree of suicidal intent, was the second most common reason for presentation in females (29%).¹⁵ In a Canadian study, NSSI within the previous 24 hours was recorded in 45% of the 468 cases of youths who presented with mental health emergencies.¹⁶ Recently, a significant increase in the number of emergency department visits for self-inflicted injury among adolescents has been observed worldwide,¹⁷ which is the most important reason for the increase in overall visits.¹⁸ Therefore, suicide and NSSI are major emergency psychiatric problems in youths and the PED plays an important role as a gateway to psychiatric management through coordinating transfers or referrals to child and adolescent psychiatry units.¹⁹ It is crucial that children and adolescents with SA and/or NSSI be assessed and managed properly.

However, to the best of our knowledge, most preceding studies concerning PED utilization or emergency psychiatric visits of children and adolescents were performed in Western countries, and there is a paucity of literature on the PED utilization for psychiatric problems in Korea. From 2016 to 2018, 2,842 children and adolescents visited the PED for psychiatric problems,²⁰ but their reasons for visiting the PED, their psychiatric diagnosis, and method of management have not been studied. Therefore, this study aimed to investigate the incidence of PED admission due to psychiatric problems in children and adolescents and to identify demographic and clinical characteristics of youths who visited the PED for SA and/or NSSI in the past 59 months at a tertiary hospital.

METHODS**Patient population**

We conducted this retrospective chart review of the children and adolescents who presented to the PED at Asan Medical Center for psychiatric problems between January 2015 and November 2019. Youths who were 18 years of age or younger and who visited the PED for any psychiatric problem were included in the study. If any individual visited on more than one occasion during this period, the clinical data for each visit were collected. Cases were not included in this study if there was an absence of appropriate psychiatric evaluation by a

psychiatrist (e.g., medical treatment was done only by pediatricians, youths and his or her guardians refused to contact a psychiatrist, and the purpose of PED visit was a non-medical reason such as administrative affair).

Data collection

Demographic variables at the time of visit including age, sex, school year, special education, parental marital status, living status, and accompanying guardian at the PED were collected. Other clinical data including the date of visit, psychiatric diagnosis according to DSM-5, comorbid pediatric diagnosis, presence of SA or NSSI, presence of violence, abuse, bullying, length of stay in the PED, use of psychotropic medication and disposition after psychiatric intervention (e.g., follow-up loss, outpatient referral, admission to psychiatric ward, transfer to another hospital for admission to a psychiatric ward, and admission to pediatric ward) were thoroughly reviewed based on medical records. Psychiatric diagnosis was made by a psychiatry resident in the PED and further confirmed by the board-certified child and adolescent psychiatrists. The lifetime diagnosis of a psychiatric disorder and lifetime history of abuse or bullying, SA, and NSSI prior to the PED visit were also reviewed.

Statistical analysis

We counted a number of visits on a monthly basis during the observation period. The cases of SA or NSSI at the time of visit were counted separately. We compared demographic factors and clinical characteristics of children and adolescents who visited the PED for SA and/or NSSI and those without both SA and NSSI. A student's *t*-test was used to analyze continuous variables such as age, school years, and length of stay in the PED. A chi-square test or Fisher's exact test was used for categorical variables to compare between-group differences. Multivariate logistic regression analysis was performed to identify independent predictive factors of SA and/or NSSI. All statistical analyses were performed using SPSS (ver. 24; IBM SPSS Statistics, IBM Corporation, Armonk, NY, USA). A two-tailed $P < 0.05$ was considered significant.

Ethics statement

This study was approved by the Institutional Review Board (IRB) of Asan Medical Center (IRB No. 2019-1597). As this study was conducted retrospectively, the requirement for informed consent was waived.

RESULTS

During the 59-month observation period, a total of 194 youths visited the PED for psychiatric problems and 46 youths (23.7%) visited the PED for SA and/or NSSI at least once. A total number of 336 visits were made by 194 youths, while the number of visits for SA and/or NSSI was 91 (27.1% of PED visits). Among 91 visits related to SA and/or NSSI, 41 visits ($n = 36$) were due to SA only, 44 visits ($n = 31$) were due to NSSI only, and 6 visits ($n = 6$) for co-occurring SA and NSSI.

Among the 47 visits due to SA, drug intoxication ($n = 38$) was the most common, followed by hanging ($n = 5$) and falling ($n = 4$). A total number of 30 youths (15.5%) had a lifetime history of SA. In total, 16 youths had attempted suicide 1 time, 5 had attempted 2 times, 3 had attempted 3 times, 2 had attempted 4 times, and 4 had attempted 5 times or more. Of the 30 youths with a lifetime history of SA, 26 also had a history of NSSI in the past.

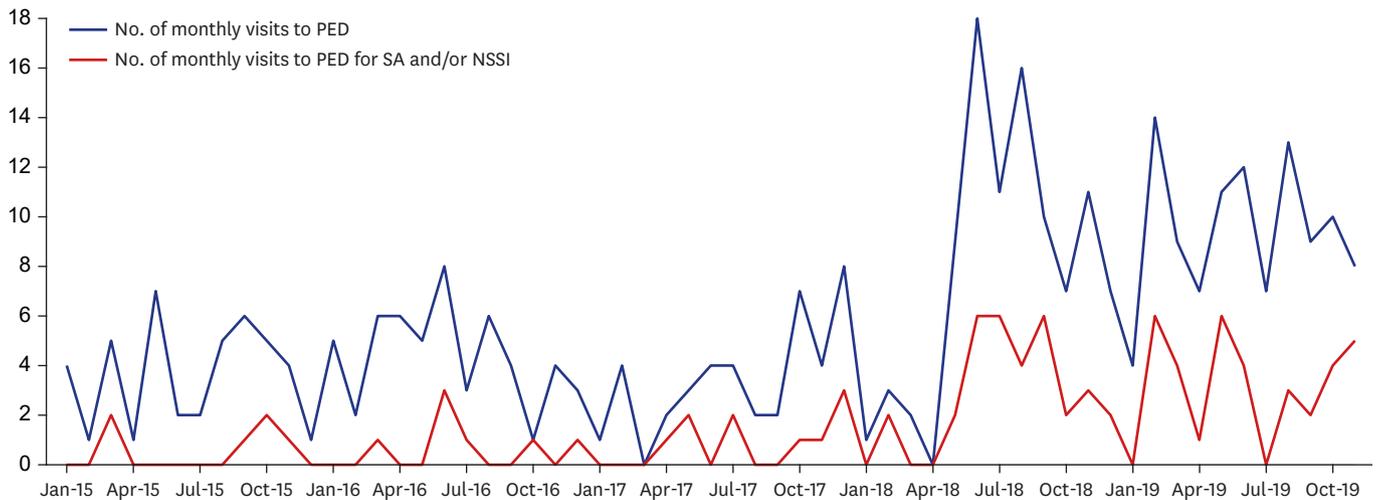


Fig. 1. Number of monthly visits to the pediatric emergency department from January 2015 to November 2019. PED = pediatric emergency department, SA = suicide attempt, NSSI = non-suicidal self-injury.

Of the 50 visits due to NSSI, cutting ($n = 46$) was the most frequent, followed by hitting or banging ($n = 4$). Among the 73 youths (37.6%) who had a lifetime history of NSSI, it was found that 11 youths had injured themselves 1 time, 3 had injured 2 times, 1 youth had injured 4 times, and 1 youth had injured 6 times, while 57 youths had 6 or more incidences of NSSI. It was found that 26 of the 73 youths who had a lifetime history of NSSI also had attempted suicide.

Fig. 1 shows that the number of total visits began to show an increase in May 2018 and the peak was observed in June 2018 with 18 visits occurring this month. The mean monthly visit number was 3.6 in year of 2015, while the number was 7.9 in 2018. Interestingly, a similar pattern was observed in the number of visits for SA and/or NSSI, suggesting that the increase in PED visits was related to an increase in SA and/or NSSI. There were 6 visits for SA and/or NSSI out of 43 PED visits (14.0%) in the year of 2015 while the rate was 13.2% in 2016, followed by 23.3% in 2017 and 34.7% in 2018.

The demographic characteristics of the children and adolescents with SA and/or NSSI and those without both SA and NSSI are presented in **Table 1**. Mean age and school year were higher in youths with SA and/or NSSI ($P = 0.001$, $P = 0.001$, respectively). There was a higher proportion of girls among children and adolescents who visited the PED due to SA and/or NSSI than among those without SA and/or NSSI ($P = 0.005$) and they were more likely to report parental absence ($P = 0.023$). There was no statistically significant difference for special education, living status, and accompanying guardian at the PED between the two groups. Youths with SA and/or NSSI were more likely to have multiple PED visits (visit range 2–9) than those without both SA and NSSI ($P = 0.068$).

Table 2 shows the comparison of psychiatric diagnosis according to DSM-5 category at the time of PED visit. Youths with SA and/or NSSI were at a greater risk of bipolar and related disorders ($P = 0.032$) and depressive disorders ($P = 0.004$), while youths without both SA and NSSI had higher chance of schizophrenia spectrum and other psychotic disorders ($P = 0.030$), as well as somatic symptom and related disorders ($P = 0.007$). There were 14 youths (7.2%) who had experienced abuse (5 individuals with physical abuse, 3 with sexual abuse, 2 with neglect, 1 with emotional abuse, and 3 with more than 2 types of abuse) and 53 youths (27.3%) with a history of bullying; however, no significant difference was observed when we

Characteristics of Youths with Suicide Attempt or Self-injury

Table 1. Demographic characteristics of youths with a history of SA or NSSI and those without

Characteristics	With SA and/or NSSI (n = 46)	Without both SA and NSSI (n = 148)	Statistical analysis	P value
Age, yr	15.1 ± 1.7	13.9 ± 3.0	-3.55 ^a	0.001
School yr	9.2 ± 1.7	8.0 ± 2.9	-3.57 ^a	0.001
Sex, female	37 (80.4)	85 (57.4)	7.96 ^b	0.005
Under special education	4 (8.7)	13 (8.8)		1.000
Parental marital status				0.023 ^c
Married	32 (69.6)	126 (85.1)		
Divorced	10 (21.7)	17 (11.5)		
Separated	2 (4.3)	0 (0)		
Death of one parent	2 (4.3)	3 (2.0)		
Unknown	0 (0)	2 (1.4)		
Currently living				0.065 ^a
Alone	1 (2.2)	0 (0)		
With parent(s)	42 (91.3)	145 (98.0)		
With other family members	2 (4.3)	1 (0.7)		
Under welfare guardianship	1 (2.2)	2 (1.4)		
Guardian at PED				0.665 ^a
Parent(s)	45 (97.8)	145 (98.0)		
Other family members	1 (2.2)	2 (1.4)		
Guardianship members	0 (0)	1 (0.7)		
Multiple visitors	20 (43.5)	43 (29.1)	3.33 ^b	0.068

Data are presented as mean ± standard deviation or number (%).

SA = suicide attempt, NSSI = non-suicidal self-injury, PED = pediatric emergency department.

^at-test; ^bχ² test; ^cP was calculated by a Fisher's exact test.

Table 2. Comparisons of psychiatric diagnosis between youths with suicide attempt or NSSI and those without

Diagnosis	With SA and/or NSSI (n = 46)	Without both SA and NSSI (n = 148)	χ ² test	P value
Neurodevelopmental disorders				
ID	2 (4.3)	11 (7.4)		0.737 ^a
ASD	1 (2.2)	5 (5.4)		1.000 ^a
ADHD	3 (6.5)	21 (14.2)	1.9	0.168
Tic disorders	1 (2.2)	11 (7.4)		0.300 ^a
Schizophrenia spectrum and other psychotic disorders	3 (6.5)	30 (20.3)	4.7	0.030
Bipolar and related disorders	12 (26.1)	19 (12.8)	4.59	0.032
Depressive disorders	33 (71.7)	70 (47.3)	8.42	0.004
Anxiety disorders	3 (6.5)	17 (11.5)		0.416 ^a
OCRD	1 (2.2)	11 (7.4)		0.300 ^a
Trauma and stressor-related disorders	4 (8.7)	8 (5.4)		0.483 ^a
Dissociative disorders	0 (0)	3 (2.0)		1.000 ^a
Somatic symptom and related disorders	1 (2.2)	27 (18.2)	7.34	0.007
Feeding and eating disorders	1 (2.2)	1 (0.7)		0.419 ^a
Disruptive, impulse-control, and conduct disorders	4 (8.7)	11 (7.4)		0.757 ^a
Substance-related and addictive disorders	1 (2.2)	1 (0.7)		0.419 ^a
Neurocognitive disorders	0 (0)	3 (2.0)		1.000 ^a
Personality disorders	6 (13.0)	7 (4.7)		0.083 ^a

SA = suicide attempt, NSSI = non-suicidal self-injury, ID = intellectual disability, ASD = autism spectrum disorder, ADHD = attention-deficit hyperactivity disorder, OCRD = obsessive-compulsive and related disorder.

^aP was calculated by a Fisher's exact test.

compared the prevalence rate of abuse and bullying between youths with SA and/or NSSI and those without both SA and NSSI.

Demographic factors and psychiatric diagnosis which were significantly different between two group differences were entered into multivariate logistic regression analysis (Table 3). After adjusting for all other variables, bipolar and related disorders (odds ratio [OR], 6.72; 95% confidence interval [CI], 1.21–37.48), depressive disorders (OR, 9.59; 95% CI, 2.09–43.96), and somatic symptom and related disorders (OR, 0.12; 95% CI, 0.01–0.94) were independent predictors of youths' SA and/or NSSI.

Table 3. Predictive factors for suicide attempt or non-suicidal self-injury of youths

Variables	OR	95% CI	P value
Age	1.10	0.91–1.34	0.326
Girls	1.81	0.72–4.57	0.209
Parental marital status			0.374
Schizophrenia spectrum and other psychotic disorders	0.31	0.08–1.27	0.103
Bipolar and related disorders	6.72	1.21–37.48	0.030
Depressive disorders	9.59	2.09–43.96	0.004
Somatic symptom and related disorders	0.12	0.01–0.94	0.044

OR = odds ratio, CI = confidence interval.

Table 4. Acute management in the pediatric emergency department of youths presenting with suicide attempt or non-suicidal self-injury and those without

Variables	With SA and/or NSSI (n = 91)	Without both SA and NSSI (n = 245)	Statistical analysis	P value
Psychotropic prescription	61 (67.0)	119 (48.6)	9.09 ^a	0.003
Disposition				0.154 ^b
Follow-up loss	6 (6.6)	11 (12.4)		
Outpatient referral	47 (51.6)	157 (64.1)		
Admission to psychiatric ward	27 (29.7)	62 (25.3)		
Transfer to another hospital for psychiatric admission	10 (11.0)	13 (5.3)		
Admission to pediatric ward	1 (1.1)	2 (0.8)		
Length of stay (min)	377.8 ± 302.1	283.0 ± 221.8	2.73 ^c	0.007

Data are presented as number (%) or mean ± standard deviation.

SA = suicide attempt.

^aχ² test; ^bP was calculated by a Fisher's exact test; ^ct-test.

We also analyzed the acute psychiatric management of each PED visit (**Table 4**). Children and adolescents with SA and/or NSSI stayed significantly longer in the PED ($P = 0.007$). They were more likely to be prescribed psychotropic medications ($P = 0.003$), but there was no difference in disposition of the PED visitors after psychiatric intervention.

DISCUSSION

We conducted a retrospective chart review of children and adolescents who presented to an emergency service. Our results show that NSSI and suicidality are one of the main reasons for child and adolescent psychiatric presentation at the PED and account for 27% of the PED visits for psychiatric problems. This is in line with previous studies on emergency mental health care^{15,16,21} which reported that NSSI and suicidality accounted for 29%–45% of the PED visits for psychiatric problems. Our results suggest the importance of proper evaluation and management of SA and/or NSSI in emergency child and adolescent psychiatry.

Our results show that there was an increase in PED visits by children and adolescents in one general hospital over the past 5 years. Moreover, this tendency was related to the increased number of visits for reasons related to SA and/or NSSI. This finding is consistent with previous research, which indicate that PED visitation in youths was increasing and the largest increase was found in adolescents due SA or self-inflicted injury.^{18,22,23} SA and NSSI have been reported to be prevalent in Korean children and adolescents,^{10-12,24,25} and our study showed that more Korean youths are presenting to the PED for psychiatric problems, especially those relating to suicidality and NSSI. Considering these results together, the PED has a significant role in the acute management of high-risk psychiatric children and adolescents. In other words, the ED offers an important treatment setting as a frontline contact for those with suicidality or NSSI and moreover, it is relatively easily accessible.^{26,27}

A steep increase in the number of PED visits was observed during May 2018. One possible explanation for this could be the copycat effect. In *High School Rapper 2*, which was a popular survival hip-hop show broadcasted from February 2018 to April 2018, self-harm was mentioned in the lyrics of the rap and wounds of self-injury were exposed several times during the show. Several studies have previously shown a rapid and sustained increase in suicide following a celebrity's completed suicide in Korea.^{28,29} The strong effect of the media has been suggested as a reason for copycat suicides, and new media including Instagram are particularly important as potential risk factors for NSSI.³⁰⁻³² Although we could not delineate a causal relationship between increased SA or NSSI and social phenomenon or media in this study, improvement in media reporting and the implementation of preventive strategies for high-risk populations might be important in reducing harmful behaviors among adolescents.^{33,34}

In our study, youths with SA and/or NSSI were older and more likely to be girls, to have parents who were not married, and to have a diagnosis of bipolar or depressive disorders. These findings are in agreement with previous research about risk factors for suicidality or NSSI. Female sex,³⁵⁻³⁷ having one or more psychiatric disorders,^{36,38} and having mood disorders such as major depressive disorder and bipolar disorder were reported to be associated with SA among adolescents.³⁹⁻⁴² Parental divorce or absence^{43,44} as well as a negative relationship or impaired communication with an individual's parents was also found to be a risk factor for suicide.⁴⁵⁻⁴⁷ Depressive disorder was the strongest predictor of future SA.⁴⁸⁻⁵⁰ For NSSI, female sex and being of middle or high school age had an increased risk of engaging in NSSI.⁵¹⁻⁵³ The risk for NSSI was higher among individuals who had mood disorders,⁵⁴ where both depressive disorder and bipolar disorder were associated with increased risk for NSSI.^{55,56} Parental divorce also had an impact on self-harm.^{44,57} Previous research showed that SA and NSSI share several common risk factors^{58,59} Moreover, as we found in this study, SA and NSSI frequently co-occur,¹⁶ and SA and NSSI are risk factors for each other^{58,59} Future studies are needed to investigate shared and specific risk factors.

Considering that NSSI and suicidality were found to be the main reasons for presenting to a child and adolescent emergency psychiatric service, it seems crucial for physicians at PEDs to provide proper crisis intervention and referral to mental health services when appropriate.⁶⁰ Our results indicate that youths with SA and/or NSSI tended to have multiple visits, stayed longer at the PED, and had prescribed more psychotropic medication. This is in accordance with previous studies, which have shown psychiatric problems are associated with a longer PED stay than non-psychiatric problems.⁶¹⁻⁶³ Furthermore, the rate of antidepressant prescription or medication adjustment was up to 50% if the ED visits were associated with SA or NSSI.^{64,65} As continuous mental health care can prevent future suicide,⁶⁶ high-risk youths who present to the ED with SA and/or NSSI require more clinical attention. Hence, the PED is one of the most important departments in a general hospital for the provision of acute management in cases of SA and/or NSSI in children and adolescents, with an important role in referring those with high risk to the correct mental health services.^{27,67-71}

The findings of our study should be interpreted in the context of some limitations. First, because this study was conducted at one tertiary hospital, it does not represent the national population. Thus, a multicenter study or study using national public health data, such as National Health Insurance Service, is recommended. Second, we conducted a retrospective chart review and therefore the quality of the medical records could not be standardized as they were recorded by different psychiatrists. However, we did cross-check our cases and found moderate agreement. Third, the diagnoses of mood disorders and comorbid

psychiatric disorders were not based on structured interviews. Fourth, data may be missing depending on the decision of the emergency physicians to refer the ED patients to psychiatrists, and cases were excluded when youths or their guardian refused to contact a psychiatrist, which could result in a selection bias.

Despite these caveats, our study is the first to evaluate presentation to the child and adolescent emergency psychiatry services in Korean children and adolescents and to show a high incidence and the clinical characteristics of youth with SA and/or NSSI in Korea. Our study suggests that the PED could play an important role in assessing high-risk youths and referring them to mental health services.

REFERENCES

1. Nock MK. Self-injury. *Annu Rev Clin Psychol* 2010;6(1):339-63.
[PUBMED](#) | [CROSSREF](#)
2. Muehlenkamp JJ, Claes L, Havtapse L, Plener PL. International prevalence of adolescent non-suicidal self-injury and deliberate self-harm. *Child Adolesc Psychiatry Ment Health* 2012;6(1):10.
[PUBMED](#) | [CROSSREF](#)
3. National Center for Health Statistics (US). Suicide and self-inflicted injury. <https://www.cdc.gov/nchs/fastats/suicide.htm>. Updated 2019. Accessed April 1, 2020.
4. Korea Suicide Prevention Center. Suicide rate by age and sex in 2018. <https://spckorea-stat.or.kr/korea02.do>. Updated 2019. Accessed April 3, 2020.
5. OECD. OECD family database. <http://www.oecd.org/els/family/database.htm>. Updated 2017. Accessed April 3, 2020.
6. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders (DSM-5®)*. Philadelphia, PA: American Psychiatric Association; 2013.
7. Lim M, Lee S, Park JI. Differences between impulsive and non-impulsive suicide attempts among individuals treated in emergency rooms of South Korea. *Psychiatry Investig* 2016;13(4):389-96.
[PUBMED](#) | [CROSSREF](#)
8. Plener PL, Allroggen M, Kapusta ND, Brähler E, Fegert JM, Groschwitz RC. The prevalence of nonsuicidal self-injury (NSSI) in a representative sample of the German population. *BMC Psychiatry* 2016;16(1):353.
[PUBMED](#) | [CROSSREF](#)
9. Giletta M, Scholte RH, Engels RC, Ciairano S, Prinstein MJ. Adolescent non-suicidal self-injury: a cross-national study of community samples from Italy, the Netherlands and the United States. *Psychiatry Res* 2012;197(1-2):66-72.
[PUBMED](#) | [CROSSREF](#)
10. Lee WK. Psychological characteristics of self-harming behavior in Korean adolescents. *Asian J Psychiatr* 2016;23:119-24.
[PUBMED](#) | [CROSSREF](#)
11. Kim M, Yu J. Factors contributing to non-suicidal self injury in Korean adolescents. *J Korean Acad Nurs* 2017;28(3):271-9.
[CROSSREF](#)
12. Shin YM, Chung YK, Lim KY, Lee YM, Oh EY, Cho SM. Childhood predictors of deliberate self-harm behavior and suicide ideation in Korean adolescents: a prospective population-based follow-up study. *J Korean Med Sci* 2009;24(2):215-22.
[PUBMED](#) | [CROSSREF](#)
13. Shepard DS, Gurewicz D, Lwin AK, Reed GA Jr, Silverman MM. Suicide and suicidal attempts in the United States: costs and policy implications. *Suicide Life Threat Behav* 2016;46(3):352-62.
[PUBMED](#) | [CROSSREF](#)
14. Jarvi S, Jackson B, Swenson L, Crawford H. The impact of social contagion on non-suicidal self-injury: a review of the literature. *Arch Suicide Res* 2013;17(1):1-19.
[PUBMED](#) | [CROSSREF](#)
15. Porter M, Gracia R, Oliva JC, Pàmias M, Garcia-Parés G, Cobo J. Mental health emergencies in paediatric services: characteristics, diagnostic stability and gender differences. *Actas Esp Psiquiatr* 2016;44(6):203-11.
[PUBMED](#)

16. Cloutier P, Martin J, Kennedy A, Nixon MK, Muehlenkamp JJ. Characteristics and co-occurrence of adolescent non-suicidal self-injury and suicidal behaviours in pediatric emergency crisis services. *J Youth Adolesc* 2010;39(3):259-69.
[PUBMED](#) | [CROSSREF](#)
17. Cutler GJ, Flood A, Dreyfus J, Ortega HW, Kharbanda AB. Emergency department visits for self-inflicted injuries in adolescents. *Pediatrics* 2015;136(1):28-34.
[PUBMED](#) | [CROSSREF](#)
18. Kalb LG, Stapp EK, Ballard ED, Hologue C, Keefer A, Riley A. Trends in psychiatric emergency department visits among youth and young adults in the US. *Pediatrics* 2019;143(4):e20182192.
[PUBMED](#) | [CROSSREF](#)
19. Gill PJ, Saunders N, Gandhi S, Gonzalez A, Kurdyak P, Vigod S, et al. Emergency department as a first contact for mental health problems in children and youth. *J Am Acad Child Adolesc Psychiatry* 2017;56(6):475-482.e4.
[PUBMED](#) | [CROSSREF](#)
20. National Emergency Medical Center. Emergency medical statistics annual report. http://www.e-gen.or.kr/nemc/statistics_annual_report.do. Updated 2019. Accessed April 3, 2020.
21. Grupp-Phelan J, Harman JS, Kelleher KJ. Trends in mental health and chronic condition visits by children presenting for care at U.S. emergency departments. *Public Health Rep* 2007;122(1):55-61.
[PUBMED](#) | [CROSSREF](#)
22. Sills MR, Bland SD. Summary statistics for pediatric psychiatric visits to US emergency departments, 1993-1999. *Pediatrics* 2002;110(4):e40.
[PUBMED](#) | [CROSSREF](#)
23. Shah M, John AR, Dennis CG. Emergency department trends for pediatric and pediatric psychiatric visits. *Pediatr Emerg Care* 2006;22(9):685-6.
[CROSSREF](#)
24. Otani T, Irioka T, Igarashi S, Kaneko K, Takahashi T, Yokota T. Self-remitting cerebral cortical encephalitis associated with myelin oligodendrocyte glycoprotein antibody mimicking acute viral encephalitis: a case report. *Mult Scler Relat Disord* 2020;41:102033.
[PUBMED](#) | [CROSSREF](#)
25. Brown AK, Damus K, Kim MH, King K, Harper R, Campbell D, et al. Factors relating to readmission of term and near-term neonates in the first two weeks of life. *J Perinat Med* 1999;27(4):263-75.
[PUBMED](#) | [CROSSREF](#)
26. Goldman-Mellor S, Olfson M, Lidon-Moyano C, Schoenbaum M. Association of suicide and other mortality with emergency department presentation. *JAMA Netw Open* 2019;2(12):e1917571.
[PUBMED](#) | [CROSSREF](#)
27. Goldstein AB, Frosch E, Davarya S, Leaf PJ. Factors associated with a six-month return to emergency services among child and adolescent psychiatric patients. *Psychiatr Serv* 2007;58(11):1489-92.
[PUBMED](#) | [CROSSREF](#)
28. Chen YY, Yip PS, Chan CH, Fu KW, Chang SS, Lee WJ, et al. The impact of a celebrity's suicide on the introduction and establishment of a new method of suicide in South Korea. *Arch Suicide Res* 2014;18(2):221-6.
[PUBMED](#) | [CROSSREF](#)
29. Kim WJ, Song YJ, Namkoong K, Kim JM, Yoon HJ, Lee E. Does a copycat effect exist in the emergency department? *Int J Psychiatry Med* 2013;45(1):59-72.
[PUBMED](#) | [CROSSREF](#)
30. Xian L, Vickers SD, Giordano AL, Lee J, Kim IK, Ramaswamy L. # selfharm on Instagram: Quantitative Analysis and Classification of Non-Suicidal Self-Injury. *2019 IEEE First International Conference on Cognitive Machine Intelligence (CogMI)*. Piscataway, NJ: Institute of Electrical and Electronics Engineers; 2019, 61-70.
31. Tseng FY, Yang HJ. Internet use and web communication networks, sources of social support, and forms of suicidal and nonsuicidal self-injury among adolescents: different patterns between genders. *Suicide Life Threat Behav* 2015;45(2):178-91.
[PUBMED](#) | [CROSSREF](#)
32. Scherr S, Arendt F, Frissen T, Oramas J. Detecting intentional self-harm on Instagram: development, testing, and validation of an automatic image-recognition algorithm to discover cutting-related posts. *Soc Sci Comput Rev*. Forthcoming 2019. DOI: 10.1177/0894439319836389.
[CROSSREF](#)
33. Gould MS, Shaffer D. The impact of suicide in television movies. Evidence of imitation. *N Engl J Med* 1986;315(11):690-4.
[PUBMED](#) | [CROSSREF](#)
34. Suh S, Chang Y, Kim N. Quantitative exponential modelling of copycat suicides: association with mass media effect in South Korea. *Epidemiol Psychiatr Sci* 2015;24(2):150-7.
[PUBMED](#) | [CROSSREF](#)

35. Kessler RC, Borges G, Walters EE. Prevalence of and risk factors for lifetime suicide attempts in the national comorbidity survey. *Arch Gen Psychiatry* 1999;56(7):617-26.
[PUBMED](#) | [CROSSREF](#)
36. Mościcki EK, O'Carroll P, Rae DS, Locke BZ, Roy A, Regier DA. Suicide attempts in the epidemiologic catchment area study. *Yale J Biol Med* 1988;61(3):259-68.
[PUBMED](#)
37. Woo S, Lee SW, Lee K, Seo WS, Lee J, Kim HC, et al. Characteristics of high-intent suicide attempters admitted to emergency departments. *J Korean Med Sci* 2018;33(41):e259.
[PUBMED](#) | [CROSSREF](#)
38. Reinherz HZ, Giaconia RM, Silverman AB, Friedman A, Pakiz B, Frost AK, et al. Early psychosocial risks for adolescent suicidal ideation and attempts. *J Am Acad Child Adolesc Psychiatry* 1995;34(5):599-611.
[PUBMED](#) | [CROSSREF](#)
39. Gould MS, King R, Greenwald S, Fisher P, Schwab-Stone M, Kramer R, et al. Psychopathology associated with suicidal ideation and attempts among children and adolescents. *J Am Acad Child Adolesc Psychiatry* 1998;37(9):915-23.
[PUBMED](#) | [CROSSREF](#)
40. Goldston DB, Daniel SS, Reboussin BA, Reboussin DM, Kelley AE, Frazier PH. Psychiatric diagnoses of previous suicide attempters, first-time attempters, and repeat attempters on an adolescent inpatient psychiatry unit. *J Am Acad Child Adolesc Psychiatry* 1998;37(9):924-32.
[PUBMED](#) | [CROSSREF](#)
41. Park S, Hong KE, Park EJ, Ha KS, Yoo HJ. The association between problematic internet use and depression, suicidal ideation and bipolar disorder symptoms in Korean adolescents. *Aust N Z J Psychiatry* 2013;47(2):153-9.
[PUBMED](#) | [CROSSREF](#)
42. Hauser M, Galling B, Correll CU. Suicidal ideation and suicide attempts in children and adolescents with bipolar disorder: a systematic review of prevalence and incidence rates, correlates, and targeted interventions. *Bipolar Disord* 2013;15(5):507-23.
[PUBMED](#) | [CROSSREF](#)
43. Bolger N, Downey G, Walker E, Steininger P. The onset of suicidal ideation in childhood and adolescence. *J Youth Adolesc* 1989;18(2):175-90.
[PUBMED](#) | [CROSSREF](#)
44. Ponnet K, Vermeiren R, Jespers I, Mussche B, Ruchkin V, Schwab-Stone M, et al. Suicidal behaviour in adolescents: associations with parental marital status and perceived parent-adolescent relationship. *J Affect Disord* 2005;89(1-3):107-13.
[PUBMED](#) | [CROSSREF](#)
45. Consoli A, Peyre H, Speranza M, Hassler C, Falissard B, Touchette E, et al. Suicidal behaviors in depressed adolescents: role of perceived relationships in the family. *Child Adolesc Psychiatry Ment Health* 2013;7(1):8.
[PUBMED](#) | [CROSSREF](#)
46. Lizardi D, Thompson RG, Keyes K, Hasin D. Parental divorce, parental depression, and gender differences in adult offspring suicide attempt. *J Nerv Ment Dis* 2009;197(12):899-904.
[PUBMED](#) | [CROSSREF](#)
47. Tulloch AL, Blizzard L, Pinkus Z. Adolescent-parent communication in self-harm. *J Adolesc Health* 1997;21(4):267-75.
[PUBMED](#) | [CROSSREF](#)
48. Stewart SE, Manion IG, Davidson S, Cloutier P. Suicidal children and adolescents with first emergency room presentations: predictors of six-month outcome. *J Am Acad Child Adolesc Psychiatry* 2001;40(5):580-7.
[PUBMED](#) | [CROSSREF](#)
49. Juon HS, Nam JJ, Ensminger ME. Epidemiology of suicidal behavior among Korean adolescents. *J Child Psychol Psychiatry* 1994;35(4):663-76.
[PUBMED](#) | [CROSSREF](#)
50. Kim HS, Kim HS. Risk factors for suicide attempts among Korean adolescents. *Child Psychiatry Hum Dev* 2008;39(3):221-35.
[PUBMED](#) | [CROSSREF](#)
51. Sornberger MJ, Heath NL, Toste JR, McLouth R. Nonsuicidal self-injury and gender: patterns of prevalence, methods, and locations among adolescents. *Suicide Life Threat Behav* 2012;42(3):266-78.
[PUBMED](#) | [CROSSREF](#)
52. Bresin K, Schoenleber M. Gender differences in the prevalence of nonsuicidal self-injury: a meta-analysis. *Clin Psychol Rev* 2015;38:55-64.
[PUBMED](#) | [CROSSREF](#)

53. Bakken NW, Gunter WD. Self-cutting and suicidal ideation among adolescents: Gender differences in the causes and correlates of self-injury. *Deviant Behav* 2012;33(5):339-56.
[CROSSREF](#)
54. Bentley KH, Cassiello-Robbins CF, Vittorio L, Sauer-Zavala S, Barlow DH. The association between nonsuicidal self-injury and the emotional disorders: A meta-analytic review. *Clin Psychol Rev* 2015;37:72-88.
[PUBMED](#) | [CROSSREF](#)
55. Taliaferro LA, Muehlenkamp JJ. Risk factors associated with self-injurious behavior among a national sample of undergraduate college students. *J Am Coll Health* 2015;63(1):40-8.
[PUBMED](#) | [CROSSREF](#)
56. Esposito-Smythers C, Goldstein T, Birmaher B, Goldstein B, Hunt J, Ryan N, et al. Clinical and psychosocial correlates of non-suicidal self-injury within a sample of children and adolescents with bipolar disorder. *J Affect Disord* 2010;125(1-3):89-97.
[PUBMED](#) | [CROSSREF](#)
57. Shek DT, Yu L. Self-harm and suicidal behaviors in Hong Kong adolescents: prevalence and psychosocial correlates. *Sci World J* 2012;2012:932540.
[PUBMED](#) | [CROSSREF](#)
58. Walsh BW. *Treating self-injury: A practical guide*. New York, NY: Guilford Press; 2012.
59. Berman AL, Silverman MM, Bongar BM. *Comprehensive Textbook of Suicidology*. New York, NY: Guilford Press; 2000.
60. Kennedy SP, Baraff LJ, Suddath RL, Asarnow JR. Emergency department management of suicidal adolescents. *Ann Emerg Med* 2004;43(4):452-60.
[PUBMED](#) | [CROSSREF](#)
61. Mapelli E, Black T, Doan Q. Trends in pediatric emergency department utilization for mental health-related visits. *J Pediatr* 2015;167(4):905-10.
[PUBMED](#) | [CROSSREF](#)
62. Santiago LI, Tunik MG, Foltin GL, Mojica MA. Children requiring psychiatric consultation in the pediatric emergency department: epidemiology, resource utilization, and complications. *Pediatr Emerg Care* 2006;22(2):85-9.
[PUBMED](#) | [CROSSREF](#)
63. Case SD, Case BG, Olsson M, Linakis JG, Laska EM. Length of stay of pediatric mental health emergency department visits in the United States. *J Am Acad Child Adolesc Psychiatry* 2011;50(11):1110-9.
[PUBMED](#) | [CROSSREF](#)
64. Goldman-Mellor S, Kwan K, Boyajian J, Gruenewald P, Brown P, Wiebe D, et al. Predictors of self-harm emergency department visits in adolescents: a statewide longitudinal study. *Gen Hosp Psychiatry* 2019;56:28-35.
[PUBMED](#) | [CROSSREF](#)
65. Katz C, Randall JR, Leong C, Sareen J, Bolton JM. Psychotropic medication use before and after suicidal presentations to the emergency department: a longitudinal analysis. *Gen Hosp Psychiatry* 2020;63:68-75.
[PUBMED](#) | [CROSSREF](#)
66. Beautrais AL. Suicides and serious suicide attempts: two populations or one? *Psychol Med* 2001;31(5):837-45.
[PUBMED](#) | [CROSSREF](#)
67. Jung JH, Kim DK, Jung JY, Lee JH, Kwak YH. Risk factors of discharged against medical advice among adolescents self-inflicted injury and attempted suicide in the Korean emergency department. *J Korean Med Sci* 2015;30(10):1466-70.
[PUBMED](#) | [CROSSREF](#)
68. Doshi A, Boudreaux ED, Wang N, Pelletier AJ, Camargo CA Jr. National study of US emergency department visits for attempted suicide and self-inflicted injury, 1997-2001. *Ann Emerg Med* 2005;46(4):369-75.
[PUBMED](#) | [CROSSREF](#)
69. Jo SJ, Lee MS, Yim HW, Kim HJ, Lee K, Chung HS, et al. Factors associated with referral to mental health services among suicide attempters visiting emergency centers of general hospitals in Korea: does history of suicide attempts predict referral? *Gen Hosp Psychiatry* 2011;33(3):294-9.
[PUBMED](#) | [CROSSREF](#)
70. Levinson D, Haklai Z, Stein N, Gordon ES. Suicide attempts in Israel: age by gender analysis of a national emergency departments database. *Suicide Life Threat Behav* 2006;36(1):97-102.
[PUBMED](#) | [CROSSREF](#)
71. Breslow RE, Erickson BJ, Cavanaugh KC. The psychiatric emergency service: where we've been and where we're going. *Psychiatr Q* 2000;71(2):101-21.
[PUBMED](#) | [CROSSREF](#)