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Characteristics of patients repeatedly presenting to the emergency department for self-harm injuries: a 6-year retrospective study

Kwang Yul Jung^{1*}, Sejin Heo², Taerim Kim² and Won Chul Cha^{2*}

Abstract

Background Self-harm is a risk factor for suicide completion, and repeated self-harm carries an even greater risk. This study aimed to assess the characteristics of patients who repeatedly presented to the emergency department (ED) for self-harm.

Methods We conducted a retrospective analysis of data from the ED-Based Injury In-Depth Surveillance registry in South Korea from January 2017 to December 2022. Patients aged 19–65 years with recorded information on prior self-harm episodes were included. Data regarding their demographic, pre-hospital, and clinical characteristics, as well as in-hospital mortality, were compared based on the number of prior self-harm episodes (0, 1, or ≥ 2). Univariate logistic regression analyses were performed within each self-harm episode group to evaluate the associations between demographic and pre-hospital characteristics and in-hospital mortality.

Results In total, 6,488 patients who self-harmed were included, of whom 3,650 reported one prior episode and 2,838 reported two or more prior episodes. Most patients were female, with the proportion increasing alongside the number of prior self-harm episodes (0: 57.5%, 1: 66.8%, and ≥ 2 : 77.2%). Those presenting with repeated attempts were younger, more likely to be Medical-aid insured, and more likely to use cutting or stabbing as methods of self-harm, but fewer arrived by emergency medical services. Injury severity, hospital admission, and in-hospital mortality decreased as the episode frequency increased. Univariate logistic regression analyses showed that demographic and pre-hospital factors consistently influenced in-hospital mortality across the three groups.

Conclusions Patients with repetitive self-harm were more likely to be female, to use cutting or stabbing as methods, and to have psychiatric issues, and they showed a lower in-hospital mortality rate than those without prior episodes.

Keywords Self-harm, Suicide, Emergency department, Repetition

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Background

Suicide is a major global public health concern, and South Korea has consistently recorded the highest suicide mortality rate among the Organization for Economic Co-operation and Development countries. Despite various national prevention efforts, the suicide rate in Korea has not fallen below 24.3 deaths per 100,000 people over the past decade [1].

Self-harm, defined as “intentional self-poisoning or self-injury, irrespective of type of motive or the extent of suicidal intent” [2], is one of the strongest risk factors of suicide and is often recurrent, which further increases the risk of suicide [3, 4]. Patients who present to the hospital for self-harm injuries more than once have approximately double the risk of subsequent suicide compared to those who present only once [5].

Although some cases of self-harm are identified before a suicide attempt is made, most patients who self-harm receive their first intervention in the emergency department (ED). Therefore, early intervention in an emergency setting plays a critical role in preventing suicide completion [6]. As a result, numerous studies have been conducted on patients who present to the ED for self-harm, including research on the characteristics of repeated self-harm. However, these studies have been predominantly conducted in the United Kingdom [7–10], and studies in East Asian countries, including South Korea, remain limited. Therefore, this study aimed to assess the characteristics of patients who presented with repeated self-harm in the ED.

Methods

Study design and setting

This retrospective study used data from the ED-Based Injury In-depth Surveillance (EDIIS) database in Korea. The EDIIS is a nationwide, prospective database of patients visiting the ED for injuries, collecting information for planning national injury prevention policies. The EDIIS project was organised and financially supported by the Korea Centre for Disease Control and Prevention (CDC). The Ministry of Health and Welfare classifies EDs into three levels based on the available resources and functional capabilities. Level 1 ($n = 19$) and Level 2 ($n = 110$) EDs are required to maintain 24/7 staffing by emergency physicians and are equipped with greater resources and facilities for emergency care [11]. The EDIIS database was established using data from injured patients who visited 23 participating Level 1 and Level 2 EDs those voluntarily participate in the program and are capable of managing trauma patients. This study used data from the EDIIS from January 2017 to December 2022.

Data source and collection

The EDIIS database collects comprehensive information on each injured patient, including demographics, injury-related characteristics, prehospital emergency medical service records, clinical findings, diagnostic assessments, treatments administered in the ED, ED disposition, and in-hospital outcomes.

In participating hospitals, when an injured patient presents to the ED, general physicians are required to complete a standardized electronic medical record (EMR) form that aligns with the EDIIS data elements and inclusion criteria. The data entered by general physicians are reviewed by emergency medicine physician. Then subsequently verified, and cleaned by trained research coordinators assigned to each hospital. These coordinators undergo mandatory training prior to participation and are responsible for uploading validated data into the web-based EDIIS database system managed by the Korea Disease Control and Prevention Agency (KDCA).

To further ensure data reliability, all records are reviewed by the national quality management committee conducts monthly audits and feedback cycles to maintain consistency and accuracy across institutions.

Participant selection

The primary inclusion criterion was being an adult aged 18–64 years registered in EDIIS database who visited ED during the study period.

The main exposure in this study was patients whose “Intention of injury” variable in the EDIIS database was recorded as ‘self-harm or suicide injury’. The in-depth variable ‘Intention of injury’ in the EDIIS registry comprises five categories: ‘unintentional or accidental injury’, ‘self-harm or suicide injury’, ‘violent or homicidal injury’, ‘other uncategorised injury’, and ‘unknown injury’. As the ‘Intention of injury’ variable is mandatorily checked for all patients, we included all patients aged 18–64 years categorised as ‘self-harm or suicide injury’. The patients were also sub-categorised based on the number of prior self-harm episodes (0, 1, or ≥ 2) defined by the one of the in-depth variable of registry comprising four categories: ‘No prior episode of self-harm’, ‘1 prior episode of self-harm’, ‘2 or more prior episodes of self-harm’ and ‘unknown past self-harm episode’. Patients with no prior self-harm episode data were excluded from the analysis.

Data analyses

Patient demographic, pre-hospital, and clinical characteristics were compared among the prior self-harm episode groups (e.g., 0, 1, or ≥ 2). The self-harm characteristics included the following variables: demographic characteristics (sex, age, and insurance type [12]), pre-hospital information (ED visit time, ED visit method, injury location, previous suicide attempt episode,

self-harm method, and self-harm motivation), and clinical information (mental status at the time of presentation to the ED, ED disposition [discharge to home, admission to the general ward or intensive care unit, death, or others], result after admission [normal discharge, discharge against medical advice, death, or other], and in-hospital mortality). The total number of in-hospital mortalities was determined by adding the number of deaths in the ED to the number of deaths after admission.

We analysed the mortality across groups stratified by self-harm episodes as the primary outcome. Secondary analysis was performed to examine how demographic and prehospital characteristics varied according to the number of self-harm episodes. The self-harm characteristics associated with mortality within each group were examined as supplemental analysis.

Statistical analyses

Continuous variables are expressed as means and standard deviations with 95% confidence intervals; between-group differences were evaluated using Student's t-test or Mann–Whitney U test after testing for normality. Categorical variables are expressed as frequencies and percentages; Pearson's χ^2 analysis and Fisher's exact test were used for inter-group comparisons. Statistical significance was set at $p < 0.05$.

We performed an ordinal logistic regression to quantitatively examine how demographic and prehospital characteristics varied according to the number of self-harm episodes, and additionally conducted a (partial) proportional-odds ordinal logistic regression to adjust for violations of the proportional odds assumption."

Univariate logistic regression analyses were performed to evaluate the associations between individual self-harm characteristics and in-hospital mortality within each self-harm episode group. The logistic regression models showed signs of complete or quasi-complete separation of several variables, resulting in unstable or non-estimable odds ratios. For these cases, Firth's penalised likelihood method was applied, and the affected categories were merged for a stable estimation. All statistical analyses were performed using R version 4.2.0 (R Foundation, Vienna, Austria).

Results

Study population

During the 6-year study period, 802,032 patients with trauma aged 18–64 years were registered in the EDIIS database. Among them, 45,535 were identified as self-harming. After excluding those without recorded previous self-harm data, 6,488 patients were included in the final analysis; 3,650 patients had no prior episode of self-harm, 1,098 patients had 1 prior episodes of self-harm,

and 1,740 patients had 2 or more prior episodes of self-harm. Figure 1 presents the patient selection process.

Demographic and pre-hospital characteristics

Most patients were female in all self-harm groups; however, the proportion of female patients increased with the number of prior episodes (no episodes, 57.5%; one episode, 66.8%; two or more episodes, 77.2%). The proportion of patients in their teens and 20s also increased as the number of prior episodes increased, but those in their 50s and 60s were less represented (Table 1). Through a preliminary investigation using cross-tabulation, we analysed the relationship between sex and age decade and the number of self-harm episode, and found that these variables were significantly associated ($P < 0.05$).

The proportion of patients covered by Medical-aid was the highest in the two-or-more episode group (no episode, 8.2%; one episode, 8.5%; two or more episodes, 11.0%). The use of emergency medical services decreased as the number of self-harm episodes increased. Regarding self-harm methods, the use of poisoning, falls, and drowning decreased, whereas stabbing or cutting significantly increased with episode frequency (no episodes: 21.5%; one episode: 23.3%; two or more episodes: 38.0%). Regarding self-reported preceding events, psychiatric problems became more prevalent in patients with repeated episodes (no episodes, 40.5%; one episode, 44.6%; two or more episodes, 58.3%), whereas relational and economic issues decreased. Table 1 summarises these findings.

Ordinal logistic regression analysis

We additionally performed an ordinal logistic regression to examine how demographic and prehospital characteristics varied according to the number of self-harm episodes. Table 2 presents the results of the ordinal logistic regression and following partial proportional-odds model examining factors associated with the number of self-harm episodes. Increasing age was inversely associated with the number of self-harm episodes (adjusted OR=0.96 per year), whereas female sex showed a proportional increase in the likelihood of repeated self-harm (adjusted OR=1.73, 95% CI 1.52–1.97). Medical-aid insurance, and self-harm by stabbing (OR $\approx$ 4.4 for 0 vs. $\geq$ 1; OR $\approx$ 2.7 for $\leq$ 1 vs. $\geq$ 2) or poisoning (OR $\approx$ 3.4 and 1.4, respectively) were significantly associated with higher odds of repeated self-harm. Psychological problems (OR $\approx$ 2.2) were also associated with repeated self-harm. Visit time was not significantly related to repetition.

Clinical characteristics

Table 3 summarises the clinical characteristics of the study population presenting to the ED. The patient's

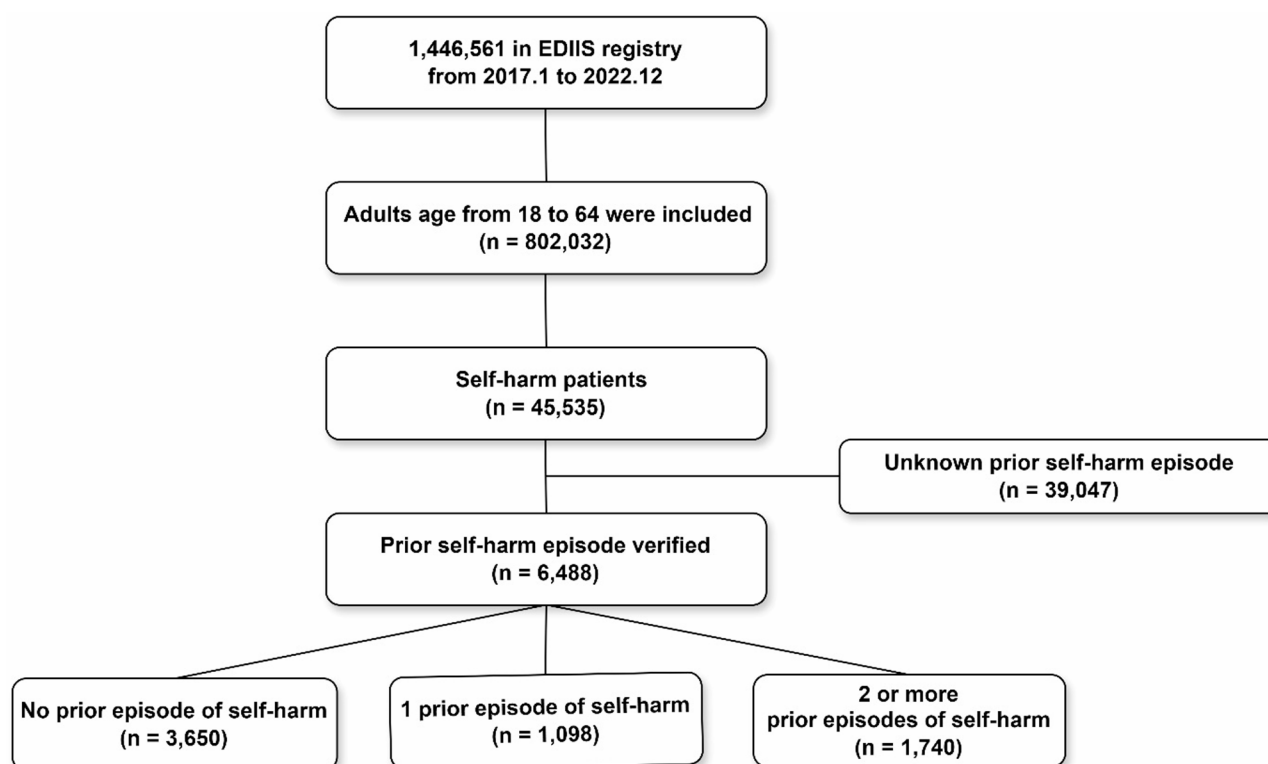


Fig. 1 Patient enrolment flow diagram

mental status and excess mortality ratio-adjusted injury severity score indicated decreasing severity as the number of self-harm episodes increased, with the two-or-more episode group showing the lowest acuity. The rates of hospital admission and in-hospital mortality also decreased progressively from the no-episode group to the one-episode and two-or-more episode groups.

Risk factors for in-hospital mortality

Figure 2 and Supplementary material 1 show the demographic and pre-hospital factors influencing mortality based on the number of prior self-harm episodes. As the number of prior self-harm episodes increased, patients were more frequently discharged to home (from 61.1% in those with no prior history to 74.5% in those with ≥ 2 episodes) and more often presented with an alert mental status (from 65.0% to 80.8%). Correspondingly, in-hospital mortality showed a statistically significant decreasing trend ($0.05 \pm 0.22 \rightarrow 0.01 \pm 0.10$, $p < 0.001$).

Discussion

This study evaluated the characteristics of patients who repeatedly presented to the ED for self-harm, and examined the in-hospital mortality and associated risk factors for fatal outcomes. Patients who repeatedly self-harmed had lower injury severity and in-hospital mortality than those who self-harmed for the first time; this trend was

more pronounced among individuals with two or more prior self-harm episodes.

Additionally, most patients who repeatedly self-harmed were female and in their teens and twenties. As the number of self-harming episodes increased, the proportion of patients covered by Medical-aid also increased. Notably, the prevalence of psychological problems increased as the number of preceding self-harm events increased, and more patients used less lethal methods, such as stabbing or cutting, as the frequency of self-harm increased. Although there are differences across study groups, self-harm methods such as fall down or drowning have known associations with an increased severity of self-harm [2, 13, 14]. Males are known to be also more likely to choose high-lethality methods [15]. Older age is associated with a higher risk of trauma-related mortality [2, 16, 17], which may explain the decrease in injury severity and in-hospital mortality as the number of self-harm episodes increased. When examining the odds ratios of risk factors contributing to in-hospital mortality across the three groups, no substantial differences were observed. Taken together, among self-harm patients aged 18–64 years who presented to the ED, in-hospital mortality decreased as the number of prior self-harm episodes increased. This finding reflects changes in the distribution of demographic and prehospital characteristics

Table 1 Demographic and pre-hospital characteristics of patients who self-harmed

n	No. of prior self-harm episodes			P-value
	0	1	≥ 2	
	3,650	1,098	1,740	
Characteristic				
Sex = Female, n (%)	2,099 (57.5)	733 (66.8)	1,344 (77.2)	< 0.001
Age, mean (SD)	38.4 (13.7)	34.86 (12.8)	28.7 (10.7)	< 0.001
Age (decade), n (%)				< 0.001
–10s	192 (5.3)	75 (6.8)	263 (15.1)	
–20s	1105 (30.3)	419 (38.2)	934 (53.7)	
–30s	665 (18.2)	225 (20.5)	236 (13.6)	
–40s	724 (19.8)	186 (16.9)	186 (10.7)	
–50s	679 (18.6)	143 (13.0)	96 (5.5)	
–60s	285 (7.8)	50 (4.6)	25 (1.4)	
Insurance, n (%)				< 0.001
-General	3118 (85.4)	939 (85.5)	1501 (86.3)	
-Medical-aid	301 (8.2)	93 (8.5)	191 (11.0)	
-None	223 (6.1)	61 (5.6)	47 (2.7)	
-Other	8 (0.2)	5 (0.5)	1 (0.1)	
ED visit time, n (%)				0.993
–00:00–08:00	31 (1.1)	10 (1.2)	14 (1.1)	
–08:00–18:00	1484 (54.2)	442 (54.3)	718 (54.9)	
–18:00–24:00	1223 (44.7)	362 (44.5)	577 (44.1)	
ED visit route = EMS, n (%)	2,833 (77.6)	786 (71.6)	1,024 (58.9)	< 0.001
Self-harm method, n (%)				< 0.001
-Poisoning	2,232 (61.2)	744 (67.8)	946 (54.4)	
-Stabbing or cutting	785 (21.5)	256 (23.3)	661 (38.0)	
-Drowning or suffocation	213 (5.8)	52 (4.7)	52 (3.0)	
-Fall	245 (6.7)	31 (2.8)	42 (2.4)	
-Contusion	134 (3.7)	5 (0.5)	15 (0.9)	
-Other	41 (1.1)	10 (0.9)	24 (1.4)	
Preceding event, n (%)				< 0.001
-Psychological problem	1,480 (40.5)	490 (44.6)	1,014 (58.3)	
-Conflict with family or friend	1,136 (31.1)	358 (32.6)	422 (24.3)	
-School or job problem	222 (6.1)	55 (5.0)	89 (5.1)	
-Economic problem	248 (6.8)	69 (6.3)	32 (1.8)	
-Health problem	174 (4.8)	50 (4.6)	49 (2.8)	
-Death of family or friend	58 (1.6)	13 (1.2)	23 (1.3)	
-Abuse	22 (0.6)	7 (0.6)	9 (0.5)	
-Other	171 (4.7)	22 (2.0)	74 (4.3)	
-Unknown	139 (3.8)	34 (3.1)	28 (1.6)	

EMS: emergency medical service; ED: emergency department; SD: standard deviation

rather than alterations in the mortality-related risk factors themselves across episodes.

Repetitive self-harm is a well-established risk factor for suicide [18]. Nearly half of individuals who die by suicide have a prior episode of self-harm [19], and in UK- and Ireland-based studies, 15–20% of those who died by suicide had visited a hospital for self-harm in the year prior to their death [20, 21]. Therefore, patients who present to the ED for self-harm, as examined in this study, may represent a critical window of opportunity for suicide prevention. However, interpreting these findings at face value, namely that patients with repeated self-harm

episodes use lower severity methods and exhibit lower mortality rates than those without a history, should be approached with caution. It is likely that individuals who used more lethal methods were not discovered on time and did not survive transportation to the ED; thus, they were not included in the dataset. Notably, national statistics from Statistics Korea during the study period show a markedly different demographic profile of suicide fatalities; the proportion of male deaths was roughly twice that of females, and the highest suicide mortality rates occurred among individuals in their 50 s and 60 s [1].

Table 2 Adjusted odds ratios (ORs) for factors associated with the number of self-harm episodes

Variable	Adjusted OR (95% CI)	p-value
Sex (Female)	1.73 (1.52–1.97)	<0.001
Age (per year)	0.96 (0.96–0.96)	<0.001
Insurance type		
– Medical-aid	1.63 (1.34–2.00)	<0.001
– None	0.80 (0.60–1.06)	0.12
– Other	1.25 (0.37–4.25)	0.73
ED visit time		
– 08:00–18:00	1.50 (0.87–2.59)	0.14
– 18:00–24:00	1.45 (0.84–2.50)	0.18
ED visit method (Other)	1.41 (1.24–1.61)	<0.001
Self-harm method		
– Poisoning	4.48 (2.56–7.85)	<0.001
– Stabbing	6.83 (3.90–11.97)	<0.001
– Drowning or suffocation	3.90 (2.10–7.25)	<0.001
– Fall down	1.98 (1.05–3.74)	0.035
– Other	5.90 (2.82–12.39)	<0.001
Preceding event		
– Psychological problem	2.33 (1.11–4.87)	0.025
– Conflict with family/friend	1.58 (0.75–3.31)	0.23
– School/job problem	1.26 (0.58–2.73)	0.55
– Economic problem	1.32 (0.60–2.91)	0.48
– Health problem	2.06 (0.94–4.53)	0.073
– Death of family/friend	1.44 (0.60–3.49)	0.42
– Other	1.16 (0.52–2.59)	0.72
– Unknown	1.26 (0.55–2.88)	0.58

ED: emergency department

As such, our findings should be interpreted not as a comprehensive profile of all individuals at risk of suicide but rather as a reference point for understanding the characteristics of those surviving suicide attempts who reach medical care—an important subgroup for targeted interventions aimed at preventing future suicide. Furthermore, as demonstrated in this study, patients with repeated self-harm episodes tended to present with less severe clinical conditions, resulting in lower rates of hospital admission and mortality. Consequently, these patients are more likely to be discharged directly from the ED after receiving acute care. This highlights a critical concern: patients who survive self-harm may not have sufficient time or opportunity in the ED to receive appropriate psychiatric intervention beyond physical treatment. Previous studies have shown that providing timely psychological interventions and appropriate referrals to self-harming patients in the ED can help prevent future suicides [22, 23]. However, many of these patients are discharged without receiving such care, often due to time constraints, limited psychiatric resources, or systemic barriers within the ED setting [24, 25]. Given that patients who repeatedly self-harm often present with less severe physical injuries, the focus of the intervention should shift more toward addressing the intentionality and underlying psychiatric causes of self-harm rather than the trauma itself. Among psychiatric disorders, depression is the affective disorder most strongly associated with suicide completion [26]. Repetition of self-harm has been frequently reported in individuals with

Table 3 Hospital characteristics of patients who self-harmed

	No. of prior self-harm episodes			P-value
	0	1	≥ 2	
n	3,650	1,098	1,740	
Characteristic				
Mental status, n (%)				<0.001
– Alert	2,374 (65.0)	754 (68.7)	1,406 (80.8)	
– Verbally responsive	665 (18.2)	200 (18.2)	227 (13.0)	
– Pain responsive	390 (10.7)	108 (9.8)	82 (4.7)	
– Unresponsive	221 (6.1)	36 (3.3)	25 (1.4)	
EMR-ISS, mean (SD)	19.3 (12.3)	18.4 (11.1)	16.2 (11.9)	<0.001
ED result, n (%)				<0.001
– Discharge to home	2,229 (61.1)	755 (68.8)	1,297 (74.5)	
– Hospital admission	1,119 (30.7)	273 (24.9)	346 (19.9)	
– ED death	144 (3.9)	15 (1.4)	15 (0.9)	
– Other	158 (4.3)	55 (5.0)	82 (4.7)	
Result after admission, n (%)				<0.001
– Normal discharge	804 (71.8)	201 (73.6)	242 (69.9)	
– Death	48 (4.3)	7 (2.6)	1 (0.1)	
– Discharge against medical advice	127 (11.3)	44 (16.1)	71 (20.5)	
– Other	140 (12.5)	21 (7.7)	32 (9.2)	
In-hospital mortality, mean (SD)	0.05 (0.22)	0.02 (0.14)	0.01 (0.10)	<0.001

ED: emergency department; EMR-ISS: excess mortality ratio-adjusted injury severity score; SD: standard deviation

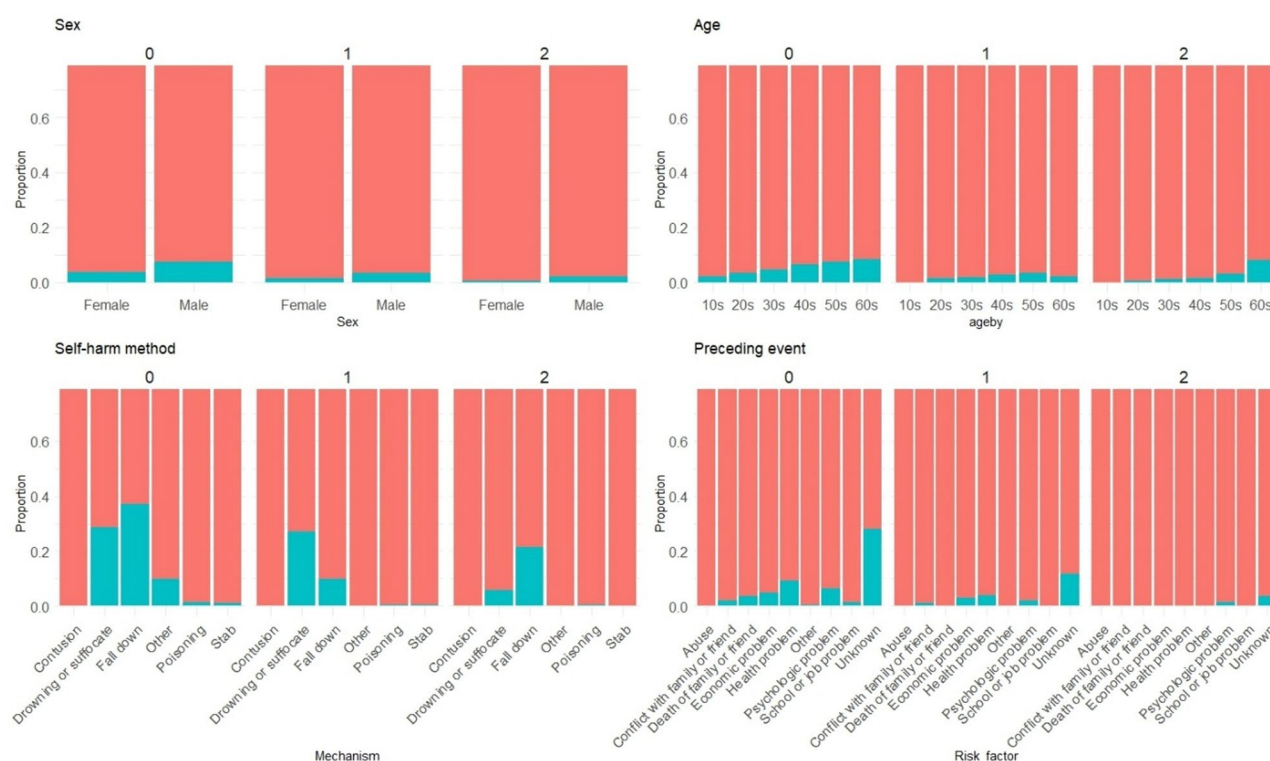


Fig. 2 Risk factors for in-hospital mortality based on the number of prior self-harm episodes

personality disorders, substance use disorders, depression, and schizophrenia [27, 28]. Understanding these characteristics is essential for emergency physicians and mental health professionals who are often the first point of contact for self-harm patients. Recognising the unique needs and risks associated with this population can help guide more effective and targeted interventions that may ultimately reduce the risk of future suicides.

Limitations

This study has some limitations. First, we retrospectively analysed patient surveillance data from the participating hospitals, which confers a potential sampling bias. Furthermore, most of these hospitals are located in urban rather than rural areas. The generalisability of the findings may be limited because of the urban concentration of the participating EDs. However, this bias is likely to be minimal because the participating hospitals were situated in 13 of the 17 provinces in South Korea. Second, the registry only included patients who visited EDs, which could have resulted in selection bias because completed suicides and cases of self-harm that did not require emergency care were excluded. Third, this study did not consider various sociocultural factors which might influence self-harm and suicide. Finally, this study had a substantial proportion of cases with unknown numbers of prior self-harm episodes. Although comparisons between known

and unknown groups showed minimal standardized differences (all SMDs < 0.2), potential bias due to missing exposure information cannot be completely excluded. To mitigate this issue, additional analyses using multiple imputation and inverse probability weighting were performed, and the results were consistent with those of the primary analysis.

Conclusions

Compared with patients without prior self-harm episodes, those with repetitive self-harm were more likely to be female, to use cutting or stabbing as methods of self-harm, and to have psychiatric issues, and they demonstrated a lower in-hospital mortality rate. Rather than assessing patients solely based on injury severity at the time of ED presentation, they should also be evaluated as survivors of suicide attempts.

Abbreviations

CDC	Centre for Disease Control and Prevention
ED	Emergency department
EDIIS	Emergency Department-Based Injury In-depth Surveillance

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s40621-025-00636-3>.

Supplementary Material 1

Author contributions

Conception and design of the investigation: Jung KY, Cha WC. Data acquisition: Heo S, Cha WC. Data analysis and preparing tables and figures: Jung KY. Draft and writing the paper: Jung KY, Cha WC. Revision and final approval of manuscript: Jung KY, Cha WC, Kim T, Heo S.

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Data availability

The datasets used and/or analysed during the current study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

Our institution's Institutional Review Board (IRB no: CAUGH 2506-250-087) approved this study and waived the informed consent requirement because of its retrospective study design. The study protocol satisfied the requirements specified in the Ministerial Decree of Health and Welfare, as set by the National Bioethics Committee.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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References

1. Causes of Death Statistics: Statistics Korea. 2024 [Available from: https://kosis.kr/statHtml/statHtml.do?orgId=101&tblId=DT_1B34E01&conn_path=I2].
2. Skegg K. Self-harm. *Lancet*. 2005;366(9495):1471–83.
3. Hawton K, Bergen H, Kapur N, Cooper J, Steeg S, Ness J, et al. Repetition of self-harm and suicide following self-harm in children and adolescents: findings from the multicentre study of self-harm in England. *J Child Psychol Psychiatry*. 2012;53(12):1212–9.
4. Gairin I, House A, Owens D. Attendance at the accident and emergency department in the year before suicide: retrospective study. *Br J Psychiatry*. 2003;183:28–33.
5. Zahl DL, Hawton K. Repetition of deliberate self-harm and subsequent suicide risk: long-term follow-up study of 11,583 patients. *Br J Psychiatry*. 2004;185:70–5.
6. Carroll R, Metcalfe C, Gunnell D. Hospital presenting self-harm and risk of fatal and non-fatal repetition: systematic review and meta-analysis. *PLoS One*. 2014;9(2):e89944.
7. Cooper J, Steeg S, Bennewith O, Lowe M, Gunnell D, House A, et al. Are hospital services for self-harm getting better? An observational study examining management, service provision and temporal trends in England. *BMJ Open*. 2013;3(11):e003444.
8. Owens D, Horrocks J, House A. Fatal and non-fatal repetition of self-harm. Systematic review. *Br J Psychiatry*. 2002;181:193–9.
9. Copsey B, Wright-Hughes A, Farrin A, Gates C, Farley K, Brennan C, et al. Results of a feasibility study of the fresh START intervention to improve quality of life and other outcomes in people who repeatedly self-harm (Function replacement in repeated Self-Harm: standardising therapeutic assessment and the related therapy). *Pilot Feasibility Stud*. 2025;11(1):67.
10. Prakash O. SMS-SOS: a randomised trial of the efficacy of a short message service (SMS) brief contact intervention in reducing repetition of hospital-treated self-harm: commentary, Prakash. *Br J Psychiatry: J Mental Sci*. 2024;225(4):464.
11. Yoo HH, Ro YS, Ko E, Lee J-H, Han S-h, Kim T, et al. Epidemiologic trends of patients who visited nationwide emergency departments: a report from the National emergency department information system (NEDIS) of Korea, 2018–2022. *Clin Exp Emerg Med*. 2023;10(Suppl):S1.
12. Bahk J, Kang H-Y, Khang Y-H. Age-and cause-specific contributions to the life expectancy gap between medical aid recipients and National health insurance beneficiaries in Korea, 2008–2017. *PLoS One*. 2020;15(11):e0241755.
13. Alfa-Wali M, Ghosh P, Koutsouris S, Aylwin C, Ward P, Elliott M, et al. Deliberate self-harm and trauma—a descriptive analysis from a London major trauma centre. *Injury*. 2023;54(1):232–7.
14. Bergen H, Hawton K, Waters K, Ness J, Cooper J, Steeg S, et al. How do methods of non-fatal self-harm relate to eventual suicide? *J Affect Disord*. 2012;136(3):526–33.
15. Berardelli I, Rogante E, Sarubbi S, Erbutto D, Cifrodelli M, Concolato C, et al. Is lethality different between males and females? Clinical and gender differences in inpatient suicide attempters. *Int J Environ Res Public Health*. 2022;19(20):13309.
16. Schmidtke A, Bille-Brahe U, DeLeo D, Kerkhof A, Bjerke T, Crepef P, et al. Attempted suicide in Europe: rates, trend, S and sociodemographic characteristics of suicide attempters during the period 1989–1992. Results of the WHO/EURO multicentre study on parasuicide. *Acta Psychiatrica Scandinavica*. 1996;93(5):327–38.
17. O'Neill S, McLafferty M, Ennis E, Lapsley C, Bjourson T, Armour C, et al. Socio-demographic, mental health and childhood adversity risk factors for self-harm and suicidal behaviour in college students in Northern Ireland. *J Affect Disord*. 2018;239:58–65.
18. Zahl DL, Hawton K. Repetition of deliberate self-harm and subsequent suicide risk: long-term follow-up study of 11 583 patients. *Br J Psychiatry*. 2004;185(1):70–5.
19. Foster T, Gillespie K, McLelland R, Patterson C. Risk factors for suicide independent of DSM–III–R axis I disorder: case–control psychological autopsy study in Northern Ireland. *Br J Psychiatry*. 1999;175(2):175–9.
20. Gairin I, House A, Owens D. Attendance at the accident and emergency department in the year before suicide: retrospective study. *Br J Psychiatry*. 2003;183(1):28–33.
21. Cully G, Russell V, Joyce M, Corcoran P, Daly C, Griffin E. Discharged from the emergency department following hospital-presented self-harm: referral patterns and risk of repeated self-harm. *Ir J Med Sci*. 2024;193(5):2443–51.
22. Wrigley M, Jennings R, MacHale S, Cassidy E. Assessment and management of self harm in emergency departments in Ireland: the National clinical programme. *Int J Integr Care*. 2017;17(5):A312.
23. Qin P, Hawton K, Mortensen PB, Webb R. Combined effects of physical illness and comorbid psychiatric disorder on risk of suicide in a national population study. *Br J Psychiatry*. 2014;204(6):430–5.
24. Bennewith O, Peters TJ, Hawton K, House A, Gunnell D. Factors associated with the non-assessment of self-harm patients attending an accident and emergency department: results of a national study. *J Affect Disord*. 2005;89(1–3):91–7.
25. Kapur N, Murphy E, Cooper J, Bergen H, Hawton K, Simkin S, et al. Psychosocial assessment following self-harm: results from the multi-centre monitoring of self-harm project. *J Affect Disord*. 2008;106(3):285–93.
26. Kara F, Gülbahçe A. The relationship between depression and suicide. *The Association Between Depression and Suicidal Behavior*: IntechOpen;; 2024.
27. Larkin C, Di Blasi Z, Arensman E. Risk factors for repetition of self-harm: a systematic review of prospective hospital-based studies. *PLoS One*. 2014;9(1):e84282.
28. Colman I, Newmann S, Schopflocher D, Bland R, Dyck R. A multivariate study of predictors of repeat parasuicide. *Acta Psychiatr Scand*. 2004;109(4):306–12.

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