The Gender Distribution and Association between Sociodemographic Factors and Hospital-Presenting Self-Injury: Analysis from the Korea National Hospital Discharge In-Depth Injury Survey

Meekang Sung, S. V. Subramanian & Rockli Kim

Published online: 06 Jun 2025.

Submit your article to this journal ⏍

Article views: 6

View related articles ⏍

View Crossmark data ⏍

Routledge
Taylor & Francis Group

Check for updates

The Gender Distribution and Association between Sociodemographic Factors and Hospital-Presenting Self-Injury: Analysis from the Korea National Hospital Discharge In-Depth Injury Survey

Meekang Sung (iD), S. V. Subramanian (iD), and Rockli Kim (iD)

ABSTRACT

Objective: Research gaps persist in understanding the underlying sociodemographic patterning of hospital-presenting self-injury (HPSI) in South Korea. Our research aims to understand the relationship between HPSI and gender over time in relation to its sociodemographic attributes.

Method: The study utilized the Korea National Hospital Discharge In-depth Injury Survey (KNHDIS) from 2004 to 2021. The change in the age-standardized rate per 100,000 Koreans over age groups and their gender distribution was examined. Logistic regression models were employed to understand the association between gender and HPSI.

Results: The study encompassed 497,882 injury patients, with 13,139 HPSI patients. The age-standardized rate per 100,000 was similar across years, and significantly higher in older age groups over 70. Also, the HPSI rate was higher in women (43.01, 95% CI: 40–46.08) than in men (36.65, 95% CI: 34.03–39.28). This gender pattern was consistent across years but showed an opposite trend over age 50, where men experience more HPSI. Gender gaps showed a decreasing trend over time, except for the 2019–2021 period in which HPSI rates rose disproportionately among adolescent girls and elderly men. Regression models confirmed these patterns, where the odds ratio of women on HPSI was 1.76 (95% CI: 1.46–2.16) in the fully adjusted model, it was 4.33 (95% CI: 3.64–5.14) in age group ≤20 and 0.39 (95% CI: 0.34–0.44) in age group >80.

Conclusions: The gender pattern of HPSI varies significantly by age group. Further research is imperative to delve into the root causes of these differences.

HIGHLIGHTS
- Overall, women are more likely to experience hospital presenting self-injury (HPSI) in South Korea (Odds ratio = 1.76, 95% CI: 1.46–2.16).
- Although women have higher rates of HPSI before age 50, men surpass women in HPSI rates after age 50.
- During the period 2019–2021, age-standardized national HPSI rates rose disproportionately among girls aged 20 and younger, and for men over age 70.

INTRODUCTION

Self-Injury (SI) could be caused by both attempted suicide and intentional, nonlethal self-injuries (Vigo et al., 2016). SI acts as both a strong predictor or "gateway" of suicidal behavior (Hamza et al., 2012), or itself as a unique mental health outcome (Muehlenkamp, 2005). Understanding SI is especially important in the South Korean context as the nation has the highest suicide rate among Organization for Economic Cooperation and Development (OECD) countries (OECD, 2023), with an increasing burden of suicide (Kim et al., 2021).

The differential patterns of SI and suicide by gender are well recognized, yet the underlying mechanisms and their variation over time and across different social demographics remain unclear. While men typically have higher suicide rates across most countries, (Currier & Oquendo, 2011) women are more likely to report deliberate self-harm (DSH) and SI (Bresin & Schoenleber, 2015; Hawton, 2000). Literature suggests a complex interplay of factors behind this discrepancy (Fox et al., 2018). Gender inequality and associated social determinants, such as lower socioeconomic status (SES) and increased exposure to stress, could contribute to the higher prevalence of mental illness and SI in women (Muntaner et al., 2004; Yu, 2018). The way emotions are socialized according to gender might also influence how men and women experience and express distress, possibly leading women to adopt SI more frequently as a coping strategy (Schoenleber & Berenbaum, 2012; Schoenleber et al., 2014).

Previous studies on SI in South Korea have identified associations with female gender, lower socioeconomic status, and psychiatric conditions (H. H. Kim, Lee et al., 2023; J. Y. Lee, Kim, et al., 2021; Shin et al., 2009). However, these studies often focused primarily on the adolescent population (Cheon et al., 2020; S. S. W. Choi, Sakong, et al., 2023; W. S. Choi, Han, et al., 2023; Jeong & Kim, 2021; Jung et al., 2018; Kim et al., 2020; H. Kim, Jhon, et al., 2023; Kwon et al., 2018; Lee, 2016; H. S. Lee, Park, et al., 2021; J. Y. Lee, Kim, et al., 2021; Park et al., 2023; Seong et al., 2021; Yang et al., 2022), limiting the generalizability of the findings to all age groups. Additionally, many relied on web-based questionnaires (Jeong & Kim, 2021; Yang et al., 2022) or small-size clinical data (Kim et al., 2020; N. M. Kim, Seo, et al., 2022; Lee et al., 2022). Although the National Emergency Department Information System (NEDIS) was frequently used (Gong et al., 2023; Jung et al., 2018; Jung, Kim, & Ro, 2023; K.-S. Lee, Sung, et al., 2023; Park et al., 2023), its limitation to emergency room visits restricted the representativeness of the study samples. The Korea National Hospital Discharge In-depth Injury Survey (KNHDIS) (Y.-K. Lee, Hong, et al., 2021) was used in two studies, with Kim et al. focusing on older adults (S. Kim, Jeon, et al., 2022). Choi et al. explored the association between sex, age, comorbidities, and other risk factors with mortality of HPSI, but did not explore the risk factors and heterogeneity of the incidence of HPSI (S. Choi, Kim, et al., 2023).

Overall, there is a research gap in understanding the associated factors with HPSI in adult populations using a nationally representative data source. In addition, it is unknown how the gender patterning has changed over time in relation to demographic factors. Thus, this study aims to understand the association between gender and HPSI, its patterning by age groups, and how it has changed in South Korea from 2004 to 2021.

METHODS

Data and Study Population

This study uses KNHDIS by the Korea Centers for Disease Control and Prevention. Raw data has been accssed through the Korea Disease Control and Prevention Agency (KDCA) after approval (KDCA-12-02-DI-2023-000003) The survey has been conducted annually since 2004, currently accumulating data from 2004 to 2021.

The survey encompasses all admitted patients discharged from hospitals with more than 100 beds across South Korea, including those admitted through the Emergency Department (ED). The sample size was 150 hospitals in 2004, which had been expanded to 200 hospitals by 2017 and 250 by 2021 (Y.-K. Lee, Hong, et al., 2021). Two-staged stratified extraction based on number of beds was utilized to sample 9% of all discharged patients. For patients discharged due to injuries or poisoning identified by ICD-10 codes S00-T98, the survey conducts a further detailed investigation (Y.-K. Lee, Hong, et al., 2021). Survey data was derived from automated medical records and in-person investigation by a medical record manager.

The study sample is all injury patients within the KNHDIS from year 2004 to 2021. Injury patients were identified as those who completed the in-depth investigation of the injury and thus had records on injury-related variables, including injury intention and injury date.

Outcome

Several terms are used to define SI. The term deliberate self-harm (DSH) is frequently employed for self-injurious behaviors both with and without suicidal intent that have nonfatal outcomes (Muehlenkamp et al., 2012). In contrast, the term nonsuicidal self-injury (NSSI) is used to define the deliberate, self-inflicted destruction of body tissue, excluding self-injuries without suicidal intent (Nock, 2010). This article uses hospital-presenting SI (HPSI) as the outcome definition, as it includes self-injurious behaviors that were identified at the hospital, which could be fatal or nonfatal, and could be both with and without suicidal intent.

Cases coded as "Self-inflicted" in the variable "injury intention" (variable name: 'injint') were considered as HPSI. "Self-inflicted" was defined in KNHDIS by extrinsic codes X60–X84 ("Intentional self-harm") based on the International Classification of Disease and cause of death (ICD-10). It includes self-injury that varies in severity from nonsevere cuts to death by suicide attempts. Examples of causes of self-injury listed in the ICD-10 codes are self-poisoning (e.g., sleeping drug, analgesics, herbicides), hanging or suffocation, drowning, and contact with sharp objects (World Health Organization (WHO), 1993).

Patient Variables

Sex/gender, age, year of survey, and the state where the hospital was located were selected as demographic variables. Age was categorized into age groups "≤20," "21–30," "31–40," "41–50," "51–60," "61–70," "71–80," and ">80." Year of survey was categoized

into three-year groups: "2004-2006," "2007-2009," "2010-2012," "2013-2015," "2016-2018," "2019-2021."

The use of sex and gender appears to have been conflated in KNHDIS, a common issue in many surveys (Oakley, 2016). This study employs the term "gender" based on the assumption that gender was more likely to have been observed and reported. Additionally, this choice aligns with the hypothesis that gender, as a social construct, and its associated inequalities will influence SI outcomes.

Mental illnesses were examined as a binary variable (yes/no) or categorized (dementia-related, alcohol use-related, psychoactive substance-related, psychosis or schizophrenia-related, mood disorder, other) based on both primary diagnosis and inclusion in all diagnoses. The initial categorization of these mental illness diagnoses was provided by KNHDIS (Injury Prevention Management Division et al., 2023) (Supplementary Table S1).

Statistical Analysis

Descriptive Analysis

In this cross-sectional study, we calculated the headcounts of HPSI in South Korea by year, age group, sex, and state. The incidence rate among discharge patients and corresponding 95% confidence intervals were calculated incorporating survey weights to accommodate the multistage stratified cluster sampling design. The age-standardized HPSI rate was calculated based on the population estimates of 2005 (Statistics Korea, 2024). The age-standardized rate was analyzed through time-series bar graphs with data grouped into three-year intervals to compare across year groups, gender, and age groups. The proportions of gender on HPSI were estimated to understand the burden of HPSI by gender over years and age groups.

Regression Analysis

Several logistic regression models were examined to understand the association of gender and self-injury. Model 1 included gender and year as the independent variables and HPSI (binomial) as the dependent variable. Model 2 added age group categories to Model 1. Model 3 adjusted for year group and age group. Model 4, the fully adjusted model, included year, gender, age group, and state as independent variables. Cluster-robust standard errors were used in models that included states to account for clustering of observations within states.

To understand how the association between gender and HPSI changes across time and age, interaction terms between gender and age groups were tested. The pattern was also assessed using stratified regression analysis by year groups and age groups.

Sensitivity Analysis

Sensitivity analysis was conducted by examining three potential confounding variables: alcohol use, mental illness, and payment method. Alcohol use was omitted from the main regression model due to high missingness (83.9%, Supplementary Table S2). Payment method was not considered in the main model due to lack of variability where

most (80.2%, Supplementary Table S2) of HPSI patients use the National Health Insurance.

The variable "payment method" (e.g., "national health insurance," "medical aid," "noncoverage") was evaluated in the supplementary sensitivity analysis. In Korea, the health security system comprises mandatory national health insurance (NHI) and medical aid (Health Insurance Review & Assessment Service, 2021), which covers most citizens. However, individuals with conditions associated with stigma, including SI and mental health disorders, often opt for noncoverage out-of-pocket payment due to concerns about privacy and preferences on uncovered treatments (Lee et al., 2018). Although the extent to which payment method reflects underlying socioeconomic factors is unclear, it may influence the relationship between gender and HPSI.

Mental health diagnosis and alcohol use could be linked to both gender and HPSI, likely serving as mediators rather than independent variables (Fox et al., 2018). The mediator effect was assessed by observing the shift in odds ratio values when incorporating these related variables into the regression models.

We used R, STATA 15.0, Tableau, and Excel for analyses and visualization.

ETHICS STATEMENT

As this study uses existing secondary database and subjects have been de-identified, it falls under Exemption 4 of the National Institutes of Health (NIH) Human Subjects Research Guideline (involves the collection/study of data or specimens if publicly available or recorded such that subjects cannot be identified) (National Institutes of Health, Office of Extramural Research, 2020). Therefore, an Institutional Review Board (IRB) review was not required.

RESULTS

Sample Characteristics

There were a total 4,141,090 discharge patients included in the KNHDIS across 2004–2021. The flowchart of study population selection is depicted in Figure 1. Among the survey sample, there were 29,758 injury patients in 2021 and 497,882 (12.0%) injury patients across all years. 2005 had the smallest number of injury patients (21,810) and the highest number of injury patients in 2019 (34,852) (Table 1). 31.8% were aged 41–60, and 57.2% were men.

There were 1,001 HPSI patients in 2021 and a total of 13,139 people during the entire period (2004 ~ 2021) (Table 1). The number of HPSI observations generally increased over the year, the smallest being in 2005 (554) and the biggest in 2020 (1,057). 56.1% of the HPSI patients in the study sample were women. 35.3% were aged 21–40, and 18.3% were aged 41–50. Seoul (14.7%) and Gyeonggi (21.4%) had the highest proportion among states, the smallest being Jeju (1.9%).

Headcounts and Age-Standardized Rate per 100,000 Koreans of HPSI

The headcount of HPSI in South Korea was estimated as 337,441. The age-standardized rate per 100,000 of HPSI in the study sample was 39.85 (95% CI: 37.20–42.50). Women had larger headcounts of HPSI (182,629) than men (154,812). The rate was also bigger for women (43.02, 95% CI: 40–46.08) than for men (36.65, 95% CI%: 34.03–39.28) (Table 2).

HPSI headcounts were smallest in the age group >80 (18,234) and biggest in the age group 41–50 (68,061). The incidence rate of HPSI among injury patients in ages 21–50 was around 2.5 %, higher than other ages . The age standardized rate, however, increased together with age. The
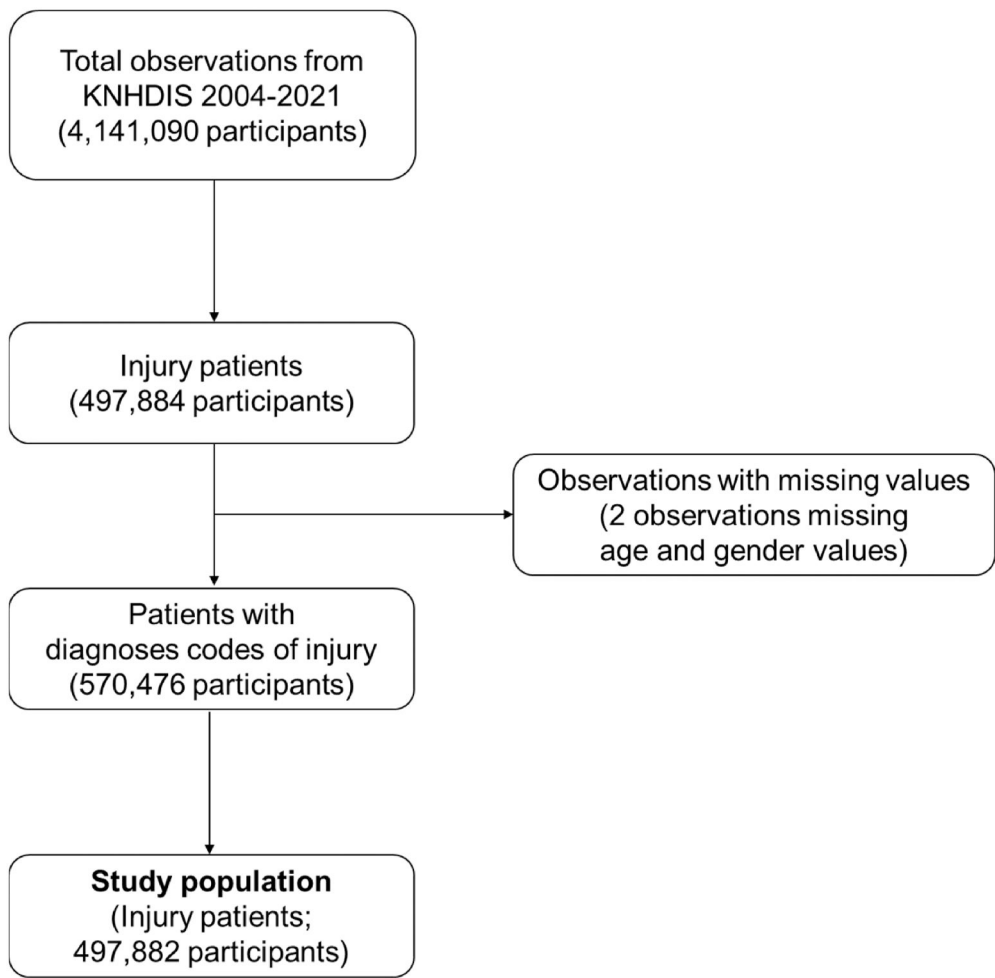
FIGURE 1. Flowchart of the selection of study population.

rate was 12.08 (95% CI: 8.04–16.11) in age group ≤20 and 100.51 (95% CI: 69.99–131.03) in ages 71–80 (Table 2). Specific headcounts and incidence rates are shown in Supplementary Table S3.

Changes in the Age-Standardized Rate per 100,000 and Gender Distribution of HPSI over Time

The overall rate of self-injury in South Korea stayed relatively steady across year 2004∼2021. In 2004 it was 39.32 (95% CI: 34.45–44.18), and 38.82 (95% CI35.61–42.02) in 2021. (Table 2, Figure 2).

HPSI rate was consistently higher in women than in men across years. Among all the HPSI cases in the study sample, 54.1% occurred in women (Supplementary Figure S1). The difference between HPSI rate of women and men was 7.4 (95% CI: −5.28–20.1) in 2004–2006, decreased steadily reaching 4.84 (95% CI: −0.62–10.5) from 2013–2015, but increased in 2019–2021 (9.21, 95% CI: 4.29–14.1) (Figure 2). The specific rate and confidence intervals across year groups are shown in Supplementary Table S4.

TABLE 1. Sample characteristics of injury patients and hospital presenting self-injury patients.

	Injury (n = 497,882)		HPSI (n = 13,139)	
	#	%	#	%
Year				
2004	23,168	4.7	684	5.2
2005	21,810	4.4	554	4.2
2006	22,051	4.4	624	4.8
2007	23,827	4.8	563	4.3
2008	24,485	4.9	643	4.9
2009	25,204	5.1	660	5.0
2010	27,967	5.6	661	5.0
2011	27,832	5.6	708	5.4
2012	28,829	5.8	664	5.1
2013	27,233	5.5	649	4.9
2014	27,785	5.6	632	4.8
2015	28,229	5.7	630	4.8
2016	27,026	5.4	629	4.8
2017	32,872	6.6	840	6.4
2018	32,946	6.6	902	6.9
2019	34,852	7.0	1,038	7.9
2020	32,008	6.4	1,057	8.0
2021	29,758	6.0	1,001	7.6
Gender				
men	284,774	57.2	5,770	43.9
women	213,108	42.8	7,369	56.1
Age group				
≤20	62,676	12.6	1,062	8.1
21–30	61,189	12.3	2,347	17.9
31–40	62,541	12.6	2,285	17.4
41–50	75,694	15.2	2,408	18.3
51–60	82,471	16.6	1,735	13.2
61–70	64,092	12.9	1,302	9.9
71–80	56,363	11.3	1,281	9.8
81–	32,856	6.6	719	5.5
State				
Seoul	79,638	16.0	1,927	14.7
Pusan	33,276	6.7	712	5.4
Daegu	24,737	5.0	391	3.0
Incheon	21,101	4.2	963	7.3
Gwangju	25,671	5.2	592	4.5
Daejeon	21,314	4.3	610	4.6
Ulsan	14,400	2.9	255	1.9
Gyeonggi	88,821	17.8	2,806	21.4
Gangwon	19,186	3.9	676	5.1
North Chungcheong	16,573	3.3	406	3.1
South Chungcheong	19,743	4.0	1,068	8.1
North Jeolla	24,081	4.8	515	3.9
South Jeolla	30,040	6.0	461	3.5
North Gyeongsang	34,195	6.9	796	6.1
South Gyeongsang	35,954	7.2	711	5.4
Jeju	9,152	1.8	250	1.9

Over time, HPSI rate remained high and increased across 2004–2021 in the older age groups over 70. Figure 3A displays trends categorized by year groups, while Supplementary Figure S2 illustrates trends on an annual basis.

Women exhibited higher HPSI rates than men up to age 40, but this trend reversed after age 60 (Figure 3C). Between 2019 and 2021, there was a sharp increase in the gender gap among adolescents aged ≤20, primarily driven by rising rates in women while rates among men remained steady (Figure 3B). Among adults over age 70, HPSI rates increased for both genders, but the rise was more pronounced in men, leading to a widening gender gap. Due to the

TABLE 2. Weighted headcount, incidence rate among injury patients, and rate per 100,000 Koreans of hospital presenting self-injury.

	Weighted headcount	Incidence rate among injury		Age standardized rate[a]	
		%	95% CI	Rate	95% CI
Total	337,441	1.9	1.9–2.0	39.85	35.79–43.9
Year					
2004	18,495	2.4	2.1–2.6	39.32	34.45–44.18
2005	18,744	2.3	2.0–2.5	39.85	33.98–45.71
2006	20,684	2.4	2.2–2.7	43.97	38.38–49.56
2007	16,236	1.9	1.7–2.1	34.51	30.5–38.53
2008	19,824	2.2	2.0–2.4	42.14	37.93–46.35
2009	19,320	2.1	1.9–2.3	41.07	36.76–45.38
2010	19,682	1.9	1.8–2.1	41.84	37.85–45.83
2011	19,595	1.9	1.8–2.1	41.66	37.67–45.64
2012	18,630	1.8	1.6–1.9	39.60	35.78–43.42
2013	20,193	1.9	1.7–2.1	42.93	38.72–47.14
2014	18,673	1.7	1.6–1.9	39.69	35.77–43.62
2015	18,896	1.7	1.6–1.9	40.17	36.07–44.26
2016	17,346	1.6	1.5–1.8	36.77	33.1–40.43
2017	16,726	1.5	1.4–1.6	35.56	32.35–38.77
2018	17,440	1.6	1.5–1.7	37.07	33.91–40.23
2019	19,273	1.8	1.7–2.0	40.97	37.45–44.49
2020	19,423	2.1	1.9–2.2	41.29	38–44.58
2021	18,260	2.2	2.0–2.3	38.82	35.61–42.02
Gender					
Men	154,812	1.5	1.5–1.6	36.65	34.03–39.28
Women	182,629	2.4	2.4–2.5	43.02	40–46.08
Age group					
≤20	27,695	1.4	1.3–1.5	12.08	8.04–16.11
21–30	52,811	2.5	2.4–2.7	39.51	28.54–50.47
31–40	55,824	2.5	2.4–2.6	37.58	26.66–48.51
41–50	68,061	2.4	2.3–2.5	47.64	35.58–59.71
51–60	47,356	1.6	1.5–1.6	54.98	38.92–71.03
61–70	34,371	1.5	1.4–1.6	54.42	37.44–71.4
71–80	33,089	1.7	1.6–1.8	100.51	69.99–131.03
>80	18,234	1.6	1.5–1.8	179.88	109.84–249.91

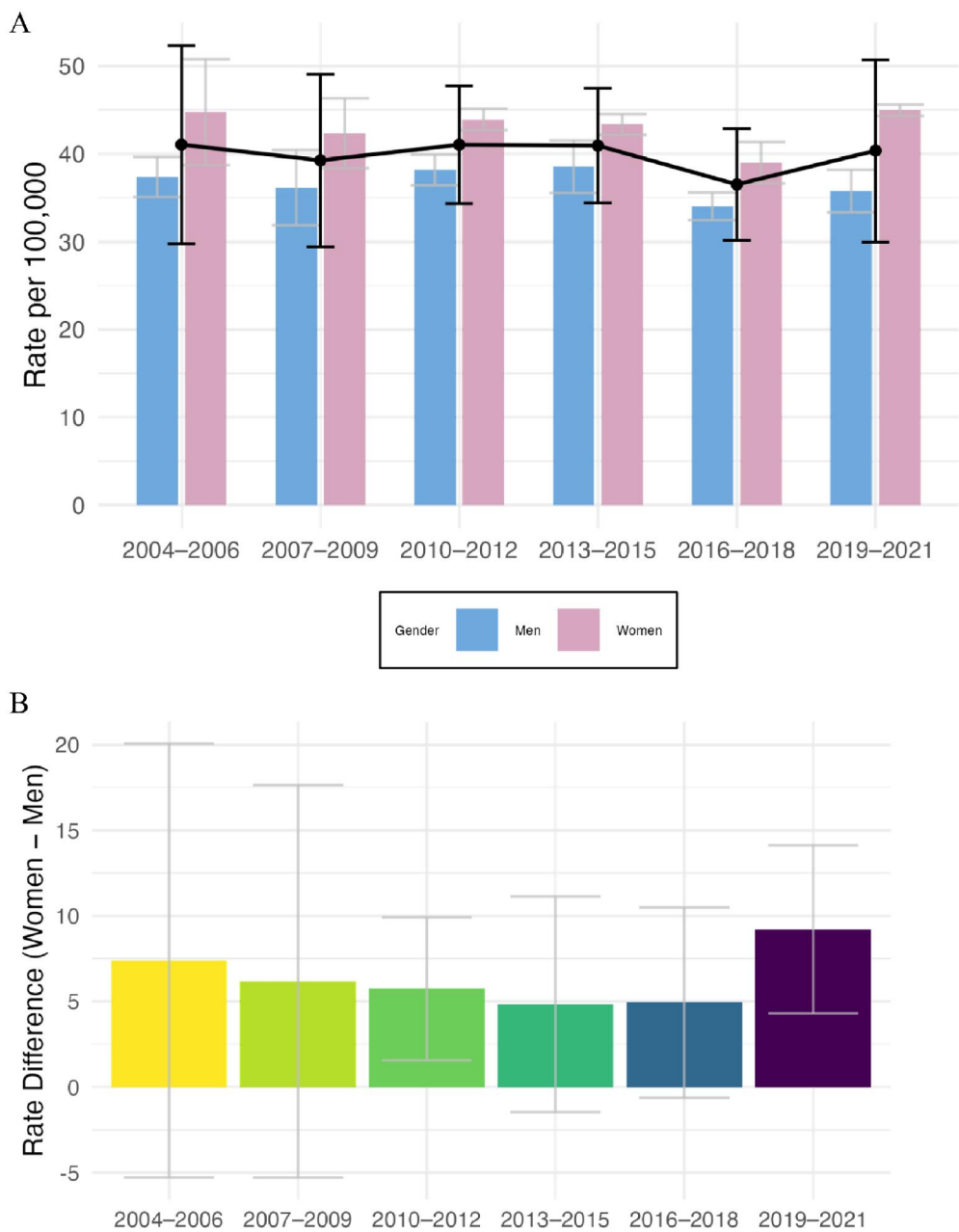[a]age standardized to the population estimates of 2005

relatively small population of people over 80 at year 2005, the estimates for this age group are unstable with large confidence intervals. For better clarity, Figure 3B and C collapsed age groups "71–80" and ">80" together as age group ">70."

The pattern of HPSI burden by gender across age groups has evolved over the years. In 2004–2006, women carried a larger burden in all age groups except 51–80, with the lowest proportion observed in the 51–60 age group (33.2%). In recent years (2019–2021), the burden on women steadily decreased, becoming lower than that of men from age 51 and older. The lowest burden on women is observed in the age group >80, with a proportion of 43.8% (Supplementary Figure S3).

Regression Based Inferences

Table 3 presents the odds ratios (OR) of women (reference: men) gender on HPSI, confidence intervals, and the pseudo-R square of regression models of the unadjusted, age-adjusted, and fully adjusted logit regression models. In Model 4, which was fully adjusted for year, age group, and state, the OR for the association between female gender and SI was 1.78 (95% CI: 1.46–2.16).

The effect measure modification of the gender–HPSI association by age group was investigated by stratified subgroups (Table 4) and by introducing an interaction term between gender and age
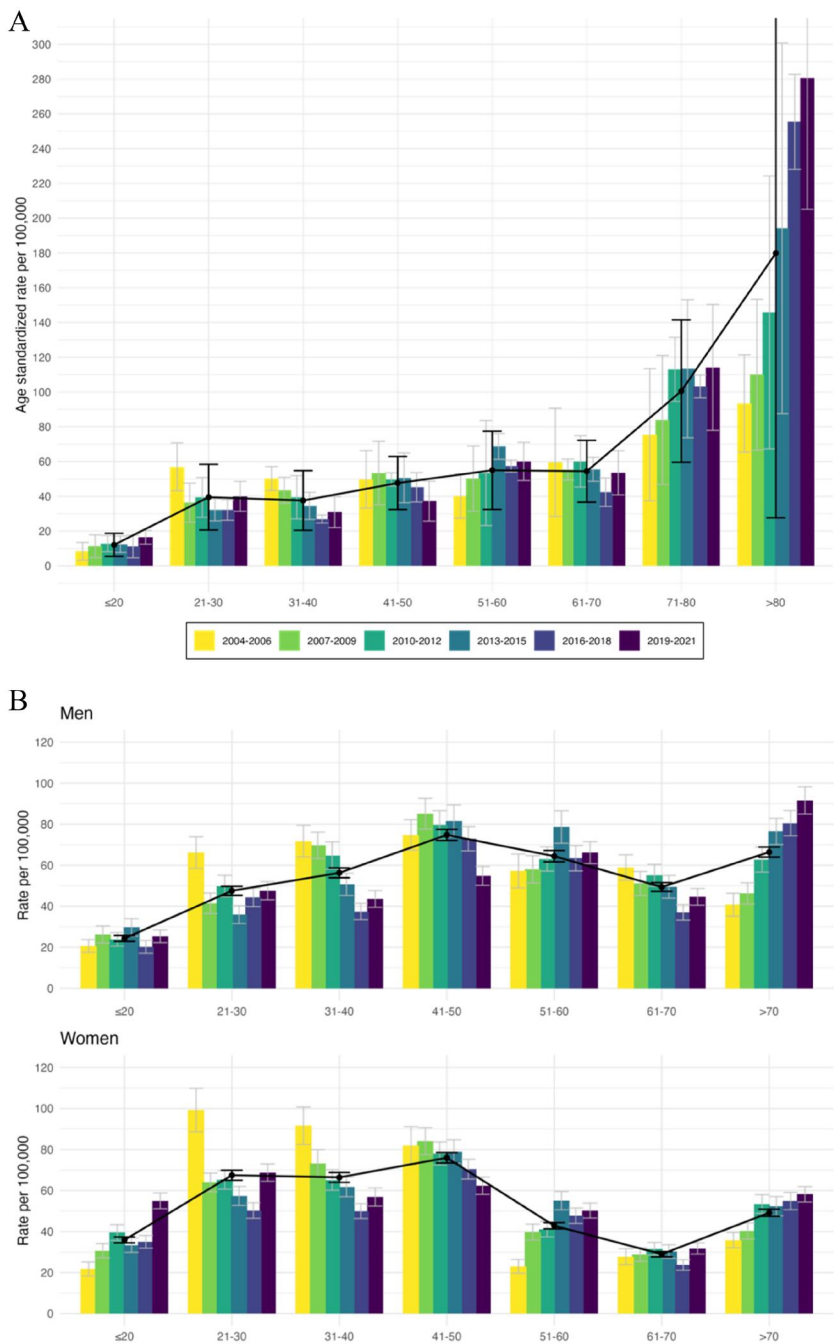
FIGURE 2. Trends of age standardized rate per 100,000 gender distribution of HPSI, 2004–2021, South Korea.
(A) Age standardized HPSI rate per 100,000 by gender.
Note. HPSI rate is age standardized to South Korea population estimates of 2005. Pooled rates for each age group are represented by black points and error bars.
(B) Difference (Women – Men) of age-standardized HPSI rate over years.

FIGURE 3. Trends of age-standardized HPSI rate per 100,000 Koreans, 2004–2021.
(A) Age-standardized rate by age group.
(B) Age-standardized rate by age group and gender.
Note. HPSI rate is age standardized to South Korea population of 2005. Pooled rates for each age group are represented by black points and error bars. The age groups "71–80" and ">80" are combined and presented as ">70" for clarity.
(C) Difference (Women – Men) of age-standardized HPSI rate by age group.
Note. Pooled rates for each age group are represented by black points and error bars. The age groups "71–80" and ">80" are combined and presented as ">70" for clarity.
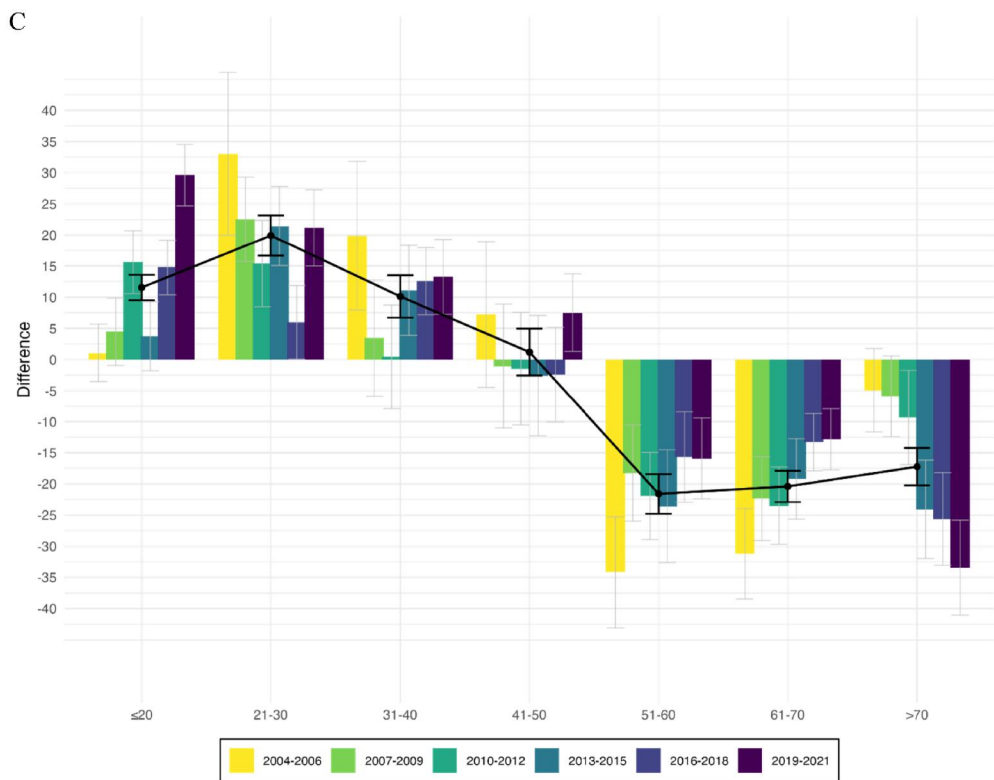
C

FIGURE 3. Continued.

TABLE 3. The association between gender and HPSI from multivariable logistic regression models (reference: men).

Model	Included variables	Odds ratio	95% CI	Pseudo R^2
1	Gender, year	1.76	(1.44–2.15)	0.0075
2	Gender, year, age group	1.76	(1.68–1.84)	0.0146
3	Gender, year group, age group	1.78	(1.46–2.16)	0.0263
4	Gender, year, age group, state	1.78	(1.46–2.16)	0.0266

Note. The p-values for all models were <0.001.

group to Model 4 (Model 5). The p-value of the interaction terms was smaller than 0.001, and Model 5 had a better fit than the fully adjusted model (Model 4). Detailed regression results are available in Supplementary Table S5.

Among year groups and age groups, the gender-SI association was most prominent in 2004–2006 (2.09, 95% CI: 1.52–2.86), declined until 2016–2018 (1.55, 95% CI: 1.27–1.89), and then increased again in 2019–2021 (1.82, 95% CI: 1.42–2.33) (Table 4).

The association between women gender and HPSI is particularly stronger in younger ages. The OR of women gender was 4.33 in age ≤ 20 (95% CI: 3.65–5.15), and 4.11 in ages 21–30 (95% CI: 3.50–4.84). The relationship was reversed in ages over 60. In age 61–70, the OR was 0.76 (95% CI: 0.66–0.88), 0.50 (95% CI: 0.45–0.56) in age 71–80, and 0.38 (95% CI: 0.34–0.44) in age >80 (Table 4, Figure 4A). Figure 4B illustrates how the patterning across year groups has changed from 2004 to 2021.

TABLE 4. The association between gender and HPSI by subgroups (reference: men).

Subgroups	Odds ratio	95% CI
Stratified by year group[a]		
2004–2006	2.09	(1.52–2.86)
2007–2009	1.86	(1.51–2.28)
2010–2012	1.78	(1.45–2.18)
2013–2015	1.63	(1.36–1.95)
2016–2018	1.55	(1.27–1.89)
2019–2021	1.82	(1.42–2.33)
Stratified by age group[b]		
≤20	4.33	(3.64–5.14)
21–30	4.12	(3.64–5.14)
31–40	3.34	(2.61–4.28)
41–50	2.15	(1.72–2.69)
51–60	1.09	(0.94–1.28)
61–70	0.76	(0.66–0.88)
71–80	0.5	(0.45–0.56)
>80	0.39	(0.34–0.44)

[a]Model was adjusted by age group and state of residence.
[b]Model was adjusted by year group and state of residence.

Sensitivity Analysis

Among HPSI patients, 5.9% had mental illnesses as a primary diagnosis, and 34.2% had them listed in all diagnoses, contrary to the rest of the sample of injury patients where the percentages were lower (primary diagnosis: 0.3%, all diagnosis: 3.7%) (Supplementary Table S2). The regression models that used mental illness as independent variable are shown in Supplementary Table S6. From this model, the OR point estimate of women decreased from that of the fully adjusted model (OR: 1.57, 95% CI: 1.27–1.93).

Overall, 62.7% of the study sample and 80.2% of HPSI patients used national health insurance as a payment method. The proportion of patients using medical aid type 1 or 2 was higher in HPSI patients (9.1%) than in injury patients (5.6%) (Supplementary Table S2). When the payment method was added to the multivariate regression model, the OR for women increased from 1.78 of the fully adjustedModel 4 to 1.91 (95% CI: 1.56–2.35) (Supplementary Table S6).

DISCUSSION

To our knowledge, this study is the first to investigate the association between HPSI and gender using a nationally representative database in South Korea. There are several strengths of this study. First, it uses data from an annual national survey KNHDIS, which is revised and quality-checked by experts every year, increasing the internal validity of data (Korea Disease Control and Prevention Agency, 2024). Second, the analysis of a wide year range (2004–2021) and large sample size helps us understand the trends of HPSI and the HPSI-gender association. Third, the study population is not limited to adolescents or a certain region, including ages 0–100, and all states of South Korea, enhancing the generalizability of the study results.

The study had four salient findings. First, it outlined the demographic patterns of HPSI, revealing the higher rate and burden of HPSI among women and older age groups over 70. Second, the temporal trends of HPSI and its gender disparities were explored. Age-standardized rates per 100,000 Koreans remained relatively steady, while gender gaps persisted throughout all periods but showed a decreasing trend over time, except during 2019–2021. Third, the study examined how the relationship between gender and HPSI is patterned by age and how this pattern has evolved. The higher burden of HPSI in women was more pronounced in younger age groups, particularly those aged ≤20. The pattern in the HPSI rate was reversed in age groups over 50, where men had a higher rate. Especially, the disparity for men

A
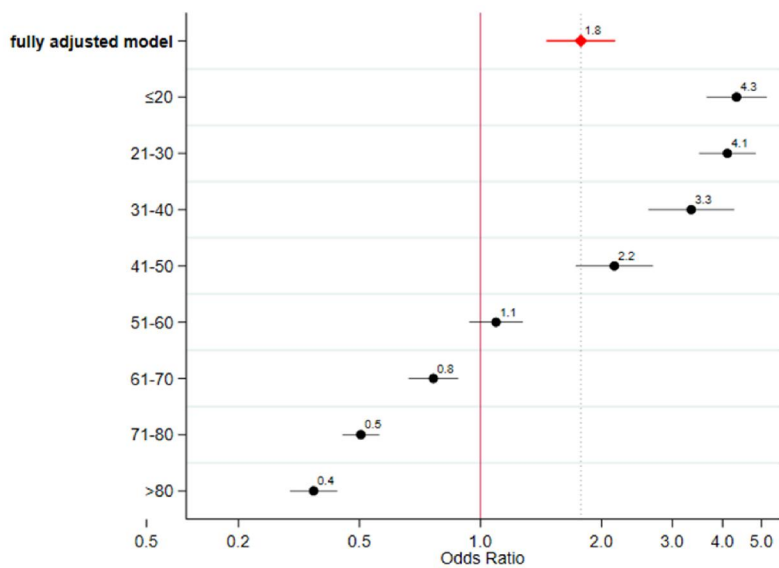
B
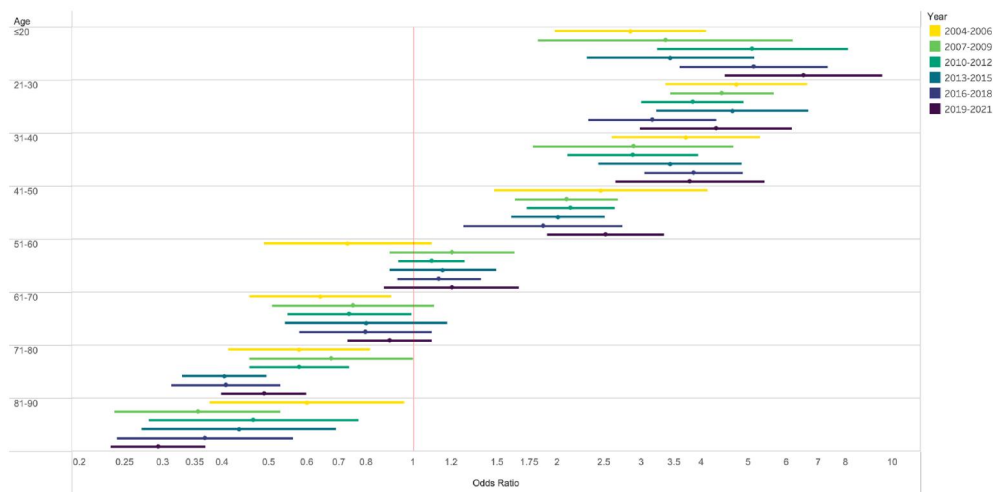
FIGURE 4. The patterns of associations between gender and HPSI in age groups across years.
(A) Overall.
Note. The red bar indicates the odds ratio of women (reference: men) and its confidence intervals in the fully adjusted multivariable model. The below black bars show fully adjusted stratified regression results by age group.
(B) Change across year groups.
Note. Each colored line shows odds ratio of women (reference: men) and its confidence intervals in the fully adjusted model, stratified by year group and age group.

over 70 increased over time. Fourth, several regression models confirmed these patterns. Odds ratios (OR) indicated that women had the highest association in the age ≤20 group (4.33, 95% CI: 3.64–5.14), which reversed in those over 60 (<1), reaching 0.39 (95% CI 0.34–0.44) at ages over 80.

The results align with existing literature documenting the increased likelihood of SI among women in South Korea, as previously reported (H. H. Kim, Lee, et al., 2023; J. Y. Lee, Kim, et al., 2021; Shin et al., 2009). The study by Jung, Kim, and Cha (2023), utilizing an emergency room patient sample, briefly noted the higher proportion of female patients in both the pediatric (0–17 years) and adult (18–64 years) groups, with the relationship reversing in the elderly group (65–130 years). Importantly, to our knowledge, this article stands out as the first to explore the specific patterns of age and gender in HPSI outcomes and highlight the change of these patterns over time.

Several explanations could be made about the higher rate and burden on women in HPSI. First, gender socialization of emotion may also potentially lead women to resort to self-harm as a coping mechanism (Schoenleber & Berenbaum, 2012; Schoenleber et al., 2014). Second, gender inequality may play a role in the observed gender disparity in HPSI outcomes. This context is crucial considering South Korea's low gender equality, as reflected in its 99th position on the Global Gender Gap Report 2022 (World Economic Forum, 2022). Third, this pattern may reflect detection bias, commonly known as the "gender paradox" (Schrijvers et al., 2012). Women could be more likely to appear in hospital records and be included in the survey because they tend to survive self-harming behaviors, often involving less lethal means, compared to men who tend to use more lethal methods and have consistently higher suicide mortality rates in Korea (Statistics Korea, 2025).

Although the gender paradox may influence observations, national suicide statistics suggest that the increase in HPSI among adolescents is less likely to be driven by this bias, as both the rate and the degree of change in suicide deaths among adolescents aged 15–19 were similar between 2016 and 2021 (Korean Women's Development Institute, 2024). In addition, other literature also supports the increase in gender gaps of HPSI rate among adolescents from 2019 to 2021. This may be related to the COVID-19 pandemic, the effects of which included increased SI (Kim et al., 2022; Park et al., 2022), and more frequent self-harm incidents among adolescents during and after the pandemic period (Park et al., 2023).

Sensitivity analysis examining the role of mental illness in the gender-HPSI association indicated that mental illness does not fully account for this relationship. This suggests that mental illness may act as a partial mediator in the pathway from gender to SI outcomes. However, it is important to note that the difference method underestimates the indirect effect when used with logistic regression (Jiang & VanderWeele, 2015). As a result, although we can infer the presence of a direct effect from gender to HPSI, determining the exact effect size remains uncertain.

Another notable finding is the higher rate of HPSI among men over 50, particularly in those aged 70 and older, where rates have steadily increased. Gender disparities in HPSI are evident in these older age groups in recent years. One possible explanation is retirement, as a study in South Korea found that depressive symptoms increased after retirement, but only among men (Noh et al., 2019). Income insecurity and associated social norms may also contribute to this trend. Prior research has identified economic instability as a key risk factor for increased suicidal ideation among older adults in South Korea (Koh et al., 2021) and in Japan during times of economic crisis (Kim et al., 2011). Economic insecurity extends beyond material deprivation and is often linked to identity crises among men, whose sense of self is tied to the role of family "breadwinner," making them more vulnerable to increased suicide rates and HPSI during economic difficulties (Kim et al., 2011).

A targeted and multifaceted strategy is essential to address the different patterns of gender disparity among age groups. Evidence-based suicide and self-harm prevention strategies include means restriction, psychotherapy, and gatekeeper training for primary care physicians (Dillon et al., 2015). For adolescent self-harm, dialectical behavior therapy for adolescents (DBT-A) has shown effectiveness, as highlighted in a Cochrane Review of RCTs (Hawton et al., 2016). Virtual interventions such as web-based suicide prevention programs could also play a role, though their effectiveness remains mixed (Campisi et al., 2022; Kelly, 2018).

The underlying mechanisms of these two types of gender disparity remain unclear, underscoring the need for a robust data infrastructure that captures socioeconomic factors such as employment status and family income. Such data would enable researchers to better understand the social and political determinants contributing to gender disparities in HPSI. This disparity also

calls for tailored prevention efforts, such as a dedicated self-harm prevention helpline for adolescent girls, social support programs for retired men, and targeted awareness campaigns. Zalsman et al. (2016) highlight in their systematic review that school-based awareness programs have significantly reduced suicide attempts and suicidal ideation. Implementing such gender-focused self-harm awareness programs in schools should be considered a key policy intervention.

The study has several limitations. First, the survey population is sampled from hospitals with over 100 beds, potentially biasing the sample toward individuals experiencing severe injuries. Second, the study could not account for confounders such as family income, wealth, injury severity, and education status due to their unavailability in the dataset, limiting the validity of the results. Nevertheless, considering that these SES variables are linked to both mental illness and demographic factors, accounting for them would have mitigated some of the confounding effects. Third, the number of hospitals the survey sampled from changed over time, which may have affected the identified trend. However, the impact is likely minimal, as the validated sampling methodology in both periods aimed to produce nationally representative statistics for the Korean population.

In conclusion, the gender association of HPSI in South Korea varies across age groups and has undergone changes over time. Women had the highest association with HPSI in ages under 20, which reversed after 50. Particularly noteworthy is the recent surge in HPSI among adolescent girls and older men over 70 during 2019–2021, demanding heightened attention. Targeted policy interventions are crucial to address the distinct challenges associated with gendered self-injury patterns in South Korea.

ACKNOWLEDGEMENTS

AUTHORS CONTRIBUTIONS

Conceptualization and Design: MS, SVS; Data Acquisition and Analysis: MS; Data Interpretation: MS, RK, SVS; Writing of the Manuscript: MS, RK; Critical Revisions: MS, RK, SVS.

DATA SHARING STATEMENT

The study is based on publicly available data and can be accessed after application on Korea Disease Control and Prevention Agency (KDCA) at https://www.kdca.go.kr/injury/biz/injury/recsroom/rawDta/rawDtaDwldMain.do.

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the author(s).

AUTHOR NOTES

Meekang Sung, Department of Social and Behavioral Sciences, Harvard T. H. Chan School of Public Health, Boston, Massachusetts, USA. S. V. Subramanian, Department of Social and Behavioral Sciences, Harvard T. H. Chan School of Public Health, Boston, Massachusetts, USA; Professor of Population Health and Geography, Harvard Center for Population and Development Studies, Cambridge, Massachusetts, USA. Rockli Kim, Assistant Professor, Division of Health Policy and Management, College of Health Science, Korea University, Seoul, South Korea;

Interdisciplinary Program in Precision Public Health, Department of Public Health Sciences, Graduate School of Korea University, Seoul, South Korea.

Correspondence concerning this article should be addressed to Meekang Sung, Department of Social and Behavioral Sciences, Harvard T. H. Chan School of Public Health, Boston, MA, USA. Email: meekangs@gmail.com

ORCID

Meekang Sung   http://orcid.org/0000-0001-5067-5792
S. V. Subramanian   http://orcid.org/0000-0003-2365-4165
Rockli Kim   http://orcid.org/0000-0002-9864-3957

REFERENCES

Bresin, K., & Schoenleber, M. (2015). Gender differences in the prevalence of nonsuicidal self-injury: A meta-analysis. *Clinical Psychology Review*, *38*, 55–64. https://doi.org/10.1016/j.cpr.2015.02.009

Campisi, S. C., Ataullahjan, A., Baxter, J.-A. B., Szatmari, P., & Bhutta, Z. A. (2022). Mental health interventions in adolescence. *Current Opinion in Psychology*, *48*, 101492. https://doi.org/10.1016/j.copsyc.2022.101492

Cheon, J., Oh, D., Lee, J., Ahn, J., Song, D. H., & Cheon, K. A. (2020). Increasing trend and characteristics of Korean adolescents presenting to emergency department for self-harm: A 5-year experience, 2015 to 2019. *Yonsei Medical Journal*, *61*(7), 614–622. https://doi.org/10.3349/ymj.2020.61.7.614

Choi, S., Kim, S., & Lee, H. (2023). Factors affecting inpatients' mortality through intentional self-harm at in-hospitals in South Korea. *International Journal of Environmental Research and Public Health*, *20*(4), 3095. https://doi.org/10.3390/ijerph20043095

Choi, S. S. W., Sakong, J. K., Woo, H. J., Lee, S. K., Lee, B. C., Yoon, H. J., Yang, J. C., & Sohn, M. (2023). The association between adverse childhood experiences and self-harm among South Korean children and adolescents: A cross-sectional study. *Child Health Nursing Research*, *29*(4), 271–279. https://doi.org/10.4094/chnr.2023.29.4.271

Choi, W. S., Han, J., & Hong, H. J. (2023). Association between internet searches related to suicide/self-harm and adolescent suicide death in South Korea in 2016–2020: Secondary data analysis. *Journal of Medical Internet Research*, *25*, e46254. https://doi.org/10.2196/46254

Currier, D., & Oquendo, M. A. (2011). Epidemiology of suicide and attempted suicide. In M. Tsuang, M. Tohen, & P. Jones (Eds.), *Textbook of psychiatric epidemiology* (pp. 517–533). Wiley.

Dillon, L., Guiney, C., Farragher, L., McCarthy, A., & Long, J. (2015). *Suicide prevention: An evidence review 2015*. Health Research Board.

Donner, N. C., & Lowry, C. A. (2013). Sex differences in anxiety and emotional behavior. *Pflugers Archiv*, *465*(5), 601–626. https://doi.org/10.1007/s00424-013-1271-7

Fox, K. R., Millner, A. J., Mukerji, C. E., & Nock, M. K. (2018). Examining the role of sex in self-injurious thoughts and behaviors. *Clinical Psychology Review*, *66*, 3–11. https://doi.org/10.1016/j.cpr.2017.09.009

Gong, A. K., Yun, J. H., Kim, I. S., Yuh, M. A., Woo, S. H., Kim, J., & Hong, S. (2023). Factors affecting emergency medical utilization after self-harm and effectiveness of community-based suicide prevention provisions in preventing self-harm: A nationwide registry-based study in Korea. *Community Mental Health Journal*, *59*(5), 942–953. https://doi.org/10.1007/s10597-022-01077-8

Hamza, C. A., Stewart, S. L., & Willoughby, T. (2012). Examining the link between nonsuicidal self-injury and suicidal behavior: A review of the literature and an integrated model. *Clinical Psychology Review*, *32*(6), 482–495. https://doi.org/10.1016/j.cpr.2012.05.003

Hawton, K. (2000). Sex and suicide. Gender differences in suicidal behaviour. *The British Journal of Psychiatry*, *177*(6), 484–485. https://doi.org/10.1192/bjp.177.6.484

Hawton, K., Witt, K. G., Taylor Salisbury, T. L., Arensman, E., Gunnell, D., Hazell, P., Townsend, E., & van Heeringen, K. (2016). Psychosocial interventions for self-harm in adults. *The Cochrane Database of Systematic Reviews*, *2016*(5), CD012189. https://doi.org/10.1002/14651858.CD012189

Health Insurance Review & Assessment Service. (2021). *Healthcare system in Korea*. https://www.hira.or.kr/dummy.do?pgmid=HIRAJ010000006000

Injury Prevention Management Division, Health Risk Response Center, Korea Disease Control and Prevention Agency. (2023). *Guidelines for using raw data in the discharge injury patient survey*.

Jeong, J. Y., & Kim, D. H. (2021). Gender differences in the prevalence of and factors related to non-suicidal self-injury among middle and high school students in South Korea. *International Journal of Environmental Research and Public Health*, *18*(11), 5965. https://doi.org/10.3390/ijerph18115965

Jiang, Z., & VanderWeele, T. J. (2015). When is the difference method conservative for assessing mediation? *American Journal of Epidemiology*, *182*(2), 105–108. https://doi.org/10.1093/aje/kwv059

Jung, K. Y., Kim, T., Hwang, S. Y., Lee, T. R., Yoon, H., Shin, T. G., Sim, M. S., Cha, W. C., & Jeon, H. J. (2018). Deliberate self-harm among young people begins to increase at the very early age: A nationwide study. *Journal of Korean Medical Science*, *33*(30), e191. https://doi.org/10.3346/jkms.2018.33.e191

Jung, K. Y., Kim, T., & Cha, W. C. (2023). Self-harm characteristics of younger-old and older-old adults admitted to emergency departments: A nationwide study. *Signa Vitae*, *19*(4), 159–166.

Jung, K. Y., Kim, T., & Ro, Y. S. (2023). Epidemiology of suicide attempts and self-harm in emergency departments: A report from the National Emergency Department Information System (NEDIS) of Korea, 2018–2022. *Clinical and Experimental Emergency Medicine*, *10*(S), S69–S74. https://doi.org/10.15441/ceem.23.141

Kelly, B. D. (2018). Are we finally making progress with suicide and self-harm? An overview of the history, epidemiology and evidence for prevention. *Irish Journal of Psychological Medicine*, *35*(2), 95–101. https://doi.org/10.1017/ipm.2017.51

Kim, H., Jhon, M., Kim, J. W., Kang, H. J., Ryu, S., Kim, S. Y., Kim, S. W., Kim, J. M., Shin, I. S., & Lee, J. Y. (2023). Suicide and non-suicidal self-injury from internet addiction among Korean adolescents. *Journal of the Korean Academy of Child and Adolescent Psychiatry*, *34*(3), 152–158. https://doi.org/10.5765/jkacap.230015

Kim, H., Ryu, J. M., & Kim, H. W. (2020). Characteristics and trends of suicide attempt or non-suicidal self-injury in children and adolescents visiting emergency department. *Journal of Korean Medical Science*, *35*(33), e276. https://doi.org/10.3346/jkms.2020.35.e276

Kim, H. H., Lee, J. H., Song, I. H., & Park, Y. R. (2023). Characteristics and risk factors of suicide among people who attempted self-harm in South Korea: A longitudinal national cohort study. *Psychiatry Research*, *330*, 115613. https://doi.org/10.1016/j.psychres.2023.115613

Kim, K. A., Kim, Y. E., & Yoon, S. J. (2021). Descriptive epidemiology on the trends and socio-demographic risk factors of disease burden in years of life lost due to suicide in South Korea from 2000 to 2018. *BMJ Open*, *11*(2), e043662. https://doi.org/10.1136/bmjopen-2020-043662

Kim, N. M., Seo, Y. W., & Kwak, S. G. (2022). Changes in self-harm attempts after the COVID-19 pandemic based on pre-hospital medical records. *Medicine*, *101*(37), e30694. https://doi.org/10.1097/MD.0000000000030694

Kim, S., Jeon, H., & Park, J. (2022). The association of physical and mental illness and self-harm resulting in hospitalization: A population-based study of older adults in South Korea. *International Journal of Environmental Research and Public Health*, *19*(14), 8303. https://doi.org/10.3390/ijerph19148303

Kim, S. Y., Kim, M. H., Kawachi, I., & Cho, Y. (2011). Comparative epidemiology of suicide in South Korea and Japan: Effects of age, gender and suicide methods. *Crisis*, *32*(1), 5–14. https://doi.org/10.1027/0227-5910/a000051

Koh, E. H., Song, S. M., Huh, S. I., & Im, H. Y. (2021). The effect of economic insecurity on suicidal thoughts in middle-aged and older adults with and without disabilities. *Health and Social Welfare Review*, 41, 239–257.

Korea Disease Control and Prevention Agency. (2024). *Discharge injury patient survey.* https://www.kdca.go.kr/injury/biz/injury/bsnsIntrcn/lhstlDamgDepthsExaminMain.do

Korean Women's Development Institute. (2024, October 11). *Suicide rate by sex and age group.* Gender Statistics Information System. https://gsis.kwdi.re.kr/statHtml/statHtml.do?orgId=338&tblId=DT_LCB_0003&conn_path=I2

Kwon, H., Lee, J. S., Kim, A. R., Hong, H. J., & Kweon, Y. S. (2018). Risk factors for suicidal ideation and attempts in adolescents. *Soa-Ch'ongsonyon Chongsin Uihak = Journal of Child & Adolescent Psychiatry*, 29(3), 114–121. https://doi.org/10.5765/jkacap.170010

Lee, H. S., Park, K. J., Kwon, Y., Shon, S. H., Youngstrom, E. A., & Kim, H. W. (2021a). Clinical characteristics associated with suicidal attempt and non-suicidal self-injury in Korean adolescents. *Psychiatry Investigation*, 18(6), 561–569. https://doi.org/10.30773/pi.2021.0024

Lee, I., Choi, J., Kim, K. S., Suh, J., Kim, J. H., & Kim, S. (2022). Suicide attempts presenting to the emergency department before and during the COVID-19 pandemic: A comparative study. *Clinical and Experimental Emergency Medicine*, 9(2), 120–127. https://doi.org/10.15441/ceem.21.088

Lee, J. T., Lim, T. J., & Kim, T. K. (2018). *Risk assurance for mental health in public and private sectors.* Korean Insurance Research Institute.

Lee, J. Y., Kim, H., Kim, S. Y., Kim, J. M., Shin, I. S., & Kim, S. W. (2021). Non-suicidal self-injury is associated with psychotic-like experiences, depression, and bullying in Korean adolescents. *Early Intervention in Psychiatry*, 15(6), 1696–1704. https://doi.org/10.1111/eip.13115

Lee, K.-S., Sung, H. K., Yoo, S. Y., & Min, H. S. (2023). Temporal trends and characteristics of adult patients in emergency department related to suicide attempt or self-harm in Korea, 2016–2020. *Journal of Korean Medical Science*, 38(6), e40. https://doi.org/10.3346/jkms.2023.38.e40

Lee, W. K. (2016). Psychological characteristics of self-harming behavior in Korean adolescents. *Asian Journal of Psychiatry*, 23, 119–124. https://doi.org/10.1016/j.ajp.2016.07.013

Lee, Y.-K., Hong, S. O., Park, S.-J., Park, M., Wang, K., Jo, M., Oh, J., Lee, S. A., Lee, H. J., Oh, J., Lim, D., Kweon, S., & Kim, Y. (2021). Data resource profile: The Korea National Hospital Discharge In-depth Injury Survey. *Epidemiology and Health*, 43, e2021052. https://doi.org/10.4178/epih.e2021052

Muehlenkamp, J. J. (2005). Self-injurious behavior as a separate clinical syndrome. *The American Journal of Orthopsychiatry*, 75(2), 324–333. https://doi.org/10.1037/0002-9432.75.2.324

Muehlenkamp, J. J., Claes, L., Havertape, L., & Plener, P. L. (2012). International prevalence of adolescent non-suicidal self-injury and deliberate self-harm. *Child and Adolescent Psychiatry and Mental Health*, 6(1), 10. https://doi.org/10.1186/1753-2000-6-10

Muntaner, C., Eaton, W. W., Miech, R., & O'Campo, P. (2004). Socioeconomic position and major mental disorders. *Epidemiologic Reviews*, 26(1), 53–62. https://doi.org/10.1093/epirev/mxh001

National Institutes of Health, Office of Extramural Research. (2020, January 15). *Final rule human subjects research exemptions: NIH infographic* [Infographic]. https://grants.nih.gov/sites/default/files/exemption_infographic_v8_508c_1-15-2020.pdf

Nock, M. K. (2010). Self-injury. *Annual Review of Clinical Psychology*, 6(1), 339–363. https://doi.org/10.1146/annurev.clinpsy.121208.131258

Noh, J. W., Kwon, Y. D., Lee, L. J., Oh, I. H., & Kim, J. (2019). Gender differences in the impact of retirement on depressive symptoms among middle-aged and older adults: A propensity score matching approach. *PLoS One*, 14(3), e0212607. https://doi.org/10.1371/journal.pone.0212607

Nolen-Hoeksema, S. (1990). *Sex differences in depression.* Stanford University Press.

Oakley, A. (2016). *Sex, gender and society* (2nd ed.). Routledge.

OECD. (2023). *Suicide rates (indicator).* https://data.oecd.org/healthstat/suicide-rates.htm

Park, J. H., Seo, Y. W., & Chae, S. (2023). Impact of the COVID-19 pandemic on adolescent self-harm: Based on a national emergency department information system. *International Journal of Environmental Research and Public Health*, 20(5), 4666. https://doi.org/10.3390/ijerph20054666

Park, S. J., Rim, S. J., Jo, M., Lee, M. G., Kim, G., & Park, S. (2022). Self-injurious behavior rate in the short-term period of the COVID-19 pandemic in Korea. *Journal of Korean Medical Science*, 37(6), e45. https://doi.org/10.3346/jkms.2022.37.e45

Schrijvers, D. L., Bollen, J., & Sabbe, B. G. C. (2012). The gender paradox in suicidal behavior and its impact on the suicidal process. *Journal of Affective Disorders*, 138(1-2), 19–26. https://doi.org/10.1016/j.jad.2011.03.050

Schoenleber, M., & Berenbaum, H. (2012). Shame regulation in personality pathology. *Journal of Abnormal Psychology*, 121(2), 433–446. https://doi.org/10.1037/a0025281

Schoenleber, M., Berenbaum, H., & Motl, R. (2014). Shame-related functions of and motivations for self-injurious behavior. *Personality Disorders*, 5(2), 204–211. https://doi.org/10.1037/per0000061

Seong, E., Noh, G., Lee, K. H., Lee, J. S., Kim, S., Seo, D. G., Yoo, J. H., Hwang, H., Choi, C. H., Han, D. H., Hong, S. B., & Kim, J. W. (2021). Relationship of social and behavioral characteristics to suicidality in community adolescents with self-harm: Considering contagion and connection on social media. *Frontiers in Psychology*, 12, 691438. https://doi.org/10.3389/fpsyg.2021.691438

Shin, Y. M., Chung, Y. K., Lim, K. Y., Lee, Y. M., Oh, E. Y., & Cho, S. M. (2009). Childhood predictors of deliberate self-harm behavior and suicide ideation in Korean adolescents: A prospective population-based follow-up study. *Journal of Korean Medical Science*, 24(2), 215–222. https://doi.org/10.3346/jkms.2009.24.2.215

Statistics Korea. (2024, October 4). *Suicide rate.* https://www.index.go.kr/unify/idx-info.do?idxCd=8040

Statistics Korea. (2025). *Korean Statistical Information Service (KOSIS).* https://kosis.kr/eng/

Vigo, D. V., Thornicroft, G., & Atun, R. (2016). Estimating the true global burden of mental illness. *The Lancet. Psychiatry*, 3(2), 171–178. https://doi.org/10.1016/S2215-0366(15)00505-2

World Economic Forum. (2022). *The global gender gap report 2022.* https://www.weforum.org/reports/global-gender-gap-report-2022

World Health Organization. (1993). *The ICD-10 classification of mental and behavioural disorders: Clinical descriptions and diagnostic guidelines.* WHO Team Classifications and Terminologies (CAT).

Yang, K., Kim, S. Y., Kim, H., & Hwang, J. W. (2022). Association among self-injury, suicidal tendency, and personality and psychological characteristics in Korean adolescents. *Psychiatry Investigation*, 19(1), 37–43. https://doi.org/10.30773/pi.2021.0184

Yu, S. (2018). Uncovering the hidden impacts of inequality on mental health: A global study. *Translational Psychiatry*, 8(1), 98. https://doi.org/10.1038/s41398-018-0148-0

Zalsman, G., Hawton, K., Wasserman, D., van Heeringen, K., Arensman, E., Sarchiapone, M., Carli, V., Höschl, C., Barzilay, R., Balazs, J., Purebl, G., Kahn, J. P., Sáiz, P. A., Lipsicas, C. B., Bobes, J., Cozman, D., Hegerl, U., & Zohar, J. (2016). Suicide prevention strategies revisited: 10-year systematic review. *The Lancet. Psychiatry*, 3(7), 646–659. https://doi.org/10.1016/S2215-0366(16)30030-X