

Trends of non-lethal intentional self-harm and suicide in Spain 2018–2023: a nationwide registry-based study



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Summary

Background Monitoring suicide and non-lethal intentional self-harm (NLISH) is critical for prevention efforts. We analysed trends in NLISH and suicide in Spain (2018–2023), including related demographic and clinical factors.

Methods Nationwide population-based study including all NLISH hospitalisations (from health registries) and suicides (from national mortality data) in Spain between 2018 and 2023. We first examined the sociodemographic characteristics and method used for both outcomes, and the clinical characteristics of NLISH hospitalisations. Then, we evaluated annual and monthly trends in NLISH and suicide rates overall and by sex and age group using Joinpoint regression.

Findings Between 2018 and 2023, we identified 73,692 NLISH hospitalisations and 23,496 suicides in Spain, averaging 12,282 and 3916 annually, respectively. NLISH hospitalisations were more common among women ($n = 44,304$; 60.1%), and suicides among men ($n = 17,471$; 74.4%). Youth aged 10–24 accounted for 17,915 (24.3%) NLISH hospitalisations but only 1125 (4.8%) suicides; conversely, individuals aged ≥ 65 represented 7327 (31.2%) suicides but only 9410 (12.8%) NLISH hospitalisations. The leading methods were drug poisoning for NLISH ($n = 50,643$; 68.7%) and hanging for suicide ($n = 10,810$; 46.0%). From 2018 to 2023, NLISH rates rose annually by 8.0% (95% CI: 1.5, 15.9), especially among young women shortly after the 2020 initial pandemic outbreak. Suicide rates rose 2.6% annually (95% CI: 0.6, 4.8), especially among young women and middle-aged men.

Interpretation Non-lethal self-harm is rising in Spain, especially among young women. Suicide shows smaller but significant increases. Urgent, age- and gender-sensitive strategies are needed to address all suicidal behaviour and ensure timely mental health care.

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Introduction

Suicide is a significant public health issue. It is estimated that approximately 700,000 people die by suicide each year, representing an estimated loss of 34.6 million years of life.¹ The 2013–2030 World Health

Organization Action Plan sets the goal of reducing suicide rates by one-third by the year 2030.² Non-lethal intentional self-harm (NLISH) is the most important risk factor for suicide.³ Accordingly, research on NLISH is considered a priority for suicide prevention given the

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Translation: For the Spanish translation of the abstract see the [Supplementary Materials](#) section.

Research in context

Evidence before this study

We systematically searched PubMed, Scopus, and Web of Science for studies published from 1 January 2000 to 31 December 2023, using the terms “self-harm”, “nonlethal self-injury”, “suicide”, “hospitalizations”, and “Spain”, without language restrictions. We included observational studies and national reports examining temporal trends in self-harm and suicide, and excluded studies focused exclusively on specific subpopulations or interventions. The existing evidence documented long-term suicide trends in Spain and Europe, but few studies provided integrated analyses of both non-lethal self-harm and suicide deaths across recent years—despite implications for prevention efforts. No nationwide studies comprehensively examined national trends during the COVID-19 period using simultaneous hospital and mortality data. The risk of bias in existing studies was moderate, primarily due to data fragmentation or lack of national scope.

Added value of this study

This is the first study to jointly analyse national-level hospitalisations for nonlethal intentional self-harm and suicide mortality in Spain between 2018 and 2023, offering a

comprehensive picture of self-directed violence trends before, during, and after the COVID-19 pandemic. By using routinely collected administrative health data, we provide up-to-date, population-based evidence on demographic and temporal shifts in self-harm and suicide, highlighting key differences by age and sex.

Implications of all the available evidence

Our findings suggest that while suicide deaths increased modestly but significantly, with heterogeneity across sociodemographic subgroups, non-lethal self-harm hospitalisations rose significantly—especially among adolescent and young women. This divergence underscores the need for targeted prevention strategies that address emerging mental health crises in younger populations. Our results can also serve as initial evidence of potential cohort effects increasing the life-course suicide risk of young women in Spain. Together with prior evidence, our study supports urgent policy attention to surveillance and early intervention for individuals at risk of suicide, delineating specific sociodemographic windows of opportunity for indicated prevention efforts.

role of NLISH for identification of high-risk individuals. In addition, NLISH is a relevant clinical outcome itself that drives substantial burden to patients, families, and health care systems.⁴ Examining NLISH alongside suicide deaths can be essential for public health purposes for several reasons, especially since a large proportion of evidence-based suicide prevention strategies (e.g., restriction of access to means) target both non-lethal and lethal self-harm. However, comprehensive simultaneous surveillance and reporting of NLISH and suicide deaths remains limited.⁵

Monitoring trends⁶ is a critical surveillance component of suicide prevention efforts, as it can guide resource allocation for planning and provide information for the generation of causal hypotheses. Incorporating NLISH, which can be up to 50 times more frequent than suicide,⁷ to suicide surveillance can improve detection of changes in temporal trends, potentially bolstering early detection and prevention efforts. There is evidence of a recent global reduction in suicides, with heterogeneity across countries, and a possible recent increase in NLISH, particularly among younger populations in developed countries, suggesting cohort effects—possibly related to the COVID-19 pandemic.^{8,9} There is limited research examining trends in NLISH and suicide using simultaneous nationwide data sources.¹⁰ In Spain, a country with one of the lowest suicide rates among high-income countries, regional studies conducted in Catalonia,¹¹ Madrid,¹² and Oviedo¹³ suggest a concerning rise in

NLISH, but not suicide deaths, in the years following 2020. This increase has been predominantly attributed to a higher incidence of NLISH among young women.¹¹

This study aims to comprehensively examine recent trends in suicidal behaviour in Spain by analysing nationwide population-based electronic health record data on hospital admissions for NLISH and mortality register data on deaths by suicide, focussing on temporal patterns, sociodemographic factors, and methods used.

Methods

Study design and data sources

Retrospective registry-based study of NLISH and suicides in Spain between 2018 and 2023. We identified NLISH hospitalisations using Spain’s Minimum Basic Data Set of Hospitalisations, an electronic health record maintained by the Ministry of Health that includes all discharges from public and private hospitals in Spain. For each hospitalisation, patient demographic and clinical information is recorded by the responsible physician at the time of discharge, including age in years, biological sex (hereafter referred to as sex), primary diagnosis, up to nineteen secondary diagnoses, up to twenty procedures, and type of discharge. Diagnoses are coded based on the International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM). Suicides were identified in the official mortality data provided by the Spanish National Statistics

Institute, where causes of death are determined based on ICD-10 codes in accordance with WHO criteria and, for suicide, derived from judicial death records for unnatural causes. These mortality data follow Eurostat's European Statistics Code of Practice for data quality assurance.¹⁴ General population denominator data for rates were retrieved from Spain's continuous population register and provided by the Spanish National Statistics Institute.

Study population and variables

For NLISH hospitalisations, we identified all electronic health records of individuals aged 10 and over with an ICD-10-CM code indicating NLISH [ICD-10-CM: T36-T65 with a 5th or 6th character of 2, T71 with a 6th character of 2, X71-X83, T14-91] between January 1, 2018 and December 31, 2023. Accordingly, one patient can generate several hospitalisations. We included admissions to any hospital ward (i.e., admissions to medical, surgical, intensive care, and psychiatric wards). We identified and excluded admissions indicating intentional self-harm resulting on inpatient death.

NLISH method was defined based on ICD-10-CM codes, as described in [Supplementary Table S1](#). When records indicated multiple self-harm methods, we assigned the highest-lethality method—e.g., if a record indicated codes for benzodiazepine intoxication and jumping from a high place, we adjudicated the latter as self-harm method. [Supplementary Figure S1](#) represents the overlap between self-harm methods identified in the records. For NLISH, we also retrieved information on mental health diagnoses based on ICD-10-CM codes ([Supplementary Table S2](#)).

For suicides, we identified all death records of individuals over 10 years old where intentional self-harm [ICD-10: X60-X84, Y87-0] was listed as the underlying cause of death as indicated by medical examiners in death certificates between 1 January 2018 and 31 December 2023. Suicide method was defined based on ICD-10 codes, as detailed in [Supplementary Table S3](#). We did not include data after 31 December 2023, as consolidated mortality data were not available.

Analyses

First, we conducted a descriptive analysis of NLISH hospitalisations and suicide deaths by sex, age, and method used.

Next, we calculated the annual and monthly crude rates per 100,000 population of NLISH hospitalisations and suicide deaths, overall as well as by sex and age group (10–24, 25–44, 45–64, ≥65 years). *Joinpoint* regression models were used to evaluate trends in rates, both on the annual and monthly level. These models assume a Poisson distribution and fit a series of linear segments to the log-transformed rates, identifying points where the slope of the trend significantly changes

(inflection point) guided by the Monte Carlo permutation test. Each segment's slope is expressed as an annual percent change (APC), annualised based on monthly data, while the average annual percent change (AAPC) summarises the overall trend across all segments. We allowed up to 0 joinpoint for annual rates and up to 5 joinpoints for monthly rates, using $\alpha = 0.05$ as the selection criterion, and estimated APCs and AAPCs, each with their respective confidence intervals.¹⁵

Statistical analyses were performed with Stata Corp College Station TX version 18.5 and Joinpoint Regression 5.4.0.

Ethics approval

This study was approved by the Research Ethics Committee of the Spanish Institute of Health Carlos III (CEI PI 35_2024-v2).

Role of the funding source

The funding source had no role in study design, data collection, data analysis, data interpretation, or writing of the report.

Results

As shown in [Table 1](#), we identified 75,391 hospital admissions with a diagnosis of intentional self-harm at discharge between 2018 and 2023. Of these, 2.3% died in the hospital, resulting in 73,692 NLISH hospitalisations—representing an average of 12,282 hospital admissions per year. We identified 23,496 suicide deaths in the official mortality data, which represents an average of 3916 suicides per year.

NLISH hospitalisations included a higher proportion of women (60.1%), whereas suicide deaths occurred predominantly among men (74.4%). In terms of age group distribution, for both NLISH hospitalisations and suicides, the largest proportion of records corresponded with the 45–64 year-old group (34.2 and 40.9% of records, respectively). There was marked variation in the age distribution of NLISH hospitalisations and suicide deaths: While a large proportion of NLISH hospitalisations corresponded with individuals aged 10–24 years (24.3% compared with just 4.8% of suicides), the opposite was true for individuals aged ≥65 (with only 12.8% of NLISH hospitalisations but 31.2% of suicides).

We also found differences between NLISH hospitalisations and suicide deaths in terms of self-harm method used. Most NLISH hospitalisations were due to drug poisoning (68.7%), followed by suicide attempts with unspecified methods (8.6%), and self-harm by sharp or blunt object (6.6%). Conversely, nearly half (46.0%) of suicides were by hanging, strangulation, or suffocation, followed by suicide by jumping (25.5%). Notably, almost 79.7% NLISH hospitalisations included at least one additional mental disorder diagnosis, with

	Non-lethal intentional self-harm	Suicide
Total number 2018–2023	73,692	23,496
Annual average 2018–2023	12,282	3916
	N (%)	N (%)
Sex		
Men	29,383 (39.9)	17,471 (74.4)
Women	44,304 (60.1)	6025 (25.6)
Age group		
10–24 y	17,915 (24.3)	1125 (4.8)
25–44 y	21,186 (28.7)	5440 (23.1)
45–64 y	25,181 (34.2)	9604 (40.9)
≥65 y	9410 (12.8)	7327 (31.2)
Used method		
Drug self-poisoning	50,643 (68.7)	2353 (10.0)
Suicide attempts unspecified	6355 (8.6)	NA
Cutting with an object	4831 (6.6)	629 (2.7)
Toxic effects of substances	4380 (5.9)	907 (3.9)
Jumping	2984 (4.0)	5988 (25.5)
Asphyxiation/hanging	281 (0.4)	10,810 (46.0)
Self-drowning	119 (0.2)	634 (2.7)
Firearms and explosives	168 (0.2)	1032 (4.4)
Others	3931 (5.3)	1143 (4.9)
Additional mental disorders diagnosis		
Mental and behavioural disorders due to psychoactive substance use	58,705 (79.7)	NR
Schizophrenia, schizotypal, delusional, and other non-mood psychotic disorders	29,321 (39.8)	NR
Mood [affective] disorders	4352 (5.9)	NR
Anxiety Disorder, and Other Somatoform Mental Disorders	17,824 (24.2)	NR
Behavioural Syndromes Associated with Physiological Disorders and Physical Factors	18,464 (25.1)	NR
Personality and behavioural disorders in adults	3347 (4.5)	NR
Other disorders	15,904 (21.6)	NR
	4400 (6.0)	NR

NA: Not applicable. NR: Not recorded.

Table 1: Characteristics of non-lethal intentional self-harm hospitalisations and deaths by suicide.

an alcohol-related disorder diagnosis present in 24.0% of cases (diagnostic information was not available for suicide mortality data).

Overall trends

Tables 2 and 3 represent joinpoint trend analyses (overall, by sex, and by sex and age group), of NLISH hospitalisations and suicide deaths, respectively. Because average percent changes are sensitive to variation across the study period, we report monthly segmented trends to capture more granular shifts in behaviour.

Fig. 1 represents monthly rates of NLISH hospitalisations and suicide deaths in Spain between 2018 and 2023, and trends identified by joinpoint models. Annual rates of NLISH hospitalisation increased by an average of 8.0% (95% CI: 1.5, 15.9) per year from 2018 to 2023. This average reflects an overall upward trend but masks a sharp inflection beginning after the initial pandemic outbreak: in terms of trends by month, NLISH

hospitalisation rates remained stable from January 2018 to January 2021, followed by a 10.9% (95% CI: 2.6, 13.6) monthly increase from January 2021 to April 2021, and remained subsequently stable after April 2021. Suicide rates increased by an average of 2.6% (95% CI: 0.6, 4.8) per year from 2018 to 2023. In terms of trends by month, suicide rates increased by a monthly 0.3% (95% CI: 0.1, 1.4) from January 2018 to August 2023, followed by a -6.6% (95% CI: -20.6, 0.2) change from August to December 2023.

Trends by sex

Fig. 2 represents monthly rates of NLISH hospitalisation and suicide deaths divided by sex in Spain between 2018 and 2023, and trends identified by joinpoint models. Among men, annual rates of NLISH hospitalisation increased by an average of 5.5% (95% CI: 1.8, 9.6) per year from 2018 to 2023. In terms of trends by month, NLISH hospitalisation rates remained stable from January 2018 to April 2020, followed by a monthly increase of 0.8% (95% CI: 0.5, 5.7) from April 2020 to September 2023, and a subsequent monthly decrease of -10.6% (95% CI: -24.4, -0.2) after September 2023. Annual suicide rates among men increased by an average of 2.4% (95% CI: 0.2, 4.7) per year. In terms of trends by month, suicide among men increased by a monthly 0.3% (95% CI: 0.1, 1.6) from January 2018 to August 2023, followed by a -7.4% (95% CI: -21.9, 0.1) change after August 2023.

Among women, annual rates of NLISH hospitalisation increased by an average of 9.8% (95% CI: 0.96, 21.2) per year from 2018 to 2023. In terms of trends by month, NLISH hospitalisation rates remained stable from January 2018 to January 2021, followed by a monthly increase of 12.9% (95% CI: 3.7, 16.0) from January 2021 to April 2021, and subsequently remained stable. Suicide among women increased by an average of 3.2% (95% CI: 0.2, 6.4) per year. In terms of trends by month, joinpoint regression models identified an increase by a monthly 0.3% (95% CI: 0.1, 0.4) among women suicide from January 2018 to December 2023.

Examination of overall and sex-specific trends after standardisation of rates to the standard European population yielded interchangeable results (Supplementary Table S4).

Trends by sex and age group

Fig. 3 shows 2018–2023 monthly rates of NLISH hospitalisation and suicide in Spain, by sex and age group, and trends identified by joinpoint models. We found heterogeneity in trends by outcome and by sex and age group. The most remarkable trends identified were increases in NLISH hospitalisations among youth, especially among girls and women aged 10–24—for whom they doubled between 2021 and 2023, and in suicide deaths among girls and women aged 10–24 and women aged 25–44.

NLISH	2018	2023	AAPC ^a (95% CI)	Monthly APC ^b (95% CI) ^c		
				Trend 1	Trend 2	Trend 3
Overall	24.3	32.7	8.0 (1.5, 15.9)	Jan 18–Jan 21 0 (−0.4, 0.3)	Jan 21–Apr 21 10.9 (2.6, 13.6)	Apr 21–Dec 23 −0.1 (−0.4, 0.2)
Men	21.2	26.0	5.5 (1.8, 9.6)	Jan 18–Apr 20 −0.1 (−2.8, 0.4)	Apr 20–Sep 23 0.8 (0.5, 5.7)	Sep 23–Dec 23 −10.6 (−24.4, −0.2)
10–24 y	14.0	23.6	13.1 (4.4, 24.4)	Jan 18–Aug 20 0.4 (−1.8, 1.0)	Aug 20–Feb 22 2.6 (1.5, 12.3)	Feb 22–Dec 23 −0.5 (−1.8, 0.3)
25–44 y	24.8	28.7	3.9 (0.5, 7.7)	Jan 18–Dec 23 0.3 (0.2, 0.5)		
45–64 y	25.2	31.1	5.3 (2.3, 8.5)	Jan 18–Dec 23 0.4 (0.3, 0.6)		
≥65 y	19.3	19.8	2.2 (−4.9, 10.5)	Jan 18–Dec 23 0.2 (−0.01, 0.4)		
Women	27.3	39.0	9.8 (0.9, 21.2)	Jan 18–Jan 21 0.2 (−0.2, 0.5)	Jan 21–Apr 21 12.9 (3.7, 16.0)	Apr 21–Dec 23 −0.2 (−0.6, 0.1)
10–24 y	42.1	80.3	18.9 (−1.6, 51.7)	Jan 18–Jun 20 −0.5 (−1.5, 0.3)	Jun 20–May 21 9.0 (6.2, 19.8)	May 21–Dec 23 −0.7 (−1.3, −0.2)
25–44 y	26.8	36.0	7.0 (3.8, 10.5)	Jan 18–Dec 23 0.5 (0.4, 0.7)		
45–64 y	29.7	36.2	5.1 (1.0, 9.9)	Jan 18–Feb 21 0.1 (−1.0, 0.4)	Feb 21–May 21 7.4 (0.6, 10.4)	May 21–Dec 23 −0.2 (−0.9, 0.2)
≥65 y	14.9	18.4	6.2 (0.8, 12.6)	Jan 18–Dec 23 0.5 (0.3, 0.7)		

Trends were identified via joinpoint regression. ^aAverage annual percent change. ^bAnnual percent change (annualised from monthly data). ^c95% Confidence Interval.

Table 2: Non-lethal intentional self-harm (NLISH) hospitalisations by 100,000 population in Spain, 2018 and 2023; and 2018–2023 trends overall, by sex, and by sex and age group.

Among boys and men aged 10–24, annual rates of NLISH hospitalisation increased by an average of 13.1% (95% CI: 4.4, 24.5). Monthly analyses suggest

that rates were stable from January 2018 to August 2020, followed by a 2.6% (95% CI: 1.5, 12.3) increase from August 2020 to February 2022, and remained

Suicides	2018	2023	AAPC ^a (95% CI)	Monthly APC ^b (95% CI) ^c		
				Trend 1	Trend 2	Trend 3
Overall	8.4	9.3	2.6 (0.6, 4.8)	Jan 18–Aug 23 0.3 (0.1, 1.4)	Aug 23–Dec 23 −6.6 (−20.6, 0.2)	
Men	12.7	14.2	2.4 (0.2, 4.7)	Jan 18–Aug 23 0.3 (0.1, 1.6)	Aug 23–Dec 23 −7.4 (−21.9, 0.1)	
10–24 y	3.5	3.4	1.0 (−2.9, 5.1)	Jan 18–Dec 23 0.1 (−0.2, 0.5)		
25–44 y	9.5	11.9	3.9 (1.7, 6.3)	Jan 18–Dec 23 0.2 (0.02, 0.4)		
45–64 y	16.0	17.4	2.7 (0.8, 4.7)	Jan 18–Dec 23 0.2 (0.05, 0.4)		
≥65 y	21.3	21.8	0.3 (−3.4, 4.2)	Jan 18–Dec 23 0.02 (−0.2, 0.2)		
Women	4.3	4.8	3.2 (0.2, 6.4)	Jan 18–Dec 23 0.3 (0.1, 0.4)		
10–24 y	1.3	1.9	10.7 (1.0, 23.5)	Jan 18–Dec 23 0.9 (0.4, 1.5)		
25–44 y	3.0	4.1	5.7 (2.7, 9.0)	Jan 18–Dec 23 0.4 (0.1, 0.7)		
45–64 y	5.6	6.0	2.5 (−1.8, 7.3)	Jan 18–Dec 23 0.2 (−0.01, 0.4)		
≥65 y	6.1	5.7	0.4 (−4.7, 6.0)	Jan 18–Dec 23 0.0 (−0.3, 0.3)		

Trends were identified via joinpoint regression. ^aAverage annual percent change. ^bAnnual percent change (annualised from monthly data). ^c95% Confidence Interval.

Table 3: Suicides by 100,000 population in Spain, 2018 and 2023; and 2018–2023 trends overall, by sex, and by sex and age group.

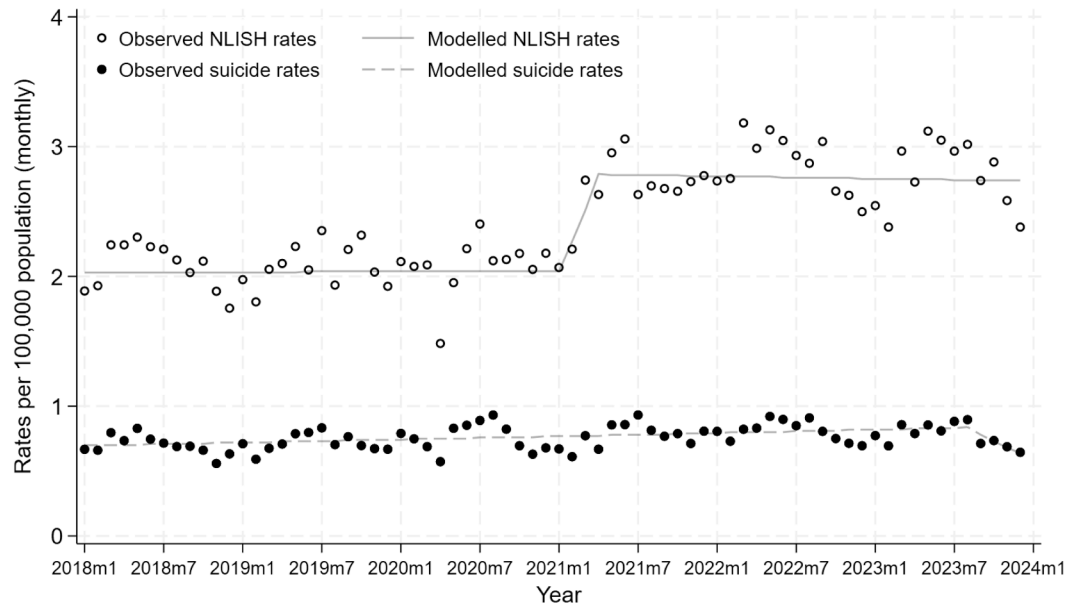


Fig. 1: Non-lethal intentional self-harm hospitalisations and suicide deaths in Spain, 2018–2023: monthly rates and temporal trends.

stable thereafter. Suicide among men aged 10–24 remained stable. Monthly analyses also show that suicide remained stable throughout the study period.

Among girls and women aged 10–24, annual NLISH hospitalisation rates increased by an average 18.9% (95% CI: –1.6, 51.7) per year from 2018 to 2023—reflecting a doubling in hospitalisation rates over the last two years of the study period, the largest increase in the study population, underscoring the

disproportionate burden in this demographic group. Monthly analyses suggest that rates remained stable from January 2018 to June 2020, followed by a monthly 9.0% (95% CI: 6.2, 19.8) increase from June 2020 to May 2021, and a subsequent monthly –0.7% (95% CI: –1.3, –0.2) decrease from May 2021 to December 2023. Suicide among women aged 10–24 increased by an average of 10.7% (95% CI: 1.0, 23.5) per year from 2018 to 2023. Monthly analyses show an

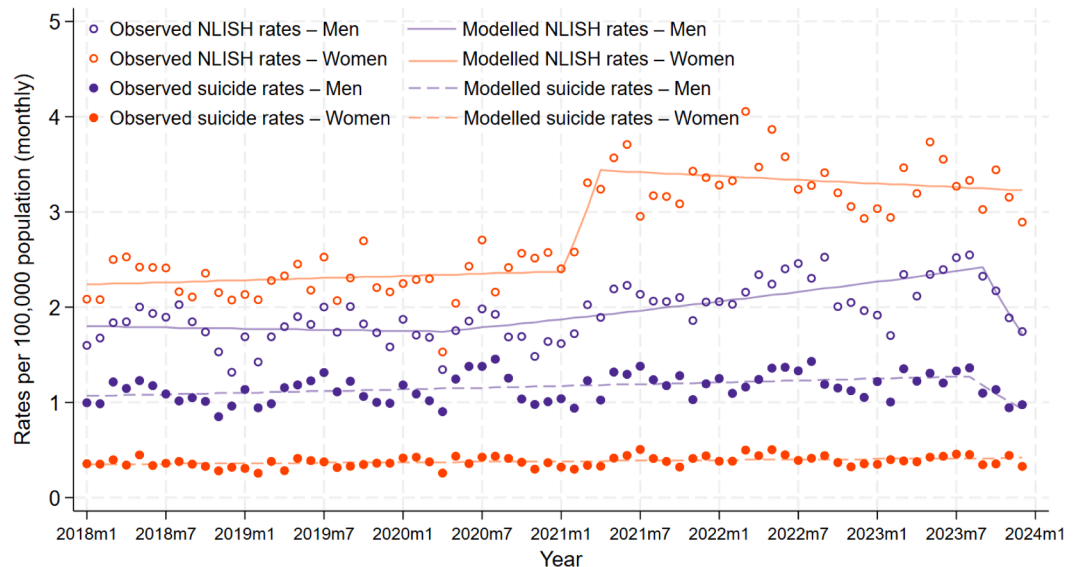


Fig. 2: Non-lethal intentional self-harm hospitalisations and suicide deaths in Spain by sex, 2018–2023: monthly rates and temporal trends.

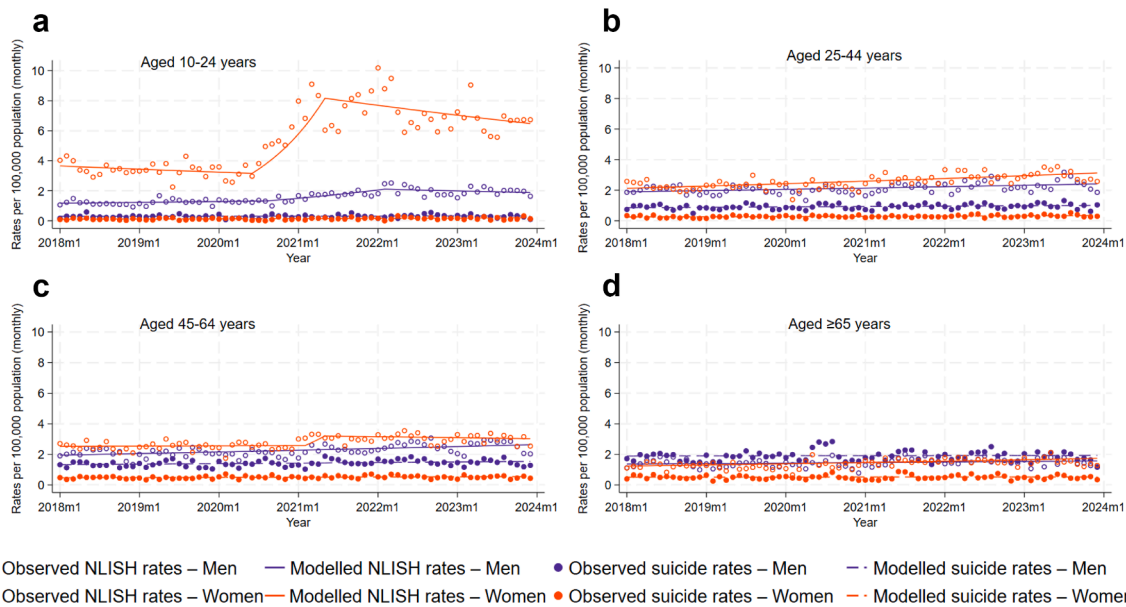


Fig. 3: Non-lethal intentional self-harm hospitalisations and suicide deaths in Spain by sex and age group, 2018–2023: monthly rates and temporal trends. a. Aged 10–24 years, b. Aged 25–44 years, c. Aged 45–64 years, d. Aged ≥ 65 years.

average monthly increase of 0.9% (95% CI: 0.4, 1.5) throughout the study period.

Among men aged 25–44, annual rates of NLISH hospitalisation increased by an average 3.9% (95% CI: 0.5, 7.7) per year from 2018 to 2023. Monthly analyses show that rates increased by a monthly 0.3% (95% CI: 0.2, 0.5). Suicide among men aged 25–44 increased by an average of 3.9% (95% CI: 1.7, 6.3). Monthly analyses show an average monthly increase of 0.2% (95% CI: 0.02, 0.4) throughout the study period.

Among women aged 25–44, annual rates of NLISH hospitalisation increased by an average 7.0% (95% CI: 3.8, 10.5) per year from 2018 to 2023. Rates increased by a monthly 0.5% (95% CI: 0.4, 0.7) throughout the study period. Suicide among women aged 25–44 increased by an average 5.7% (95% CI: 2.7, 9.0) per year from 2018 to 2023. In terms of trends by month, suicide rates show a monthly increase of 0.4 (95% CI: 0.1, 0.7) throughout the study period.

Among men aged 45–64, NLISH hospitalisation increased by an average 5.3% (95% CI: 2.3, 8.5) per year from 2018 to 2023. Monthly rates analyses show that rates increased by a monthly 0.4% (95% CI: 0.3, 0.6) throughout the study period. Suicide among men aged 45–64, increased by an average 2.7% (95% CI: 0.8, 4.7). Monthly analyses indicate a monthly 0.2% (95% CI: 0.05, 0.4) increase.

Among women aged 45–64, annual rates of NLISH hospitalisation increased by an average 5.1% (95% CI: 1.0, 9.9) per year from 2018 to 2023. Monthly analyses show that rates remained stable from January 2018 to February 2021, followed by a 7.4% (95% CI: 0.6, 10.4)

increase from February 2021 to May 2021, and subsequent stability after May 2021. Suicide among women aged 45–64 remained stable from 5.6 in 2018 to 6.0 per 100,000 in 2023—both analysed annually and monthly.

Among men aged ≥ 65 , annual rates of NLISH hospitalisation and suicide remained stable during the study period. For both non-lethal intentional self-harm and suicide, monthly analyses also suggest stability of rates. Among women aged ≥ 65 , annual rates of NLISH hospitalisation increased by an average 6.2% (95% CI: 0.8, 12.6) per year from 2018 to 2023. In terms of trends by month, rates increased by 0.5% (95% CI: 0.3, 0.7) throughout the study period. Suicide among women ≥ 65 remained stable in both annual and monthly analyses.

We conducted two sensitivity analyses. First, we examined trends in 2018–2023 hospitalisations indicating any psychiatric disorder as the reason for admission, finding no relevant trends (Supplementary Figure S2). Then, we examined 2018–2023 trends in NLISH hospitalisation by specific self-harm method, finding that overall NLISH hospitalisation trends were largely driven by trends in drug poisoning (Supplementary Figure S3). Based on ICD-10-CM coding, the most common drug types involved in NLISH hospitalisations were antiepileptic, sedative-hypnotic, and antiparkinsonism drugs (40.9%); psychotropic drugs not elsewhere classified (18.9%); and nonopioid analgesics, antipyretics, and antirheumatics (13.2%). NLISH hospitalisations indicating involvement of these three groups experienced marked increases after 2020 (Supplementary Figure S4).

Discussion

This study presents a comprehensive national analysis of suicidal behaviour in Spain between 2018 and 2023, focussing on both NLISH hospitalisations and deaths by suicide. The findings reveal a concerning upward trend in hospitalisations for NLISH across nearly all demographic groups, particularly among younger individuals and women, while suicide rates showed modest overall increases with notable demographic differences. These results underscore the importance of a dual-focus public health strategy that addresses both suicide mortality and the broader phenomenon of self-harming behaviours.

One of the most salient findings of our study is the substantial and sustained increase in NLISH hospitalisations, rising by an average of 8.0% annually over the study period. This trend was especially pronounced among adolescent and young adult women, with the highest increases observed in females aged 10–24 years (average annual increase of 18.9%). These findings align with previous regional reports in Spain and international evidence suggesting rising mental health needs among young people, particularly young women, in the last decade and especially in the aftermath of the COVID-19 pandemic.^{12,16} Several hypotheses have been proposed in the literature to explain these trends, including the psychosocial impact of lockdowns, academic pressures, and broader cultural and economic stressors disproportionately affecting younger populations¹⁷—increased social media use and screen time,¹⁸ cyberbullying,¹⁸ reduced sleep,¹⁹ shifts in puberty towards younger ages,¹⁸ economic uncertainty,¹⁸ or climate anxiety.²⁰ Monthly temporal trends suggest an inflection point in early 2021, where rates of NLISH admission increased sharply. This finding aligns temporally with the aftermath of the initial pandemic outbreak and its proposed negative effects on well-being,²¹ such as social isolation, disruption of routines, economic instability, and diminished access to mental health services.²² From a biological perspective, pandemic-related stressors could have led to population increases in dysregulation of the hypothalamic–pituitary–adrenal axis, which has been shown to play a role in suicidal behaviours²³—especially among young populations.²⁴ Despite the sharp rise in self-harm among women, suicide rates in this group remained relatively stable, potentially reflecting differences in the lethality of methods used, access to lethal means, or protective factors such as stronger social support networks. Importantly, if suicide risk in this population is increasing through an initial rise in non-lethal suicidal behaviours, a delayed cohort effect may emerge in future years, potentially leading to a subsequent increase in suicide mortality as these individuals age or face accumulated stressors over time.

The marked increase in NLISH among youth, and especially females, underscores the need for the

development and implementation of youth-centred²⁵ and gender-sensitive²⁶ suicide prevention strategies (i.e., public health campaigns and clinical strategies focussing on accessibility and developmental relevance through school-based programs and digital-based tools, incorporating a focus on gender-specific risk factors such as body image and gender-based violence for females and stigma around help-seeking in males)—especially since these findings may highlight the vulnerability of young populations to major external societal disruptors. Our results also bear relevance from a healthcare provision perspective. While an increase in NLISH hospitalisations likely reflects a real increase in self-harm and related risk factors (e.g., depression and anxiety) at the population level, it can also indicate an increase in needs for hospitalisation following intentional NLISH due to disruptions in provision of appropriate outpatient care following NLISH, or a shift toward riskier self-harm methods potentially driven by delays in early detection of suicide risk at the clinical level. Substantial evidence indicates that, across Europe, outpatient mental health service use decreased markedly during the initial pandemic outbreak with services not returning to pre-pandemic use levels throughout subsequent years,²⁷ leading to increased treatment gaps in terms of treatment rate, access to care, and perceived access to care.²⁸ Along these lines, our finding that NLISH via drug poisoning (most frequently involving sedatives, anti-epileptic, and other psychotropic drugs) largely drove increases in NLISH may indicate disruptions in adequate provider monitoring of prescription medications. In Spain, where longitudinal studies indicate sustained increases in sick leaves among healthcare workers between 2021 and 2023²⁹ compared to the pre-pandemic period, leading to understaffing problems in healthcare delivery,³⁰ the 2024 “Health Barometer” representative survey conducted by the Center for Sociological Studies revealed that only 26% of people referred to mental health services obtained an appointment within 30 days.³¹ Our results should be considered another piece of mounting evidence supporting the design and implementation of resilient mental healthcare systems with a focus on ensuring timely and accessible care to adolescents and young adults. Stakeholder surveys have identified access to outpatient mental health services and especially to self-harm prevention programs as an opportunity for improvement in the Spanish National Health System.³²

Suicide deaths, on the other hand, were more common among men (74.4% of suicides), particularly those aged 45–64 and ≥65. This finding is in keeping with global estimates³³ and reinforces the well-established gender paradox³⁴ in suicidal behaviour: In most Western societies, women have higher rates of non-lethal self-harm, while men are more likely to die

by suicide, often using more lethal methods such as hanging or firearms. In terms of trends, suicide mortality in Spain increased at a lower rate than NLISH hospitalisations, with a 2.6% average annual increase during the study period. This trend is in keeping with reports from some but not all European countries³⁵ and should be contemplated as clinically and socially significant. Comparisons across countries, focussing on the distribution of population-level risk factors, could provide deeper insight into the underlying, and potentially modifiable, drivers of recent increases in suicide rates. Stratified analyses by sex and age further reveal nuanced trends that warrant targeted policy responses. Among men aged 25–44, both non-lethal self-harm and suicide rates increased steadily over the study period, with suicide rates in this group rising by nearly 25% over five years. On the other hand, among older adults (particularly men ≥ 65), both non-lethal self-harm and suicide rates remained high but stable. Increases in NLISH and suicide in working-age men, but not in men aged ≥ 65 , may highlight the potential protective role of strong economic support measures, especially in the setting of rapid economic variations, including major economic downturns such as the one following the initial pandemic outbreak—while inflation increased by 19% between 2018 and 2023 in Spain³⁶ and the average retirement pension for retired individuals increased by 29% during the same period,³⁷ the average annual salary for active workers increased by only 6% between 2018 and 2022.³⁸ Notwithstanding, suicide rates remain highest among men aged ≥ 65 , underscoring a major unmet public health problem.

The distribution of self-harm methods differed notably between non-lethal and fatal events. Drug poisoning was the predominant method for NLISH hospitalisations (68.7%), whereas hanging accounted for nearly half of all suicide deaths (46.0%), in keeping with substantial evidence that access to and use of highly lethal means (e.g., firearms or hanging) is a major determinant of the outcome of suicidal behaviours.³⁹ This divergence in fatality ratios may point to differences in intent, access to means, or knowledge of lethality, and highlights the need to interpret trends in NLISH hospitalisations and suicide deaths in parallel to better understand shifts in suicidal behaviour, identify at-risk populations, and inform method-specific prevention strategies. Importantly, nearly 80% of NLISH hospitalisations indicated a co-occurring mental health diagnosis, underlining the need for integrated psychiatric care in general emergency and hospital settings. The absence of comparable diagnostic data in the mortality database is a limitation that hinders full understanding of psychiatric comorbidity among suicide decedents.

This study has several strengths, including the use of nationally representative data and robust case

definitions. Limitations include potential under-reporting or misclassification in both hospital and mortality data, particularly concerning the intent behind injuries or deaths. As there is no reason to expect temporal variations in reporting errors during the study period, such errors would be expected to reduce our ability to detect changes in trends if present. Also, as mentioned above, we could not access data on intentional self-harm not leading to hospitalisations, and we lacked information on incidence of self-harm during hospitalisations for other reasons—an important outcome with potential implications for management of risk for self-harm in hospitals. Additionally, the lack of psychosocial and contextual data limits our ability to explore potential drivers for trends. Last, our data did not allow for linkage of NLISH hospitalisations within patient—a natural next step to this study should focus on repetition of self-harm.

It is also important to note that NLISH and suicide can differ in important ways. Current conceptualisations often distinguish between non-suicidal self-injury—typically characterised by a lack of suicidal intent—and suicidal behaviour, which involves a desire to die. Our data source does not allow for the examination of intent underlying NLISH. Understanding the rising rates of NLISH among youth, especially young women, may also benefit from additional research efforts based on theoretical frameworks that emphasise intent in self-harm and incorporate concepts such as mental pain, affect regulation, and psychosocial distress.⁴⁰

In conclusion, this study reports the growing burden of non-lethal self-harm in Spain, particularly among young women, alongside significant increases in suicide mortality. Our findings emphasise the need for robust national surveillance systems tracking both non-lethal and fatal suicidal behaviour to enable timely detection and indicated prevention and guide resource allocation as well as the need for comprehensive, age- and gender-specific prevention strategies to address the full spectrum of suicidal behaviours. Urgent action is crucial to reverse these trends and meet WHO suicide prevention targets.

Contributors

TLC and GMA were responsible for the conceptualisation and design of the study. TLC and GMA designed the analyses. TLC conducted the formal analysis and led the visualisation efforts. Funding for the project was secured by TLC, PM, JA, and GMA. The investigation and development of methodology involved contributions from all authors—TLC, PM, JA, and GMA—who also collectively provided resources and validated the results. GMA provided overall supervision. TLC and GMA drafted the original manuscript, and all authors (TLC, PM, JA, and GMA) contributed to the review and editing of the final version. All authors critically reviewed the manuscript for important intellectual content and approved the final manuscript. TLC and GMA were responsible for the decision to submit for publication. TLC and GMA verified the data and had access to raw data.

Data sharing statement

The data that support the findings of this study are available from National Institute of Statistics (www.ine.es) and from the Sub-Directorate General for Healthcare Information of the Spanish Ministry of Health (<https://www.sanidad.gob.es/estadEstudios/estadisticas/estadisticas/estMinisterio/SolicitudCMBD.htm>) but restrictions apply to the availability of these data, which were used under licence for the current study, and so are not publicly available.

Declaration of interests

The authors declare no conflicts of interest. All funding was received from public or non-profit sources and is included in the Acknowledgements section. The funding source had no role in study design, data collection, data analysis, data interpretation, or writing of the report.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.lanepc.2025.101467>.

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