Gender-based violence against women and girls aged ≥15 years presenting to European emergency departments: a multinational, cross-sectional analysis

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Summary

Background Gender-based violence (GBV) is an important public health issue in Europe, yet standardised cross-national data remain scarce. Emergency departments (EDs) are often the first point of contact for an individual who has been assaulted. This study aimed to analyse GBV-related ED presentations using data from the European Injury Database (IDB).

Methods This cross-sectional study analysed IDB data from 16 European countries (Jan 1, 2008, to Dec 14, 2023), defining GBV as intentional injuries inflicted by male perpetrators, involving female individuals aged ≥15 years. Descriptive analyses compared GBV with other female injuries (female victims in whom the perpetrator was recorded as female or was not specified). Multivariable logistic regression assessed GBV-associated injury severity compared with other violence against girls and women, adjusting for age, period, and country.

Findings Of 5 643 295 injury-related ED attendances, 1 960 096 were other female injuries and 21 048 were violence cases, of which 10 315 were GBV. Mean age was 38·2 years (SD 15·7) for individuals subjected to GBV and 55·3 years (41·5) for those with other female injuries. There were higher rates of head and face injuries, contusions, and asphyxiation-related injuries in cases of GBV than other female injuries, but there were lower rates of fractures. Most GBV events occurred in domestic settings (5802 [56·3%] of 10 315 GBV cases) and during night-time hours (3931 [41·9%]), involving physical force (7340 [73·1%]); perpetrators were most commonly intimate partners (4906 [47·6%]) or strangers (1546 [15·0%]). Hospital admission was more frequent in GBV than in other female injuries (2210 [21·4%] of 10 315 *vs* 366 765 [18·7%] of 1 960 096; p<0·0001). GBV was associated with higher injury severity compared with other female injuries after adjustment (odds ratio 1·22, 95% CI 1·12–1·34; p<0·0001).

Interpretation GBV-related ED cases show distinct features that characterise the visible spectrum of violence against girls and women in emergency settings. These patterns highlight the need for improved documentation and greater awareness of less visible presentations. Cross-national variability underscores the need for harmonised surveillance protocols to capture the true burden of GBV in Europe.

Funding None.

Introduction

Gender-based violence (GBV) remains a preventable yet persistent public health concern in Europe,[1,2] contributing substantially to intentional injuries treated in emergency departments (EDs). GBV encompasses physical, sexual, and psychological harm directed at individuals based on gender, and most commonly affects women and girls.[3,4]

Emergency care settings often represent the first or only point of contact that individuals who have been assaulted have with support systems, positioning EDs as potential sentinels for early detection and prevention. However, despite this role, GBV-related ED presentations are rarely analysed systematically across countries. WHO has recognised violence as a major public health issue and promoted use of ED data as a core component of prevention efforts.[5–7] Routine documentation enables injury surveillance systems to identify high-risk groups, monitor trends, and evaluate prevention measures. Two decades after the WHO's call for stronger surveillance systems, application to GBV prevention and harmonised ED data on GBV remain scarce across EU member states, hindering evidence-based interventions.

The magnitude of this challenge is substantial. Recent EU-wide data indicate that about one (30·7%) in three women have been subjected to physical or sexual violence in adulthood, with intimate partner violence affecting 17·7% of women.[8] However, these estimates primarily rely on self-reported data, and cross-national observational evidence remains scarce. Recent European legislative frameworks (including the Istanbul Convention and EU Directive 2024/1385)[9] mandate systematic data collection and evidence-based monitoring of GBV across member states,[10,11] underscoring the need for harmonised health-sector surveillance. This

Research in context

Evidence before this study

We searched PubMed, Scopus, and Web of Science for articles published between Jan 1, 2000, and Aug 31, 2025, without language restrictions, using search terms "gender-based violence", "intimate partner violence", "emergency department", and "injury surveillance". No studies reported emergency department-based gender-based violence (GBV) data, involved European populations, and provided clinical or epidemiological patterns. Relevant studies were single-country analyses focused on primary care settings or prevalence estimates without clinical characterisation. For example, a Catalonian primary care study reported GBV prevalence of 0·42–0·48%, suggesting substantial under-reporting compared with known population prevalence rates. Implementation-focused systematic reviews of intimate partner violence screening in health-care settings report variable reach and effectiveness, with only 32% of women who were subjected to GBV receiving referrals to follow-up services. No systematic reviews or multi-country studies have examined anatomical injury patterns, temporal distributions, or GBV clinical profiles in emergency departments.

Added value of this study

This cross-sectional analysis represents the first multi-country study to examine clinical patterns of GBV in European emergency departments, addressing a complete gap in the literature. This study uses harmonised emergency department data across 16 European countries with standardised injury classification systems. Our analysis provides the first quantitative evidence of systematic anatomical targeting in GBV and reveals distinctive clinical profiles combining demographic characteristics, temporal patterns, injury mechanisms, and perpetrator relationships. For example, we found that individuals who had experienced GBV were 3·4 times more likely to have a head or facial injury than those with other female injuries (48·8% *vs* 14·4%). Additionally, after adjustment for age, period, and country, GBV was associated with significantly higher odds of hospital admission or death compared with other violence against women (adjusted odds ratio 1·22, 95% CI 1·12–1·34). Our findings move beyond self-report screening approaches by providing objective, clinically observable indicators, such as anatomical injury patterns and temporal presentation profiles, that can help emergency clinicians distinguish GBV from other injury causes, addressing a critical gap in systematic identification tools.

Implications of all the available evidence

The anatomical targeting patterns and evidence-based profile we identified provide emergency health-care providers with objective screening indicators that could substantially improve detection rates beyond current thresholds. Combined with evidence supporting integrated primary care approaches that leverage behavioural health providers for systematic GBV identification, the importance of ongoing institutional support for sustained screening programmes, and the availability of adequate referral services, our findings support implementation of harmonised surveillance protocols across European emergency departments.

convergence of policy calls for standardised, evidence-based monitoring systems.

The clinical importance of ED-based surveillance is indicated in national reports: in England and Wales alone, over 146 000 violence-related ED attendances were recorded in 2021.[12] Internationally comparable data on GBV-related injuries are therefore needed.

ED presentations capture only a small fraction of GBV, as most intimate partner abuse involves psychological, emotional, or financial coercion that does not lead to ED attendance. Even when serious physical or sexual violence occurs, many individuals who have been assaulted do not seek emergency care and some access sexual assault referral centres or disclose to primary care providers weeks later, whereas others avoid health services altogether. Estimates suggest that only 1·4% of women attend an ED directly following intimate partner violence.[13] Barriers include fear of perpetrator retaliation, concerns that disclosure might trigger safeguarding or reporting mechanisms, and lack of trust in institutional responses.[14] Consequently, girls and women who were subjected to GBV presenting to EDs probably represent the most severe end of the violence spectrum, often following multiple previous incidents. This context is essential for interpreting ED-based surveillance data, which, although valuable, cannot capture the full burden of GBV.

For more on the **European Injury Database** see https://www.eurosafe.eu.com/key-actions/injury-data/aims-network

The European Injury Database (IDB), hosted by the Italian National Institute of Health, provides a platform for cross-national surveillance of non-fatal injuries, including those from intentional violence.[15] It operates on two levels: the minimum data set with core variables and the full data set (FDS) that captures detailed information on injury circumstances, intent, mechanism, location, and context.[16,17] By collecting standardised, patient-level information from EDs across member states, the IDB-FDS enables identification and comparison of GBV-related injury patterns, supporting comparative analysis that can inform policy responses.

This study aims to analyse GBV presentations across European countries using IDB data, focusing on violence against women and girls perpetrated by men—the most prevalent and consistently identifiable form in ED settings. This focus reflects the nature of ED presentations, which predominantly involve physical or sexual injuries, and aligns with international frameworks such as the Istanbul Convention and EU Directive 2024/1385.[9] By examining demographic, clinical, and

contextual patterns, this study provides insights into the clinical burden of GBV and informs targeted strategies for early identification, monitoring, and prevention in Europe.

Methods

Study design and data source

This cross-sectional analysis examined violence-related injury cases from the IDB-FDS between Jan 1, 2008, and Dec 14, 2023. Cases were included if intent was coded as violence, following the IDB-FDS coding manual[17] and the WHO Injury Surveillance Guidelines.[7] Data collection was performed by trained hospital personnel using standardised procedures, with validation and harmonisation before database integration. The IDB-FDS is based on national samples of sentinel EDs, designed for injury surveillance rather than nationally representative incidence estimates. The number and selection of participating hospitals vary across countries, reflecting differences in national IDB implementation.

Violence cases included records from 18 EU countries, although data coverage varies considerably across countries and years. Two countries (Netherlands and Slovenia) were excluded because they do not record perpetrator sex, precluding GBV classification. This heterogeneity should be considered when interpreting cross-country comparisons.

This study was approved by the internal review process of the Department of Environment and Health at the Italian National Institute of Health, in its capacity as the EU-IDB Data Host. The EU-IDB data represent routine hospital care activities and are, by design and according to the Network's protocols, completely anonymous. Individual consent was not required.

Case selection and definitions

Violence-related injuries were identified using intent codes 3 (assault) and 4 (other violence),[17] activating the IDB Violence Module. This module captures structured variables including perpetrator sex, victim–perpetrator relationship, perpetrator age group, and context of assault.

GBV cases were operationally defined as cases involving female patients aged ≥15 years with a male perpetrator, the subset consistently identifiable within the IDB. The age threshold reduces misclassification of non-gendered childhood violence while aligning with international frameworks recognising adolescent dating violence as part of the GBV continuum.[18–20]

This definition of GBV captures only a restricted subset of cases, excluding psychological violence, coercive control, and socioeconomic abuse (which do not have standardised codes in the IDB and other international injury classification systems), as well as same-sex violence, violence against men, and institutional abuse. Repeat ED attendances could not be tracked due to data anonymisation, potentially inflating the number of unique individuals who have been assaulted and limiting insights into patterns of recurrence or escalation.

In severity analyses, the comparator group (ie, other female injuries) included female victims in whom the perpetrator was recorded as female or was not specified. Because perpetrator sex is frequently missing in ED records, this group should be interpreted as cases not classifiable with respect to perpetrator sex rather than as a distinct non-GBV category, reflecting the structure of routine ED documentation in which recording of perpetrator characteristics is incomplete.

A step-by-step case selection workflow is provided in the appendix (p 9), outlining each analysis stage from the full IDB dataset to the final GBV sample and ensuring transparency and reproducibility.

See Online for appendix

Statistical analysis

To examine gender asymmetry, we stratified violence-related attendances by victim sex, perpetrator sex, and victim–perpetrator relationship, comparing GBV cases with other configurations across relational (intimate partner) and non-relational (stranger) contexts.

We used frequency (95% CI) for descriptive analyses. χ^2 tests assessed differences between GBV-related attendances and other injury-related ED attendances among girls and women, excluding GBV (other female injuries). This comparison group controls for sex-related and age-related differences in injury patterns, isolating features attributable to GBV. Effect sizes were calculated using Cramér's V; percentage point differences with 95% CIs provided clinically interpretable measures. Age differences across assault contexts were examined using one-way ANOVA, with Tukey's Honestly Significant Difference post-hoc comparisons and Bonferroni correction. Given the large sample size, parametric methods were retained based on their robustness to deviations from normality; results were confirmed using non-parametric alternatives.

Multivariable logistic regression assessed whether GBV was associated with greater injury severity compared with other forms of violence. The outcome was high severity (ie, hospital admission or death) versus low severity (ie, ED discharge). The exposure was GBV compared with other violence against women (female victims aged ≥15 years with female or unspecified perpetrator) allowing for the assessment of severity differences attributable to male perpetration. Models were adjusted for age group (ages 15–24, 25–44, 45–64, and ≥65 years), time period (2008–12, 2013–18, and 2019–23), and country, with cluster-robust standard errors for within-country correlation. Multivariable analysis of injury severity was restricted to countries with complete perpetrator sex data and representative ED case-mix. Czech Republic, Germany, and Latvia were excluded due to selection bias (severity rates >50%). Sensitivity analyses examined intimate partner violence separately, excluded the COVID-19 period (2019–23), and

compared GBV with other female injuries. All models were adjusted for calendar period to account for temporal changes in health-care use.

Analyses were conducted using Stata (version 19), based on available data without imputation. A p value less than 0·05 was considered significant.

Role of the funding source

There was no funding source for this study.

Results

Of 5 643 295 injury-related ED attendances, 1 960 096 were other female injuries and 21 048 were violence cases. Among the 21 048 violence-related ED attendances in the included countries, perpetrator sex was documented as male in 10 315 (49·0%) cases involving female victims (ie, GBV cases), as female in 1881 (8·9%), and unknown or unspecified in 8852 (42·1%). Cases with unknown perpetrator sex could not be classified as GBV; therefore, the 49·0% of cases classified as GBV represents a lower bound constrained by recording practices rather than a complete estimate of perpetrator sex distribution.

Other female injuries and GBV had variable coverage reflecting differences in surveillance capacity across member states (table 1). Mean age was 55·3 years (SD 41·5) in girls and women with other female injuries and 38·2 years (15·7) in those with GBV injuries, with 8151 (79·0%) of 10 315 aged 15–49 years. This age group represents the largest share of GBV-related ED attendances across participating countries.

Time-distribution analysis showed significant differences between time of ED attendance for GBV and other female injuries (figure). There was a higher proportion of GBV cases than other female injury cases during late evening hours (ie, 2000–2359 h; 2050 [21·8%] of 9389 *vs* 251 127 [15·5%] of 1 619 450) and early morning hours (0000–0359 h; 1202 [12·8%] *vs* 77 353 [4·8%]), but a lower frequency during morning and early afternoon hours (0800–1559 h; 3486 [37·1%] *vs* 821 875 [50·8%]). Overall, night-time hours (2000–0759 h) represented 3931 (41·9%) GBV presentations versus 387 682 (23·9 %) presentations of other female injuries. There was a significant association between case type and time of attendance (χ^2 [df 5]=2200; p<0·0001).

Analysis of injury types showed marked differences between GBV and other female injuries (χ^2 [df 24]=15 847; p<0·0001; Cramér's V=0·27; table 2). Injuries consistent with direct violence were more common in GBV cases than in cases of other female injuries. Contusions and bruises represented the most frequent injury type in GBV cases (4956 [48·0%, 95% CI 47·1–49·0] of 10 315) compared with cases of other female injuries (527 218 [26·9%, 26·8–27·0] of 1 960 096); concussions occurred in 824 (8·0%, 7·5–8·5) GBV cases compared with 84 579 (4·3%, 4·3–4·3) other female injury cases. Suffocation-related injuries, often considered a marker of strangulation, were ten times more frequent in cases of GBV than in cases of other female injuries, as was polytrauma, indicating severe multisite violence. Conversely, orthopaedic injuries were under-represented in GBV. Fractures occurred in 1170 (11·3%, 10·7–12·0) GBV cases and in 501 897 (25·6%, 25·5–25·7) other female injury cases, and distortions and sprains occurred in 262 (2·5%, 2·3–2·9) and 147 060 (7·5%, 7·5–7·5), respectively. Collectively, orthopaedic injuries (ie, fractures, luxation or dislocations, and distortions and sprains) represented 1526 (14·8%) GBV cases versus 688 176 (35·1%) other female injury cases.

Anatomical distribution differed significantly between cases of GBV and other female injuries (χ^2 [df 62]=32 000; p<0·0001, Cramér's V=0·13; table 3). Head and facial injuries occurred in 5029 (48·8%, 95% CI 47·8–49·7) of 10 315 GBV cases versus 282 446 (14·4%, 14·4–14·5) of 1 960 096 other female injury cases (difference of 34·4 [33·4–35·3] percentage points); multiple body-part involvement was 3·87 times more common in GBV, whereas neck and throat injuries occurred 2·40 times more frequently. Conversely, lower extremity injuries were markedly under-represented in GBV cases.

Among 10 315 GBV cases, 6413 (62·2%) occurred in or around the home, including the living room

	Violence cases	GBV cases	Proportion of GBV cases (95% CI)
Countries included, total	21 048	10 315	..
Malta (2009–23)	2530 (12·0%)	321 (3·1%)	12·7% (11·4–14·0)
Denmark (2008–10)	3797 (18·0%)	1164 (11·3%)	30·7% (29·2–32·1)
Sweden (2008–15)	2304 (10·9%)	778 (7·5%)	33·8% (31·8–35·7)
Luxembourg (2013–22)	981 (4·7%)	505 (4·9%)	51·5% (48·4–54·6)
Spain (2015–19)	206 (1·0%)	111 (1·1%)	53·9% (47·1–60·7)
Czech Republic (2008–12)	106 (0·5%)	59 (0·6%)	55·7% (46·2–65·1)
Greece (2008–09)	7 (<0·1%)	4 (<0·1%)	57·1% (20·5–93·8)
Italy (2010–16)	3166 (15·0%)	2003 (19·4%)	63·3% (61·6–64·9)
Latvia (2008–18)	4611 (21·9%)	2958 (28·7%)	64·2% (62·8–65·5)
Türkiye (2012–22)	2120 (10·1%)	1415 (13·7%)	66·7% (64·7–68·8)
Cyprus (2008–19)	164 (0·8%)	117 (1·1%)	71·3% (64·4–78·3)
Austria (2008–23)	568 (2·7%)	454 (4·4%)	79·9% (76·6–83·2)
Romania (2009–14)	90 (0·4%)	76 (0·7%)	84·4% (77·0–91·9)
Hungary (2008–10)	84 (0·4%)	71 (0·7%)	84·5% (76·8–92·3)
Germany (2008–19)	312 (1·5%)	277 (2·7%)	88·8% (85·3–92·3)
Poland (2008–09)	2 (<0·1%)	2 (<0·1%)	100% (100–100)*
Countries excluded, total	11 100	..	..
Netherlands (2013–17)	7835 (70·6%)	NR	NR
Slovenia (2008–19)	3265 (29·4%)	NR	NR

Data are n (% of all cases in included countries) or n (% of all cases in excluded countries), unless otherwise specified. The proportion of GBV cases is the number of GBV cases divided by the number of violence cases multiplied by 100. Countries ordered by ascending GBV proportion within each section. Netherlands and Slovenia were excluded from GBV analyses because they do not record perpetrator sex, precluding GBV classification. Countries with small sample sizes (Greece and Poland) have wide 95% CIs. GBV=gender-based violence. NR=not recorded. *For Poland (n=2), the 95% CI is degenerate (100–100) since the standard error equals zero when the observed proportion is 100%.

***Table 1*: Violence-related emergency department attendances among women and girls aged ≥15 years as gender-based violence, by country**

(2510 [24·3%]), residential area unspecified (2216 [21·5%]), other indoor residential settings (672 [6·5%]), and kitchen (443 [4·3%]). Outside the home, 601 (5·8%) of 10 315 GBV cases occurred on pavements and 351 (3·4%) in commercial areas (ie, cafés, hotels, restaurants, or shops). In most GBV cases, violence was exerted through direct physical force (7340 [73·1%] of 10 315). Sharp objects (ie, knives, scissors, or razors) were used in 208 (2·3%) of 9064 GBV cases and blunt instruments (ie, hammers, clubs, or bats) in 73 (0·8%). Firearms were reported in 27 (0·3%) of 9064 GBV cases. Everyday items were also weaponised, including glass bottles, crockery, furniture, and cleaning or kitchen tools. Cases involving chemical substances, hot liquids, or recreational drugs were documented.

Victim–perpetrator relationships differed markedly by sex (appendix p 10). Among female GBV victims, 5802 (56·3%) of 10 315 were assaulted within their close family circle, including by spouses or partners (4906 [47·6%]), other family relatives (669 [6·5%]), and parents (227 [2·2%]); strangers accounted for 1546 (15·0%) and unspecified relationships accounted for 1100 (10·7%). Male victims most frequently reported the perpetrator as unspecified (52 201 [57·7%]) or as a stranger (18 504 [20·6%]). Violence by spouses or partners (1731 [1·9%]) and relatives (871 [1·0%] parents, 1767 [1·9%] other relatives) was less frequent.

Gender asymmetry in violence patterns was examined by stratifying attendances by victim sex, perpetrator sex, and victim–perpetrator relationship (appendix p 5). Female victims of male perpetrators accounted for 4906 (53·5%) of 9177 intimate partner violence cases compared with 355 (3·9%) cases involving male victims of female perpetrators. Among stranger violence cases, the pattern reversed: male-on-male cases were most common (11 784 [53·9%] of 21 854) whereas female victims of male strangers represented 1546 (7·1%) of 21 854 cases. Overall, girls and women assaulted by male partners outnumbered men assaulted by female partners by a 6·3:1 ratio (4906 *vs* 774 cases). Same-sex intimate partner violence was uncommon (103 [1·1%] of 9177 female–female cases and 355 [3·9%] of 21 854 male–male cases).

5553 (53·8%) of 10 315 GBV cases occurred in interpersonal or conflicted contexts, primarily altercations or relationally driven confrontations (appendix p 6). Sexual assaults accounted for 440 (4·3%) GBV cases, whereas criminally motivated incidents (theft, drug-related, or gang activity) represented 628 (6·1%). Over a third (3694 [35·8%]) lacked contextual specification, highlighting documentation gaps in ED settings.

Patient age varied significantly across contexts: individuals who were sexual assaulted were youngest (mean 28·5 years [SD 12·9]), followed by victims of interpersonal or conflictual assaults (38·7 years [14·9]) and criminally motivated violence (45·8 years [SD 20·0]; *F*[3–10 311] 107·1; p<0·0001). This finding was confirmed by a Kruskal–Wallis test (χ^2=357·1 [df 3]; p<0·0001). Post-hoc pairwise comparisons with Bonferroni correction showed that victims of sexual assault were significantly younger than those assaulted in interpersonal (mean difference –18·8 years [95% CI –27·4 to –10·2], p<0·0001) and criminally motivated contexts (–21·5 years [–30·7 to –12·3], p<0·0001). There was no significant difference between sexual assault and unspecified settings. Full post-hoc results are reported in the appendix (p 7). These patterns indicate age-related differences in exposure contexts.

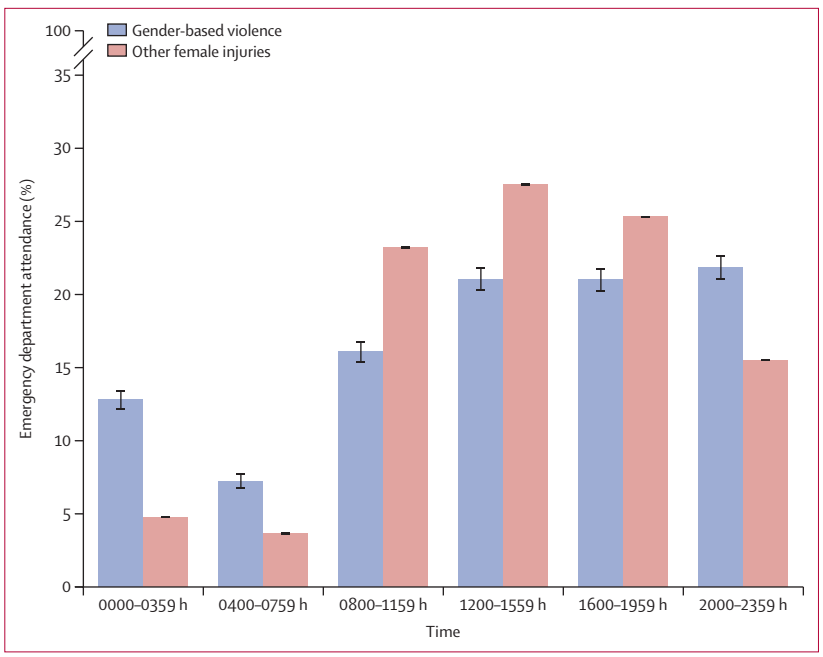

Figure: **Emergency department attendance for gender-based violence and other female injuries in 24 h**
Data are grouped into 4-h time periods. Error bars represent 95% CIs.

GBV required hospital admission more often than other female injuries (2210 [21·4%] of 10 315 *vs* 366 765 [18·7%] of 1 960 096; p<0·0001). Mean length of stay for GBV-related admissions (5·3 days [SD 6·1]) was shorter than for other female injury-related admissions (7·9 days [9·1]).

Multivariable severity analysis included 15 114 female victims of violence from 13 countries (sample restrictions in Methods): 6479 (42·9%) cases were classified as GBV and 8635 (57·1%) were classified as other violence against women (female or unspecified perpetrator). The unadjusted proportion of high-severity cases (ie, leading to hospital admission or death) was similar between groups (505 [7·8%] of 6479 GBV cases *vs* 656 [7·6%] of 8635 cases of other violence against girls and women [female or unspecified perpetrator]). After adjustment for age, period, and country, GBV was associated with higher severity compared with other violence against girls and women (OR 1·22, 95% CI 1·12–1·34; p<0·0001). Country-stratified analyses showed a consistent positive

	GBV (n=10 315)	Other female injuries (n=1 960 096)	Difference (95% CI), percentage points	p value
Injuries consistent with direct violence				
Contusion and bruise	4956 (48·0%, 47·1–49·0)	527 218 (26·9%, 26·8–27·0)	+21·1 (20·2 to 22·1)	<0·0001
Abrasion	323 (3·1%, 2·8–3·5)	13 813 (0·7%, 0·7–0·7)	+2·4 (2·1 to 2·8)	<0·0001
Open wound	1338 (13·0%, 12·3–13·6)	208 281 (10·6%, 10·6–10·7)	+2·4 (1·7 to 3·0)	<0·0001
Concussion	824 (8·0%, 7·5–8·5)	84 579 (4·3%, 4·3–4·3)	+3·7 (3·1 to 4·2)	<0·0001
Other brain injury	60 (0·6%, 0·5–0·7)	9736 (0·5%, 0·5–0·5)	+0·1 (−0·06 to 0·23)	0·22
Suffocation (asphyxia)	35 (0·34%, 0·24–0·47)	657 (0·03%, 0·03–0·04)	+0·31 (0·19 to 0·42)	<0·0001
Polytrauma	112 (1·1%, 0·9–1·3)	2186 (0·1%, 0·1–0·1)	+1·0 (0·77 to 1·17)	<0·0001
Orthopaedic injuries				
Fracture	1170 (11·3%, 10·7–12·0)	501 897 (25·6%, 25·5–25·7)	−14·3 (−14·9 to −13·6)	<0·0001
Luxation or dislocation	94 (0·9%, 0·7–1·1)	39 219 (2·0%, 2·0–2·0)	−1·1 (−1·3 to −0·9)	<0·0001
Distortion and sprain	262 (2·5%, 2·3–2·9)	147 060 (7·5%, 7·5–7·5)	−5·0 (−5·3 to −4·7)	<0·0001
Other injury types				
Muscle and tendon injury	44 (0·4%, 0·3–0·6)	36 202 (1·8%, 1·8–1·9)	−1·4 (−1·5 to −1·3)	<0·0001
Burns or scalds	31 (0·3%, 0·2–0·4)	17 661 (0·9%, 0·9–0·9)	−0·6 (−0·71 to −0·49)	<0·0001
Poisoning	31 (0·3%, 0·2–0·4)	46 027 (2·3%, 2·3–2·4)	−2·0 (−2·2 to −1·9)	<0·0001
Other specified	442 (4·3%, 3·9–4·7)	62 741 (3·2%, 3·2–3·2)	+1·1 (0·7 to 1·5)	<0·0001
Unspecified	370 (3·6%, 3·2–4·0)	231 171 (11·8%, 11·7–11·8)	−8·2 (−8·6 to −7·8)	<0·0001

Data are n (%, 95% CI), unless otherwise specified. Differences were calculated as the proportion of GBV cases minus the proportion of cases of other female injuries. GBV=gender-based violence.

Table 2: **Distribution of injury types in cases of GBV versus other female injuries**

	GBV (n=10 315)	Other female injuries (n=1 960 096)	Difference (95% CI), percentage points	p value	Ratio
Head and face	5029 (48·8%, 47·8–49·7)	282 446 (14·4%, 14·4–14·5)	+34·4 (33·4 to 35·3)	<0·0001	3·39
Neck and throat	528 (5·1%, 4·7–5·6)	41 823 (2·1%, 2·1–2·2)	+3·0 (2·6 to 3·4)	<0·0001	2·40
Trunk, thorax, and abdomen	1165 (11·3%, 10·7–11·9)	166 900 (8·5%, 8·5–8·6)	+2·8 (2·2 to 3·4)	<0·0001	1·33
Upper extremities	1504 (14·6%, 13·9–15·3)	568 845 (29·0%, 29·0–29·1)	−14·4 (−15·1 to −13·8)	<0·0001	0·50
Lower extremities	521 (5·1%, 4·6–5·5)	592 819 (30·2%, 30·2–30·3)	−25·1 (−25·6 to −24·8)	<0·0001	0·17
Multiple body parts	929 (9·0%, 8·5–9·6)	45 628 (2·3%, 2·3–2·3)	+6·7 (6·1 to 7·2)	<0·0001	3·87
Other or unknown	639 (6·2%, 5·7–6·7)	261 635 (13·3%, 13·3–13·4)	−7·1 (−7·6 to −6·7)	<0·0001	0·47

Data are n (%, 95% CI), unless otherwise specified. Differences were calculated as the proportion of GBV cases minus the proportion of cases of other female injuries 95% CIs calculated using the Wilson method. The ratio is calculated as percentage of GBV cases divided by other percentage of female injury cases. GBV=gender-based violence.

Table 3: **Anatomical distribution of injuries in cases of GBV versus other female injuries**

association between GBV and higher injury severity across all included countries, with ORs ranging from 1·11 (Sweden) to 2·17 (Italy), although individual country estimates did not always reach statistical significance due to smaller sample sizes (appendix p 8). This result reflects negative confounding: GBV cases were concentrated in countries with lower baseline severity rates (eg, Italy and Türkiye), whereas other female injuries were over-represented in higher-severity settings (eg, Sweden and other countries). This association was stable when excluding the COVID-19 period (odds ratio [OR] 1·21, 95% CI 1·07–1·36; p=0·0018). When restricted to intimate partner violence, the association was attenuated and non-significant (1·04, 0·77–1·39; p=0·81), suggesting that the increased severity is driven by non-partner violence. In a sensitivity analysis restricted to cases with documented perpetrator sex (7835 cases in ten countries), comparing GBV with confirmed female-perpetrated violence, the OR was 1·30 (95% CI 0·96–1·77; table 4). Evidence of effect modification by age was observed ($p_{interaction}$=0·011): the GBV–severity association was strongest among women aged 45–64 years (OR 1·50, 1·24–1·81) and 25–44 years (1·19, 1·06–1·35), with no significant excess in younger girls and women (15–24 years: 1·13, 0·71–1·77) or older women (≥65 years: 1·03, 0·73–1·47).

Discussion

This cross-national analysis shows the magnitude, features, and clinical burden of GBV across Europe. Although GBV-related ED presentations represent a small share of all injuries, they have distinct epidemiological patterns and raise important concerns for health systems and policy.

Several key variables from the Violence Module showed high rates of unknown responses, probably reflecting under-reporting and documentation gaps in ED settings.[21,22] Under-reporting of violence in health-care settings is well documented, with studies showing that up to 88% of violent incidents go undocumented in electronic systems.[21] Similarly, screening of intimate parter violence in EDs identifies positive cases in only 5·8% of encounters, despite frequent ED attendance by individuals known to have experienced violence.[21,23] This under-ascertainment is likely not random and might preferentially capture individuals with greater injury severity, clearer perpetrator identification, or explicit disclosure, reinforcing that the IDB-based GBV estimates represent a lower bound of the true burden.

Victims of GBV were younger than those with other female injuries (mean 38·2 years *vs* 55·3 years), with 80% of cases occurring among girls and women aged 15–49 years. This pattern suggests heightened vulnerability and a window for early identification. Given the frequent contact of this age group with reproductive and primary care services, embedding routine screening protocols beyond emergency settings might improve detection of hidden violence.[24–26] GBV cases peaked during night-time hours, when overall ED presentations decrease, consistent with the domestic nature of incidents occurring in private settings away from potential witnesses.[27–29]

Clinically, GBV cases show higher severity and distinctive diagnostic patterns compared with other female injuries.[30] The rate of hospital admissions among women assaulted by men (21·4%) exceeded that of other female injuries (18·7%), indicating more acute or complex trauma. Average length of hospital stay for GBV-related admissions was slightly shorter than for other female injuries (5·3 days *vs* 7·9 days), possibly reflecting different clinical trajectories. GBV-related injuries, although often serious, might involve more localised trauma that can be managed within a predictable recovery window, whereas other female injuries largely occur in older women and includes hip fractures and frailty-related trauma requiring prolonged care.

Injury pattern analysis provides clinical evidence supporting the intentional nature of GBV-related trauma. The 21·1 percentage-point difference in contusions underscores the prevalence of blunt force injuries. Concussions were nearly twice as frequent in GBV cases than in other female injuries, and asphyxiation-related injuries occurred ten times more often, highlighting particularly concerning patterns, with strangulation representing a form of intimate partner violence with potentially lethal implications. Typical accidental patterns were less common in GBV cases—notably, a 14·3 percentage-point reduction in fractures compared with cases of other female injury—supporting distinct mechanisms from intentional force directed at vulnerable body areas.

	OR (95% CI)	p value
Primary analysis (n=15 114)		
GBV *vs* other violence against women and girls		<0·0001
Other violence against women and girls	1 (ref)	..
GBV (male-perpetrated violence)	1·22 (1·12–1·34)	<0·0001
Covariates in primary analysis model		
Age group, years		
15–24	1 (ref)	..
25–44	1·44 (1·25–1·65)	<0·0001
45–64	1·66 (1·30–2·13)	<0·0001
≥65	3·37 (2·50–4·54)	<0·0001
Time period		
2008–12	1 (ref)	..
2013–18	0·80 (0·70–0·93)	0·0034
2019–23	0·97 (0·79–1·18)	0·74
Country		
Italy	1 (ref)	..
Türkiye	2·17 (1·98–2·38)	<0·0001
Denmark	1·92 (1·78–2·08)	<0·0001
Sweden	5·03 (4·73–5·35)	<0·0001
Luxembourg	1·43 (1·26–1·61)	<0·0001
Other*	5·50 (5·04–6·01)	<0·0001
Sensitivity analyses		
IPV-only *vs* other violence against women and girls (n=15 114)	1·04 (0·77–1·39)	0·81
GBV *vs* other violence against women and girls pre-COVID-19, 2008–18 (n=13 253)	1·21 (1·07–1·36)	0·0018
GBV *vs* confirmed female perpetrator only (n=7835)†	1·30 (0·96–1·77)	0·093
GBV *vs* all female injuries (n=582 201)	0·85 (0·66–1·08)	0·19

Severity was defined as hospital admission or death (high severity) versus discharge from the emergency department (low severity). The sensitivity analysis of GBV versus confirmed female perpetrator only additionally excluded cases with unknown perpetrator sex to address potential misclassification in the comparator group. GBV=gender-based violence. IPV=intimate partner violence. OR=odds ratio. *Other countries include Austria, Cyprus, Spain, Greece, Hungary, Malta, Poland, and Romania. †Excludes cases for which the sex of perpetrator is unknown.

Table 4: **Multivariable logistic regression analyses of severe outcomes among female victims of violence**

Anatomical distribution further supports intentional targeting in GBV, with the concentration of head and facial injuries (48·8% of GBV cases *vs* 14·4% of other female injuries) suggesting violence directed at vulnerable and visible body areas. Neck involvement (2·40 times higher in GBV cases versus other female injuries) is clinically relevant given its association with strangulation attempts and lethal escalation risk. This central–peripheral pattern, with fewer peripheral injuries, provides objective diagnostic indicators distinguishing intentional trauma from accidental trauma. Multiple body part involvement (3·87 times higher in GBV cases) suggests greater violence severity requiring enhanced intervention protocols. These patterns align with clinical evidence identifying head, face, and neck injuries as characteristic features of GBV and intimate partner violence, as described in international clinical guidelines.[31]

These findings describe the visible spectrum of GBV as currently recognised in emergency settings. The

combination of head and facial injuries, predominance of contusions, night-time presentation, and patients in the reproductive age range characterises cases that clinicians identify and document, but might also reflect recognition bias. Injuries that are more visible, acute, or aligned with clinicians' expectations of violence are more likely to be recognised and recorded, whereas less overt or non-physical forms remain under-documented. Asphyxiation-related injuries and neck involvement are important red flags requiring immediate safety assessment and specialised intervention. However, the absence of these patterns should not preclude consideration of GBV as older women, non-physical abuse, and less overt presentations might be systematically under-recognised. These findings therefore support improved documentation and broader clinician awareness rather than serving as definitive screening criteria.

The data indicate the domestic setting as a key site of violence, with nearly two-thirds of incidents occurring in residential environments.[32,33] However, the proportion of cases in public spaces underscores the need for prevention strategies extending beyond household settings. Direct physical force without weapons predominated (73·1%), reflecting the close-contact nature of GBV in domestic contexts. Weapon use, although infrequent (~3%), raises lethality concerns, whereas weaponisation of everyday household objects shows the opportunistic nature of some GBV incidents.

Victim–perpetrator relationship patterns underscore the gendered dynamics of violence. When the perpetrator is male, the relational context diverges considerably by victim sex: girls and women are mostly assaulted within intimate relationships, whereas men are predominantly harmed in stranger encounters. Overall, more than half of female victims were assaulted within their close family circle, reinforcing the predominantly domestic and relationship-based nature of violence against women, which occurs largely within trusted relationships. By contrast, violence against men more frequently involves strangers, indicating different underlying mechanisms of aggression and social dynamics. Nevertheless, the high proportion of cases with missing perpetrator information reflects a crucial gap in ED documentation. This paucity of contextual detail limits clinical risk assessment and weakens the capacity of health systems to identify and respond to GBV effectively.

Multivariable analysis showed that GBV was associated with significantly higher odds of hospital admission or death than other violence against girls and women, after controlling for age, period, and country (OR 1·22, 95% CI 1·12–1·34). This association was not observed for intimate partner violence specifically, suggesting that the increased severity is driven by non-partner male violence, including assaults by strangers, acquaintances, and other family members. This finding aligns with evidence that stranger violence often involves more severe mechanisms and less controlled aggression than intimate partner violence, which frequently consists of repeated lower-severity incidents. Effect modification by age was also observed ($p_{interaction}$=0·011): the GBV–severity association was strongest among women aged 25–64 years (OR range 1·19–1·50), with no significant excess in younger or older age groups. This distribution might reflect life-stage differences in violence dynamics, with the highest severity burden during peak reproductive and cohabitation years.

Country-stratified analyses showed a consistent association between GBV and higher injury severity across all countries (OR range 1·11–2·17), although effect sizes varied (appendix p 8). This heterogeneity likely reflects differences in case ascertainment, health care-seeking behaviour, or contextual factors shaping the severity of cases presenting to emergency care.

This study identifies a distinct clinical profile characterising the visible spectrum of GBV in emergency settings (appendix p 11): women in their reproductive years, presenting during night-time hours with head and facial trauma and contusions, often following domestic violence, and requiring hospital admission in over a fifth of cases. This profile reflects current recognition and documentation practices but also highlights potential blind spots (ie, older women, adolescents, and non-physical forms of abuse), which might be systematically under-detected. These findings should inform efforts to improve documentation and broaden clinician awareness rather than serving as definitive identification criteria.

These findings should be interpreted in the context of substantial cross-national variability in data availability and recording practices. The proportion of violence-related ED attendances classified as GBV ranged from 0% in countries that do not record perpetrator sex (ie, Slovenia and Netherlands) to more than 60% in countries with more complete data (ie, Italy, Latvia, Türkiye). These discrepancies likely reflect methodological, systemic, and cultural differences rather than true epidemiological variation. Larger proportions of GBV might indicate structured screening protocols, whereas smaller proportions in countries like Sweden or Denmark might signify effective prevention strategies or alternative care pathways diverting patients from EDs. Health-care system structures, availability of support services, and culturally embedded attitudes towards violence disclosure shape how GBV is captured (or obscured) in routine surveillance.

This variability underscores the need for harmonised surveillance protocols. The IDB, as the only cross-national ED-based system in the EU, offers a unique foundation for such harmonisation, providing standardised information on injury causes and circumstances. However, realising this potential requires consensus on standard definitions, core variables, and quality benchmark. Without these components, cross-national

comparisons risk reflecting artefacts rather than true epidemiological differences.

EDs remain an important but underused touchpoint for surveillance and early intervention. For these settings to fulfil their potential, key priorities include: (1) mandatory collection of core variables (eg, perpetrator sex and victim–perpetrator relationship); (2) staff training on GBV recognition and documentation; (3) integration of ED data with public health and legal response systems; and (4) clear referral mechanisms from EDs to support services. Without these investments, GBV will remain under-recognised and inadequately addressed in clinical practice and public health policy. These findings have global implications for ED-based violence surveillance in any health-care system with standardised injury coding. These findings also have important implications for clinical practice. The elevated frequency of asphyxiation-related injuries among GBV cases (0·34% *vs* 0·03%) is particularly concerning, as non-fatal strangulation is a recognised predictor of lethal violence in intimate partner abuse.[34] ED clinicians should be trained to identify and document subtle signs of strangulation, even without disclosure, and to understand their prognostic importance.

Detection of GBV in emergency settings should be accompanied by effective intervention pathways. Screening alone does not consistently translate into support when referral systems are fragmented or under-resourced. Coordinated protocols are needed to link EDs with specialist services, such as domestic violence advocacy, sexual assault referral centres, and, when appropriate, law enforcement, while ensuring survivor-centred responses that do not increase risk.

Standardised surveillance data such as those provided by the IDB should guide decisions on public funding, service availability, and workforce training at national and EU levels. Without translation into policy and practice, surveillance risks remain descriptive rather than contributing to prevention and improved care.

Taken together, these findings suggest that routine ED surveillance can evolve into a powerful resource for understanding violence against women and girls if systems are strengthened to reduce missingness, improve coding consistency, and broaden recognition of less visible forms of violence.

Study limitations include variability in data availability across countries, derivation from sentinel hospitals rather than representative samples, under-reporting challenges in emergency settings, and an operational definition of GBV capturing only a restricted subset of cases. Missing perpetrator data in the comparator group might bias severity estimates towards the null. However, this pattern illustrates a key finding: routine ED surveillance captures only a visible subset of violence against women, shaped by disclosure and recognition practices. The clinical profiles observed reflect epidemiology and recognition processes, highlighting opportunities to improve documentation and broaden the range of presentations captured. The dataset also lacks important sociodemographic variables such as ethnicity, socioeconomic status, immigration background, educational level, and employment status, which could serve as potential confounders or effect modifiers. Detailed discussion of study limitations is provided in the appendix (pp 1–3).

This study shows how ED data can provide insights into the burden and dynamics of GBV across Europe. The findings highlight a recurring clinical profile of women presenting to hospital following GBV, characterised by patterns of age, timing of presentation, injury localisation, and perpetrator relationship that describe how violence is recognised in emergency settings. These patterns can inform documentation practices, staff training, and clinical awareness, while revealing recognition biases that might contribute to underdetection of less visible presentations.

In this context, the IDB serves as a unique cross-national surveillance platform, offering information on injury causes and circumstances. Its value lies in clinically anchored and routinely collected data capturing real-world interactions between individuals who have been assaulted and the health-care system, complementing survey-based sources. Despite limitations related to under-reporting, variable completeness, and sentinel hospital coverage, the IDB represents a valuable resource for informing evidence-based prevention and response strategies.

With harmonised data collection protocols, expanded country participation, and systematic training of ED personnel, the IDB could become a cornerstone of European GBV surveillance. Investing in this infrastructure is essential to ensure that EDs fulfil their potential, not only as sites of care, but as crucial sentinels for the early detection and prevention of GBV. Making the invisible visible is not merely a scientific endeavour; it is a public health and ethical imperative that calls for sustained and coordinated action.

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Contributors

AC, AP, and MG contributed to the conceptualisation and design of the study. TF, TA, HV, and SN contributed to data curation and investigation (data collection). AC and MG performed the formal analysis. AC, GF, and MG were responsible for data validation and quality control. AC, AP, and MG provided supervision. AC and MG wrote the original draft of the manuscript. All authors contributed to data interpretation and reviewed and edited the manuscript for important intellectual content. All authors had full access to all the data in the study and had final responsibility for the decision to submit for publication.

Declaration of interests

We declare no competing interests.

Data sharing

All data relevant to the study are included in the Article. Original data are available on request and approval. Requests for data should be directed to secretariat@eurosafe.eu.com and will be reviewed by the research team in accordance with the EuroSafe data sharing policies.

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