

## ORIGINAL ARTICLE

## Women and intimate partner violence: Prevalence of hospital visits and nature of injuries in the Icelandic population

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### Abstract

**Aims:** The purpose of this study was to analyse the prevalence of hospital visits and nature of injuries caused by intimate partner violence (IPV) against women and associated costs. **Methods:** All visits to Landspítali National University Hospital by women 18 years or older subjected to IPV, inflicted by a current or former male partner during 2005–2014, were observed and analysed. Information was obtained on number, date and time of visits and admissions, place of occurrence, patients' and perpetrators' age and relationship, number of perpetrators, medical diagnosis, aetiology, injury severity and cost. **Results:** The number of new hospital visits due to IPV was 1454, of which 92.6% were to the Emergency Department. The average age of the women was 34 years and 3.2% were admitted. According to the Injury Severity Score, physical injuries were mostly minor (92.4%) and mainly located on the upper body (64.3%) – namely, face, head and neck (37.1%) and upper limbs (27.2%). The majority of injuries were superficial (76.2%) and punching (29.7%), shoving (17.8%), kicking (10.5%) and attempted strangulation (9.8%) were the most common types of aetiology. Repeated new visits were 37.8%. The total cost for the hospital relating to IPV was €783,330. **Conclusions:** The total number of new visits resulting from IPV was 1454, and prevalence was 1.69 per 1000 women in the capital area over the research period. The majority of women were shown to have minor physical injuries of a superficial nature, located on the upper body. Although a low percentage of women were admitted, the associated cost for visits and admissions was substantial.

**Keywords:** Intimate partner violence, domestic violence, prevalence, location of injuries, severity, admissions

### Introduction

Intimate partner violence (IPV) against women is a worldwide preventable public health problem and a violation on human rights [1]. IPV has extensive negative consequences on survivors, reducing their ability to perform their normal social roles, and a large part have reported an injury as a consequence of the

violence [1]. IPV is the worldwide leading cause of non-fatal injuries to women [2]. Globally, 38.6% of all female homicides were committed by their intimate partner [3].

The problem affects a large part of the world's population. According to a World Health Organization (WHO) multi-country study on over 24,000 women,

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the lifetime prevalence of sexual and/or physical IPV ranges from 15% to 71%, and the current prevalence ranges from 4% to 54% [4]. The results from an interview-based report with 42,000 women provided comparable individual country percentages on lifetime sexual and/or physical IPV, finding the percentage to be 32% in Denmark, 30% in Finland, 28% in Sweden and 29% in the UK [5]. A recent Norwegian study found 21.6% of ever-partnered women reporting some form of violence or sexual abuse from their partner [6]. A national survey in Iceland estimates the lifetime prevalence of IPV at 22.4% and the current prevalence at 1.6% [7]. Data on the prevalence of hospital visits due to IPV is scarce [8].

A number of terms and definitions are used to refer to IPV, including domestic violence, battered women, spousal abuse and family violence. IPV against women is defined as completed or threatened behaviour by an intimate male, current or ex-partner, which negatively impacts the woman's physical, psychological and/or sexual health, and different types of IPV may overlap within a single relationship [9]. Because of different definitions and methodologies, study results vary and are not always comparable.

IPV seems to peak in the reproductive years, with the highest number of women being in the age group 18 to 29 years [5,10]. In a US study, around a third of all women's assault-related emergency visits were a consequence of IPV [11]. Women subjected to IPV have been shown to experience repeated violent episodes [12] and use the Emergency Department (ED) more frequently, compared to women subjected to non-partner violence [13–15]. Recent results from a sample study of ED visits in New York and from a self-report study in Helsinki revealed that patients visiting the ED as a result of IPV usually had multiple injuries [11,16]. The most common types of IPV-inflicted injuries were superficial injuries and contusions, wounds, sprains and strains. Studies from different specific populations have shown an admission rate of up to around 5%, and the most frequently reported locations of injuries are the head, face and neck [4,8,12,17]. When the Injury Severity Score (ISS) has been reported, it ranged from 0 to 5, with a mean of 1.8 [12]. The aetiology most frequently included punching, kicking and pushing, followed by gripping, attempted strangulation, pulling hair and hitting with an object [18,19]; however, studies revealing a comprehensive clinical profile of these women attending hospitals are lacking.

## Aims

The aim of this research was to analyse the prevalence of hospital visits, the nature of injuries – location, severity

and type – and the cost of male-partner-inflicted IPV against women who visited Landspítali National University Hospital (LUH) during 2005–2014.

## Method

### *Research population*

The following inclusion criteria were used to determine those exposed to IPV: (1) the reason for visit to LUH was IPV; (2) the patient is female; (3) patient was aged 18 years or older when the violence occurred; (4) the perpetrator was male; and (5) IPV was inflicted by the patient's current or ex-partner, cohabiting or not. The place of occurrence was not bound to residential area. In order to increase the accuracy of the sample selection, the sample was identified in two searches. First, through a search criterion for IPV in the Nordic Medico-Statistical Committee (NOMESCO) Classification of External Causes of Injuries registration system [20] at the ED and Rape Trauma Service Centre (RTSC). Second, by searching for specified text strings in all medical records at the LUH. The following text strings were searched: *child's father, husband, boyfriend, partner, intimate partner violence, punched, beaten, hit, attacked, fight*.

### *Data collection*

All data were collected retrospectively from LUH, which is the only tertiary as well as the only referral hospital in Iceland where all specialities are covered, including the RTSC. All injuries in the capital area and all major injuries in Iceland are treated at LUH, and the ED had around 100,000 visits per year during the study period. Furthermore, LUH is the only hospital in the capital area, where approximately 65% of 360,000 inhabitants reside. All data were collected from the hospital's medical records from January 1, 2005 through December 2014. The patients' unique social security numbers were used to track patients through the hospital and to avoid repeated counting.

Information on IPV-inflicted physical injuries was collected, not psychological condition. To categorize location and severity of injuries, we used the Abbreviated Injury Scale (AIS) [21], and to provide an overall score for comparison of patients with multiple injuries we used the ISS [22] scoring system. All women received a medical diagnosis from the 10th revision of the International Classification of Diseases and Related Health Problems (ICD-10) [23]. The ICD-10 enabled researchers to group types of injuries and prevalence of diagnosis. The derived costs of IPV-related visits and admissions to the LUH were

requested from the Division of Finance and Information at the Department of Economics at LUH, which uses the Diagnosis-Related Group classification system to estimate cost for each patient.

#### *Scoring systems*

The AIS is an anatomically based severity scoring system, which is used to classify each injury by body region in accordance to its relative importance on a six-point ordinal scale, ranging from minor (AIS 1) to maximal, currently untreatable (AIS 6).

The ISS system assesses the combined effects of a multiply injured patient, providing a score ranging from 1 to 75.

#### *Variables*

Data were collected on the following variables: time and date of visits and admissions, place of occurrence, patients' and perpetrators' age and relationship, number of perpetrators, patients ICD-10 diagnosis and aetiology. ISS, location and type of injury was determined from the above-mentioned variables.

#### *Statistical procedures*

Categorical variables such as month, day and time of visit, as well as number of visits by year, were analysed using chi-square tests. To analyse the time trend of number of visits per year by number of women in the capital area, we used Pearson correlation analysis. The average injury scores between visits and admissions were compared using a *t*-test.

Statistical analyses were carried out in R 3.5.1.

#### *Cost calculations*

In order to convert the cost derived from IPV-related visits and admissions during the research period to the 2018 value, the Division of Finance used an index which is a composite index of consumer prices, including housing (30%) and wages of government employees (70%). Indexes were collected from Statistics Iceland and the exchange rate used to convert the local currency to Euros was based on the Central Bank of Iceland's official exchange rate on December 31, 2018.

#### *Ethical considerations*

The National Bioethics Committee, which governs scientific research in the health sector regarding data on human subjects in Iceland, approved the research

(number VSNb2015080015/03.03) as well as the Chief medical officer at LUH (number 16, LSH 49-15). As the research is retrospective, patient consent was not needed and they were not contacted.

## **Results**

#### *Visits*

A total of 1454 new visits to LUH due to IPV were recorded between 2005 and 2014. The majority of women visited the ED (92.6%), 5.6% visited the RTSC and 1.8% visited other wards of the hospital. Re-visits due to the same incidence (9.6%) were excluded from the results section. The proportion of repeated visits due to a new IPV-related incident was 37.8%. The majority of women came from the capital area (87.6%). By using Pearson's correlation and analysing the trend for number of visits by years, we found a negative, but non-significant ( $p > 0.05$ ), correlation between years and number of visits in the capital area. However, there was a statistically significant time trend towards fewer visits as a proportion of the population when conducting regression analysis, both in the capital area ( $p < 0.05$ ) and the whole country ( $p < 0.05$ ) (Table I).

The average age of women visiting the hospital as a result of IPV was 34 years, with 72% of women being in their reproductive age (18–39 years old). The most common place of occurrence was the perpetrators' or patients' residential area (62.3%). In 48.8% of cases, the perpetrator was the patient's current partner; in 33.1% of cases, it was the ex-partner; and in 18.1% of cases, it was the current/ex-partner. The perpetrator's age was most often between 25 and 64 years (57.5%) and there was one perpetrator in 87.6% of the cases (Table II).

The most common time of visit was during weekends (42.6%;  $p < 0.05$ ), between 16:00 and 24:00 (36.3%;  $p < 0.05$ ). There was a non-significant increase in IPV-related visits during May, August, October and December ( $p > 0.05$ ) (Table III).

Injuries were primarily located on the head area (30.9%: head 21.1%, face 9.8%), upper limbs (27.2%) and lower limbs (12.3%) ( $p < 0.05$ ) (Figure 1).

Injuries were usually minor, with an average ISS score of 1.48 (0–14; mean (M) = 1; standard deviation (SD) = 1.22). The most common types of ICD-10 diagnosis were superficial injuries, including contusions (76.2%), sprains and strains (9.0%), wounds (8.0%) and also fractures (5.3%) ( $p < 0.05$ ). The most common mechanisms of violence (aetiology) were punching/hitting/slapping (29.7%), shoving/pushing (17.8%), kicking (10.5%) and attempted

Table I. Number of 18–74-year-old women's IPV-related visits in Iceland to LUH by residence, wards and year. Research period ranges from January 1, 2005 to December 31, 2014.

	New visits (due to new incidence) n (%)	Population n (%)	p-value
Total	1454	1,165,005	
Residency			
Capital area	1274 (87.6%)	753,451 (64.7%)	<2.2e-16
Rural area	101 (6.9%)	411,554 (35.3%)	
Missing	79 (5.4%)		
	New visits (due to new incidence) n (%)	Unique Individuals n (%)	
Total	1454	1108	
Visits			
Single	904 (62.2%)	904 (81.6%)	
Repeated	550 (37.8%)	204 (18.4%)	
Wards			
ED	1347 (92.6%)		
RTSC	81 (5.6%)		
Other wards	26 (1.8%)		
Year	Whole country		Capital area
	New visits (due to new incidence) n (%)	Population n (%)	p-value
			New visits (due to new incidence) n (%)
2005	193 (13.3%)	107,866	0.01624
2006	161 (11.1%)	109,809	175 (13.7%)
2007	151 (10.4%)	112,151	140 (11.0%)
2008	142 (9.8%)	115,299	136 (10.7%)
2009	110 (7.6%)	117,784	125 (9.8%)
2010	141 (9.7%)	118,203	96 (7.5%)
2011	138 (9.5%)	119,094	120 (9.4%)
2012	161 (11.1%)	120,205	119 (9.3%)
2013	127 (8.7%)	121,445	144 (11.3%)
2014	124 (8.5%)	123,149	105 (8.2%)
Missing	6 (0.4%)	0	114 (8.9%)
			0 (0.0%)
			0

ED: Emergency Department; RTSC: Rape Trauma Service Centre.

Note: categorical variables were analysed using chi-square tests.

strangulation (9.8%) ( $p < 0.05$ ) (Table IV). In 8.2% of cases, weapons were involved.

#### Admissions

There were 47 (3.2%) admissions to hospital wards over the research period. The women's average age was 38 years and the majority of assaults took place at the patient's residential area (51.1%), with only one perpetrator (96.9%) aged between 25 and 64 years (55.3%). The perpetrators were patient's current partners (71.9%), ex-partners (12.5%) and current/ex-partners (15.6%).

The majority of admissions were on Sundays (36.2%) and Mondays (17%) ( $p < 0.05$ ), between 00:00 and 08:00 (48.9%) ( $p > 0.05$ ). There was a non-significant increase in admissions during the research period.

For admitted women, the average ISS was 3.41 (0–10; M = 3.5; SD = 2.58) and more serious compared to ISS for visits only ( $p < 0.05$ ) but still classified as minor (Table IV). Injuries were primarily located on the head area (28.6%: head 14.3%, face 14.3%), upper limbs (25.0%) and abdomen (14.3%) but were, however, not significant ( $p > 0.05$ ). The most common types of ICD-10 diagnoses were fractures (41.4%), superficial injuries (including contusions) (31.0%) and wounds (13.8%) ( $p < 0.05$ ).

#### Cost

The average cost per visit was €258 and the total cost for visits was €375,431. The average cost per admission was €8678 and the total cost for admissions was €407,899. The total cost for LUH due to treatment for IPV was €783,330 over the research period.

Table II. Descriptive characteristics of women in Iceland, aged 18–74 years, visiting the LUH as a result of IPV-related injuries. Research period ranges from January 1, 2005 to December 31, 2014.

Patient's age group	n (%)
18–19	85 (5.8%)
20–29	532 (36.6%)
30–39	431 (29.6%)
40–49	252 (17.3%)
50–59	123 (8.5%)
60–69	26 (1.8%)
70+	5 (0.3%)
<b>Place of occurrence</b>	
Patient's residential area	782 (53.8%)
Residential area, unspecified	356 (24.5%)
Perpetrator's residential area	123 (8.5%)
Other area	6 (0.4%)
Missing	187 (12.9%)
<b>Perpetrator</b>	
Current partner	709 (48.8%)
Former partner	482 (33.1%)
Current/former partner	263 (18.1%)
<b>Perpetrator's age</b>	
15–24 years old	158 (10.9%)
25–64 years old	836 (57.5%)
65+	10 (0.7%)
Unspecified	258 (17.7%)
Missing	192 (13.2%)
<b>Number of perpetrators</b>	
One	1274 (87.6%)
Two or more	20 (1.4%)
Missing	113 (7.8%)
Unspecified	47 (3.2%)

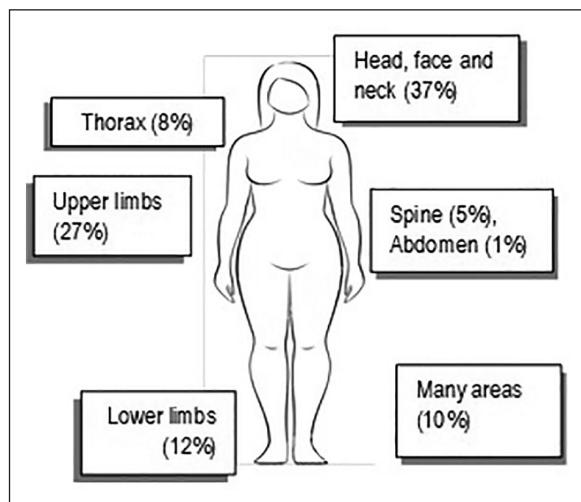


Figure 1. Location of injuries. Women in Iceland, aged 18–74 years, visiting LUH as a result of IPV-related injuries. Research period ranges from January 1, 2005 to December 31, 2014.

## Discussion

The current research on IPV against women, concerning prevalence of hospital visits at LUH and the

Table III. Time, day and month of IPV-related visits. Women in Iceland, aged 18–74 years, visiting LUH as a result of IPV-related injuries. Research period ranges from January 1, 2005 to December 31, 2014.

	New visits (due to new incidence)	p-value
Total	1454	
Time of visit		
08:00–16:00	448 (30.8%)	8.618e-8
16:00–24:00	528 (36.3%)	
24:00–08:00	358 (24.6%)	
Missing	120 (8.3%)	
Day of visit		
Monday	205 (14.1%)	<2.2e-16
Tuesday	148 (10.2%)	
Wednesday	152 (10.5%)	
Thursday	149 (10.2%)	
Friday	175 (12.0%)	
Saturday	261 (18.0%)	
Sunday	358 (24.6%)	
Missing	6 (0.4%)	
Month of visit		
January	108 (7.4%)	0.4182
February	109 (7.5%)	
March	123 (8.5%)	
April	114 (7.8%)	
May	139 (9.6%)	
June	120 (8.3%)	
July	117 (8.0%)	
August	131 (9.0%)	
September	124 (8.5%)	
October	132 (9.1%)	
November	104 (7.2%)	
December	133 (9.1%)	

Note: categorical variables were analysed using chi-square tests.

nature of injuries, is the first of its kind in Iceland. No studies based on medical records on such an extensive scale were found in order to compare our results comprehensively. The prevalence of IPV-related hospital visits in the capital area over the research period was 1.69 visits per 1000 women. A US sample study, comprising ED visits only, not the whole hospital, found an IPV prevalence of 2.1 out of 1000 female ED visits, which is higher than our results, most likely due to different sampling [24]. An injury profile for women visiting LUH as a result of IPV has now been drawn for the first time, outlining systematically useful practical information for ward managers. The study is the first to summarize the cost derived from IPV visits to LUH. The results add new knowledge for the development of emergency care for this vulnerable patient group.

### Use of hospital services

The majority of visits were to the ED, during weekends and in the afternoon – information which is

Table IV. Aetiology and nature of physical injuries: severity, type and location. Women in Iceland, aged 18–74 years, visiting LUH as a result of IPV-related injuries. Research period ranges from January 1, 2005 to December 30, 2014.

<b>Severity of injuries</b>		<b>Only visits</b>	<b>Only admissions</b>
Scores		<i>N</i> (%)	<i>N</i> (%)
3≤ (minor injury)		1208 (93.6%)	17 (50.0%)
4–8 (moderate)		72 (5.6%)	14 (41.2%)
9–15 (serious)		11 (0.9%)	3 (8.8%)
<b>Type of injuries – visits only</b>		<i>n</i> (%)	<i>p</i> -value
Superficial injuries		2172 (76.2%)	<2.2e-16
Sprains and strains		256 (9.0%)	
Wounds		227 (8.0%)	
Fractures		150 (5.3%)	
Brain injury (mainly concussion)		41 (1.4%)	
Internal organ injury		5 (0.2%)	
<b>Location of injuries – visits only</b>			
Head		632 (21.1%)	<2.2e-16
Face		292 (9.8%)	
Neck		185 (6.2%)	
Spine		145 (4.8%)	
Thorax		238 (8.0%)	
Upper limbs		813 (27.2%)	
Abdomen		30 (1.0%)	
Lower limbs		369 (12.3%)	
Many areas		287 (9.6%)	
<b>Aetiology – visits only</b>			
Hit/punched/slapped		260 (29.7%)	<2.2e-16
Shoved/pushed		156 (17.8%)	
Other*		136 (15.6%)	
Kicked		92 (10.5%)	
Attempted strangulation		86 (9.8%)	
Grabbed		44 (5.0%)	
Pulling hair		42 (4.8%)	
Twisting fingers/arms		32 (3.7%)	
Beaten with an object		27 (3.1%)	

Note: categorical variables were analysed using chi-square tests.

Other\*: there were too few cases of other form of aetiology (mechanism of injury) to warrant a separate column. Types of violence in the “other” column included being head-butted, hand cuffed, dragged by the hair, thrown down stairs, bitten, stamped on, driven on, suffocated, tied up, burnt and scratched.

useful for healthcare management. The admission ratio in this research was 3.2%, slightly lower than prior findings [8]. Women subjected to IPV are frequent guests at EDs [13] and in this study the women seemed to have experienced repeated violent episodes, as 37.8% of all IPV-related visits were repeated visits due to a new IPV-related assault. The current study found 35% of all women’s assault-related visits to the ED were IPV-related. As indicated in a sample study from the US and in a Dutch study on forensic examinations data, around a third of all women’s ED assault-related visits were due to IPV-inflicted injuries [11,19].

IPV is generally a hidden and underreported topic, which may result in a reluctance to disclose and discuss the abuse, thus not shedding the correct light on the prevalence [2]. Hence, it must be

acknowledged that sometimes study results only display the tip of the iceberg. Due to this stigmatization, survivors may not actually experience the behaviour as abuse, and health professionals may be reluctant to broach the issue [25].

A US retrospective cohort study estimated the average mean cost for treat and release visits to be €1722 and, for admissions, €23,480 [8]. Since no comparable studies calculating the cost of IPV visits to hospital were found, our results add new knowledge on this topic.

#### *Nature of injuries and aetiology*

Our results expand previous studies. IPV-inflicted injuries in our research were multiple, mainly located

on the head, face, neck and upper limbs, as in previous research results [4,8,12,16,17]. Women with IPV-related injuries usually rank low on a severity index and less than 10% had serious lesions [17]; our results confirm the low severity of injuries. Types of injuries were mainly superficial, such as contusions, but there were also sprains, strains, wounds and fractures [8,19,26].

Perpetrators used from one to seven (average 1.7) different mechanisms of violence to injure their partners. The majority of injuries were located primarily on the patient's left side (50.3%) of the body, which might be explained by the majority of individuals being right-handed.

This study provides not only new information on the prevalence of hospital visits and the nature of injuries, but also epidemiological information and a baseline that can be used to measure the effectiveness of possible new future approaches when treating patients visiting LUH as a result of IPV.

### *Limitations*

*Definitions of IPV.* Known limitations within this field of research in terms of comparing results in an international context are the different definitions and methodological approaches as well as cultural differences related to IPV.

*Underreporting.* Underreporting and incorrectly registered information at LUH, as well as worldwide, on the reason for women's visits, resulting from some women's lack of willingness to disclose what actually happened in the cases of IPV [4,5,27], is viewed here as a limitation as it might reduce hospital data recording reliability.

*Data collection.* Data were not collected from primary healthcare clinics, health institutions in the rural area or private medical services, where women might seek assistance due to IPV-related injuries.

### *Strengths*

*University hospital with a national service area.* LUH is the only hospital servicing the capital area. All medical specialities are presented at LUH and it is a referral hospital for the whole country. The RTSC at LUH is the only service of its kind in the capital area and services the vast majority of all sexual abuse cases in Iceland.

*Use of extensive electronic health record database.* Data were obtained from every form of medical records from all wards at LUH. Unique social security numbers make data collection more precise in terms of synchronizing data and avoiding repeat counting.

*Homogeneity within the country.* The rural and urban areas are relatively homogeneous, which makes generalization more reliable.

### *Future research*

It is important to improve the registration of information on IPV within the healthcare sector. The influence on children being direct or indirect survivors of IPV also needs to be addressed. Another angle might be to analyse further the medical diagnosis women subjected to IPV have, to find out if their health condition is in any way different to the general population. As research has primarily been on women as survivors and men as perpetrators, it would add significantly to the field of research to look at men as survivors and women as perpetrators.

### **Conclusion**

There were 1454 IPV-related visits to the LUH, with a prevalence of 1.69 per 1000 women from the capital area over the 10-year research period and 3.2% were admitted. The majority of women had minor physical injuries, located on the upper body. The most common aetiology was punching, pushing, kicking and attempted strangulation. This form of violence is an extensive, expensive public health issue, which needs more attention in order to prevent it and to assist survivors and perpetrators.

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The authors have no conflicts of interest to declare.

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