



Prevalence of abuse and intimate partner violence surgical evaluation (PRAISE) in orthopaedic fracture clinics: a multinational prevalence study

PRAISE Investigators*

Summary

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*See Contributors section for writing committee and investigative team

Correspondence to:

Sheila Sprague, McMaster University, 293 Wellington Street North, Suite 110, Hamilton, ON, L8L 8E7, Canada
sprags@mcmaster.ca

Background Intimate partner violence (IPV) is the leading cause of non-fatal injury to women worldwide. Musculoskeletal injuries, which are often seen by orthopaedic surgeons, are the second most common manifestation of IPV. We aimed to establish the 12-month and lifetime prevalence of IPV in women presenting to orthopaedic fracture clinics.

Methods The PRAISE team of 80 investigators did a cross-sectional study of a consecutive sample of 2945 female participants at 12 orthopaedic fracture clinics in Canada, the USA, the Netherlands, Denmark, and India. Participants who met the eligibility criteria anonymously answered direct questions about physical, emotional, and sexual IPV, and completed two previously developed questionnaires (Women Abuse Screening Tool [WAST] and Partner Violence Screen [PVS]). We did a multivariable logistic regression analysis to investigate the risk factors associated with IPV.

Findings The overall response rate was 85% (2344 of 2759 patients provided informed consent). One in six women (455/2839, 16.0%, 95% CI 14.7–17.4%) disclosed a history of IPV within the past year, and one in three (882/2550, 34.6%, 32.8–36.5%) had experienced IPV in their lifetime. 49 women (1.7%, 1.3–2.2%) attended their clinic visit as a direct consequence of IPV, only seven of whom (14%) had ever been asked about IPV in a health-care setting. Women in short-term relationships (OR 0.584, 99% CI 0.396–0.860, $p=0.0001$) were at increased risk of IPV and physical abuse in the past 12 months in this study. Compared with women in Canada and the USA, those in the Netherlands and Denmark were at reduced risk of any abuse in the past 12 months, physical abuse in lifetime, and any abuse in lifetime (OR 0.595, 99% CI 0.427–0.830, $p<0.0001$; 0.630, 0.445–0.890, $p=0.001$; and 0.464, 0.352–0.612, $p<0.0001$, respectively).

Interpretation PRAISE is the largest prevalence study done so far in orthopaedics. Orthopaedic surgeons should be confident in the assumption that one in six women have a history of physical abuse, and that one in 50 injured women will present to the clinic as a direct result of IPV. Our findings warrant serious consideration for fracture clinics to improve identification of, respond to, and provide referral services for, victims of IPV.

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Introduction

Intimate partner violence (IPV)—also known as domestic violence, spouse abuse, and battering—refers to physical, emotional, sexual, psychological, or financial abuse between intimate partners.^{1,2} The list of short-term and long-term physical and psychological consequences of IPV is exhaustive and is well established in scientific literature.^{3,4}

In a large-scale, multicountry study,⁵ WHO reported that the lifetime prevalence of IPV in women ranged from 15% to 71%, and in a systematic review,⁶ investigators reported that the prevalence ranged from less than 20% to more than 50%. This review also emphasised the scarcity of studies in which the prevalence of IPV within orthopaedic fracture clinics was investigated.⁶ We have shown that the 12-month prevalence of IPV in fracture clinics at two trauma centres in Ontario, Canada,⁷ was 32%, which was much higher than anticipated.⁷ In the present multicentre study, we aimed to establish the prevalence of IPV in the

past year in women who present to orthopaedic trauma fracture clinics in different countries.

Methods

We did a cross-sectional multicentre study at 12 orthopaedic trauma fracture clinics at medical centres in Canada (seven sites), the USA (one site), the Netherlands (two sites), Denmark (one site), and India (one site). We selected sites on the basis of feasibility for successful completion of the study (ie, previous collaboration, interest in participation, and availability of research personnel) and to represent a range of geographical areas.

The methods centre received approval from the McMaster/Hamilton Health Sciences research ethics board (reference REB #08–369), and from each local research ethics board. We will summarise only the methods used, since a full report of the methodology of the PRAISE study has already been published

(reference 8, and appendix pp 1–13). Subsequent to the publication of the protocol, we added one site from India and removed our site in Australia to improve feasibility.

Study design and participants

Patients presenting at participating fracture clinics (for Canadian and American sites) or trauma clinics (for Dutch, Danish, and Indian sites), collectively known as injury clinics, were screened for study participation by a female study coordinator. Patients at these injury clinics are seen by an orthopaedic surgeon about an orthopaedic injury that needs either surgical or conservative management. Acute injuries are typically seen in emergency departments at our sites and are followed up for several months in the injury clinic, although some patients with acute injuries are first seen in the injury clinic.

To be included in the study, patients must have presented to the fracture clinic for their own appointments (ie, they must not have accompanied someone else to the clinic for their appointment for a musculoskeletal injury); been at least 16 or 18 years of age (dependent on the site ethics policies); been able to read, understand, and write in English, Dutch, Danish, Hindi, or Marathi (dependent on the study site); been seen at the fracture clinic for treatment of an orthopaedic injury; and separated themselves from anyone who accompanied them to the fracture clinic to complete the questionnaire in private. We excluded patients who were judged too ill or injured to participate and those who were cognitively impaired and unable to participate. All patients provided written informed consent.

Objectives

The primary objective was to establish the proportion of women who had been subjected to IPV in the past 12 months among those who present to orthopaedic fracture clinics. We defined IPV as physical, emotional, or sexual abuse by an intimate partner and asked participants by direct questioning if they were subject to any such abuse. We also asked patients to complete two validated questionnaires (Women Abuse Screening Tool [WAST] and the Partner Violence Screen [PVS]), which were designed to assess IPV in health-care settings.^{9–11}

Secondary objectives were to determine the proportion of women who experienced IPV in their lifetime, the proportion of women who presented with an orthopaedic injury that was the direct result of IPV, assessment of which patient characteristics are associated with IPV, and investigation of patients' previous experiences with, and perceptions of, being asked about IPV by health-care professionals.

Outcome measures and survey methods

The 12-month prevalence of IPV was assessed with three direct questions (taken from WAST) about patients' experience of IPV in the past 12 months, PVS, and WAST.

We used the three direct questions that were rephrased to assess lifetime IPV. These questions were: "Have you been physically abused?"; "Have you been emotionally abused?"; and "Have you been sexually abused?", with a preamble defining the period of interest (ie, "in the past 12 months" or "in your lifetime"). We chose to use more than one measure of IPV prevalence to minimise the number of missed cases. We chose WAST and PVS because, according to a recent systematic review¹² about IPV screening methods, these two devices are among the most widely used and well-validated IPV screening methods.

We translated the questionnaires into Dutch, Danish, Hindi, and Marathi with the help of clinicians who were fluent in English and the language of interest. In each case, the translations were back-translated into English and the study team compared the wording with the original English version and made corrections as necessary.

Data collection

After obtaining informed consent, a female study coordinator provided every participant with a questionnaire to complete independently in a private location. The questionnaire consisted of 37 questions about the patient's demographics and orthopaedic injury, direct questions about their experience with IPV in the past 12 months and in their lifetime, WAST, PVS, and several questions about their experiences of and opinions about health-care

See Online for appendix

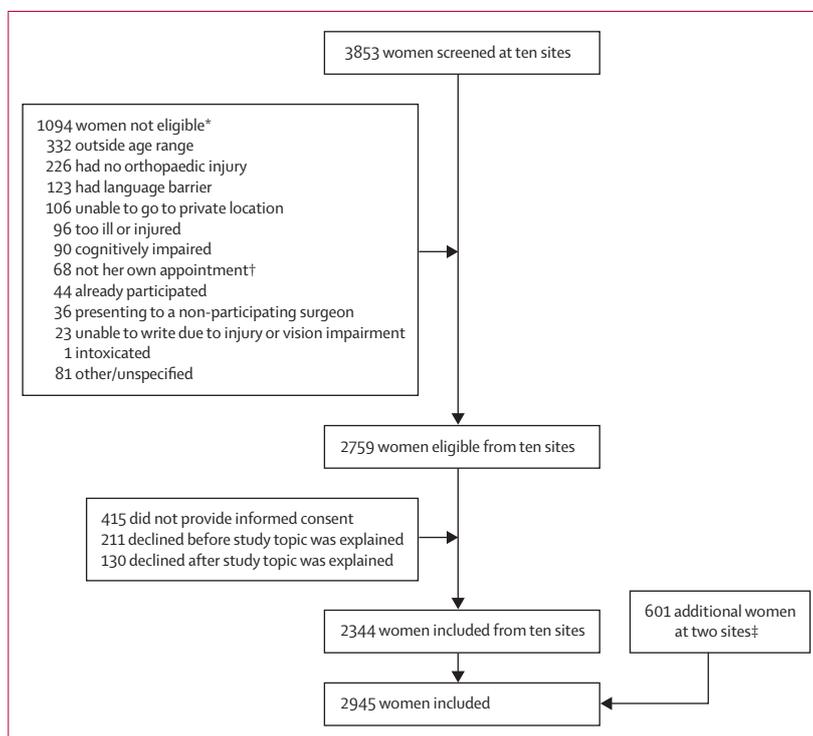


Figure 1: Study flow diagram

*Women could be ineligible for more than one reason. †"Not her own appointment" means that the woman presenting came to the clinic accompanying someone else with a musculoskeletal injury for their appointment. ‡These two sites did not keep track of exclusions because of personnel and resource restrictions.

	All respondents (n=2839)	Respondents who did not experience IPV* (n=2384)	Respondents who experienced IPV* (n=455)
Age range (years)			
16–29	695 (25%)	595 (25%)	100 (22%)
30–39	423 (15%)	352 (15%)	71 (16%)
40–49	493 (18%)	396 (17%)	97 (22%)
50–59	650 (23%)	532 (23%)	118 (26%)
≥60	531 (19%)	468 (20%)	63 (14%)
Missing values†	47 (2%)	41 (2%)	6 (1%)
Annual income (CAN\$)‡			
<20 000	790 (29%)	643 (29%)	147 (34%)
20 000 to <60 000	1230 (46%)	1044 (46%)	186 (43%)
60 000 to <100 000	507 (19%)	426 (19%)	81 (19%)
≥100 000	161 (6%)	140 (6%)	21 (5%)
Missing values†	151 (5%)	131 (6%)	20 (4%)
Highest level of education completed or in progress			
No or some high school	385 (14%)	309 (13%)	76 (17%)
High-school diploma	736 (26%)	610 (26%)	126 (28%)
College or university degree/diploma or higher	1683 (60%)	1435 (61%)	248 (55%)
Missing values†	35 (1%)	30 (1%)	5 (1%)
Ethnicity/race			
White	2333 (83%)	1962 (83%)	371 (82%)
Asian	205 (7%)	174 (7%)	31 (7%)
Black	44 (2%)	39 (2%)	5 (1%)
Other	226 (8%)	179 (8%)	47 (10%)
Missing values†	31 (1%)	30 (1%)	1 (<1%)
Marital status			
Married	1162 (41%)	954 (40%)	208 (46%)
Single	751 (27%)	649 (27%)	102 (22%)
Divorced or separated	360 (13%)	299 (13%)	61 (13%)
Common law	334 (12%)	277 (12%)	57 (13%)
Widowed	138 (5%)	127 (5%)	11 (2%)
In a relationship	71 (3%)	56 (2%)	15 (3%)
Other	12 (<1%)	11 (<1%)	1 (<1%)
Missing values†	11 (<1%)	11 (<1%)	0 (0%)
Length of existing relationship (years)			
Not in relationship	862 (32%)	771 (34%)	91 (21%)
0–5	519 (19%)	438 (19%)	81 (19%)
6–19	573 (21%)	467 (20%)	106 (25%)
20–39	556 (20%)	448 (20%)	108 (25%)
≥40	204 (8%)	164 (7%)	40 (9%)
Missing values†	124 (4%)	95 (4%)	29 (6%)
Children			
Yes	1737 (62%)	1428 (60%)	309 (68%)
No	1085 (38%)	943 (40%)	142 (32%)
Missing values†	17 (<1%)	13 (<1%)	4 (<1%)
Sexual orientation			
Heterosexual	2573 (96%)	2170 (96%)	403 (93%)
Non-heterosexual	116 (4%)	84 (4%)	32 (7%)
Missing values†	150 (5%)	130 (6%)	20 (4%)
Type of injury			
Fracture	1800 (65%)	1512 (65%)	288 (64%)
Sprain/strain	261 (9%)	231 (10%)	30 (7%)

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	All respondents (n=2839)	Respondents who did not experience IPV* (n=2384)	Respondents who experienced IPV* (n=455)
(Continued from previous page)			
Dislocation	96 (3%)	78 (3%)	18 (4%)
Patient was unsure	120 (4%)	103 (4%)	17 (4%)
Other	400 (14%)	319 (14%)	81 (18%)
More than one	111 (4%)	94 (4%)	17 (4%)
Missing values†	51 (2%)	47 (2%)	4 (<1%)
Cause of injury			
Fall	1034 (36%)	863 (36%)	171 (38%)
Sports	538 (19%)	463 (19%)	75 (16%)
Motor vehicle accident	320 (11%)	253 (11%)	67 (15%)
Unspecified/other twist	72 (3%)	61 (3%)	11 (2%)
Struck or struck by object	59 (2%)	52 (2%)	7 (2%)
Work	36 (1%)	32 (1%)	4 (<1%)
Non-intimate partner violence	28 (<1%)	18 (<1%)	10 (2%)
Other	262 (9%)	222 (9%)	40 (9%)
No response	490 (17%)	420 (18%)	70 (15%)
Location of injury			
Lower limb	1271 (47%)	1081 (47%)	190 (44%)
Upper limb	796 (29%)	683 (30%)	113 (26%)
Chest	55 (2%)	45 (2%)	10 (2%)
Pelvis	34 (<1%)	30 (1%)	4 (<1%)
Axial spine (spine/neck)	33 (<1%)	27 (1%)	6 (<1%)
Head and face	15 (<1%)	11 (<1%)	4 (<1%)
Other	22 (<1%)	16 (<1%)	6 (<1%)
More than one location	501 (18%)	400 (17%)	101 (23%)
Missing values†	112 (4%)	91 (4%)	21 (5%)
Location			
Canada/USA	1870 (66%)	1537 (65%)	333 (73%)
Denmark/Netherlands	858 (30%)	756 (32%)	102 (22%)
India	111 (4%)	91 (4%)	20 (4%)
Data are number of patients in each category (%). PV=intimate partner violence. *IPV defined as physical, emotional, or sexual abuse. †Missing values were excluded from the denominator to calculate percentages for available data; percentages for missing values were calculated with the full denominator ‡All reported incomes were converted to Canadian dollars.			

Table 1: Patient demographics and injury characteristics and risk factors associated with IPV in the past 12 months

professionals asking about IPV (appendix pp 9–10). After completing the questionnaire, the participant returned it to the study coordinator in a sealed envelope.

Sample size

We had initially aimed to include 300 women per site, across 12 sites, for a total sample size of 3600 women. We used an estimated 12-month IPV prevalence of 25% within orthopaedic clinics and a standard statistical formula^{13,14} for estimation of sample size of prevalence studies and calculated that a sample size of 288 (rounded up to 300) women per site was necessary to provide an estimate of IPV prevalence with 95% confidence.

In September, 2012, we did an analysis of the 2945 women included in this study and the primary outcome estimate to ensure that our sample size assumptions were valid. The 12-month prevalence of IPV

in the recruited women in this study was 16%. With an assumption of a 5% error margin, our sample size was readjusted to 206 women per site, for a total of 2478 women across 12 clinical sites. This readjustment was done because the sample size increases as the prevalence approaches 50% (highest variability).¹⁴ We also did a sensitivity analysis for clustered data by centre and showed no difference in the primary outcome. Since our recruitment had exceeded the revised estimate by more than 450 women, and because of the low likelihood of recruiting an additional 600 women with increased cost and delay to dissemination of key findings, the lead investigators agreed to stop enrolment.

Statistical analysis

Surveys were entered into a study-specific database, and descriptive analyses, including frequency counts and

percentages, were calculated for all data gathered. Continuous data are presented as means and standard deviations. We did χ^2 tests, regression analyses, and a sensitivity analysis to establish whether any differences existed in patients' perceptions about IPV or cluster effects between sites located in Canada and the USA, Denmark and the Netherlands, and India. No statistical imputation process was undertaken for missing information. On the basis of published studies, we did a multivariable logistic regression analysis on demographic characteristics—age (continuous), ethnicity, sexual orientation, income, education, marital status, length of relationship, having children, type of injury, location of injury, and continent of residence—to establish whether any of these variables were independently associated with experience of IPV and physical abuse in the patient's lifetime and in the past 12 months.^{15,16} We added the type and location of injury because these factors might be of

particular interest to orthopaedic surgeons. All data analyses were done with SPSS v20.0.

Role of the funding source

The sponsors of this study had no role in study design or execution; the gathering, management, analysis, or interpretation of the data; or the preparation, review, or approval of the report. None of the authors have been paid to write this article by a pharmaceutical company or other agency. The corresponding author had full access to all the data and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Results

Ten sites screened 3853 patients for inclusion and 1094 women were ineligible. Of the 2759 patients who met the eligibility criteria, 2344 provided informed consent and completed all or part of the study questionnaire. Two

	Acute physical abuse*, n (%)	Physical abuse, n (%)		Emotional abuse, n (%)		Sexual abuse, n (%)		Overall prevalence of intimate partner violence, n (%)	
		12-month	Lifetime	12-month	Lifetime	12-month	Lifetime	12-month	Lifetime
Canada/USA									
Foothills Medical Centre, Calgary, AB, Canada	1/299 (<1%)	7/296 (2%)	57/290 (20%)	44/296 (15%)	108/290 (37%)	3/295 (1%)	31/290 (11%)	46/294 (16%)	110/289 (38%)
Hamilton Health Sciences Centre—General Site, Hamilton, ON, Canada	8/299 (3%)	11/293 (4%)	65/285 (23%)	62/292 (21%)	119/286 (42%)	5/294 (2%)	34/284 (12%)	63/292 (22%)	120/284 (42%)
Hamilton Health Sciences Centre—McMaster/Juravinski Sites, Hamilton, ON, Canada	2/300 (<1%)	4/296 (1%)	35/293 (12%)	50/294 (17%)	93/292 (32%)	3/296 (1%)	14/293 (5%)	52/295 (18%)	93/292 (32%)
QE II Health Sciences Centre, Halifax, NS, Canada	6/295 (2%)	12/289 (4%)	63/289 (22%)	45/288 (16%)	118/287 (41%)	3/288 (1%)	30/288 (10%)	51/289 (18%)	120/286 (42%)
Royal Columbian Hospital, New Westminster, BC, Canada	3/87 (3%)	7/85 (8%)	17/81 (21%)	18/85 (21%)	35/82 (43%)	2/85 (2%)	8/82 (10%)	16/85 (19%)	36/82 (44%)
St Michael's Hospital, Toronto, ON, Canada	3/299 (1%)	6/290 (2%)	56/287 (20%)	32/292 (11%)	101/287 (35%)	0/292 (0%)	27/287 (9%)	32/291 (11%)	107/287 (37%)
Thunder Bay Regional Health Sciences Centre, Thunder Bay, ON, Canada	1/39 (3%)	2/36 (6%)	7/37 (19%)	4/36 (11%)	15/37 (41%)	0/37 (0%)	5/37 (14%)	13/271 (14%)	15/37 (41%)
University of Missouri Health Care, Columbia, MO, USA	7/296 (2%)	14/290 (5%)	50/166 (30%)	68/293 (23%)	85/166 (51%)	8/290 (3%)	37/166 (22%)	68/288 (24%)	88/166 (53%)
Canada/USA overall	31/1914 (2%)	63/1875 (3%)	350/1728 (20%)	323/1876 (17%)	674/1727 (39%)	24/1877 (1%)	186/1727 (11%)	333/1870 (18%)	689/1723 (40%)
Netherlands/Denmark									
Aarhus University Hospital, Aarhus, Denmark	9/301 (3%)	5/269 (2%)	12/130 (9%)	43/268 (16%)	25/130 (19%)	5/274 (2%)	7/129 (5%)	44/269 (16%)	26/130 (20%)
Onze Lieve Vrouwe Gasthuis, Amsterdam, Netherlands	7/291 (2%)	10/297 (3%)	41/295 (14%)	26/296 (9%)	75/296 (25%)	2/298 (<1%)	16/296 (5%)	28/296 (10%)	80/295 (27%)
Academic Medical Centre, Amsterdam, Netherlands	2/292 (<1%)	16/296 (5%)	42/293 (14%)	29/293 (10%)	64/290 (22%)	4/296 (1%)	15/291 (5%)	30/293 (10%)	67/290 (23%)
Netherlands/Denmark overall	18/884 (2%)	31/862 (4%)	95/718 (13%)	98/857 (11%)	164/716 (23%)	11/868 (1%)	38/716 (5%)	102/858 (12%)	173/715 (24%)
Sancheti Institute (India)	0/113 (0%)	3/111 (3%)	2/112 (2%)	19/110 (17%)	22/112 (20%)	0/111 (0%)	0/112 (0%)	20/111 (18%)	20/112 (18%)
All sites	49/2911 (2.7%), 95% CI 1.3-2.2	97/2848 (3.4%), 95% CI 2.8-4.1	447/2558 (17.5%), 95% CI 16.1-19.0	440/2843 (15.5%), 95% CI 14.2-16.9	860/2555 (34.7%), 95% CI 31.9-35.5	35/2856 (1.2%), 95% CI 0.9-1.7	224/2555 (8.8%), 95% CI 7.7-9.9	455/2839 (16.0%), 95% CI 14.7-17.4	882/2550 (34.6%), 95% CI 32.8-36.5

*Patients presenting to the orthopaedic clinic with injuries caused by an intimate partner.

Table 2: Prevalence of intimate partner violence within the past 12 months and in lifetime at each site

additional sites in Canada (Foothills Medical Centre, Calgary, and St Michael's Hospital, Toronto) included 601 patients but did not keep track of exclusions because of resource limitations and clinic structure; thus, a total of 2945 women from 12 centres were included in this study (figure 1) and the response rate was 85.0% (range 73.3–99.3%) for the ten sites that kept screening records. Because of missing data, the sample size for the primary outcome was 2839.

Table 1 shows patient demographics, injury, and risk factors. Most women who participated in the study were

of white ethnicity (>80%), older than 40 years (60%), married or in a common law relationship (>50%), had children (>60%), and had a college or university degree or diploma (two-thirds). Fractures were the most common type of injury (nearly two-thirds). The most frequently reported cause of injury was a fall (more than a third), and most injuries (>50%) affected the lower limb.

Table 2 shows the overall prevalence of IPV in the past 12 months (about 16%) and during lifetime (about 35%) based on direct questioning. About 16% had experienced emotional abuse, 3% physical abuse, and 1% sexual abuse. The 12-month prevalence of IPV was higher in Canadian and US centres (18%) than in Dutch and Danish centres (12%, $p < 0.0001$), but was much the same as that for the centre in India (18%; $p = 0.35$). No significant differences between continents were recorded for the prevalence of physical abuse in the past 12 months ($p = 0.87$; figure 2). Both PVS and WAST identified two-times fewer women who had experienced IPV within the past 12 months (7.1%, 95% CI 6.2–8.1%, and 7.4%, 6.5–8.4%, respectively) than with direct questioning (appendix pp 14–15). IPV prevalence for either PVS or WAST ($p = 0.244$ and $p = 0.322$, respectively) did not differ across continents. The 12-month IPV prevalence estimate did not differ significantly when we omitted the two sites that did not record reasons for exclusions (16.7%, 5.0–18.0%), and no difference was noted in 12-month IPV prevalence when adjusted by site (16%, 13–18%).

The overall lifetime prevalence of IPV based on direct questioning was about 35% (table 2). A third of women had experienced emotional abuse, about 18% physical abuse, and just under 10% sexual abuse in their lifetime

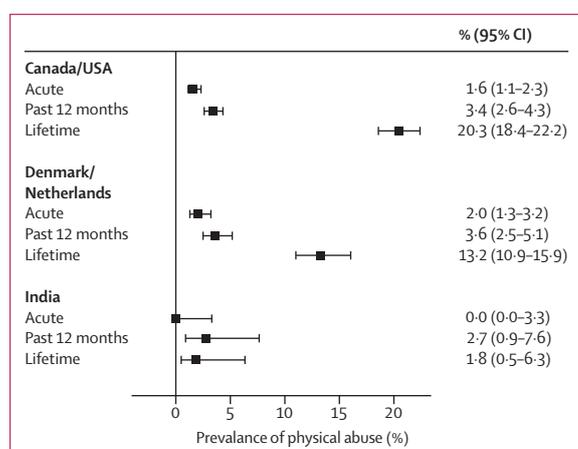


Figure 2: Prevalence of acute, lifetime, and past year physical intimate partner violence across continents

Error bars represent 95% CIs. Lifetime physical abuse differed significantly between continents ($p < 0.0001$). There were no differences between continents for acute physical abuse ($p = 0.27$) or physical abuse in the past 12 months ($p = 0.87$).

	Any abuse in past 12 months		Physical abuse in lifetime		Any abuse in lifetime	
	Odds ratio (99% CI)	p value	Odds ratio (99% CI)	p value	Odds ratio (99% CI)	p value
Older age	0.987 (0.976–0.997)	0.001	0.999 (0.990–1.007)	0.646	1.006 (0.998–1.014)	0.075
White ethnicity	1.110 (0.738–1.639)	0.540	1.093 (0.736–1.622)	0.562	1.112 (0.805–1.538)	0.397
Heterosexual	0.715 (0.454–1.127)	0.058	0.599 (0.380–0.946)	0.004	0.875 (0.582–1.315)	0.398
Annual income less than CAN\$20 000	1.295 (0.936–1.790)	0.040	1.352 (0.977–1.873)	0.017	1.277 (0.971–1.679)	0.021
No post-secondary education	1.104 (0.825–1.476)	0.383	1.211 (0.894–1.639)	0.104	0.957 (0.746–1.226)	0.645
Married	0.857 (0.583–1.261)	0.303	0.477 (0.311–0.731)	<0.0001	0.603 (0.429–0.847)	<0.0001
In present relationship for <10 years	0.584 (0.396–0.860)	0.0001	1.465 (0.967–2.217)	0.018	1.824 (1.300–2.559)	<0.0001
Have no children	0.637 (0.440–0.924)	0.002	0.379 (0.262–0.548)	<0.0001	0.516 (0.383–0.696)	<0.0001
Fracture or dislocation	1.063 (0.783–1.443)	0.608	0.994 (0.727–1.358)	0.958	1.100 (0.853–1.418)	0.333
Location of injury						
Upper limb	0.720 (0.501–1.036)	0.020	0.597 (0.408–0.873)	0.0017	0.665 (0.489–0.904)	0.0013
Lower limb	0.739 (0.537–1.018)	0.015	0.681 (0.488–0.952)	0.003*	0.720 (0.546–0.950)	0.002
Other*	1.000	..	1.000	..	1.000	..
Location						
Canada/USA	1.000	..	1.000	..	1.000	..
Netherlands/Denmark	0.595 (0.427–0.830)*	<0.0001	0.630 (0.445–0.890)	0.001	0.464 (0.352–0.612)	<0.0001
India	1.329 (0.606–2.915)	0.352	0.118 (0.018–0.783)	0.004	0.501 (0.239–1.050)	0.016

$p < 0.01$ is significant. *Other injuries include head/neck/face, chest, spine, pelvis, more than one injury, and unknown injury.

Table 3: Multivariable logistic regression of selected demographic characteristics

	Canada/USA (n=1928)	Netherlands/ Denmark (n=904)	India (n=113)	All respondents, (n=2945)
Been to this clinic or another to address injuries as a result of violence from an intimate partner?				
Yes	63 (3.3%)	28 (3.1%)	0 (0.0%)	91 (3.1%)
No	1843 (95.6%)	855 (94.6%)	112 (99.1%)	2810 (95.4%)
Declined to answer	22 (1.1%)	21 (2.3%)	1 (0.9%)	44 (1.5%)
Been asked by another health-care professional about previous experience with intimate partner violence?				
Yes	155 (8.0%)	34 (3.8%)	0 (0.0%)	189 (6.4%)
No	1745 (90.5%)	851 (94.1%)	112 (99.1%)	2708 (92.0%)
Declined to answer	28 (1.5%)	19 (2.1%)	1 (0.9%)	48 (1.6%)
Aware of specific resources for people who have been abused by an intimate partner?				
Yes	1234 (64.0%)	548 (60.6%)	0 (0.0%)	1782 (60.5%)
No	648 (33.6%)	313 (34.6%)	112 (99.1%)	1073 (36.4%)
Declined to answer	46 (2.4%)	43 (4.8%)	1 (0.9%)	90 (3.1%)
Should health-care providers ask all women whether they are experiencing intimate partner violence?				
Yes	1555 (80.6%)	598 (66.1%)	20 (17.7%)	2173 (73.8%)
No	250 (13.0%)	232 (25.7%)	92 (81.4%)	574 (19.5%)
Declined to answer	123 (6.4%)	74 (8.2%)	1 (0.9%)	198 (6.7%)
Should orthopaedic surgeons in particular ask all women whether they are experiencing intimate partner violence?				
Yes	1294 (67.1%)	500 (55.3%)	19 (16.8%)	1813 (61.6%)
No	368 (19.1%)	173 (19.1%)	93 (82.3%)	634 (21.5%)
Declined to answer	266 (13.8%)	231 (25.6%)	1 (0.9%)	498 (16.9%)

Data are number of patients (%).

Table 4: Patients' experiences, knowledge, and perceptions about intimate partner violence: participants' answers to specific questions

(table 2). The prevalence of IPV was significantly higher in the North American centres (40%) than in the European centres (24%; $p=0.001$) or the Indian centre (18%, $p<0.016$, table 2). Women in Canada and the USA had a significantly higher rate of self-reported physical abuse in their lifetime (20%) than did those in the Netherlands and Denmark (13%) and India (2%; $p<0.004$; figure 2).

Just under 2% of women presented to fracture clinics with injuries as a direct result of IPV (table 2). 40 (80%) of the 49 women with acute injury due to IPV were treated for fractures. Most injuries were fractures of the foot or ankle (nine patients, 18%), hand or wrist (seven patients, 14%), or were at more than one location (nine patients, 18%). The proportion of women who presented as a direct result of IPV varied across clinical sites, ranging from less than 1% to between 3 and 4% (table 2). Of the women who presented because of an IPV injury, only seven (14%) had ever been asked by a health-care provider in the medical system whether they were subject to IPV.

Married women, women with children, women with injuries of the limbs, and women living in the Netherlands or Denmark were at a lower risk of IPV during their lifetime than those in the other groups. Women who were older, in a short term relationship (<10 years), and who lived in the Netherlands or Denmark, and those who had no children were at a

significantly decreased risk of any abuse in the past 12 months than those in the other groups (table 3).

Only 6% of the study participants and none from India had ever been asked by another health-care professional about IPV (table 4). About 60% of participants were aware of specific resources for people who have been abused by an intimate partner; however, none at the site in India were aware of such resources. Almost three-quarters of participants believed that health-care providers should ask all women whether they are subject to IPV, and about 60% indicated that orthopaedic surgeons, in particular, should ask all women about IPV (table 4). Significant differences were noted between respondents in Canada and the USA, the Netherlands and Denmark, and India about whether health-care providers and orthopaedic surgeons should ask all women about IPV—patients in Canada (81%) and the USA (66%) were more open to such questions than were those in the Netherlands or Denmark (18%; $p<0.0001$).

Discussion

The results of the PRAISE study show that one in six women presenting to orthopaedic clinics have a history of abuse in the past year, and that one in 50 attend their appointment as a direct consequence of IPV. These findings are similar to those of a recent meta-analysis of 37 studies in which the prevalence of IPV in patients presenting to different medical specialties was investigated, with the best estimates of the lifetime prevalence of any type of IPV being 40% in family medicine and 38% in emergency medicine (panel).⁶ Arguably, the severity of physical abuse in women presenting to orthopaedic clinics is higher than in those presenting to other specialties, in view of the high proportion of fractures caused by IPV (eg, 80% in this study).

Characteristics of women who were positive for IPV included being in a relationship for a short period (<10 years), being unmarried, and having children. This profile is consistent with Capaldi and colleagues' systematic review,¹⁸ in which they showed that high income is a protective factor, whereas the effect of marital status as a risk factor was unclear. Differences between the USA and Canada and the Netherlands and Denmark could be real and attributable to cultural and political divergence between the continents, or they might be due to differences in how the participants interpreted the survey questions because of variations in culture or language.

This study has many strengths, such as the inclusion of several clinical sites, the use of female study coordinators for patient comfort and safety, broad eligibility criteria, the use of previously developed screening questionnaires and direct questions, and the completion of self-administered questionnaires in a private location. Our broad eligibility criteria and large sample size ensured that women with a range of characteristics were eligible for participation.

The broad definition of IPV used is a limitation of the study and might have categorised some women as

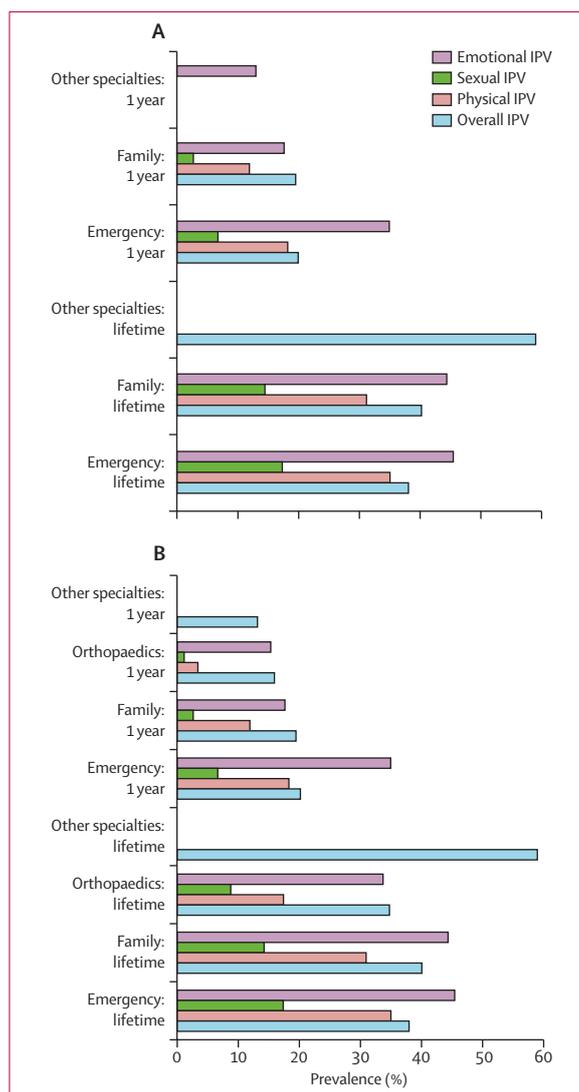


Figure 3: Prevalence of intimate partner violence in past year and lifetime, by medical speciality (A) Pooled prevalence of intimate partner violence. (B) Updated pooled prevalence of intimate partner violence including the results of the PRAISE study (orthopaedics data).

victims whereas, in reality, they were not. However, since there is no widely accepted gold standard for assessment of IPV, the patients' answers to the direct questions about abuse were interpreted at face value. The use of several screening methods was helpful to maximise the number of cases of IPV detected; nevertheless, the prevalence of IPV was higher with the direct questions than with WAST or PVS. PVS contains questions that enable easy assessment of physical abuse, whereas WAST contains questions that help detection of emotional and sexual abuse, which could help to explain some of the differences recorded.⁶ Another limitation is that WAST and PVS are validated only for English-speaking populations, which might limit the

Panel: Research in context

Systematic review

The authors did the most recent systematic review of prevalence studies assessing intimate partner violence (IPV) in the health-care setting.⁶ We identified 37 studies through a systematic search, in duplicate, of an electronic database, consultation with experts, and a review of the references of included articles. Two reviewers, both with methodological expertise and one with content expertise, independently graded the methodological quality of every included study with questions adapted from the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement designed for cross-sectional studies.¹⁷ A priori, we established that studies that met at least ten of the 13 reporting criteria within our modified STROBE criteria would be judged high quality, studies that met between seven and nine reporting criteria would be classified as medium quality, and studies that met six criteria or fewer would be judged low quality. We decided that 26 studies were of high methodological quality, ten were of moderate quality, and the remaining study was of low quality. Most studies were undertaken in family medicine clinics and emergency departments, but none were done in orthopaedic fracture clinics. We provide pooled rates of lifetime and 1-year physical abuse, emotional abuse, and sexual abuse for emergency medicine, family medicine, and other specialties (figure 3A) and with the PRAISE study added (figure 3B).

Interpretation

PRAISE—a multinational cross-sectional study undertaken across 12 orthopaedic clinics in five countries—shows that one in six women presenting to orthopaedic clinics have a history of abuse in the past year, and one in 50 presented to the clinic as a direct consequence of IPV. These findings are similar to those of our recent systematic review (figure 3B), in which we found that the best estimates of the lifetime prevalence of any type of IPV were 40% in family medicine and 38% in emergency medicine.⁶ Arguably, the severity of physical abuse among women presenting to orthopaedic clinics is higher than that in the aforementioned specialties, in view of the high proportion of fractures seen at orthopaedic clinics. The PRAISE definitive study is the first prevalence study completed in orthopaedic fracture clinics assessing IPV across several countries.

accuracy and external validity of the results across all continents because of differential interpretation of the questions among non-English-speaking participants.

Our response rate was high (85%) and is much the same as that in prevalence studies in other health-care settings.¹⁹ Despite efforts to maximise enrolment, 415 women refused to provide informed consent and participate in the study. The prevalence of IPV might differ between non-participants and participants, and the direction in which it could vary is unclear. Because of confidentiality and ethics requirements, we were unable to obtain information about patients who did not participate and those who were missed. Therefore, we cannot assess the effect of these patients on our data. Although sites aimed to include consecutive patients, this approach was not possible in a few cases because of logistics (ie, some clinics were missed because of research coordinator availability).

We used a self-administered questionnaire, which patients completed privately. The study coordinator was available to address any questions; however, to ensure patient privacy and confidentiality because of the sensitivity of the topic, the study coordinator did not

review with the study participant the completed questionnaire for completeness or to ensure that the responses were logical and consistent. Consequently, several questionnaires had missing data. Other IPV prevalence studies faced similar challenges.^{15,16} In our analyses, we used all available data and we did not exclude questionnaires because of missing data.

Despite a focus on emergency departments as case-finding opportunities for IPV,^{20–22} we argue that women admitted to emergency departments with physical injuries, such as fractures, often do not disclose IPV to their emergency physicians. Further, musculoskeletal injuries are the second most common type of injury incurred as a result of IPV and invariably lead to referrals to an orthopaedic surgeon.²³ Additionally, health-care professionals in injury clinics are well positioned to identify patients experiencing IPV, since they often develop long-term interactions with women during repeat clinic visits for follow-up of fractures and associated surgical procedures.²⁴ This information, combined with our finding that the prevalence of IPV is high in orthopaedics, leads us to believe that the development and assessment of an IPV identification and support programme in injury clinics is warranted. Although IPV screening has been controversial historically,²⁵ the US Preventive Services Task Force has recently published a statement recommending that all clinicians screen women for IPV and provide referrals to appropriate support services.²⁶ Additionally, Liebschutz and Rothman²⁷ recommend that all primary care providers screen all women older than 12 years and suggest some simple steps for identification and referral.

The Canadian Orthopaedic Association and American Medical Association judge it as good medical practice to take steps to identify and offer assistance to IPV victims,^{28,29} but health-care providers have been consistently shown not to screen for IPV routinely—eg, in our study, only 6% of women had previously been asked about IPV by a health-care professional. Of the women who attended a fracture clinic with an injury resulting from IPV, only 14% had ever been asked about IPV by a health-care provider. Health-care professionals in injury clinics have an opportunity to identify the patients who were missed in the emergency department.

Almost two-thirds of the women in our study suggested that orthopaedic surgeons should ask all women presenting after trauma whether they are experiencing IPV, indicating that patients with injuries are generally supportive of this notion. Nonetheless, orthopaedic guidelines for management of IPV victims are new and are not implemented widely in orthopaedic practices.³⁰ Consequently, an intervention programme in orthopaedic and trauma clinics is needed. Such a programme should be supported by an appropriate referral and support scheme and should include professionals who are specifically trained to assist IPV victims.³¹

A recent survey³² in India found that 31% of Indian women of childbearing age had been subject to physical domestic violence. The low prevalence recorded in our study could be related to differences in the way that we gathered data, the cultural acceptability of the questions asked, and the fact that participants from India tended to be young women who had never been in a relationship. Moreover, an earlier pilot screening study in India³³ identified several key cultural issues that could account for the low reported prevalence. These issues were an inherent belief that for health-care providers to ask about IPV in a fracture clinic is not appropriate, the fact that Indian women were shy, patients might be offended and never return to the hospital, and domestic violence and abuse is often regarded as normal and women might not recognise that they are being abused or might perceive the behaviour to be standard.³³ Furthermore, the use of WAST and other checklists might not translate culturally in India.³³ 22 women from the site in India declined to participate after they learned that the topic of the study was IPV, suggesting that participation bias was probably a factor. Additionally, the youth and absence of an intimate relationship in the women from India probably explains the lower estimate of IPV prevalence than has been reported previously. Another explanation for the under-reporting in India could stem from a pervasive attitude in men and women in that country who do not view IPV as a contributor to health issues.³⁴ The results of our study and the lessons learned will help to inform our future planned initiative to further investigate the prevalence of IPV at clinical sites in that country.

Health-care professionals should be especially concerned about escalation of abuse to intentional physical injury with associated fractures, which suggests that victim identification and support to ensure their future safety should be a high priority. The escalation of physical violence is a key risk factor for intimate partner homicide³⁵ and is the first question on the widely used danger assessment scale.³⁶ Additionally, between 2002 and 2009, the top cause of death after domestic violence was trauma (42% of cases).³⁵ Orthopaedic fracture clinics, as our results suggest, are key to the identification of women subjected to severe IPV who might be at increased risk of further injury and homicide.

Contributors

Writing committee: Sheila Sprague and Mohit Bhandari (joint leads) were involved in the protocol design, supervised data management at the central coordinating centre (McMaster University), interpreted data, and wrote and edited the report. Gregory J Della Rocca, J Carel Goslings, and Rudolf W Poolman provided input on the study protocol, reviewed and edited the report, and assisted with data interpretation. Kim Madden assisted with protocol preparation and study coordination, analysed data, and drafted tables and figures. Nicole Simunovic analysed data and drafted tables and figures. Sonia Dosanjh and Emil H Schemitsch provided input on the study protocol, reviewed and edited the report, and were content experts. *Steering committee:* Mohit Bhandari (steering committee chair and principal investigator), Sheila Sprague (project officer),

Gregory J Della Rocca, Brad A Petrisor, Rudolf W Poolman, Sonia Dosanjh, and Emil H Schemitsch.

Central coordinating and methods centre: Mohit Bhandari, Sheila Sprague, Kim Madden, Katelyn Godin, Nicole Simunovic, Diane Heels-Ansdell, Sonia Dosanjh (IPV expertise), Clare Freeman (IPV expertise), David Mathews (IPV expertise), and Diana Tikasz (IPV expertise).

PRAISE investigators

Hamilton Health Sciences—General Hospital, Hamilton, ON, Canada: Brad A Petrisor, Brian Drew, Krishan Rajaratnam, Dale Williams, Ivan Wong, Desmond Kwok, Matt Denkers, Alicia Cameron, Sarah Resendes, Ivanna Ramnath, Teresa Chien, Ngan K Pham. Hamilton Health Sciences—McMaster Hospital and Henderson Hospital, Hamilton, ON, Canada: Victoria Avram, Olufemi R Ayeni, Justin de Beer, Mitchell Winemaker, Rick Ogilvie, Devin Peterson, Rukia Swaleh. St Michael's Hospital, Toronto, ON, Canada: Emil H Schemitsch, Jeremy Hall, Michael McKee, James Waddell, Timothy Daniels, Daniel Whelan, Earl Bogoch, Aaron Nauth, Milena Vicente, Jennifer Hidy. Thunder Bay Regional Health Sciences Centre, Thunder Bay, ON, Canada: David Puskas, Tina LeFrancois. QEII Health Sciences Centre, Halifax, NS, Canada: Chad Coles, Mark Glazebrook, Ross Leighton, David Johnston, Gwen Dobbin, Kelly Trask, Shelley MacDonald, Jocelyn Stairs. Foothills Medical Centre, Calgary, AB, Canada: Paul Duffy, Richard Buckley, Robert Korley, Shannon Puloski, Kimberly Carcary, Jeanine McColl, Danica Brister. Royal Columbian Hospital, New Westminster, BC, Canada: H Michael Lemke, Dory Boyer, Robert McCormack, Bertrand Perey, Farhad Moola, Trevor Stone, Darius Viskontas, Kelly Apostle, Mauri Zomar, Amber Oatt, Karyn Moon. University of Missouri Health Care, Columbia, MO, USA: Gregory J Della Rocca, Brett D Crist, David A Volgas, Linda K Anderson, Jacqueline L Beshears, Jessica L Evans. Onze Lieve Vrouwe Gasthuis, Amsterdam, Netherlands: Rudolf W Poolman, Vanessa A Scholtes, Kim Opdam, Esri de Waal, Robert Haverlag. Academic Medical Center, Amsterdam, Netherlands: J Carel Goslings, M S H Beerekamp. Aarhus University Hospital, Aarhus, Denmark: Ole Brink. Sancheti Institute for Orthopaedics and Rehabilitation, Pune, Maharashtra, India: Parag Sancheti, Steve Rocha, Mangesh Shende.

Conflicts of interest

We declare that we have no conflicts of interest.

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