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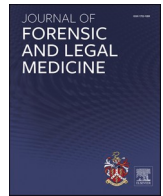
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Research Paper

The completeness of routine registration of the counterpart in deliberate interpersonal violence in an urban emergency department

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ABSTRACT

Most studies of violence from the health care system lack reliable information about the counterpart, which is important for distinguishing between different types of violence. Since 2014, the emergency department at Odense University Hospital in Denmark has routinely registered information about the counterpart. The purpose of this study was to evaluate the completeness of registering information about the counterpart during routine registration of victims of interpersonal violence in the emergency department. We included 11,200 victims treated at the emergency department 2014–2021. Using the patient registration data, we estimated the proportion of missing information on the counterpart, stratified by age group and gender of the victim as well as type of incident and severity of injury. Information about the counterpart was registered in 91.5 % of all cases. In 43.1 % (CI: 42.2–44.0) of the cases, the counterpart was unknown to the victim, in 24.3 % (CI: 23.5–25.1) the counterpart was an acquaintance, in 10.5 % (CI: 10.0–11.1) the counterpart was a partner, and in 4.2 % (CI: 3.8–4.5) the counterpart was another family member. The proportion of cases with no information about the counterpart varied with gender, age group, time of violence, place of violence, weapon use, and severity of injury. Half of the victims injured with firearms (46.2 %, CI: 30.1–62.8) and one-fourth of the victims injured with knives (25.9 %, CI: 21.9–30.2) did not reveal information about the counterpart. The majority of the victims revealed information about the counterpart, making it possible to analyse different types of violence separately.

1. Introduction

Police crime statistics have traditionally been the main source of data for violence research and for describing changes in the frequency and severity of interpersonal violence (IPV). However, several papers document the limitations of these data due to a high level of non-reporting.^{1–6} A Danish study found that 62 % of all registered IPV episodes in the health care system and/or by the police were unknown to the police and that the police registered only 15 % of IPV.⁷ Similarly, a Norwegian study found that the proportion of victims reported to the police was 62 %.⁸ Studies from the UK showed that between 23 % and 46 % of all victims of violence admitted to the emergency departments (EDs) were known to the police.^{2,9} The proportion of police-registered violence may change over time due to changes in the tendency of reporting to the police.^{10,11} Therefore, previous studies recommend using data from the health care system for violence research and

surveillance.^{4–6,12}

Numerous studies using data from the health care system have described the development, frequency, or severity of IPV. Most of these studies are limited by the lack of information regarding the counterpart. Reliable information about the counterpart is important for distinguishing between different types of IPV. The World Health Organization (WHO) distinguishes between two types of interpersonal violence: family violence involving family members (partners, children, elderly) and community violence involving unrelated persons (strangers, acquaintances).¹³ The epidemiology of family violence and community violence is different. Family violence often takes place at home and involves women or children, whereas community violence often takes place in public places, involves males, and is weapon-related.^{14,15}

In most countries, information about the counterpart is not routinely registered in the health care system. A single study from the UK has

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evaluated the use of an assault patient questionnaire in a large ED and found that it provided important information about the relationship between the assault patient and the attacker.¹⁶ In Denmark, all injury contacts with the ED are registered according to the National Medical Coding Classification System.¹⁷ In addition to the basic registration, the coding system contains specific codes for the registration of victims of violence that include information about the counterpart.¹⁷

The ED at Odense University Hospital (OUH) in Denmark has used these codes since 2014 for registration of the counterpart in IPV, but the usefulness of the specific codes has not been assessed.¹⁷ The aim of this study was to evaluate the completeness of the specific codes for registration of IPV containing information about the counterpart in the routine registration of victims of IPV in the ED.

2. Materials and methods

In this study, IPV was defined according to the definition from the WHO.¹³ Included in the study were all victims of IPV treated at the ED at OUH, Denmark in 2014–2021. We defined a victim of IPV as a patient treated in the ED after injury sustained from IPV if the victims claimed that the ^{injury} was due to IPV. Data were extracted retrospectively from the patient registration system at the ED. In the case of more than one ED contact for the same incident, only the first contact was included. The patient registration system included self-report information coded according to the Danish Health Data Authority.¹⁷ The registration of patients with injuries from IPV requires that patients disclose the information as being due to assault. We did not register or include data from the medico-legal examinations. In Denmark, health care professionals are obligated by professional confidentiality towards outsiders including the police authorities. Basically, health care professionals are not allowed to share any information regarding patients with the police authorities. Only, in special cases e.g. violence against children the health professionals have reporting obligation to the police or public authorities.

The trained staff at the ED completed all registrations, with physicians determining the ICD-10 diagnoses, with up to six diagnoses per patient. For all cases, information was collected on patient age and gender, time of treatment, place of assault, ICD-10 diagnoses, and weapon use. Injury severity was evaluated using a diagnosis-based scoring system that categorised ICD-10 diagnoses into severe or mild injuries.¹⁸ ‘Severe injuries’ included amputations, bone fractures, joint sprains and strains, all types of soft tissue damage, eye corrosion and burns, and electrical shock. ‘Mild injuries’ included superficial lacerations, wounds, and being struck by a foreign body (mainly in eyes).¹⁸

We also collected information about the counterpart defined as the person who inflicted the violence, based on the specific codes for IPV as defined in the National Medical Coding Classification System.¹⁷ We defined the following counterparts: person unknown to the victim, present or former partner, other family member, acquaintance, other person known to the victim, or missing information.¹⁷

The completeness of the registration coding on counterpart was evaluated by calculating the proportion of missing or unspecified information stratified by age, gender, time of violence, place of violence, weapon use, and severity of injury. We calculated proportions with 95 % confidence intervals (CI). Non-parametric statistics were used all other statistical analyses. STATA 15.1© was used in all statistic calculations and a p-value <0.05 was considered as statistically significant.

3. Results

We included 11,200 victims of IPV treated at the ED in 2014–2021. Of these, 7927 (71 %) were males. The median age was 25 (0–95) years for males and 31 years (0–98) for females (Mann-Whitney, $p = 0.000$).

Information about the counterpart was registered in 91.5 % of all cases (Table 1). The proportion of cases revealing no information about the counterpart varied with gender and age group. Overall, 10.2 % (CI: 9.6–11.0) of males and 3.8 % (CI: 3.2–4.6) of females did not reveal information about the counterpart. In the age groups 15–24 and 25–49 years, 9.1 % (CI: 8.3–9.9) and 9.0 % (CI: 8.1–10.0) of victims did not reveal information about the counterpart, whereas in the age group 0–14 years, only 3.8 % (CI: 2.2–6.1) did not reveal information about the counterpart. Overall, family violence accounted for 14.7 % (CI: 14.0–15.4) of cases and community violence for 76.9 % (CI: 76.1–77.7) of cases. For males, family violence accounted for 4.6 % (CI: 4.2–5.1) of cases and community violence for 85.1 % (CI: 84.3–85.9). For females, family violence accounted for 39.2 % (CI: 37.4–40.8) of cases and community violence for 57.7 % (55.9–59.4).

For violence occurring Monday-Thursday, 17.2 % (CI: 16.1–18.4) was defined as family violence and 75.0 % (CI: 73.7–76.2) was defined as community violence. For violence occurring Friday-Sunday, 13.2 % (CI: 12.2–13.9) was defined as family violence and 78.1 % (CI: 77.1–79.1) was defined as community violence. There was no difference in the proportion of victims who did not reveal information about the counterpart when comparing violence occurring Monday-Thursday 7.7 % (CI: 6.9–8.6) with Friday-Sunday 8.8 % (CI: 8.2–9.5) (Table 2). For violence occurring in the daytime, in the evening, and during the night, 16.8 % (CI: 15.7–18.0), 19.2 % (CI: 17.8–20.6), and 8.6 % (CI: 7.6–9.5) were defined as family violence, whereas 76.8 % (CI: 75.3–77.8), 72.6 % (CI: 70.9–74.1), and 80.8 % (CI: 79.6–81.2) were defined as community violence, respectively. Overall, 10.6 % (CI: 9.6–11.6) of the victims injured during the night did not reveal information about the counterpart, whereas 6.6 % (CI: 5.9–7.4) of those injured in the daytime did not reveal information about the counterpart.

For violence occurring in domestic areas, outdoor areas, institutions/schools, and bars/restaurants/shops, 44.3 % (CI: 42.6–46.1), 3.6 % (CI: 3.1–4.2), 4.4 % (CI: 3.6–5.3), and 2.2 % (CI: 1.5–3.1) were defined as family violence, and 50.5 % (CI: 48.7–52.3), 86.8 % (CI: 85.8–87.8), 92.8 % (CI: 93.1–94.1), and 85.5 % (CI: 84.0–86.9) were defined as community violence. More than half of the victims who did not reveal information about the place of violence also did not reveal information

Table 1

Information about the counterpart revealed by victims of violence attending a hospital ED, stratified by gender and age group of the victim (data are proportions with CIs).

	Family violence		Community violence			No information	All
	Partner	Family member	Acquaintance	Other known	Unknown	No information	All
	% (CI)	% (CI)	% (CI)	% (CI)	% (CI)	% (CI)	N (%)
Gender of victim							
Males	1.5 (1.2–1.8)	3.1 (2.7–3.5)	23.2 (22.2–24.1)	9.6 (8.9–10.2)	52.4 (51.3–53.5)	10.2 (9.6–11.0)	7927 (100)
Females	32.4 (30.8–34.0)	6.8 (5.9–7.7)	27.3 (25.7–28.8)	9.0 (8.1–10.1)	20.7 (19.3–22.1)	3.8(3.2–4.6)	3273 (100)
Age group of victim							
0–14 years	0	10.0 (7.3–13.3)	59.7 (55.0–64.4)	9.3 (6.7–12.5)	17.2 (13.7–21.1)	3.8 (2.2–6.1)	419 (100 %)
15–24 years	6.9 (6.1–7.7)	3.8 (3.2–4.4)	22.7 (21.4–24.0)	6.8 (6.0–7.6)	50.8 (49.4–52.3)	9.0 (8.1–10.0)	4282 (100 %)
25–49 years	14.7 (13.7–15.7)	3.3 (2.8–3.8)	23.0 (21.8–24.1)	10.7 (9.9–11.6)	39.3 (37.9–40.7)	9.1 (8.3–9.9)	4989 (100 %)
≥50 years	10.1 (8.7–11.8)	5.6 (4.5–6.9)	23.8 (21.7–26.1)	12.6 (11.0–14.4)	41.3 (38.7–43.8)	5.6 (4.5–6.9)	1510 (100 %)
All	10.5 (10.0–11.1)	4.2 (3.8–4.5)	24.3 (23.5–25.1)	9.4 (8.9–10.0)	43.1 (42.2–44.0)	8.4 (7.9–8.9)	11,200 (100 %)

Table 2

Information about the counterpart revealed by victims of violence attending a hospital ED, stratified by weekday of violence, time and place of violence.

	Family violence		Community violence			No information	All
	Partner	Family member	Acquaintance	Other known	Unknown	No information	All
	% (CI)	% (CI)	% (CI)	% (CI)	% (CI)	% (CI)	N (%)
Weekday							
Monday – Thursday	12.2 (11.2–13.2)	5.1 (4.4–5.7)	30.2 (28.9–31.6)	11.3 (10.4–12.3)	33.5 (32.1–34.9)	7.7. (6.9–8.6)	4453 (100 %)
Friday – Sunday	9.6 (8.8–10.2)	3.6 (3.1–4.0)	20.4 (19.5–21.4)	8.1 (7.5–8.8)	49.5 (48.9–50.7)	8.8 (8.2–9.5)	6747 (100 %)
Time of day							
06.00–17.59	12.1 (11.1–13.1)	4.7 (4.1–5.4)	27.5 (26.1–28.9)	11.3 (10.3–12.3)	38.0 (36.3–39.2)	6.6 (5.9–7.4)	4337 (100 %)
18.00–23.59	13.9 (12.7–15.2)	5.3 (4.5–6.1)	28.6 (27.0–30.2)	8.7 (7.7–9.7)	35.3 (33.6–37.0)	8.3 (7.3–9.3)	3106 (100 %)
00.00–05.59	6.0 (5.2–6.8)	2.6 (2.1–3.1)	17.1 (15.9–18.4)	7.8 (7.0–8.7)	55.9 (54.3–57.5)	10.6 (9.6–11.6)	3757 (100 %)
Place of violence							
Domestic area	32.8 (31.1–34.5)	11.6 (10.4–12.8)	33.6 (31.9–35.3)	3.9 (3.2–4.6)	13.0 (11.9–14.3)	5.1 (4.4–6.0)	3058 (100 %)
Outdoor areas	2.2 (1.8–2.7)	1.4 (1.1–1.8)	16.5 (15.4–17.7)	7.2 (6.4–8.0)	63.1 (61.6–64.6)	9.5 (8.7–10.5)	4170 (100 %)
Institution/school	1.9 (1.3–2.8)	0.3 (0.1–0.7)	38.8 (36.1–41.4)	29.0 (26.7–31.5)	25.0 (22.7–27.3)	5.0 (3.9–6.3)	1419 (100 %)
Bar/restaurant/shop	2.4 (1.8–3.1)	2.0 (1.5–2.6)	18.3 (16.7–19.9)	8.9 (7.8–10.1)	58.3 (56.3–60.3)	10.1 (8.9–11.4)	2415 (100 %)
Unknown	1.4 (0.1–5.1)	0	11.6 (6.8–18.1)	7.2 (3.5–12.9)	28.3 (20.9–36.5)	51.5 (42.8–60.0)	138 (100 %)

about the counterpart (51.5 %, CI: 42.8–60.0). Only 5.0 % (CI: 3.9–6.3) of the victims injured in institutions or schools did not reveal information about the counterpart.

For violence involving no weapon, firearm, and knife, 14.7 % (CI: 14.1–15.4), 0 %, and 15.0 % (CI: 11.8–18.6) of the cases were defined as family violence, whereas 77.7 % (CI: 76.9–78.5), 53.9 % (CI: 37.2–69.9), and 59.1 % (CI: 54.4–63.7) were defined as community violence. Almost half of the victims injured with firearms (46.2 %, CI: 30.1–62.8) and one-fourth of the victims injured with knives (25.9 %, CI: 21.9–30.2) did not reveal information about the counterpart (Table 3). For victims with mild lesions, 15.2 % (CI: 14.5–15.9) of the incidents were defined as family violence and 77.2 % (CI: 76.3–87.0) as community violence. For victims with severe lesions, 11.4 % (CI: 9.8–13.2) of the incidents were defined as family violence and 75.2 % (CI: 72.8–77.4) as community violence. Overall, 13.4 % (CI: 11.7–15.3) of the victims with severe lesions did not reveal information about the counterpart, whereas only 7.7 % (7.1–8.2) of the victims with mild lesions did not reveal information about the counterpart.

4. Discussion

Using the specific registration codes for counterpart in incidents of IPV, we investigated the information provided about the counterpart by IPV victims seen at an urban Danish ED. Overall, we found that 91.5 % of all IPV victims treated in the ED revealed information about the counterpart, and thus only 8.5 % did not reveal any information about the counterpart. Based on the information registered, we could distinguish between family violence and community violence.¹³ Furthermore, we found that the tendency to reveal information about the counterpart varied with age group and gender of the victim, time of violence, place of violence, weapon use, and severity of injury. The proportions of victims revealing no information about the counterpart were highest in males, in young adults, in victims injured at the weekends, in victims injured at night, in victims injured by a weapon, and in victims with

severe injuries. In particular, victims injured by firearms or knives were most likely not to reveal any information about the counterpart.

Few studies have described the counterpart in victims of IPV treated in the health care system. In a previous one-year Danish study, 8 % of the male victims and 11 % of the female victims did not reveal any information about the counterpart when they sought medical treatment in an urban ED.⁷ The study also showed that 1.9 % of the male victims were injured by a partner, 2.6 % by another family member, 20.4 % by an acquaintance, and 65.0 % by a person unknown to the victim. Among females, 39.1 % of the victims were injured by a partner, 4.9 % by another family member, 17.3 % by an acquaintance, and 27.9 % by a person unknown to the victim.⁷ Other Danish studies have shown similar proportions and are thus comparable to our present results.^{19–22}

A UK study evaluating an assault patient questionnaire in a large ED reported that only 2.8 % of the female victims and 1.7 % of the male victims refused to reveal information about the counterpart or were unable to remember, which is lower than in our study.¹² The UK study evaluated a newly implemented tool for a period of only 19 months. We consider that increased focus on valid registration in the study period led to the lower proportion of missing information. In our study, the ED staff did not know that registration of the counterpart was being evaluated. The UK study showed that 19.5 % of the female victims were injured by a partner, 7.0 % by another family member, 16.1 % by an acquaintance, and 50.1 % by a stranger.¹² In males, 1.0 % were injured by a partner, 2.0 % by another family member, 8.4 % by an acquaintance, and 80.3 % a stranger/not known.¹² Similarly, a study from New South Wales of 29, 701 hospitalizations due to IPV showed that 39.2 % of female victims were injured by a partner, 11.2 % by another family member, 7.3 % by an acquaintance, 6.0 % by an unknown person, and 29.3 % by an unspecified person.²³ In male victims, the proportions were 10.1 % partner, 6.0 % other family member, 5.9 % an acquaintance, 11.1 % an unknown person, and 57.4 % an unspecified person. Different definitions of the groups of counterparts may explain the discrepancies compared to our present study.

Table 3

Information about counterpart revealed by the victims of violence attending a hospital ED, stratified by weapon use and severity of injury.

	Family violence		Community violence			No information	All
	Partner	Family member	Acquaintance	Other known	Unknown	No information	All
	% (CI)	% (CI)	% (CI)	% (CI)	% (CI)	% (CI)	N (%)
Weapon use							
No weapon	10.4 (10.0–11.2)	4.0 (3.8–4.5)	24.5 (23.7–25.3)	9.6 (9.0–10.2)	43.8 (42.9–44.8)	7.5 (7.0–8.0)	10713 (100 %)
Firearm	0	0	10.3 (2.9–24.2)	12.8 (4.3–27.4)	30.8 (17.0–47.6)	46.2 (30.1–62.8)	39 (100 %)
Knife	9.4 (6.8–12.5)	5.6 (3.6–8.1)	21.2 (17.5–25.3)	4.9 (3.1–7.3)	33.0 (28.7–37.6)	25.9 (21.9–30.2)	448 (100 %)
Severity							
Mild	11.1 (10.5–11.7)	4.1 (3.7–4.5)	24.6 (23.7–25.4)	9.6 (9.0–10.2)	43.0 (42.0–44.0)	7.7 (7.1–8.2)	9749 (100 %)
Severe	6.8 (5.5–8.2)	4.6 (3.6–5.9)	22.7 (20.6–24.9)	8.2 (6.8–9.7)	44.3 (41.7–46.9)	13.4 (11.7–15.3)	1445 (100 %)

The strength of this study is the systematic registration of ED data by trained staff 24 h a day and throughout the study period. A small group of secretaries do all registrations systematically and uniformly including a particular focus on correct classification of cause of contact (medical, unintentional injury, violence, self-harm, suicide attempt). There have been no major changes in the registration of injury patients in the ED during the study period. Furthermore, the municipality is a well-defined area with only one hospital and ED. Previous studies have shown that very few victims of violence seek medical attention from general practitioners or at hospitals more than 45 km away.^{24,25} We have no reason to consider that victims of IPV seeking medical attention at other hospitals are different from those seeking medical attention at OUH.

Our results emphasise the key role that the ED staff have in obtaining useful information that can contribute to community safety and crime reduction initiatives. Violence in a community is a multidisciplinary problem that requires effective collaboration, and the data collectors should be kept fully informed regarding their important role. As victims of violence may present to multiple hospitals, primary care physicians or other health care providers, multicentre collection of data is required. Furthermore, linkage of data between the health care providers and the police authorities is expected to further improve the quality and completeness of data on violence.

There are some limitations to our study. Firstly, our registrations depended on victims revealing the correct information in the ED, that IPV had led to the lesions. An unknown number of victims of IPV may fail to reveal violence as the cause of their lesions. Some persons may intentionally give false information such as in cases of self-harming behaviour or a factitious disorder imposed on self. Self-inflicted lesions may be used by the injured person to make credible a feigned assault. We have no reliable information about the size of this bias. Furthermore, the victims of IPV may submit wrong information on the real offender e.g. for fear of the perpetrator taking revenge or due to shame. Especially, victims of domestic violence may be tempted to claim that they injured themselves accidentally. We have limited information about the importance of this information bias. However, a previous study indicated conformity between information about the counterpart revealed in the ED data and revealed to the police (7). Further studies should address the reliability of the information registered in the ED, including the information about the counterpart. Secondly, we have used a diagnosis-based tool for measuring severity of violence. This tool was described in a previous paper, but has not yet been validated.¹⁸

The hospital knowledge of a violence incident is in general not reported to police or discussed with medico-legal experts. The only incidents are cases with children with an obligation to report to municipal authorities or in cases of a perpetrator indicating further explicit intent of violence against others.

5. Conclusion

Reliable information about the counterpart is important for distinguishing between different types of interpersonal violence – family violence and community violence. In the present study, we evaluated the completeness of data routinely collected in an urban Danish ED using registration codes specifically related to the counterpart. Such data can be used to analyse, monitor, evaluate, and determine appropriate preventive strategies or interventions against violence. The vast majority of victims of violence revealed information about the counterpart, making it possible to analyse different types of violence separately. The proportions of victims revealing no information about the counterpart were highest in males, in younger adults, in victims injured at the weekends, in victims injured at night, in victims injured by weapons, and in victims with severe injuries.

Ethical approval

As the study was register-based and used anonymous data, it did not

require approval from the Regional Ethical Committee or the Danish Patient Safety Authority. The Head of Research at the Department of Orthopaedic Surgery and Traumatology at OUH approved the study.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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