Past violence and future work-related violence: a case-control study of Minnesota nurses

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Abstract

Background: Violence in healthcare settings places nurses at risk for physical assaults (PA) and non-physical violence (NPV -- threat, sexual harassment, verbal abuse). Studies on life-span violence suggest that persons with violence histories are more likely to experience future PA. Yet, little is known about the relation between violence history and risk of current violence among healthcare workers. The aim of the study was to investigate whether or not reported history of work-related and non-work-related PA and NPV was associated with the risk of current work-related PA among nurses.

Methods: From a comprehensive survey of 6,300 randomly selected Minnesota nurses, a nested case-control study (N= 310 cases and 944 controls) was conducted. Multivariate logistic regression analyses were used to estimate odds ratios (OR) and 95% confidence intervals (CI). Directed acyclic graphs identified potential confounders. Horvitz-Thompson reweighting was applied to adjust for unknown eligibility and non-response.

Results: Reported histories of work-related PA and work-related threat were associated with elevated risks of current work-related PA (OR = 12.8; 95% CI = 2.2, 73.9 and OR = 4.8; CI = 1.1, 20.9, respectively). Risks were elevated, but not important, for histories of work-related sexual harassment (OR = 1.8; CI = 0.5, 6.3) and verbal abuse (OR = 1.9; CI = 0.6, 5.7). History of non-work-related PA was not associated with current work-related PA, nor was history of non-work-related NPV.

Conclusions: Results identified increased risks of current work-related violence among nurses who reported work-related violence histories. These results serve as a basis for targeted interventions and further research.

Key words: nurses, physical assault, work-related violence

Background

Occupational violence is recognized worldwide as a major public health problem. In the United States, an estimated 1.7 million nonfatal work-related acts of violence are reported each year and violence ranks consistently within the top four causes for work-related fatal events [1]. Workers in healthcare settings are among the groups at highest risk of experiencing workplace violence, with nonfatal physical assault (PA) accounting for 8.3 assaults per 10,000 workers compared to 2 per 10,000 in private-sector industries [2]. Moreover, the problem is not limited to industrialized nations. A study across seven countries revealed that more than half of healthcare workers reported experiencing psychological or physical abuse in the previous 12 months while on the job [3].

Experiencing, as well as witnessing, occupational violence can lead to adverse outcomes for employees, employers and patients. Negative effects include increased absenteeism, higher turnover, elevated feelings of fear, decreased morale, post-traumatic stress and burnout [3,4]. Furthermore, stress related to violence can negatively affect patient care [5,6] and ultimately impact the cost and efficiency of the organisation [3].

Several studies on life-span violence reveal that persons who have experienced violence in the past are more likely to suffer violence in the future [5,7-9]. Numerous hypotheses attempt to explain the underlying mechanism through which past violence influences future victimization risk.
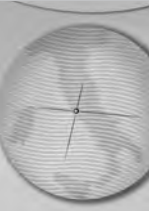
The overarching theme is that abuse early in life results in the development of maladaptive attitudes, behaviours, and beliefs which contribute to increased vulnerability as an adult [10]. It is also hypothesized that failure to recognize potentially threatening situations [11-13] and/ or failure to develop appropriate responses to aggressive behaviour (e.g., assertiveness and anger management) leads to increased risk of suffering future abuse [5,14,15].

Environmental factors that increase risk of violence are well-documented and interventions targeting these risk factors have helped reduce assaults against employees. However, high rates of violence within healthcare persist in spite of increased awareness. Though past abuse is widespread, few studies have explored the relation between history of violence and current risk of physical assault by those who work in healthcare [5,16]. The purpose of this study was to investigate whether a self-reported history of work-related and non-work-related PA and non-physical violence (NPV) was associated with the current risk of work-related PA among nurses.

Methods
Data Collection
Approval for the conduct of this study was obtained from the Institutional Review Board, University of Minnesota. Data for this analysis were generated from the Risk Factors for Violence Among Nurses (RFVAN) study [17-19] which was designed to identify specific risk factors for and magnitude of work-related violence. The target population for this study was all Registered Nurses (RNs) (57,388) and Licenced Practical Nurses (LPNs) (21,740) licenced in Minnesota, USA, as of October 1, 1998 [20].

Definitions
Operational Definitions for key terms were as follows:

Work-related events: any activities associated with the nurse's job or events that occur in his/her work environment; work-related travel included;

Work-related violence: the intentional use of physical force or emotional abuse, against an employee, that results in physical or emotional injury and consequences; this includes physical assault and non physical violence;

Physical assault (PA): occurs when one is hit, slapped, kicked, pushed, choked, grabbed, sexually assaulted or otherwise subjected to physical contact intended to injure or harm;

Non-physical violence (NPV): includes sexual harassment, threats, and verbal abuse;

Sexual harassment: occurs when one experiences any type of unwelcome sexual behaviour (words or actions) that create a hostile work environment;

Threat: when someone uses words, gestures or actions with the intent of intimidating, frightening, or harming (physically or otherwise);

Verbal abuse: when another person yells or swears, calls names, or uses other words intended to control or hurt.

The RFVAN study
The RFVAN study consisted of two phases: a comprehensive study (Phase 1) and a nested case-control study (Phase 2). In Phase 1, a self-administered questionnaire was sent to 6,300 randomly sampled subjects to identify persons who worked as nurses in Minnesota in the past 12 months and to determine who did and did not experience work-related violent events. Demographic information including age, gender, race and years of work experience was collected. Details of work-related violence events were also collected.

Cases and controls were identified through responses to the Phase 1 survey that collected data on all work-related PAs. Cases (n=475) were defined as those who reported being physically assaulted and also worked as nurses in Minnesota at some time during the 12 months prior to the date of survey completion. Individuals who reported more than one event were counted as a case only once, with the most remote event used. Unmatched controls (n=1,425) were randomly selected at a 3:1 ratio from all nurses who worked and reported not having been assaulted during the study period. For each study phase, up to four mailings were sent to maximize response rates.

A nested case-control design in Phase 2 enabled examination of the relation between various exposures and work-related PA by utilizing a self-administered questionnaire that was mailed to both cases and controls to collect exposure information; violence history and environmental exposure data were collected from cases for the one-month period prior to the PA and from controls for a randomly assigned one-month period during the study period in which they indicated having worked. The data obtained from the survey included questions regarding history of PA, both related and not related to work, and past occurrences of NPV. The survey also included questions to assess potential covariates such as demographic information, perceived stress levels in the workplace, number of hours
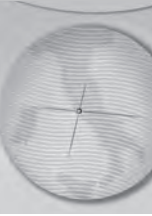
of patient contact, level of lighting in the work environment, and patient population with whom they had contact.

The causal model (Figure 1) illustrates which environmental factors and personal characteristics may influence the likelihood of experiencing PA in the workplace. *A priori* causal models and directed acyclic graphs (DAGs) guided selection of potentially confounding covariates included in the multivariate logistic regression. This method is described by Greenland, Pearl and Robins [21] and illustrated by Hernán, Hernandez-Diaz, Werler, & Mitchell [22]. To control for potential biases associated with non-response and unknown eligibility, database characteristics such as age, gender, licence type and home address that were available for both responders and non-responders were used to adjust for differential response and eligibility; this technique is widely used to minimize such bias [23-24]. All multivariate logistic regression models were analysed using SAS version 9.1.

Results

Of the 6,300 nurses randomly selected for Phase 1 of the study, 79% responded. The majority of the respondents worked as nurses in the previous 12 months and 13% indicated they

experienced work-related PA in the past year. Given that patients perpetrated over 96% of the reported PA, this final analysis focused only on patient-perpetrated violence. The response rate for the nested case control study (Phase 2) was 68%, resulting in 310 cases and 944 controls that were included in this analysis.

Participant characteristics are reported in Table 1. The majority of respondents were female (96%), white (97%), and between 40-59 years of age. Seventy three percent were RNs and had earned either a diploma or an Associate's Degree. Approximately half of the sample reported a history of work-related PA (90% of the cases and 35% of controls) while 78% reported a history of NPV. Cases most frequently reported working in a nursing home or long-term care facility, while controls worked primarily with hospitalized patients. Cases also worked more frequently with geriatric patients while controls worked more with non-geriatric, adult patients. The average length of time participants reported working as a nurse was 18 years and the majority provided patient care.

Results from the univariate and multivariate logistic regression models are presented in Table 2. At the univariate level, nurses with a history of work-related PA were at increased risk of

Figure 1. History of work-related and non work-related abuse causal model.
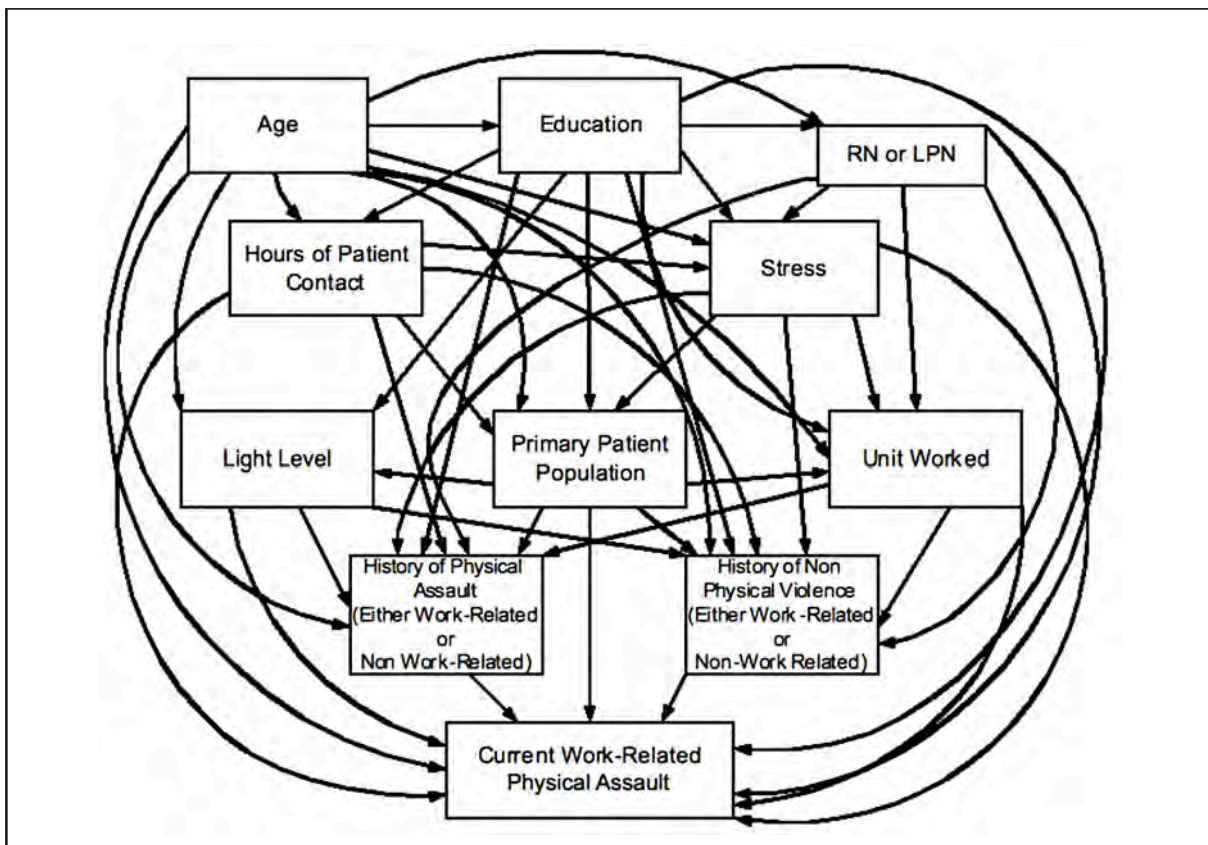
Table 1. Case-control participant characteristics: risk factors for violence among nurses.

Characteristics	Cases N (%)	Controls N (%)
Total	310 (100)	944 (100)
Age		
21-30	32 (10)	64 (7)
31-40	71 (23)	148 (16)
41-50	112 (36)	403 (43)
51-60	74 (24)	246 (26)
61-80	21 (7)	85 (9)
Licence Type		
Registered Nurse	213 (69)	700 (74)
Licenced Practical Nurse	97 (31)	244 (26)
Gender		
Female	293 (95)	909 (96)
Male	17 (5)	35 (4)
Race		
White	304 (98)	918 (98)
Other	5 (2)	23 (2)
Missing	1	3
Education		
Diploma	120 (39)	361 (38)
Associate Degree	118 (38)	259 (27)
Bachelor's Degree	66 (21)	253 (27)
Master's Degree	4 (1)	58 (6)
Doctorate	0	1 (0.1)
Missing	2 (1)	12 (1)
Unit Worked		
Medical/Surgical/Ob/Gyn	71 (23)	267 (28)
Emergency	12 (4)	24 (3)
Psychiatric/Behavioural	34 (11)	57 (6)
Intensive Care	27 (9)	65 (7)
Long-term, Assisted Care	123 (40)	145 (15)
Other	43 (14)	386 (41)
Light Level		
Bright as Daylight	185 (60)	711 (75)
Less than Daylight	122 (39)	225 (24)
Missing/Unsure	3 (1)	8 (1)
Stress		
No	2 (1)	25 (3)
Yes	302 (97)	911 (96)
Missing/Unsure	6 (2)	8 (1)
Previous Work-Related Assault		
No	30 (10)	607 (65)
Yes	279 (90)	334 (35)
Hours of Patient Contact per shift		
0-1	29 (9)	202 (21)
2-4	53 (17)	150 (16)
5-7	171 (55)	400 (42)
8-18	53 (17)	185 (20)
Missing	4 (1)	7 (1)
Primary Population		
Adult	110 (35)	416 (44)
Neonatal, Paediatric, Adolescent	13 (4)	128 (14)
Geriatric	144 (46)	206 (22)
Split time equally	43 (14)	191 (20)
Missing	0	5 (1)
Primary Professional Activity		
No Patient Care	51 (16)	284 (30)
Provided Patient Care	210 (68)	588 (62)
Supervised Patient Care	49 (16)	72 (8)

Table 2. Regression analyses for history of assault and the outcome current work-related physical assault (PA).

Exposures of Interest	Model 1[a] OR (95% CI)	Model 2[b] OR (95% CI)	Model 3[c] OR (95% CI)
History Work-related Assault	14.6 (2.8, 77.2)*	14.0 (9.0, 21.7)*	12.8 (2.2, 73.9)*
History Non Work-related Assault	1.6 (0.4, 6.3)	1.7 (1.2, 2.6) *	1.9 (0.4, 8.2)
History Work-Related Threat	5.0 (1.3, 19.9) *	5.1 (3.5, 7.3) *	4.8 (1.1, 20.9)*
History Work-Related Sexual Harassment	2.7 (0.96, 7.7)	2.6 (1.9, 3.5) *	2.4 (0.8, 7.3)
History Work-Related Verbal Abuse	5.1 (0.9, 27.3)	5.8 (3.7, 9.2) *	4.6 (0.8, 26.9)
History Non Work-Related Threat	1.4 (0.5, 4.4)	1.7 (1.2, 2.4) *	1.7 (0.5, 5.7)
History Non Work-Related Sexual Harassment	1.5 (0.5, 4.7)	1.9 (1.3, 2.6) *	1.8 (0.5, 6.3)
History Non Work-Related Verbal abuse	1.5 (0.5, 4.4)	1.9 (1.4, 2.6) *	1.9 (0.6, 5.7)

*indicates 95% CI excludes 1. [a]Model 1: Univariate Model. [b]Model 2: Multivariate model was adjusted for age, hours of patient contact, years worked, licence type, primary population, primary professional activity, education, unit worked, light level and stress level. [c]Model 3 (adjusted multivariate): Adjusted for all variables in Model 2 and non-response and eligibility.

experiencing current PA, as were nurses with a history of work-related threats and an overall history of PA. After adjusting for the covariates, based on the causal model, all histories of PA and NPV were significantly associated with a heightened risk of experiencing current work-related PA (Model 2). In Model 3, adjustment for both non-response and unknown eligibility resulted in most exposures no longer reaching a level of statistical significance. Only histories of work-related PA and work-related threats remained as exposures significantly associated with current risk of PA (OR = 12.8; 95% CI = 2.2, 73.9 and OR=4.8; 95% CI = 1.1, 20.9 respectively). Risks were elevated, but did not reach a level of significance for the remaining outcomes assessed, including histories of non work-related threat, work-related and non work-related sexual harassment, and work-related and non work-related verbal abuse.

Discussion

Almost half of the respondents in this study reported a history of work-related assault which is consistent with past reports [5,16]. While previous reports were descriptive studies of a small population of nurses, this study utilized a large-scale, case-control study design. Findings in our study suggest that both histories of work-related PA and work-related threats were

associated with the increased risk of PA against nurses. A very strong association between a history of work-related PA and current risk of assault was observed even after adjusting for other known risk factors such as education and type of unit in which they worked. These results support previous findings that some nurses who report a history of abuse do have heightened risk of subsequent victimization [5,16]. What remains unclear is the reason underlying this relationship and which types of abuse result in increased risk of subsequent victimization.

Two earlier studies also found an increased risk of work-related PA among nurses who reported a history of abuse, specifically abuse that occurred in childhood [5,16]. Most of the literature exploring the link between past abuse and future victimization has reported an increased risk of abuse. However, abuse before age 18 apparently puts women at even higher risk of future victimization [7,25,26]. Given that we did not collect information about the timing of previous PA and NPV events, it is not possible to differentiate, in the current study, whether or not the previous abuse occurred in childhood. The lack of consistent significant associations across past abuse types and current risk of PA seen in our study could be due to age differences in which prior abuse occurred.

What are the characteristics of nurses who
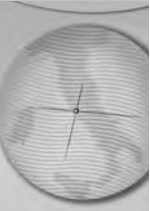
repeatedly suffer physical abuse while at work? Do nurses who report a history of abuse have different attitudes towards and responses to aggression? Do they blame themselves for abuse incurred? Hypotheses explaining the link between past abuse and subsequent victimization suggest that maladaptive survivor behaviour and attitudes may be associated with this phenomenon [7,27]. Victims of past abuse may not be equipped to manage aggression and, thus, lack the ability to develop appropriate boundaries with and responses to others. Additionally, the severity of abuse experienced may influence whether or not there are long-term changes in behaviour or attitudes. A better understanding of personal attitudes and beliefs of abuse victims is necessary in order to develop appropriate intervention strategies.

Modifiable personal characteristics associated with increased risk of PA should be considered when devising risk reduction strategies. In their 2002 report, The National Institute of Occupational Safety and Health (NIOSH) recommended behaviour modification as part of a comprehensive safety and health plan for employers. This may be of particular importance for workers who report a history of violence. Employers should include in their training programs recognition and management of assaults, conflict resolution and hazard awareness. A better understanding of personal characteristics can inform employees of their potential vulnerability and enhance employers' development of current and future intervention efforts. Future studies should investigate whether or not attitudes, beliefs and coping mechanisms of those with a history of abuse differ from those who do not report a history of abuse.

Though training is widely recognized and recommended as part of a comprehensive approach to address workplace violence, studies evaluating the effectiveness of training yield mixed results. Nachreiner et al. [28], in a previous publication examining the effect of training in this same sample of Minnesota nurses, failed to find a protective effect for workers who participated in training programs. In fact, there is little consensus around the effectiveness of workplace violence training programs. Mixed results in program success may reflect lack of tailoring content to nurses' unique needs — particularly if they have a history of PA and/or NPV.

Previous studies have demonstrated that past abuse is associated with increased risk of later victimization. This study is unique because we examined the associations between histories of both work- and non work-related PA and NPV with occurrence of current PA in the workplace. A strength of this study is that the sample population is derived from a random sample of all licenced nurses in the state of Minnesota, thus improving our ability to generalize back to this population. Additionally, precision in this large case-control study was enhanced through a 3:1 control to case comparison.

Despite numerous strengths, several limitations should be acknowledged. First, due to the sensitive nature of the questions being asked, some respondents may have felt uncomfortable revealing past instances of abuse. Despite a strong response rate of 79% there remains the possibility of bias linked to non-response. In an effort to minimize this potential bias, a weighting factor that adjusted for both non-response and eligibility was employed. Utilization of the Horvitz-Thompson method can result in less biased central estimates. However, it can also lead to increased standard errors and wider confidence intervals such as those reported in this paper. Second, it is possible that cases may provide better recall of events, compared to controls (differential recall), because they have a specific event to serve as a reference. However, the recall period was limited to one month within the preceding year in an effort to minimize this form of bias. Finally there are likely social and demographic characteristics unique to this population within the state of Minnesota. Consequently, our ability to generalize these findings to other, more diverse workforce populations may be limited.

Given the current and predicted shortage of nurses in healthcare [29], all efforts should be made to reduce work-related violence and retain experienced nurses. Modifiable personal characteristics such as attitudes or the use of interpersonal boundaries that result in increased risk of violence should be identified. This information should not be used to punish nurses but, instead, strengthen and inform intervention strategies. Customizing workplace violence training programs so that the curriculum respectfully recognises past abuse of any participants and reflects specific employee needs may better protect those at increased risk of work-related violence or, at the very least, help support those who have suffered past abuse. Recognition and acknowledgement of modifiable personal characteristics associated with increased victimization risk should not be used to place blame upon the victim but should, instead, be considered part of a multi-pronged approach to address the complex causal factors that contribute
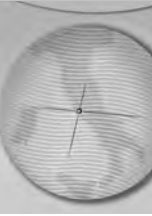
to workplace violence. Current and future efforts to control the environmental and organisational factors that also contribute to increased risk of violence in the workplace must continue as part of a comprehensive safety and health plan.

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