An epidemiological study of the magnitude and consequences of work related violence: the Minnesota Nurses’ Study

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Aims: To identify the magnitude of and potential risk factors for violence within a major occupational population.

Methods: Comprehensive surveys were sent to 6300 Minnesota licensed registered (RNs) and practical (LPNs) nurses to collect data on physical and non-physical violence for the prior 12 months. Re-weighting enabled adjustment for potential biases associated with non-response, accounting for unknown eligibility.

Results: From the 78% responding, combined with non-response rate information, respective adjusted rates per 100 persons per year (95% CI) for physical and non-physical violence were 13.2 (12.2 to 14.3) and 38.8 (37.4 to 40.4); assault rates were increased, respectively, for LPNs versus RNs (16.4 and 12.0) and males versus females (19.4 and 12.9). Perpetrators of physical and non-physical events were patients/clients (97% and 67%, respectively). Consequences appeared greater for non-physical than physical violence. Multivariate modelling identified increased rates for both physical and non-physical violence for working: in a nursing home/long term care facility; in intensive care, psychiatric/behavioral or emergency departments; and with geriatric patients.

Conclusions: Results show that non-fatal physical assault and non-physical forms of violence, and relevant consequences, are frequent among both RNs and LPNs; such violence is mostly perpetrated by patients or clients; and certain environmental factors appear to affect the risk of violence. This serves as the basis for further analytical studies that can enable the development of appropriate prevention and control efforts.

Abbreviations: RN, registered nurse; LPN, licensed practical nurse; CI, confidence interval
informative, these studies provide limited knowledge of the frequency and consequences of and potential risk factors for, work related violence. This study was designed to address some of these limitations.

**METHODS**

**Study population**

The study population, all licensed registered (RN) and practical (LPN) nurses in Minnesota, is one of the few professions at risk for violence for which a database of contact and some demographic information is available for selection of subjects.

**Study cohort**

This study examined the population of RNs (n = 57,388) and LPNs (n = 21,740) licensed in the state of Minnesota as of 1 October 1998 and was targeted towards those who worked in the 12 months before they began completing their survey. Besides name, licence type, and address, the state database included birth date, gender, and year of first licensure. Since licensing is required for both RNs and LPNs who practice in Minnesota, the study population was expected to be a dynamic cohort, but somewhat stable through time. A random sample of 6300 nurses was selected from the combined population (n = 79,128); 78% (49,181) responded. For RNs and LPNs, the proportions were 80% and 74%, respectively. Adjusting for the eligible fraction of the entire sample had little effect on the response rate.

**Definitions**

Work related violence includes any activities (including travel) associated with the job or events that occur in the work environment involving the intentional use of physical force or emotional abuse against an employee resulting in physical or emotional injury and consequences. Besides physical assault, this includes non-physical forms of violence, including threat, sexual harassment, and verbal abuse. Physical assault occurs when one is hit, slapped, kicked, pushed, choked, grabbed, sexually assaulted, or otherwise subjected to physical contact intended to injure or harm. A threat occurs when someone uses words, gestures, or actions with the intent of intimidating, frightening, or harming (physically or otherwise). Sexual harassment occurs when one experiences any type of unwelcome sexual behaviour (words or actions) that creates a hostile work environment. Verbal abuse occurs when another person yells or swears, engages in name calling, or uses other words intended to control or hurt.

**Data collection**

The study involved two phases. Phase 1, the focus of this paper, was to estimate the frequency and consequences of work related violence and identify potential risk factors. Phase 2 used a case-control approach to identify specific risk factors for the assault related outcomes. After approval by the institutional review board, study data collection instruments and methods were pre-tested. Following minor modifications, phase 1 began.

**Contact procedures**

Initially, a packet was sent to the sample of nurses. This packet included a specially designed survey instrument pertinent to work related violence along with a letter inviting participation and providing informed consent, and a postage paid, return envelope. Up to four mailings were sent to maximise the response rate. If no response was received after these mailings, a final packet including a brief, one page survey, cover letter, and postage paid return envelope was sent in an attempt to ascertain only work related violence events and the most pertinent demographics.

**Data collection instruments**

The initial survey established: (1) during which of the previous 12 months, if any, the respondent worked in a nursing position in Minnesota; (2) demographic information such as race, years of experience, year of graduation, level of education (although also in the licensing databases, age and gender were collected); and (3) occurrence and specifics of relevant physical and non-physical work related violence events during the previous 12 months. This survey enabled participants to provide information about each event, including: date(s); descriptions of the perpetrator(s); surrounding circumstances and activities; locations of the event(s); diagnosis(es) or types of injury(ies) and anatomical locations; relevant length of restrictions on activities; lost work time; medical treatment sought or self administered; and other consequences. It also facilitated determination of eligibility of the respondents (that is, practiced in Minnesota...
during the relevant study period), whether the reported violence events met the definition of work related violence, and demographic and exposure information. A comprehensive diagram representing causal relations was used to define variables to be included in the data collection instruments.

**Data analyses**

Analyses began with basic descriptive statistics on the sample and the consequences of reported events, and crude estimates of event rates. Potential response bias was controlled by inversely weighting observed responses by probabilities of response, estimated as a function of characteristics (age, gender, licence type, and home address: metropolitan versus non-metropolitan area) available from the licensing database. The probability of being eligible among the respondents across these same characteristics was used to estimate the unknown eligibility among non-respondents. Validation procedures, reported elsewhere, were conducted for self reported physical assault injury occurrences through review of health care records and for workplace exposures through comparisons between respondent and employer reporting to facilitate assessment of potential bias.

An overall conceptual model for the occurrence of work related violence events was first developed, based on previous knowledge and using the framework of the general epidemiological model—that is, the dynamic interactions of a host, agent(s), and vehicles (or vectors) within the environment; this conceptual model served as the basis for a more detailed causal model that guided instrument development and, when represented as a directed acyclic graph (DAG), study analyses. The ultimate goal of the data analyses was to estimate the causal impact of the above factors on violence, controlling for important confounding factors. Selection of confounders for multiple logistic regression was based on the DAG (fig 1), following the methods described by Greenland and colleagues and Maldonado and Greenland, and illustrated by Hernan and colleagues. For a particular multiple logistic regression, the variables included beyond the exposure of interest and the outcome of violence are the sufficient set of confounders required to block all "backdoor pathways" from the exposure of interest to the outcome. These variables will adjust for potential confounding and, at the same time, avoid bias from variables that are located in the causal pathway between the exposure of interest and the outcome. To include all sources of uncertainty, confidence intervals for annual incidence per person estimates and regression coefficients were calculated by bootstrapping the entire estimation procedure, including weighting for non-response.

**RESULTS**

Table 1 presents characteristics of the comprehensive phase 1 study participants. Among participants, nearly all were women (96%), the average age (SD) was 46 years (10.1), and 75% were RNs. The highest level of nursing education was most commonly a diploma (39%), followed by associate (28%), and bachelor's (26%) degrees. Also shown in table 1, the most frequently reported primary work facilities were: hospital inpatient; nursing home or long term care; and clinics/health care provider offices. Most nurses reported their primary facility was privately owned, compared with ownership by a city/town, county, state, or federal agency. The primary departments in which nurses most often worked were medical/surgical, followed by public health/home care, family practice, and psychiatric/behavioural, operating/recovery, and intensive care. Primarily, nurses worked with non-geriatric adults or geriatric patients. Most nurses reported their primary professional activity as providing patient care.

There were 711 physical assault events reported by 476 nurses who completed full surveys; one, two, three, four, or "ongoing" events were reported, respectively, by 280, 81, 29, 32, and 54 nurses. Adjustment for potential response bias resulted in an assault rate of 13.2 per 100 persons per year, overall (table 2), reflecting a minimal increase from the unadjusted rate. For RNs and LPNs, respectively, the adjusted rates (12.0 and 16.4) differed by a similar amount from the unadjusted. Adjusted rates (95% confidence intervals, CIs) for males and females (not shown) were 19.4 (13.8 to 25.9) and 12.9 (11.9 to 14.0), respectively. Overall, 75% of those who reported physical assault also reported non-physical violence, and among those who reported non-physical violence: the Minnesota Nurses’ Study.

![Figure 1](https://example.com/figure1.png)
The unadjusted rates. Adjusted rates (and 95% CIs) for males 38.5 and 39.7, respectively, again differing only slightly from unadjusted rate. For LPNs and RNs, the adjusted rates were physical violence rate of 38.8 was slightly higher than the event. Also shown in table 2, the adjusted overall non-violence, 25% also reported at least one physical assault event. Also shown in table 2, the adjusted overall non-physical violence, over 7% of nurses reported sexual harassment, 17% reported threats, and nearly 34% reported verbal abuse in the previous 12 months. The time period over which the non-physical violence occurred ranged from identification as a single event (30%) to those involving repetitive/continuous behaviours for greater than nine months or more (36%); at the time of the study, 46% indicated that the behaviour was continuing. In table 3, reporting is based on physical and non-physical violence (threats, sexual harassment, and verbal abuse events). Reported violence could be either a specific event, with a short duration, or it could be an ongoing event, that occurs daily over many days, weeks, or months. It is shown that the majority (over 90%) of physical violence was perpetrated by patients/clients, while perpetrators of non-physical violence were more varied and included patients/clients (67%), as well as doctors, patients' visitors, other employees, and supervisors. The majority of perpetrators associated with physical violence was described as: impaired because of disease/illness (>80%), or prescribed medication (18%); male; and 66 years of age or older. Only 8% were perceived as not impaired. In contrast, perpetrators associated with non-physical violence were less frequently perceived as impaired because of disease/illness (41%) or prescribed medication (12%). They were also primarily male; however, a greater proportion were younger (35–65 years of age) than those associated with physical assault. By location (not shown), the physical assaults identified as specific and ongoing events, respectively by percentages, occurred in: patient rooms (61; 72); hallways (20; 37); reception, lobby, or lounge areas (8; 11); nursing stations (4; 13); procedure or examination rooms (5; 0); bathrooms (2; 20); classroom or meeting rooms, offices, and elevators (each less than 1 for both categories); and other (1; 0). Locations/sources of the behaviours associated with non-physical violence events, by percentages, were face-to-face (90), telephone (16), email/mail (2), and other (3). Anatomically, physical assaults for specific and ongoing events, respectively, by percentages primarily involved were: arm/elbow/wrist (47; 70); hand/finger/thumb (13; 33); face (13; 26); leg (8; 20); head/skull/brain (5; 7); and external chest (6; 2). The resulting types of physical injuries (specific or ongoing events) reported most frequently were bruises/contusions (33; 48); temporary discolorations/slap marks (22; 26); cuts/abrasions, scratches, or abrasions (28; 44); and bites/punctures (5; 20). No overt physical injury was identified for some of the events (19; 11).
Table 3 Characteristics of perpetrators associated with physical and non-physical violence: the Minnesota Nurses' Study

<table>
<thead>
<tr>
<th>Characteristics of perpetrators</th>
<th>Physical (specific event)</th>
<th>Physical (ongoing event)</th>
<th>Non-physical*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Professional relation with perpetrator†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient/client</td>
<td>636</td>
<td>96.8</td>
<td>49</td>
</tr>
<tr>
<td>Supervisor</td>
<td>6</td>
<td>0.9</td>
<td>0</td>
</tr>
<tr>
<td>Other employee</td>
<td>4</td>
<td>0.6</td>
<td>1</td>
</tr>
<tr>
<td>Doctor</td>
<td>3</td>
<td>0.5</td>
<td>0</td>
</tr>
<tr>
<td>Patient's visitor</td>
<td>3</td>
<td>0.5</td>
<td>0</td>
</tr>
<tr>
<td>Subordinate</td>
<td>1</td>
<td>0.2</td>
<td>0</td>
</tr>
<tr>
<td>Other visitor</td>
<td>1</td>
<td>0.2</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Unsure</td>
<td>1</td>
<td>0.2</td>
<td>0</td>
</tr>
<tr>
<td>Missing (refused)</td>
<td>3</td>
<td>0.5</td>
<td>4</td>
</tr>
<tr>
<td>Perceived perpetrator impairment status†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes, any impairment</td>
<td>588</td>
<td>89.5</td>
<td>49</td>
</tr>
<tr>
<td>Yes, disease/illness</td>
<td>525</td>
<td>79.9</td>
<td>47</td>
</tr>
<tr>
<td>Yes, prescribed medication</td>
<td>121</td>
<td>18.4</td>
<td>12</td>
</tr>
<tr>
<td>Yes, drugs/alcohol</td>
<td>56</td>
<td>8.5</td>
<td>4</td>
</tr>
<tr>
<td>Not impaired</td>
<td>56</td>
<td>8.5</td>
<td>4</td>
</tr>
<tr>
<td>Unsure</td>
<td>11</td>
<td>1.7</td>
<td>1</td>
</tr>
<tr>
<td>Missing</td>
<td>3</td>
<td>0.5</td>
<td>4</td>
</tr>
<tr>
<td>Perpetrator gender†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>386</td>
<td>58.8</td>
<td>30</td>
</tr>
<tr>
<td>Female</td>
<td>266</td>
<td>40.5</td>
<td>27</td>
</tr>
<tr>
<td>Unsure</td>
<td>1</td>
<td>0.2</td>
<td>0</td>
</tr>
<tr>
<td>Missing (refused)</td>
<td>7</td>
<td>1.1</td>
<td>5</td>
</tr>
<tr>
<td>Perceived age of perpetrator‡</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;13 years</td>
<td>18</td>
<td>2.7</td>
<td>2</td>
</tr>
<tr>
<td>13–17 years</td>
<td>17</td>
<td>2.6</td>
<td>4</td>
</tr>
<tr>
<td>18–24 years</td>
<td>26</td>
<td>4.0</td>
<td>1</td>
</tr>
<tr>
<td>25–34 years</td>
<td>43</td>
<td>6.5</td>
<td>2</td>
</tr>
<tr>
<td>35–65 years</td>
<td>120</td>
<td>18.3</td>
<td>7</td>
</tr>
<tr>
<td>66 or older</td>
<td>423</td>
<td>64.4</td>
<td>38</td>
</tr>
<tr>
<td>Unsure</td>
<td>7</td>
<td>1.1</td>
<td>1</td>
</tr>
<tr>
<td>Missing</td>
<td>4</td>
<td>0.6</td>
<td>5</td>
</tr>
</tbody>
</table>

*Non-physical violence category combines threats, sexual harassment, and verbal abuse categories.
†Question denotes "check all that apply"; therefore, responses may total >100%.
‡This category is a summary of the next three.

Despite the fact that the events were reported according to the definition of physical assault.

The "instruments" used in the physical assaults (not shown), for specific and ongoing events, respectively by percentages, were hands/arms (87%; 91%); feet/legs (39%; 63%); teeth (15%; 31); body fluids, including spitting (7%; 19); knives (8%; 13); genitals (1%; 2); and other (1%; 1). Body fluids were also reported for both categories.

In Table 4, reporting of consequences is based on physical (specific or ongoing events, respectively) and non-physical violence. It is noted that very small proportions of either the physical events (both specific and ongoing) and non-physical violence were reported to someone (69% and 65%, respectively), for specific and ongoing physical violence reported subsequent consequences (table 4). Although 8% of nurses who were physically assaulted reported persistent problems as a result of the event, nearly 13% who experienced non-physical violence reported persistent problems. While less than 10% of those experiencing physical violence reported subsequent changes in their work status, nearly 22% among those who experienced non-physical violence reported changes, including 6% who quit as a result (table 4).

Only 27% of nurses perceived violence to be a problem in their work environment; 15% were unsure (not shown). However, over 52% perceived violence against nurses to be preventable; 12% indicated it was not preventable, and 34% were unsure. For specific and ongoing physical violence events, 69% and 65%, respectively, were reported to someone either only orally (39% and 31%), only in writing (15% for each), or both orally and in writing (15% and 19%). A similar percentage (71%) who reported non-physical violence was identified: 47%, only orally; 6%, only in writing; and 18% both orally and in writing. Reasons given for not reporting the physical events (both specific and ongoing) and non-physical events included, respectively: (1) considered it part of the job (45% and 44%; (2) considered it a minor or isolated incident (32% and 8%); (3) perceived it as unnecessary to report (14% and 17%); (4) non-supportive environment (5% and 30%); and (5) "too busy" (3% and 2%).

Table 5 presents results of multivariate modelling of several exposures of interest, using directed acyclic graphs that were based on a causal model. Multiple logistic regression analyses identified increased odds ratios, respectively, for both physical and non-physical violence for: working in a nursing home or long term care facility (2.6; 1.5); working in intensive care (1.5; 1.3); psychiatric/behavioural (2.1; 2.8); or emergency (2.5; 3.1) departments; and splitting time equally between patient populations (1.5; 1.3). In addition, odds ratios for working primarily with geriatric patients were increased pertinent to physical assault (2.3) and suggestive for non-physical violence (1.2). Decreased rates for both physical and non-physical violence were identified for working in a combined category of facilities including schools/colleges/universities, independent practice/consulting, insurance/utilisation review, industry; split time, and other (0.4; 0.7), as well as in a clinic/health care provider offices (0.2; 0.6) or public health/home health agencies (0.2; 0.6).

Additional important changes, pertinent to physical violence, included: increases in odds ratios for providing...
patient care (1.9) and supervising patient care (1.8); decreases for working in a hospital or non-hospital outpatient facility (0.4), or in operating/recovery (0.4) or public health/hospital facility (0.5), and working primarily with neonatal/paediatric/adolescent populations (0.6). Other changes for non-physical violence rates, were increases for working primarily in departments involving occupational health and splitting time equally between two departments, or other (1.3).

DISCUSSION
This comprehensive population based effort enabled identification of the magnitude and consequences of and potential risk factors for work related violence among nurses. High rates of both physical (13.2) and non-physical violence (38.8) per 100 persons per year were identified. Due to different study methods, populations studied, and definitions of violence, other studies are not comparable.

Despite lack of direct comparability with other studies, some findings were similar with respect to physical violence. Males were more likely than females to experience violence, which may relate to differences in exposures. As in this study, younger age has been associated with an increased likelihood of incurring an occupational assault.

For both physical and non-physical violence, working in a nursing home/long term care/rehabilitation facility increased risk the greatest in this study, based on multivariate modelling. Consistent with the current findings, working in psychiatric and emergency departments has been identified previously as placing persons at greatest risk of work related violence. However, in this study, increased rates were also identified for working in intensive care departments for both physical and non-physical violence; increased rates for working in occupational health or splitting time equally between two departments, or other (1.3).

Table 4  Consequences and characteristics of physical and non-physical violence: the Minnesota Nurses’ Study

<table>
<thead>
<tr>
<th>Consequences and characteristics of physical and non-physical violence</th>
<th>Physical (specific event)</th>
<th>Physical (ongoing event)</th>
<th>Non-physical violence*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Hospitalised as a result of the event</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>654</td>
<td>99.5</td>
<td>51</td>
</tr>
<tr>
<td>Yes</td>
<td>1</td>
<td>0.2</td>
<td>0</td>
</tr>
<tr>
<td>Missing (refused)</td>
<td>2</td>
<td>0.3</td>
<td>3</td>
</tr>
<tr>
<td>Treatment by any of the following†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self treated</td>
<td>121</td>
<td>18.4</td>
<td>11</td>
</tr>
<tr>
<td>Physician</td>
<td>34</td>
<td>5.2</td>
<td>0</td>
</tr>
<tr>
<td>Chiropractor</td>
<td>7</td>
<td>1.1</td>
<td>2</td>
</tr>
<tr>
<td>Nurse/nurse practitioner/physician assistant</td>
<td>5</td>
<td>0.8</td>
<td>0</td>
</tr>
<tr>
<td>Physical/occupational therapist</td>
<td>5</td>
<td>0.8</td>
<td>0</td>
</tr>
<tr>
<td>Psychiatrist/psychologist/therapist</td>
<td>2</td>
<td>0.3</td>
<td>0</td>
</tr>
<tr>
<td>Dentist</td>
<td>1</td>
<td>0.2</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>0.6</td>
<td>2</td>
</tr>
<tr>
<td>None</td>
<td>490</td>
<td>74.6</td>
<td>38</td>
</tr>
<tr>
<td>Missing (refused)</td>
<td>6</td>
<td>0.9</td>
<td>3</td>
</tr>
<tr>
<td>Symptoms/feelings following assault†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frustration</td>
<td>301</td>
<td>45.8</td>
<td>31</td>
</tr>
<tr>
<td>Anger</td>
<td>215</td>
<td>32.7</td>
<td>18</td>
</tr>
<tr>
<td>Fear/anxiety/stress</td>
<td>149</td>
<td>22.7</td>
<td>18</td>
</tr>
<tr>
<td>Irritability</td>
<td>87</td>
<td>13.2</td>
<td>6</td>
</tr>
<tr>
<td>Fatigue</td>
<td>59</td>
<td>9.0</td>
<td>12</td>
</tr>
<tr>
<td>SAD</td>
<td>47</td>
<td>7.2</td>
<td>6</td>
</tr>
<tr>
<td>Headaches</td>
<td>17</td>
<td>2.6</td>
<td>4</td>
</tr>
<tr>
<td>Difficulty concentrating</td>
<td>17</td>
<td>2.6</td>
<td>2</td>
</tr>
<tr>
<td>Difficulty sleeping</td>
<td>15</td>
<td>2.3</td>
<td>3</td>
</tr>
<tr>
<td>Shame/low self-esteem</td>
<td>14</td>
<td>2.1</td>
<td>1</td>
</tr>
<tr>
<td>Depression</td>
<td>12</td>
<td>1.8</td>
<td>4</td>
</tr>
<tr>
<td>Flashbacks</td>
<td>4</td>
<td>0.6</td>
<td>2</td>
</tr>
<tr>
<td>Nightmares/hallucinations</td>
<td>1</td>
<td>0.2</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>11</td>
<td>1.7</td>
<td>1</td>
</tr>
<tr>
<td>None</td>
<td>222</td>
<td>33.8</td>
<td>13</td>
</tr>
<tr>
<td>Missing (refused)</td>
<td>2</td>
<td>0.3</td>
<td>2</td>
</tr>
<tr>
<td>Persistent problems resulting from the event</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>597</td>
<td>90.9</td>
<td>47</td>
</tr>
<tr>
<td>Yes</td>
<td>56</td>
<td>8.5</td>
<td>4</td>
</tr>
<tr>
<td>Missing (refused)</td>
<td>4</td>
<td>0.6</td>
<td>3</td>
</tr>
<tr>
<td>Work changes as a result of the event†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No changes</td>
<td>592</td>
<td>90.1</td>
<td>50</td>
</tr>
<tr>
<td>Restrictions/modified work</td>
<td>42</td>
<td>6.4</td>
<td>0</td>
</tr>
<tr>
<td>Quit job</td>
<td>7</td>
<td>1.1</td>
<td>1</td>
</tr>
<tr>
<td>Voluntary transfer</td>
<td>7</td>
<td>1.1</td>
<td>1</td>
</tr>
<tr>
<td>Leave of absence</td>
<td>6</td>
<td>0.9</td>
<td>0</td>
</tr>
<tr>
<td>Involuntary transfer</td>
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<td>0.5</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>0.8</td>
<td>0</td>
</tr>
<tr>
<td>Missing (refused)</td>
<td>1</td>
<td>0.2</td>
<td>2</td>
</tr>
</tbody>
</table>

*Non-physical violence category combines threats, sexual harassment, and verbal abuse categories.
†Question denotes “check all that apply”; therefore, responses may total >100%.
Table 5  Multivariate analyses of environmental exposures: the Minnesota Nurses' Study

<table>
<thead>
<tr>
<th>Primary facility</th>
<th>Physical violence</th>
<th>Physical violence weighted</th>
<th>Non-physical violence</th>
<th>Non-physical violence weighted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Odds ratio</td>
<td>95% CI</td>
<td>Odds ratio</td>
<td>95% CI</td>
</tr>
<tr>
<td>Primary facility</td>
<td>Hospital–inpatient</td>
<td>1</td>
<td>–</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Nursing home/lng term care/rehabilitation facility</td>
<td>2.566</td>
<td>2.054 to 3.205*</td>
<td>2.589</td>
</tr>
<tr>
<td></td>
<td>School/college/university, independent practice/consulting, insurance/utilisation review, industry, split time, other</td>
<td>0.365</td>
<td>0.241 to 0.553*</td>
<td>0.370</td>
</tr>
<tr>
<td></td>
<td>Hospital/non-hospital outpatient</td>
<td>0.438</td>
<td>0.266 to 0.723*</td>
<td>0.437</td>
</tr>
<tr>
<td></td>
<td>Clinic/health care provider office</td>
<td>0.155</td>
<td>0.086 to 0.280*</td>
<td>0.155</td>
</tr>
<tr>
<td></td>
<td>Public health/home health agency</td>
<td>0.188</td>
<td>0.099 to 0.360*</td>
<td>0.185</td>
</tr>
<tr>
<td>Primary department</td>
<td>Medical/surgical; obstetrics/gynaecology; procedural diagnostic</td>
<td>1</td>
<td>–</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Intensive care</td>
<td>1.571</td>
<td>1.083 to 2.278*</td>
<td>1.499</td>
</tr>
<tr>
<td></td>
<td>Psychiatric/behavioural</td>
<td>2.072</td>
<td>1.511 to 2.842*</td>
<td>2.063</td>
</tr>
<tr>
<td></td>
<td>Emergency</td>
<td>2.562</td>
<td>1.501 to 4.374*</td>
<td>2.675</td>
</tr>
<tr>
<td></td>
<td>Occupational health, split time, other</td>
<td>0.739</td>
<td>0.521 to 1.048</td>
<td>0.745</td>
</tr>
<tr>
<td></td>
<td>Operating/recovery</td>
<td>0.389</td>
<td>0.210 to 0.721*</td>
<td>0.401</td>
</tr>
<tr>
<td></td>
<td>Public health/home care, school health, education/research</td>
<td>0.457</td>
<td>0.260 to 0.802*</td>
<td>0.465</td>
</tr>
<tr>
<td></td>
<td>Family practice</td>
<td>1.304</td>
<td>0.542 to 3.137</td>
<td>1.415</td>
</tr>
<tr>
<td>Patient population</td>
<td>Adult</td>
<td>1</td>
<td>–</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Geriatric</td>
<td>2.405</td>
<td>1.694 to 3.416*</td>
<td>2.342</td>
</tr>
<tr>
<td></td>
<td>Split time</td>
<td>1.512</td>
<td>1.123 to 2.038*</td>
<td>1.472</td>
</tr>
<tr>
<td></td>
<td>Neonatal/pediatric/adolescent</td>
<td>0.574</td>
<td>0.344 to 0.958*</td>
<td>0.575</td>
</tr>
<tr>
<td>Primary professional activity</td>
<td>All non-direct care: teaching; research; administration; case management; insurance/utilisation review; telephone triage/health information; split time; other</td>
<td>1</td>
<td>–</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Provided patient care</td>
<td>1.823</td>
<td>1.315 to 2.527*</td>
<td>1.849</td>
</tr>
<tr>
<td></td>
<td>Supervised patient care</td>
<td>1.717</td>
<td>1.107 to 2.662*</td>
<td>1.750</td>
</tr>
</tbody>
</table>

*95% CI excludes 1.
†Model includes: participant gender and race.
‡Model includes: type of facility and gender.
§Model includes: type of primary facility; primary department/unit/area; participant race and gender.
∥Model includes: type of primary facility; primary department/unit/area; primary population with which they worked; gender; age; licence type; participant race; participant marital status; years worked as nurse; and years in department.
geriatric populations increased the risk for physical violence and was suggestive for non-physical violence. Cognitive impairment of the perpetrator has been identified previously; however, in the current effort, the proportions of perceived impairment of the perpetrator are much greater for physical than non-physical violence.

Work related violence affects the employee, the employer, others in the work environment, and significant others outside the work setting. Adverse consequences of violence reported in the current study are similar to those reported by others. Occupational violence has been associated with reduced productivity, increased turnover, absenteeism, counselling costs, decreased staff morale, and reduced quality of life. Simonowitz described the consequences of work related violence—physical injury, disability, and other physical effects, such as sleeplessness. Levin and colleagues found that work related violence resulted in short and long term physical, personal, emotional, and professional effects. Changes in job performance and morale, chronic pain, muscle tension, loss of sleep, nightmares, and flashbacks were among those symptoms reported, in addition to physical consequences. Others identified consequences including: family disruption, career change, fear of recurrent assault; anxiety, helplessness, irritability, soreness, sadness, depression, shock, disbelief that the assault occurred, and sympathy for the patient who committed the assault. Even in the absence of injury, some assaulted staff experienced moderate to severe reactions for six months to one year. Caldwell documented that, among 224 clinical mental health staff, 61% experienced symptoms of post-traumatic stress disorder (PTSD), symptoms also identified in the current study. Findorff-Dennis and colleagues found that the consequences of violence appeared to continue long after the event occurred. Through a case study design, it was found that workers’ health and quality of life were affected and resulted in job changes, chronic pain, changes in functional status, and depression four years after the assault.

The consequences of non-physical violence reported in this study deserve particular attention, as these consequences appeared to be more severe than for physical violence. This is not to minimise the problem of physical violence but, rather, to highlight the fact that the effects of non-physical violence must not be neglected. Individuals who experience non-physical violence, and endure feelings/symptoms over time, may be at risk for adverse mental health outcomes such as acute stress disorder or post-traumatic stress syndrome. In particular, the adverse work effects were greater for non-physical violence than for physical assault. This included outcomes of restricted or modified work, quitting, and transferring and obtaining a leave of absence. Attention to the facilities, departments, patient populations, and activities that place these workers at risk is important and requires attention from employers. Moreover, consideration needs to be given to adaptation of prevention strategies to the specific types of violence. Given that physical assaults are perpetrated almost exclusively by patients, the majority of whom are impaired, and 66 years of age or older, suggests that patient care activities for the relevant subgroup of nurses must be investigated closely for specific risk factors and potential interventions (for example, flagging the chart of a violent patient, assigning two care providers, or using appropriate strategies for a combative patient). Conversely, for non-physical violence, while many patients were perpetrators, 33% were not; they were supervisors, physicians, visitors, and other employees. Risk factors and interventions for verbal abuse, threats, and sexual harassment suggest a need for creating a culture of respect in the workplace through relevant strategies. Given the nursing shortage, hospital and health care administrators may want to consider the role that prevention and control of work related violence could play in affecting the quality of working life for nurses. Results from a survey of registered nurses conducted by the American Nurses Association revealed that health and safety concerns played a major role in nurses’ decisions to remain in the profession.

Limitations in the current study include the fact that participants self reported violence and relevant exposures; thus, there were potential biases. Numerous strategies were implemented to minimise these biases. Attempts to minimise recall bias included limiting recall of violent events to the previous 12 months and recall of exposures to a one month period within the preceding year—approaches that have been utilised in previous studies. To further minimise information bias, nurses were followed up by mail to clarify ambiguous or missing information, as necessary. Validation subsudies, relevant to environmental exposures and health care treatment were also conducted to determine potential measurement error. Potential response bias was controlled for by inversely weighting observed responses by probabilities of response estimated as a function of characteristics available from the licensing database. The probability of being eligible among the respondents across these same characteristics was used to estimate the unknown eligibility among non-respondents. To minimise the effect of confounding, selection of confounders for multiple logistic regression was based on directed acyclic graphs. This study is among the first such comprehensive efforts to identify the magnitude of the violence problem and potential risk factors in a major occupational population of nurses. It also serves as the basis for future analytical studies that can enable identification of specific risk factors and serve as the basis for development of appropriate prevention and control efforts.

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