Violence risks in nursing—results from the European 'NEXT' Study

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Background	Recent research suggests that violence in health care is increasing and that it strongly influences the recruitment and retention of nurses as well as sick leave and burnout levels.
Aims	To identify the prevalence of violence in nursing and to provide a basis for appropriate interventions.
Methods	Nurses from 10 European countries answered to a questionnaire and to a follow-up assessment. Stepwise adjusted multiple logistic regression was used to assess the association between frequency of violence, factors related to teamwork and other work-related factors and outcomes, such as burnout, intention to leave nursing and intention to change institution.
Results	A total of 39 894 nurses responded to the baseline questionnaire (51% response rate). After adjustment for age, gender and other risk factors, quality of teamwork appeared to be a major factor with odds ratio (OR) 1.35 (1.24–1.48) for medium quality and 1.52 (1.33–1.74) for low quality. Uncertainty regarding patients' treatments was linked with violence, with a clear gradient (OR 1.59, 1.47–1.72 for medium uncertainty and 2.13, 1.88–2.41 for high uncertainty). Working only night shift was at high risk (OR 2.17, 1.76–2.67). High levels of time pressure and physical load were associated with violence OR 1.45 (1.24–1.69) and 1.84 (1.66–2.04), respectively. High and medium frequency of violence was associated with higher levels of burnout, intent to leave nursing and intent to change institution. A 1-year follow-up assessment indicated stability in the relationships between outcomes.
Conclusion	This study supports efforts aimed at improving teamwork-related factors as they are associated with a decrease in violence against nurses.
Key words	Burnout; Europe; health care workers; social support; teamwork; turnover; violence.

Introduction

Recent research suggests that violence in the health care setting is increasing [1–3] and that it strongly influences the recruitment and retention of nurses [4–5] as well as

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sick leave and burnout levels [6]. Workplace violence takes many forms, such as verbal abuse, aggression, harassment, bullying, physical violence, and it may include various types of perpetrators.

Gerberich *et al.* [7] identified that unqualified nurses were more at risk of violence occurring than registered nurses, especially in psychiatry [8–9], geriatrics [10] and intensive care units. Emotional reactions following violence include antipathy against the perpetrator, insult and fear [2].

Although many studies indicate that the development of nurse–patient relationships and working in a supportive team may be protective factors [9,11–12], strong support for this hypothesis is still lacking. The current study therefore aimed: (i) to investigate the prevalence of violence from patients/relatives in different clinical areas, (ii) to test the influence of teamwork characteristics upon violence, (iii) to examine the relationship between violence and burnout and intent to leave nursing and intent

to change employer and (iv) to examine changes in levels of violence over time. We hypothesized that relatively high levels of violence would be present in psychiatric settings, geriatric settings and emergency units (Hypothesis 1). Moreover, we hypothesized that a lack of high-quality teamwork would be associated with a higher level of violence (Hypothesis 2), and that exposure to violence would subsequently be associated with higher levels of burnout, intent to leave the nursing profession and intent to change employer (Hypothesis 3).

Methods

The NEXT Study [13] was conducted in 10 European countries at baseline (Belgium, Germany, Finland, France, Italy, the Netherlands, Norway, Poland, Slovakia and the UK) and in 8 countries at follow-up. In each country, a stratified sampling procedure was conducted with the aim of reflecting the national distribution of nursing staff by type of workplace, geographical spread and funding (public or private). In most countries, the questionnaires were distributed via the organization's internal mailing system to staff. All questionnaires were coded so that the researchers could match the respondents across measurements at the two time points. An introductory letter explaining that all data would be treated anonymously was included (see [13] for further information on NEXT Study).

The first (baseline) assessment was carried out in each country between October 2002 and June 2003 and the follow-up assessment was conducted 1 year later.

Age was classified into three groups: <30 years, 30–44 years, ≥45 years, with the youngest category being the reference group. Nursing grade was classified into registered nurses, head nurses and other highly qualified nurses, specialist nurses and nursing aids and other less-qualified health care workers. Registered nurses were used as the reference group. Time pressure was measured using a four-item scale [14]. Example item: 'How often do you lack time to complete all your work tasks?' Scores from 1 through 2.4 were considered as low, from 2.5 through 3.5 as medium and from 3.6 through 5 as high. Uncertainty concerning patients' treatment was measured by means of a five-item scale [15]. Example item: 'not knowing what a patient or a patient's family ought to be told about the patient's medical condition and its treatment'. A four-point rating scale was used: 'never' to 'very frequently'. Scores from 1 through 2 were considered as low, from 2.01 through 2.99 as medium and from 3 through 5 as high. Quality of teamwork was measured using some items from the Copenhagen Psychosocial Questionnaire [14] and some items created by the NEXT Study group. Two scales were constructed: satisfaction with teamwork and quality of information sharing. Satisfaction with teamwork was measured with four items. Example item: 'How pleased are you with psychological support at your workplace?' A four-point rating scale was used ranging from 'very unsatisfied' to 'highly satisfied'. Quality of information sharing was measured by means of three items. Example item: 'How often do you receive information, which is relevant to your work, insufficiently or too late?' A five-point rating scale was used: 'never', 'less than once per week', 'about 1 to 5 times per week', 'about 1 to 5 times per day' and 'constantly'. The scale reliability was 0.70. We also included one additional item: 'In your department, are there opportunities to discuss professional matters which you think are important?' with the following answering categories: 'no', 'yes, briefly' and 'yes, in detail'. Scores from 3.6 through 5 were considered as low, from 2.6 through 3.59 as medium and from 1 through 2.59 as high. Depending upon the aim of the analyses, we used either the aggregated scale or the separate categories. Physical load was measured with a three-item scale. Example item: 'lifting patients in bed without aid', with four answering categories: '0–1 time a day' to 'more than 10 times a day'. Moreover, we included an additional item: 'How long on an average day are you in a standing posture?' with four answering categories: 'less than 2 hours' to '6 hours or more'. Scores from 1 through 2 were considered as low, from 2.1 through 2.99 as medium and from 3 through 4 as high. Harassment by superiors was measured with one item: 'At your work place, are you subjected to harassment by your superiors?' A five-point rating scale has been used: 'never' to 'daily'. This variable was dichotomized with a split between 'very seldom' and 'monthly'. Interruption was measured with one item: 'I have many interruptions and disturbances in my job'. The answering categories were 'yes' and 'no'. Satisfaction with staff handovers was measured with one item: 'Are you satisfied with staff handovers when shifts change?' The answering categories were 'yes' and 'no'. Working week duration was operationalized as 'average number of work hours per week according to work contract'. This variable was dichotomized with a split between 'less than 35 hours per week' and '≥35 hours'. Work schedules were categorized into five groups: 'day work at regular hours', 'irregular day work', 'only night shifts', 'shift work without night shifts' and 'shift work with nights'. 'Day work at regular hours' was used as the reference group.

Violence from patients/relatives was measured with one item: 'At your work place, are you subjected to violence from patients or their relatives?' A five-point rating scale was used ranging from never, very seldom, monthly, weekly to daily. This variable was dichotomized ('never or very seldom' versus 'monthly or more' called 'frequent') in order to preserve consistency with commonly used self-ratings for violence. Confrontation with aggressive patients was measured with one item: 'In your work, how often are you confronted with aggressive

patients?' A five-point rating scale was used: never, seldom, sometimes, often to always. This variable was dichotomized as well into 'sometimes' versus 'often'. Intention to leave nursing was measured with one item: 'How often do you think of leaving the nursing profession?' A five-point rating scale was used: never, sometimes/year, sometimes/month, sometimes/week and every day. The dichotomized categories comprised of 'sometimes/year' versus 'sometimes/month'. Intention to change employer was measured by asking the participants if they had thought about it during the past year. The variable comprised different types of movements, such as going to work in a different institution or in a free practice. A five-point rating scale (identical to the one for intention to leave nursing) was used. Burnout was measured using the six items of the Copenhagen Burnout Inventory [16]. The answering categories ranged from 'never/almost never' to '(almost) every day'. This variable was dichotomized with a split between 2.99 and 3.00.

For all the above questions, Cronbach's alpha score for all the scales was between 0.63 and 0.90.

Chi-square tests were used for the analysis of the cross-sectional baseline measurement data. Teamwork characteristics, frequency of violence and several outcome indicators were compared across factors such as country, nursing grade, clinical area where the nurse was employed, etc. For the prediction of violence rates at baseline, multivariate analyses, adjusted for gender and age, was performed. Estimated odds ratios (ORs) with a 95% confidence interval (CI) were computed, and all predictor variables whose P values were <0.05 were included in the multivariate logistic regression model. A similar procedure was used in order to test the association between exposure to violent events, on the one hand, and intention to leave nursing, intention to leave the employer and burnout, on the other hand. SPSS 13.0 was used to perform the analysis.

Results

The baseline questionnaire was sent to 77 681 nurses, of whom 39 898 (51%). In total, 13 820 (41%) nurses participated in both measurements giving a follow-up response rate of 41% (NB Norway and the UK did not participate in the follow-up phase of the study). Non-completers at follow-up included both non-respondents and nurses who had left the health care institution during the 1-year follow-up. This left 13 537 questionnaires which were used for the study to compare the nurses' declarations as regards violence, its predictors and its outcomes at baseline and follow-up.

Twenty-two per cent of nurses reported suffering from frequent violent episodes from patients and relatives (Table 1). Table 1 depicts the prevalence of

Table 1. Sample sizes, mean age and gender distribution by country

	Sample size		Occupational position and qualification				Age		Gender	Frequent violent events from patients/relatives, n (%)
	Questionnaires sent out (n)	Total response, n (%)	HN, n (%)	SN, n (%)	RN, n (%)	NA, n (%)	Mean age	SD age	Male, n (%)	
Belgium	7049	4257 (60)	426 (10)	724 (17)	2639 (62)	468 (11)	38.30	9.24	383 (9)	979 (23)
Germany	6484	3565 (55)	749 (21)	428 (12)	2068 (58)	321 (9)	39.24	9.37	606 (17)	998 (28)
Finland	5161	3970 (77)	1628 (41)	1231 (31)	873 (22)	199 (5)	43.90	9.87	199 (5)	794 (20)
France	13 017	5376 (41)	645 (12)	269 (5)	2419 (45)	2043 (38)	40.12	9.52	591 (11)	2097 (39)
UK	7962	2578 (32)	825 (32)	619 (24)	825 (32)	309 (12)	40.45	10.16	180 (7)	748 (29)
Italy	7447	5645 (76)	508 (9)	508 (9)	4629 (82)	0 (0)	39.14	7.95	1468 (26)	1129 (20)
the Netherlands	9309	2733 (29)	273 (10)	0 (0)	1886 (69)	574 (21)	41.58	10.82	219 (8)	273 (10)
Norway	na	4024	0 (0)	1046 (26)	2535 (63)	443 (11)	39.20	9.73	362 (9)	362 (9)
Poland	7091	4354 (61)	435 (10)	0 (0)	3875 (89)	0 (0)	39.72	7.63	44 (1)	827 (19)
Slovakia	6382	3396 (53)	917 (27)	204 (6)	2173 (64)	136 (4)	39.58	8.89	68 (2)	577 (17)
Total	77 681	39 898 (51)	6335	4933	23 584	4488	40.01	9.33	4065 (10)	8778 (22)

HN, head nurses or other highly qualified health care workers; SN, specialized nurses; RN, registered nurses; NA, nursing aids or less-qualified health care workers; na, not available.

violence according to country and shows that nurses in Belgium, France, Germany and the UK reported the highest rates.

Table 2 (available as Supplementary data at *Occupational Medicine* Online) shows that violent episodes were significantly ($P < 0.001$) more prevalent in psychiatric

settings, geriatric settings and emergency departments. Table 2 also indicates that specialist nurses were more numerous in intensive care/operating rooms and in paediatrics/gynaecology/obstetrics. These are settings with a relatively low prevalence of violence. Moreover, in our dataset, nursing aids comprised 30% of the sample in

Table 3. Multivariate analysis showing relationships between workplace factors and reporting of frequent violent episodes

		Total response, n ($N = 39\ 898$)	% declaring frequent violent episodes, n (%)	Multivariate analysis adjusted ORs ($N = 20\ 374$)	95% CIs
Gender	Female	32 159	6753 (21)	1.00	
	Male	3739	1084 (29)	1.13*	1.02–1.26
Age (years)	<30	6604	1915 (29)	1.00	
	30–44	20 182	4642 (23)	0.82***	0.76–0.90
	≥45	9112	1731 (19)	0.70***	0.63–0.78
Occupational level	Registered nurses	3672	808 (22)	1.00	
	Head nurses and other highly qualified	4812	1059 (22)	1.11ns	0.97–1.28
	Specialized nurses	20 998	3780 (18)	1.02ns	0.91–1.13
	Nursing aids or less quality	379	102 (27)	1.46*	1.29–1.65
Uncertainty regarding treatment	Low	19 825	3370 (17)	1.00	
	Medium	9686	3100 (32)	1.59***	1.47–1.72
	High	2132	959 (45)	2.13***	1.88–2.41
Quality of teamwork	High	12 274	1596 (13)	1.00	
	Medium	15 896	4292 (27)	1.35***	1.24–1.48
	Low	3104	1211 (39)	1.52***	1.33–1.74
Harassment by superiors	Seldom	32 717	6871 (21)	1.00	
	Monthly or more	3006	1263 (42)	1.84***	1.65–2.05
Time pressure score	Low	3953	593 (15)	1.00	
	Medium	18 509	3332 (18)	1.20*	1.04–1.39
	High	13 094	3928 (30)	1.45***	1.24–1.69
Satisfied with handover shift	Yes	19 623	3728 (19)	1.00	
	No	11 813	3780 (32)	1.37***	1.27–1.47
Frequent interruptions	No	10 683	1282 (12)	1.00	
	Yes	22 363	6262 (28)	1.79***	1.63–1.96
Physical load	Low	10 781	1833 (17)	1.00	
	Medium	10 921	2293 (21)	1.13*	1.02–1.25
	High	10 207	3675 (36)	1.84***	1.66–2.04
Work week duration (h)	<35	9676	1548 (16)	1.00	
	≥35	24 005	6001 (25)	1.34***	1.23–1.46
Work schedules	Day work regular hours	5362	643 (12)	1.00	
	Day work others	4602	690 (15)	1.29*	1.09–1.53
	Only night shift	1319	435 (33)	2.17***	1.76–2.67
	Shift work without nights	6358	1717 (27)	1.67***	1.43–1.95
	Shift work with nights	1517	379 (25)	1.38***	1.19–1.61
Department	Day, home care and outpatient	3191	383 (12)	1.00	
	Paediatrics/gynaecology/ obstetrics	6008	1142 (19)	0.98ns	0.80–1.20
	Intensive care and operating rooms	635	121 (19)	1.02ns	0.84–1.24
	Emergency departments	1621	584 (36)	2.66***	2.14–3.32
	Medico-surgical units	6118	1530 (25)	1.03ns	0.85–1.25
	Geriatrics and long stay	4602	1243 (27)	1.53***	1.26–1.88
	Psychiatrics	1745	838 (48)	6.74***	5.37–8.45
	Other	5939	1010 (17)	0.95ns	0.78–1.17

*$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.

areas with a high prevalence of violence, i.e. geriatrics, long-term care and nursing homes.

After controlling for only age and gender, quality of teamwork was strongly related to violence (OR 2.37, 95% CI 2.22–2.52 for medium quality and OR 4.13, 95% CI 3.38–4.52 for low quality). For uncertainty regarding treatment, high ORs were also seen (OR 2.19, 2.07–2.31 for medium and 3.37, 3.42–4.12 for high uncertainty).

Multivariate logistic regression analyses (Table 3) showed that male nurses, younger nurses and nursing aides were more at risk for violence compared to female nurses, older nurses and registered nurses. In line with our assumption, psychiatric, geriatric and emergency units appeared to indeed have a higher risk for frequent

violent episodes. Working part-time was associated with less-violent incidents, while working night shifts and shift work was significantly associated with more violent incidents. Quality of teamwork appeared to be a major factor with OR 1.35 (1.24–1.48) for medium quality and 1.52 (1.33–1.74) for low quality. Uncertainty regarding patients' treatments was also linked with violence, with a clear gradient (OR 1.59, 1.47–1.72 for medium uncertainty and 2.13, 1.88–2.41 for high uncertainty). Dissatisfaction with shift handovers and frequent interruptions were associated with ORs of 1.37 (1.27–1.47) and 1.79 (1.63–1.96), respectively. Time pressure and physical load also exhibited a gradient in their association with violence with ratios of 1.20 (1.04–1.39) for medium and 1.45 (1.24–1.69) for high and 1.13 (1.02–1.25) for

Table 4. Multivariate analysis showing relationship between workplace factors and work setting in nurses who report frequent violent episodes

		Emergency departments (N = 503/1102)		Geriatrics and long stay (N = 766/2505)		Psychiatrics (N = 521/942)	
		Adjusted OR	95% CI	Adjusted OR	95% CI	Adjusted OR	95% CI
Gender	Female	1.00		1.00		1.00	
	Male	1.57**	1.11–2.22	0.75ns	0.53–1.06	1.23ns	0.86–1.75
Age (years)	<30	1.00		1.00		1.00	
	30–44	1.09ns	0.79–1.50	1.05ns	0.82–1.34	0.68ns	0.46–1.00
	≥45	0.57*	0.37–0.88	0.82ns	0.62–1.10	0.71ns	0.45–1.10
Occupational level	Registered nurses	1.00		1.00		1.00	
	Head nurses and other highly qualified	0.87ns	0.49–1.55	0.90ns	0.63–1.28	0.66ns	0.40–1.07
	Specialized nurses	0.94ns	0.64–1.39	0.70ns	0.47–1.06	0.60*	0.37–0.97
	Nursing aids or less qualified	1.28ns	0.75–2.17	1.34*	1.06–1.69	0.70ns	0.42–1.17
Uncertainty regarding treatments[a]	Low	1.00		1.00		1.00	
	Medium or high	0.80ns	0.61–1.05	2.08***	1.70–2.53	2.65***	1.93–3.63
Quality of Teamwork	High	1.00		1.00		1.00	
	Low or medium	1.98***	1.44–2.72	1.63***	1.29–2.05	1.29ns	0.88–1.89
Harassment by superiors	Seldom	1.00		1.00		1.00	
	Monthly or more	1.41ns	0.84–2.35	2.59***	1.94–3.47	2.01*	1.07–3.79
Time pressure score	Low	1.00		1.00		1.00	
	Medium or high	1.24ns	0.94–1.62	1.17ns	0.95–1.43	0.92ns	0.60–1.40
Satisfied/handover shift	Yes	1.00		1.00		1.00	
	No	1.71***	1.31–2.24	1.30**	1.07–1.59	1.56**	1.15–2.11
Frequent interruptions	No	1.00		1.00		1.00	
	Yes	1.86**	1.26–2.75	1.69***	1.34–2.13	1.99***	1.42–2.77
Physical load score	Low	1.00		1.00		1.00	
	Medium or high	1.76**	1.22–2.55	1.73***	1.33–2.25	0.85ns	0.61–1.17
Work week duration (h)	<35	1.00		1.00		1.00	
	≥35	1.29ns	0.96–1.74	1.48***	1.19–1.84	1.14ns	0.78–1.66
Work schedules	Day work regular hours	1.00		1.00		1.00	
	Day work others	2.82*	1.21–6.59	1.01ns	0.64–1.59	1.58ns	0.85–2.93
	Only night shift	1.58ns	0.66–3.81	1.35ns	0.80–2.29	3.40***	1.70–6.80
	Shift work without nights	1.19ns	0.55–2.60	1.49*	1.01–2.20	2.09**	1.27–3.43
	Shift work with nights	1.15ns	0.54–2.43	1.02ns	0.69–1.51	2.15**	1.33–3.46

[a]Quality of teamwork, uncertainty regarding treatment, time pressure and physical load have been dichotomized due to the smaller sample in the analysis by department.

*P < 0.05, **P < 0.01, ***P < 0.001.

medium and 1.84 (1.66–2.04) for high, respectively. Those who reported a higher amount of harassment from superiors also reported more violent events (OR 1.84, 1.65–2.05).

Table 4 depicts the outcomes of a similar logistic regression analysis for the three 'highest risk' clinical areas. The results show a strong relationship between certain predictor variables and violence. Uncertainty regarding treatment was significantly associated with reporting of violent incidents in geriatrics and psychiatrics (OR 2.08, 1.70–2.53 and 2.65, 1.93–3.63, respectively) and quality of teamwork in emergency units and geriatrics (OR 1.98, 1.44–2.72 and 1.63, 1.29–2.05, respectively).

After controlling for only age and gender, violence appears to be strongly related to an intention to leave nursing (OR 1.82, 1.70–1.94), intent to change institution (OR 1.83, 1.73–1.94) and burnout (OR 2.39, 2.27–2.54).

In multivariate analysis (Table 5), violence from patients/relatives was a moderate risk factor for intention to leave nursing. Each of the teamwork variables was also significantly linked with intention to leave nursing except for satisfaction with shift handover. The highest ORs were for 'moderate' and 'low' quality of teamwork,

Table 5. Multivariate analysis of associations between work factors and burnout, intent to leave nursing (ITL) and intent to change employer (ITC)

		Burnout (N = 5800/20 338)		ITL (N = 2716/19 190)		ITC (N = 5094/20 515)	
		Adjusted OR	95% CI	Adjusted OR	95% CI	Adjusted OR	95% CI
Gender	Female	1.00		1.00		1.00	
	Male	0.44***	0.39–0.49	1.26***	1.11–1.42	1.41***	1.27–1.55
Age (years)	<30	1.00		1.00		1.00	
	30–44	1.09*	1.00–1.19	0.94ns	0.84–1.04	0.59***	0.55–0.64
	≥45	1.04ns	0.93–1.16	0.68***	0.59–0.78	0.32***	0.28–0.36
Occupational level	Registered nurses	1.00		1.00		1.00	
	Head nurses and other highly qualified	0.95ns	0.84–1.08	0.95ns	0.80–1.13	0.70***	0.60–0.81
	Specialist nurses	0.83***	0.74–0.92	1.28***	1.13–1.45	0.97ns	0.87–1.07
	Nursing aids or less qualified	1.56***	1.39–1.75	0.88ns	0.74–1.04	1.02ns	0.90–1.15
Violence from patients or relatives	Seldom	1.00		1.00		1.00	
	Monthly	1.38***	1.26–1.52	1.09ns	0.96–1.22	1.16**	1.06–1.28
	Weekly+	1.90***	1.72–2.11	1.32***	1.17–1.50	1.18**	1.06–1.31
Uncertainty regarding treatments	Low	1.00		1.00		1.00	
	Medium	1.34***	1.24–1.44	1.11*	1.01–1.22	1.19***	1.10–1.28
	High	1.64***	1.45–1.86	1.42***	1.23–1.64	1.34***	1.18–1.52
Quality of teamwork score	High	1.00		1.00		1.00	
	Medium	2.03***	1.86–2.22	3.11***	2.73–3.55	2.29***	2.09–2.50
	Low	3.74***	3.28–4.25	7.38***	6.24–8.72	5.23***	4.58–5.96
Harassment by superiors	Seldom	1.00		1.00		1.00	
	Monthly or more	1.52***	1.36–1.70	1.51***	1.33–1.71	1.36***	1.22–1.52
Satisfied handover shift	Yes	1.00		1.00		1.00	
	No	1.08*	1.01–1.16	0.98ns	0.89–1.07	1.29***	1.20–1.39
Frequent interruptions	No	1.00		1.00		1.00	
	Yes	1.20***	1.11–1.31	1.17**	1.05–1.31	1.16***	1.06–1.26
Work week duration (h)	<35	1.00		1.00		1.00	
	≥35	1.76***	1.62–1.92	0.90*	0.81–1.00	1.13**	1.04–1.23
Time pressure score	Low	1.00		1.00		1.00	
	Medium	1.49***	1.28–1.72	0.90ns	0.75–1.07	0.85*	0.74–0.96
	High	2.24***	1.92–2.61	1.19ns	0.99–1.44	0.98ns	0.85–1.13
Work schedules	Day work regular hours	1.00		1.00		1.00	
	Day work others	0.99ns	0.85–1.14	0.77**	0.63–0.94	0.79**	0.67–0.92
	Only night shift	1.39***	1.15–1.68	0.96ns	0.75–1.23	1.10ns	0.90–1.34
	Shift work without nights	1.02ns	0.89–1.17	0.76**	0.64–0.91	0.93ns	0.81–1.07
	Shift work with nights	0.66***	0.58–0.75	0.73***	0.62–0.85	0.79***	0.69–0.90
Physical load	Low	1.00		1.00		1.00	
	Medium	1.20***	1.09–1.32	0.92ns	0.82–1.04	1.08ns	0.98–1.18
	High	1.40***	1.27–1.54	1.03ns	0.91–1.17	1.04ns	0.94–1.15

*$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.

harassment by superiors and high uncertainty concerning patients' treatment. Being a specialist nurse, male and younger than 45 years were factors associated with higher ORs for intention to leave.

For intention to change employer, the outcomes were very similar to the ones for intention to leave the profession. Violence from patients/relatives was significantly related to intention to change employer. Again, the teamwork variables were significantly linked with intention to change employer, with the strongest intention linked to 'moderate' and 'low' quality of teamwork, harassment by superiors, and uncertainty concerning patients' treatment. Being a head nurse, being female and being older were found to be significantly associated with less intent to change institution. Violence also appeared to be an important risk factor for burnout, with an OR gradient from 'monthly' (OR 1.38, 1.26–1.52) to 'weekly violence' (OR 1.90, 1.72–2.11). Each of the teamwork variables was significantly linked with burnout, especially a lack of quality of teamwork, harassment by superiors and uncertainty regarding treatments. Being a nursing aid was a risk factor, as well as working full-time and in fixed night shifts. The second major risk factor for burnout was time pressure, with a gradient from 'medium' to 'high time pressure'. Males reported lower burnout than females.

The results from the follow-up assessment (Table 6) (available as Supplementary data at *Occupational Medicine* Online) show that 1814 (60%) of the nurses who reported in the baseline measurement that they were 'seldom' confronted with aggressive patients were of the same opinion 1 year later, while 967 (32%) shifted up to the 'sometimes' and 242 (8%) to the 'often' categories, respectively; 3330 (60%) nurses who reported 'sometimes' at the baseline assessment gave the same answer in the follow-up measurement, while 1055 (19%) shifted up to the 'often' category (more so in psychiatrics and geriatrics). Finally, 2892 (63%) of the nurses who reported 'often' at baseline gave the same answer 1 year later, while only 275 (6%) shifted down to the 'seldom' category (more often in home and day care).

In total, 386 (51%) of the nurses who reported low quality of teamwork at baseline were often confronted with aggressive patients 1 year later. Also, a high number of nurses reporting low quality of teamwork at baseline reported low satisfaction with teamwork in the follow-up measurement. Only one group, nurses who changed wards between the two assessments at their own request, had some members who reported an increase in satisfaction with teamwork from baseline to follow-up.

higher prevalence of violence in psychiatric, geriatric and emergency units. Factors associated with high reporting of violent events were quality of teamwork, uncertainty regarding patients treatments, young age, being a nursing aide, night work and high time pressures. Nurses who reported exposure to violence had higher levels of burnout and reported more intentions to either leave nursing or change employer.

The present study has some limitations. Firstly, all data have been collected using questionnaires opening up the possibility of response and reporting bias. Another point of concern is the so-called 'common method bias' [17–18] (oversimplifications of the true state of affairs).

Alexander and Fraser [1] suggested that management strategies addressing occupational violence need to adopt a comprehensive and multidisciplinary approach. Team support, a fixed allocation of nurses to patients, and a decrease in job demands are well-known methods to improve quality of care and could lead to reductions in violence in long-term care [19–21]. The cyclical model by Whittington and Wykes [22] suggests that stress induced by exposure to violence leads to an adoption of behaviors that in turn increase the likelihood of a reoccurrence of violence. Stultz [23] demonstrated how a highly trained, multidisciplinary health care team can defuse emergency room confrontations. We would suggest that the issues highlighted in our study need to be addressed in nursing orientation programs and in undergraduate curricula. Staff should be protected by a sound trust policy and incidents should be carefully monitored. Workplace violence is one of the most complex and dangerous occupational hazards facing nurses [24]. As its effects are varied, including increased sick leave, security costs, litigation, workers' compensation and recruitment and retention issues, it is important to address both its psychological and organizational costs. We would urge employers to implement high-quality intervention programs aimed at combating violence [25,26], and to carefully evaluate their value.

Key points

- Of the nurses, 22% reported exposure to frequent violent events from patients or relatives.
- Highest prevalences of violence were reported in psychiatric, geriatric and emergency units.
- Nurses who reported exposure to violence had higher levels of burnout and reported more intentions to either leave nursing or change employer.

Discussion

We found that 22% of nurses reported exposure to frequent violent events from patients or relatives, with

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Conflicts of interest

None declared.

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