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Incidence and risk factors of workplace violence on psychiatric staff

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Abstract

BACKGROUND—A study by Hesketh et al. found that 20% of psychiatric nurses were physically assaulted, 43% were threatened with physical assault, and 55% were verbally assaulted at least once during the equivalent of a single work week. From 2005 through 2009, the U.S. Department of Justice reported that mental health occupations had the second highest average annual rate of workplace violence, 21 violent crimes per 1,000 employed persons aged 16 or older.

OBJECTIVE—An evaluation of risk factors associated with patient aggression towards nursing staff at eight locked psychiatric units.

PARTICIPANTS—Two-hundred eighty-four nurses in eight acute locked psychiatric units of the Veterans Health Administration throughout the United States between September 2007 and September 2010.

METHODS—Rates were calculated by dividing the number of incidents by the total number of hours worked by all nurses, then multiplying by 40 (units of incidents per nurse per 40-hour work week). Risk factors associated with these rates were analyzed using generalized estimating equations with a Poisson model.

RESULTS—Combining the data across all hospitals and weeks, the overall rate was 0.60 for verbal aggression incidents and 0.19 for physical aggression, per nurse per week. For physical incidents, the evening shift (3 pm – 11 pm) demonstrated a significantly higher rate of aggression than the day shift (7 am – 3 pm). Weeks that had a case-mix with a higher percentage of patients with personality disorders were significantly associated with a higher risk of verbal and physical aggression.

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Disclaimer

The findings and conclusions in this report are those of the author(s) and do not necessarily represent the views of the National Institute for Occupational Safety and Health.

CONCLUSION—Healthcare workers in psychiatric settings are at high risk for aggression from patients.

Keywords

Aggression; nursing; training

1. Background

Data from several sources indicate that workers on psychiatric wards are at an increased risk for experiencing workplace violence [1,2]. A study by Hesketh et al. [3] found that 20% of psychiatric nurses were physically assaulted, 43% were threatened with physical assault, and 55% were verbally assaulted at least once during the equivalent of a single work week. From 2005 through 2009, the U.S. Department of Justice reported that mental health occupations had the second highest average annual rate of workplace violence, 21 violent crimes per 1,000 employed persons aged 16 or older [4]. Only law enforcement with a rate of 48 workplace violence incidents per 1,000 employed persons had a higher rate [4].

In an effort to prevent workplace violence in psychiatric wards, Lanza et al. [5,6] designed a protocol using the Delphi Approach [7] for a Violence Prevention Community Meeting (VPCM) that used community meetings as a form of intervention familiar to staff and patients on most psychiatric units. Its efficacy was then assessed in a pre-treatment/treatment/post-treatment design using a single treatment sample. There was a 30% reduction in violence from Pre-test to Treatment and a 50% reduction in violence from Pre-test to Post-test for the day shift [8]. On the basis of this pilot, a nationwide study to assess VPCM as an effective intervention to reduce workplace violence was undertaken and is to be published. An evaluation of risk factors associated with patient aggression towards nursing staff was a component of this study and the focus of this manuscript.

The majority of studies cited in the literature have focused on risk factors associated with these incidents from the perspective of staff and perpetrator demographics [9–11]. Steinert [9] reported that a history of violent episodes was the strongest predictor lessening the role of gender, age, diagnosis, and alcohol abuse. Flannery [10] contended that a diagnosis of psychosis and a history of violent episodes and drug misuse are major risk factors. Woods and Ashley [11] concluded that demographic variables alone are inconsistent and less reliable than clinical diagnoses (schizophrenia, mania and some organic syndromes) as predictors of violent episodes.

Few studies [12–14] have examined the correlation of violence with diagnostic category. From these limited studies, aggressive patients are more likely to have a diagnosis of schizophrenia or personality disorder. Tardiff [12] found that of all psychological disorder diagnoses, the paranoid schizophrenia diagnosis was most frequently associated with aggressive behavior. Other studies indicate that aggressiveness is commonly associated with anti-social personality disorders (manipulative, exploitive) [13,14]. This study presents a risk factor analysis from the perspective of overall, verbal, and physical aggression incidents associated with demographic data of healthcare professionals and perpetrators, as well as diagnostic information for perpetrators. The following hypotheses will be addressed: the

association between demographics of the nurses prior to enrollment and verbal and physical aggression (against persons and against property) within the last 30 days, the association between training characteristics and verbal and physical aggression, and the association between risk factors and incident rates.

2. Methods

2.1. Units

The National Institute for Occupational Safety and Health (NIOSH) collaborated with the Veterans' Health Administration (VHA) to evaluate the effectiveness of the Violence Prevention Community Meeting (VPCM) and to evaluate the risk factors associated with patient aggression towards nursing staff in eight acute locked psychiatric units of VHA throughout the United States. A recruitment email went to all VHA acute locked psychiatric units. The first unit was enrolled in September 2007 and the last unit completed data collection September 2010. Institutional Review Board approval was obtained from NIOSH and at each of the five intervention and three control VHA sites.

2.2. Hospital records

Hospital records were collected on both patient and nurse staffing characteristics to assess workplace violence risk factors. Hospital records were collected weekly during the course of the study on number and percentage of patients diagnosed as having a substance abuse issue, post-traumatic stress disorder (PTSD), personality disorder, schizophrenia, bipolar, depression, cognitive, or other form of psychosis. Other potential risk factors evaluated were sex, age group, and ethnic origin. Data were not collected on the actual aggressor.

2.3. Survey

Prior to the enrollment of each hospital in the study, all nurses ($n = 284$) in this study population completed a survey describing the nurse's demographics, training history in violence prevention, and experience of workplace aggression directed towards them in the previous 30 days. Each nurse employed at the start of the study and newly hired during the study completed the self-administered survey form. To ensure anonymity, no personal identifiers were recorded.

2.4. Daily incident forms

Once the study began in each hospital, daily incident forms were completed by nursing staff for each aggressive incident to capture relevant information such as the quantity, type and severity, preceding circumstances, target, emotional reaction, and shift. A weekly participation rate of nursing staff was calculated to ensure 80% or better for each site. The daily incident forms were batched and sent to NIOSH on a weekly basis. Due to confidentiality restrictions, no information regarding which nurse experienced the aggression or which patient initiated the aggression was collected on the daily incident forms.

For purposes of this study, aggressive behaviors in the units were assessed using the Modified Overt Aggression Scale (MOAS) [15]. The MOAS is a standardized behavioral

checklist that rates aggression in three main categories, representing violent behavior on a severity scale from 0 to 5 (verbal aggression, physical aggression against persons, and physical aggression against property). The coefficient of concordance, $W = 0.68$ supports the internal reliability of the MOAS [15]. Verbal aggression was defined as statements that seek to inflict psychological harm on another through devaluation, degradation, or threats of physical attack. Physical aggression against a person was defined as actions attempting to inflict pain, bodily harm, or death upon another. Physical aggression against property was defined as deliberate attack on, damage to, or destruction of unit property or possessions of self or others. Each category consists of four factors ranging in severity from least to most severe. For verbal aggression, the severity scale was 0 = none; 1 = curses mildly, makes insulting remarks, shouts angrily; 2 = curses viciously, is severely insulting, has temper outbursts; 3 = threatens violence toward others impulsively; 4 = threatens violence towards others repeatedly or deliberately. For physical aggression against persons, the severity scale was 0 = none; 1 = makes menacing gestures, swings at people, grabs at clothing without bodily contact; 2 = strikes, kicks, pushes, scratches, pulls hair of others; 3 = attacks others causing mild injury such as a bruise; 4 = attacks others causing serious injury such as a fracture. For physical aggression against property, the severity scale was 0 = none; 1 = slams door angrily, rips clothing, urinates/spits/defecates inappropriately; 2 = throws objects down, kicks furniture, defaces walls; 3 = breaks objects, smashes windows; 4 = sets fires, throws objects dangerously. Physical aggression against persons and physical aggression against property were combined into physical aggression for this study. The nursing staff were trained in the use of the MOAS and filled out a daily incident form at the end of each 8-hour shift (day 7 am – 3 pm; evening 3 pm – 11 pm; and night 11 pm – 7 am) and recorded the number of verbal, physical, or both physical and verbal incidents. Nursing staff that worked sixteen hour shifts were instructed to complete a daily incident form for each shift.

2.5. Nursing staff rosters

During the course of the study, rosters were collected to determine the number of nursing staff (registered nurse, licensed practical nurse, and nursing assistants) on duty during each shift. Additionally, hospital records which contained the number of hours worked by shift each day by nurses in the study population were sent to NIOSH on a weekly basis. Data were collected in each of the eight hospitals for a total of 21 weeks once enrolled in the study. The first hospital enrolled in the study began data collection in September 2007 and the last hospital enrolled in the study commenced data collection April 2010.

2.6. Survey data analysis

Mantel-Hanzel chi-square statistics with each hospital as a stratum were calculated to test the hypothesis of an association between demographics of the nurses prior to enrollment and verbal and physical aggression (against persons and against property) within the last 30 days. Similarly, Mantel-Hanzel chi-square statistics were calculated to test the hypothesis of an association between training characteristics and verbal and physical aggression.

2.7. Verbal and physical aggression analysis from report forms

Rates from the daily incident forms and hospital records were calculated by dividing the number of incidents by the total number of hours worked by all nurses, then multiplying by

40 so that the rates are presented in units of incidents per nurse per 40-hour work week. Risk factors associated with these rates were analyzed through the use of generalized estimating equations (GEE) with a Poisson model [16]. Each hospital was treated as a cluster in this model assuming an autoregressive error structure of lag 1 (AR[1]). The dependent variable was the weekly number of incidents and an offset of the natural logarithm of hours worked was used so that incident rates were modeled. Independent variables were diagnoses, sex, race/ethnicity, and age groups. Values of independent variables in this model were the percentage of patients during the week who were in each category of each independent variable. The nurse to patient ratio was calculated for each week and each hospital by dividing the total hours all nurses worked in the week by the number of patients for the week. Wald chi-square statistics provided from the GEE models were used to test the association between risk factors and incident rates. All analyses were performed using the SAS statistical software system [17].

3. Results

3.1. Experiences in the 30 days prior to data collection

Table 1 shows the sample characteristics of the nursing staffs aggregated for all eight hospitals. Out of the 284 nurses who completed a survey, 242 (85.2%) of these nurses reported at least one assault from a patient within the past 30 days of the survey. Seventy percent of the study population reported their gender as female. Slightly over 90% of the males and females reported experiencing some form of violence during the 30 days immediately prior to the study period. Just under 90% of the males and females reported the violence as verbal and a higher percentage of females (86%) reported physical violence, compared to males (81%).

The majority of the staff was either African American (41%) or white (37%). Hispanics accounted for 14% of the study group and 9% of the participants listed their race/ethnicity as “Other”. Overall aggression was experienced by 90 to 92% of each racial/ethnicity group. More variation was reported for verbal aggression, where 87% of African American and Hispanic nurses experienced incidents. The percentage was higher, 91%, for nurses who stated their race/ethnicity as either “White” or “Other”. For physical aggression, only 70% of the Hispanic group experienced any incidents, while the other race/ethnicity groups ranged from 86 to 88%.

Just over 50% of the respondents were over the age of 50, while another 27% were between the ages 40 to 49 years. The remaining 20% were under 40 years of age. The highest percentage (94%) of participants experiencing overall aggression by age group was the 50 to 59 years of age group. Both the 40 to 49 and 20 to 29 years of age groups reported the lowest percentage, 87%, for overall aggression. The lowest percentage for verbal and physical aggression was reported by the 60 years of age and older group, with 84% and 81% respectively. None of the personal demographic variables (Gender, Race/Ethnicity, Age) was statistically significant as risk factors for verbal aggression (Gender = 0.5336, $p = 0.46$, Race/Ethnicity = 4.5301, $p = 0.21$, Age = 4.94288, $p = 0.29$) or physical aggression (Gender = 0.1507, $p = 0.70$, Race/Ethnicity = 3.3423, $p = 0.34$, Age = 0.9495, $p = 0.92$).

The majority of nurses responded as either being registered nurses (54%) or nursing assistants (35%). Licensed practical nurses accounted for an additional 9% of the study group. Nearly 50% of the staff had worked in their current job for over five years and 79% were in their present job at least one year.

Job tenure in their current position was the only variable significantly associated with experiencing any type of aggression ($\chi^2_3=9.6802, p = 0.02$) and with verbal aggression ($\chi^2_3=7.9316, p = 0.05$) within the past 30 days. Generally, staff members that were in their current job less than a year experienced less aggression than staff members that were in their current job more than a year. Over two-thirds of the incidents involved workers with less than 10 years of experience in their current job.

Almost all staff who completed the survey (99%) reported they had received at least one type of violence training (Table 2). The most common components of violence training were communicating with staff (78%) and verbal de-escalation (78%); the least common component of violence training received was practice and feedback about violence prevention efforts in regards to on the job training (62%). When looking at the components of training received by the staff in terms of experiencing aggression, receiving training on communicating with staff was associated with a higher level of experiencing aggression in the past 30 days than not receiving the training ($\chi^2 = 5.4934, p = 0.02$). In regards to experiencing verbal aggression and physical aggression in the past 30 days, no components of violence training were significantly associated with the proportions of the specific aggression experienced by staff (Table 2).

3.2. Concurrent data collection

Combining the data across all hospitals and weeks, the overall number of all aggressive incidents was 2,709. For verbal aggression only incidents, the overall number was 2,392. For physical aggression (against persons and against property) only, the overall number was 778. Combining the data across all hospitals and weeks, the overall rate was 0.68 incidents per nurse per week (Table 3). For physical aggression only, the overall rate was 0.19 incidents per nurse per week. The overall rate of verbal aggression incidents was 0.60 incidents per nurse per week.

Incident rates of the types of aggression by shift are presented in Table 3. The night shift demonstrated a significantly lower rate of aggressive incidents than either the day shift or the evening shift (based on comparison of 95% confidence intervals), regardless of the type of aggressive patient behavior. For verbal incidents, the day shift had a slightly higher rate of aggression than the evening shift; for physical incidents, the evening shift demonstrated a significantly higher rate of aggression than the day shift. There were no significant differences of the aggression rates between weekdays and weekends.

Table 4 presents the association of potential risk factors with aggressive incidents of patients toward nurses during the study period. For verbal aggression, weeks where there were a higher percentage of patients with cognitive disorders was significantly associated with a lower risk of verbal aggression. Schizophrenia, substance abuse, post-traumatic stress syndrome, and depression were also associated with a lower risk of verbal aggression

although the relationship was not statistically significant. Weeks that had a higher percentage of patients with personality disorders were significantly associated with a higher risk of verbal aggression. Patients with a diagnosis of a bipolar or “Other” disorder were also more verbally abusive towards staff, but the relationship was not statistically significant.

None of the patient demographics were found to be significantly associated with acts of verbal aggression. However, having a higher percentage of patients classified as “White” or “Other” was associated with a lower level of verbal aggression. A higher percentage of African American or Hispanic patients resulted in an increased risk of verbal aggression.

From the physical aggression perspective, patients with personality disorders were associated with a significantly (p-value 0.004) higher risk for physical aggression (Table 4). Weeks where there were a higher percentage of patients aged 30–39 and 40–49, were associated with a lower risk of physical aggression.

When looking at any type of aggression (verbal and/or physical), weeks that had a higher percentage of patients with cognitive disorders were associated with a lower risk for aggression. Weeks where there were a higher percentage of patients with personality disorders and patients aged 50–59 were associated with a higher risk for aggression towards the nurses (Table 4).

Circumstances which were occurring at the time of the aggression are presented for verbal and physical aggression in Table 5. A significant difference between the different circumstances which led to verbal and physical aggression was found ($\chi^2_5=69.78$, p-value < 0.0001). Limit setting regarding behaviors or privileges (i.e. access to activities outside of unit) were associated with a higher percentage of verbal aggression incidents (44%) than physical aggression incidents (35%). Assisting patients with activities of daily living had a higher percentage of physical aggression incidents (18%) than verbal aggression incidents (6%). The proportion of incidents with circumstances due to medication (medication times not specified), limit setting-no smoking and other were similar with respect to verbal and physical aggression.

4. Discussion

One of the most important steps in preventing workplace violence is being aware of the risk factors and knowing which risk factors are significant. The objective of this paper was to determine the risk factors present in incidents that occurred in the psychiatric units. Risk factors were examined by overall, verbal, and physical aggression using staff and patient demographics and characteristics.

4.1. Experiences in the 30 days prior to data collection

Although not statistically significant, the only difference by gender was females reporting more physical aggression than males. Some researchers found that females typically are smaller in physical stature and therefore a more likely target [18]. The African American and Hispanic nurses reported the lowest percentage of verbal aggression. Additionally, the

lowest percentage of workers reporting physical aggression reported their race as Hispanic. Workers in all age groups experienced high levels of overall aggression, verbal aggression, and physical aggression. Registered nurses experienced the highest level of overall aggression and verbal aggression while licensed practical nurses experienced the highest level of physical aggression. One study found that prevalence was higher for nurses as compared to nonnurses for psychological violence, for physical violence, and for any episodes of workplace violence [19]. Power held and exerted (i.e. refusing a patient's request or instructing a patient to comply with unit rules) by psychiatric nurses may explain these results [20].

These findings confirm the results from previous studies that workers in psychiatric wards are at risk for having aggression directed at them [21,22]. Job tenure did have statistically significant relationships to acts of overall aggression ($p = 0.02$) and verbal aggression ($p = 0.05$). Consistently across all types of aggression, those who had less than one year tenure in their current position reported less acts of aggression. This may be a result of healthcare workers not wanting to appear to be a complainer or incompetent during their first year of performance. It could also be that nursing staff with less than one year tenure were on orientation (10–12 weeks) or on a residency program (3–6 months) [23,24]. The healthcare literature documents many cases of underreporting because health-care workers are reluctant to report injuries and illnesses because they feel that it might compromise how they are perceived by management [25–29].

Ninety-nine percent of the healthcare workers in this study had received some form of training in preventing workplace aggression. The VHA requires workplace aggression prevention training as part of its annual staff training for workers at psychiatric facilities. Other studies have found much lower percentages of staff members trained in some aspect of workplace aggression prevention [30]. In a narrative review of the effectiveness of aggression management training programs on aggressive incidents, six studies showed that staff training programs may increase levels of aggression [31–36]

4.2. Concurrent data collection

The night shift had significantly lower rates of verbal and physical violence when compared to the day and evening shifts. This is likely because most patients are asleep or resting during the nighttime hours. The evening shift had a significantly higher rate of physical aggression than the other shifts. This finding is possibly explained by other studies that found patients act out physically around medication times (4–6 p.m.) [37]. It is also explained by the sundowning syndrome where some patients experience periods of extreme agitation that is often targeted toward the health-care workers [38]. Weekends had slightly higher rates than weekdays, but no statistically significant relationships were present.

White patients tended to use significantly less verbal forms of aggression than did African Americans, Hispanics, or those classified in the “Other” ethnicity group. They also demonstrated less aggressive behavior overall. Most evidence shows that race and social class are unrelated to recurrence of violence [39].

Examining aggression from the diagnoses perspective, having a higher percentage of patients with cognitive disorders was significantly associated with a decreased risk for verbal and physical aggression. Cognitive disorders, such as dementia, are typically associated with advancing age, but are not limited to elderly patients. Weeks with a high percentage of patients diagnosed with substance abuse issues were associated with a lower risk of verbal aggression. These patients usually enter the facility under the influence of alcohol, illicit drugs, or misused prescription medications. After spending time in the facility, the effects of the substance abuse become less and the patients start to return to a “normal” state of mind. Unlike our study results, previous research has shown that alcohol/drug misuse increase the risk of aggression [40]. For this study population, a high percentage of patients with personality disorders were significantly associated with a higher risk for verbal and physical aggression. This suggests that the most aggressive patients are those with personality disorders. Previous research has shown that aggressive patients are more likely to have a diagnosis of schizophrenia (or more generally psychosis) or personality disorders [40].

In general, circumstances such as limit setting, assisting patients with daily living activities, and administering medications were associated with more verbal aggression than physical aggression. Verbal aggression percentage was highest (44%) for circumstances that required limit setting regarding behavior. Previous research has shown that limiting setting could lead to verbal aggression [41]. Vatne et al. found that limit setting was a major reason for conflictual nurse-patient relationships, and sometimes increased the intensity and extent of patients’ disruptive behavior [42].

Assisting patients with activities of daily living (i.e. bathing) had a higher physical aggression percentage (18%) than the percentage for verbal aggression (6%) which could be attributed to being in close contact with the patient [43].

5. Limitations

The associations found in this study were in general agreement with previous studies examining patient assault to nurses, however, very few of these associations were found to be statistically significant despite the somewhat large sample size. Much of this lack of statistical significance could be due to the necessity of studying the phenomena of patient on nurse assaults through an etiologic perspective. Due to nurse personnel privacy restrictions as well as HIPAA patient privacy legal restrictions, we were not able to link and record information regarding an assault to a specific nurse or a specific patient. Additionally, we were restricted to collecting data on patients through one week aggregations to further insure patient confidentiality. Because our analyses were conducted by summing information on assaults across a full week, this study lacked statistical power compared to a study which could analyze each assault on an individual basis.

6. Conclusions

Healthcare workers in psychiatric settings are at high risk for aggression from patients. The VHA has been very proactive in addressing workplace aggression by patients in all of its healthcare facilities, especially the psychiatric facilities. The VHA’s national training policy

and program were likely the main reason that such a high percentage, 99%, of the study population reporting receiving at least one form of workplace aggression prevention training. Their program may have led to greater employee willingness to report assaults [44]. The high percentages of verbal and physical workplace aggression that were reported by staff participating in this study indicate that prevention of workplace violence aggression is a complicated issue that will take a comprehensive prevention program to alleviate. Future research could link aggression to a definite patient and a definite nurse.

6.1. Implications for workplace violence prevention

Being cognizant of the risk factors of patient aggression (i.e. patients with a personality disorder diagnosis, assisting patients with activities of daily living), nurses could receive training on the risk factors and thus be more aware of their work environment. A VHA study on the impact of center complexity on nursing staff incidence rates for reported assaults found that rates were higher for two groups of body parts: arms and hands, and head and neck. Facility-specific staff training regarding close proximity patient care for preventing assaultive behavior on nursing staff would seem to be warranted [45]. The legislature in Washington State enacted a requirement that healthcare settings develop a violence prevention program [46]. It required implementation of staff training on workplace violence risk factors, patient violence predictors, de-escalation techniques and post-incident procedures.

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Table 1

Assaults and verbal aggression by staff demographics

	Overall aggression			Verbal aggression			Physical aggression		
	N (%)	Yes* (%)	No* (%)	Yes* (%)	No* (%)	p-value**	Yes* (%)	No* (%)	p-value**
Gender						0.45			0.46
Male	85 (30)	77 (92)	7 (8)	75 (89)	9 (11)		69 (81)	16 (19)	0.70
Female	198 (70)	165 (91)	17 (9)	166 (89)	21 (11)		160 (86)	26 (14)	
Race/ethnicity						0.33			0.34
White	104 (37)	89 (92)	8 (8)	90 (91)	9 (9)		86 (88)	12 (12)	
African American	115 (41)	98 (90)	11 (10)	95 (87)	14 (13)		95 (86)	16 (14)	
Hispanic	39 (14)	34 (92)	3 (8)	33 (87)	5 (13)		26 (70)	11 (30)	
Other	24 (9)	21 (91)	2 (9)	21 (91)	2 (9)		20 (87)	3 (13)	
Age group						0.25			0.29
Age 20–29	15 (5)	13 (87)	2 (13)	13 (87)	2 (13)		13 (87)	2 (13)	
Age 30–39	43 (15)	35 (90)	4 (10)	37 (90)	4 (10)		34 (87)	5 (13)	
Age 40–49	77 (27)	62 (87)	9 (13)	62 (86)	10 (14)		62 (84)	12 (16)	
Age 50–59	109 (38)	98 (94)	6 (6)	97 (92)	8 (8)		90 (85)	16 (15)	
Age 60	40 (14)	34 (92)	3 (8)	32 (84)	6 (16)		30 (81)	7 (19)	
Occupation						0.90			0.31
RN	153 (54)	132 (92)	12 (8)	133 (90)	15 (10)		125 (86)	20 (14)	
LPN	26 (9)	21 (91)	2 (9)	19 (83)	4 (17)		22 (92)	2 (8)	
Nursing Assistant	99 (35)	83 (89)	10 (11)	83 (88)	11 (12)		78 (81)	18 (19)	
Other	6 (1)	6 (100)	0 (0)	6 (100)	0 (0)		4 (67)	2 (33)	
JOB TENURE						0.02			0.05
< 1 Year	60 (21)	44 (81)	10 (19)	45 (80)	11 (20)		44 (79)	12 (21)	
1–5 Years	88 (31)	81 (96)	3 (4)	81 (95)	4 (5)		77 (91)	8 (9)	
5–10 Years	42 (15)	38 (90)	4 (10)	37 (88)	5 (12)		33 (79)	9 (21)	
10 Years	93 (33)	79 (93)	6 (7)	78 (90)	9 (10)		75 (86)	12 (14)	

* May not sum to total due to missing cases;

** Based on Mantel-Haenszel Chi-square test controlling for hospital.

Table 2

Assaults and verbal aggression by staff training history

Training	N (%)	Overall aggression			Verbal aggression			Physical aggression		
		Yes* (%)	No* (%)	p-value**	Yes* (%)	No* (%)	p-value**	Yes* (%)	No* (%)	p-value**
Reporting incidents	219 (77)	188 (91)	19 (9)	0.73	185 (89)	24 (11)	0.77	175 (83)	36 (17)	0.26
Communicating staff	222 (78)	192 (93)	15 (7)	0.02	190 (90)	21 (10)	0.09	180 (85)	31 (15)	0.22
Communicating patients	215 (76)	186 (92)	16 (8)	0.22	183 (89)	22 (11)	0.59	175 (85)	31 (15)	0.80
Assessing	191 (67)	164 (91)	16 (9)	0.70	160 (88)	22 (12)	0.66	153 (84)	30 (16)	0.69
Verbal de-escalation	221 (78)	191 (92)	16 (8)	0.26	190 (90)	22 (10)	0.66	179 (85)	32 (15)	0.85
Self-defense	200 (70)	171 (91)	16 (9)	0.42	171 (89)	21 (11)	0.58	158 (84)	31 (16)	0.73
Training: Observations	186 (65)	160 (91)	16 (9)	0.61	156 (88)	22 (12)	0.72	150 (84)	29 (16)	0.90
Training: Assistance	185 (65)	159 (91)	15 (9)	0.35	155 (88)	21 (12)	0.97	150 (84)	28 (16)	0.71
Training: Practice	175 (62)	148 (90)	17 (10)	0.78	144 (87)	22 (13)	0.50	141 (83)	28 (17)	0.82
No training	2 (1)	1 (50)	1 (50)	0.29	1 (50)	1 (50)	0.39	1 (50)	1 (50)	0.55

* May not sum to total due to missing cases;

** Based on Mantel-Hanzel Chi-square test controlling for hospital.

Table 3

Rates of assaults and verbal aggression per week per nurse by shift and time of week

	Verbal rate (CI)	Physical rate (CI)	Overall* rate (CI)
Overall	0.60 (0.57, 0.62)	0.19 (0.18, 0.21)	0.68 (0.65, 0.70)
Shift			
Day	0.68 (0.64, 0.72)	0.19 (0.17, 0.21)	0.77 (0.72, 0.81)
Evening	0.63 (0.59, 0.67)	0.25 (0.22, 0.28)	0.74 (0.70, 0.79)
Night	0.42 (0.38, 0.46)	0.12 (0.10, 0.14)	0.46 (0.42, 0.50)
Time of week			
Weekday	0.59 (0.56, 0.61)	0.18 (0.17, 0.20)	0.66 (0.63, 0.69)
Weekend	0.62 (0.58, 0.67)	0.22 (0.19, 0.25)	0.71 (0.66, 0.76)

* A single incident could include both verbal and physical aggression.

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Table 4
 Association of potential risk factors (Perpetrator diagnoses and demographics) with aggressive incidents

Risk factor	Verbal		Physical		Overall	
	Estimate*	p-value**	Estimate*	p-value**	Estimate*	p-value**
Nurse-Patient Ratio	-0.346	0.148	-0.383	0.299	-0.285	0.244
Diagnoses						
Schizophrenia	-0.391	0.379	-0.267	0.461	-0.546	0.193
Bipolar	1.391	0.127	0.873	0.181	1.380	0.104
Substance	-0.132	0.802	0.216	0.820	-0.101	0.870
PTSD	-0.501	0.777	1.319	0.533	0.012	0.993
Personality	8.096	< 0.001	6.075	0.004	7.466	< 0.001
Depression	-0.032	0.940	-0.084	0.826	-0.059	0.887
Cognitive	-1.828	0.001	-0.940	0.305	-1.315	0.006
Other	0.656	0.457	-0.092	0.947	0.733	0.417
Demographics						
Sex						
Male	0.553	0.562	0.704	0.565	0.460	0.569
Female	-0.553	0.562	-0.704	0.565	-0.460	0.569
Race/Ethnicity						
White	-0.494	0.513	0.974	0.255	-0.343	0.638
African American	0.253	0.772	-0.386	0.678	0.200	0.816
Hispanic	0.365	0.501	-0.338	0.716	0.227	0.706
Other	-0.039	0.987	-6.915	0.225	-0.661	0.798
Age						
20-29	1.097	0.512	1.139	0.495	1.007	0.524
30-39	0.196	0.900	-3.265	0.033	-0.280	0.852
40-49	-0.860	0.267	-1.554	0.006	-1.063	0.070
50-59	0.477	0.109	0.929	0.082	0.494	0.036
> 60	-0.217	0.720	0.383	0.622	0.019	0.969

* Estimates are regression coefficients from Poisson regression model;

** p-values from Wald chi-square statistic.

Table 5

Circumstances at time of aggressive incidents

Circumstances	Overall aggression		Verbal aggression		Physical aggression		Both verbal and physical aggression	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Limit setting-no smoking	412	17	227	14	27	10	42	11
Limit setting regarding behaviors	928	39	693	44	95	35	134	34
Assisting patient with activities of daily living	207	9	88	6	48	18	70	18
Medication	186	8	141	9	11	4	33	8
Other	599	25	377	24	86	32	98	25
Multiple	70	3	50	3	3	1	16	4

* May not sum to total due to missing.