The Aggressive Incidents in Medical Settings (AIMS) Study: Advancing Measurement to Promote Prevention of Workplace Violence

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Background: Rates of aggressive events and workplace violence (WPV) exposure are often represented by proxy measures (restraint, incident, injury reports) in health care settings. Precise measurement of nurse and patient care assistant exposure rates to patient aggression on inpatient medical units in acute care hospitals advances knowledge, promoting WPV prevention and intervention.

Methods: This prospective, multisite cohort study examined the incidence of patient and visitor aggressive events toward patient care staff on five inpatient medical units in a community hospital and an academic hospital setting in the northeastern United States. Data were collected with event counters, Aggressive Incident and Management Logs (AIM-Logs), and demographic forms over a 14-day period in early 2017.

Results: Participants recorded a total of 179 aggressive events using event counters, resulting in a rate of 2.54 aggressive events per 20 patient-days. Patient verbal aggression rates (2.00 events per 20 patient-days) were higher compared to physical aggression rates (0.85 events per 20 patient-days). The staff aggression exposure rate was 1.17 events per 40 hours worked (verbal aggression exposure rate: 0.92 events per 40 hours; physical aggression exposure rate: 0.39 events per 40 hours). The most common precipitants included medication administration (18.6%), waiting for care (17.2%), and delivering food/drinks (15.9%). Most events were managed with verbal de-escalation (75.2%). The number of patients assigned to patient care staff was significantly greater during a shift when an aggressive event occurred compared to when no event occurred (6.3 vs. 5.7, $t = -2.12$, df $= 201.6$, $p = 0.0348$).

Conclusion: Event counters and AIM-Logs offer greater information about patterns of aggression and preventive interventions used and provide information on the need for debriefing and worker support after aggressive events. Additional studies of this methodology in other settings are needed to evaluate the value of this technology for improving worker and patient safety.

Workplace violence (WPV) is a significant and pervasive problem for health care workers and health systems.[1] According to the National Institute for Occupational Safety and Health (NIOSH), experts classify the most common form of WPV among health care workers as Type II, which describes the patient or consumer as the perpetrator of the aggressive event.[2] Previous studies support that Type II incidents threaten patient safety,[3] contribute to employee psychological distress,[4,5] result in injuries and loss of productivity,[6] and negatively affect turnover rates.[7,8] Despite the plethora of evidence identifying the severity of this issue, gaps remain in the literature as to specific aggression incidence rates and WPV exposure rates that RNs and patient care assistants (PCAs) experience in acute medical care settings.[9] Variability in reported rates depends on how WPV exposure, and aggressive events more specifically, are defined and measured.[10]

Decades of research indicate high rates of RN exposure to violence, although the extent and precise incidence rate of aggression exposure remains elusive. The common use of proxy measures of aggression, including rates of patient restraint, worker injury, incident reports, or involvement of security personnel in clinical settings, is a common reason for the lack of precision. These measures fail to identify the actual exposure of individual workers to aggressive events. Reporting violent events remains challenging due to high acuity, insufficient time, and perceptions on how leadership uses the data.[11] Experts caution that estimated aggression exposure rates may be underreported due to varying definitions of assaults or aggressive events, peer pressure not to report, fear of blame, and excessive paperwork.[12] Further, nurses often accept verbal and physical abuse as part of the job.[13]

Given the wide use of proxy measures, a gap exists in direct measurement and identification of incidence rates of WPV from patient or visitor aggression (physical, verbal, and both) among RNs and PCAs on inpatient medical units in acute care hospitals. This study used Morrison's 1990

definition of aggression—"any verbal, nonverbal, or physical behavior that was threatening . . . or actually did harm to self, others, or property"[14(p. 67)]—to measure verbal and physical aggression events as well as patient care staff exposure to aggressive events.

The Aggressive Incidents in Medical Settings (AIMS) research study was conducted to rigorously examine incidence rates and characteristics of patient and visitor aggressive events in inpatient medical settings and patient care staff's (RNs and PCAs) exposure rate to patient and visitor aggressive behavior. Separate identification of the patient aggression rate and worker exposure to aggression rate are important because not all workers are exposed to all patient aggression events occurring on a unit. This article reports results for three objectives:

1. To identify the unit-level incidence rate of patient and visitor verbal and physical aggressive behavior in inpatient medical settings
2. To identify the incidence rate of patient care staff exposure to patient and visitor verbal and physical aggressive behavior in inpatient medical settings
3. To describe the characteristics of patient and visitor events involving aggressive behavior toward patient care staff in inpatient medical settings and the effects of these events on staff

METHODS

Study Design and Setting

This prospective, multisite cohort study examined the incidence of patient and visitor aggressive behavior toward patient care staff on inpatient medical units and associated outcomes. The study was conducted in five inpatient medical units from two Magnet-designated not-for-profit hospitals in the northeastern United States. One hospital was a 275-bed community hospital from which two inpatient medical units (22 and 20 beds) participated. The second hospital was a 1,541-bed academic hospital with three inpatient medical units participating (22, 21, and 21 beds, respectively). These units were selected because of the similarity in bed capacity and stable patient care management staff. Patient populations were also similar based on age, diagnosis, census, and frequency of reported aggressive events. These units often had patients with underlying psychiatric diagnoses admitted for medical management. In addition, managers on these five units voiced commitment to the project and identified that they all had similar staffing patterns with a stable workforce enabling them to conduct the study on their respective units without causing an undue burden on RNs and PCAs. STROBE guidelines for reports of cohort or observational studies were followed.[15]

Sample

Patient care staff, composed of RNs and PCAs, were eligible to participate if they were employed a minimum of 24 hours per week on the study unit. Participants were excluded if they were employed by the centralized staffing unit or involved in orientation. A convenience sample was obtained after inviting a total of 212 eligible staff (147 RNs and 65 PCAs). The two participating units from the community hospital had 85 eligible staff members, whereas the academic hospital had 127 staff on their three participating study units.

Patient Care Staff and Patient Demographic Information

After informed consent was obtained, patient care staff participants completed a survey that identified demographics (age, gender, race, ethnicity, education, years of experience, shifts worked, and experience caring for patients with aggressive behaviors). Research team members extracted patient demographic information (unit, age, gender, and diagnosis) from the electronic health record (EHR).

Aggressive Incident and Management Log

Patient care staff participants completed the Aggressive Incident and Management Log (AIM-Log) throughout each shift (Figure 1). The AIM-Log was used to collect aggressive event information, including event time, aggression type (verbal, physical, or both), severity of aggression (1 = low, 5 = high), and level of difficulty caring for the patient (0 = very easy, 10 = very difficult). Additional items had coded options for participants to identify the specific precipitant, person or object targeted, management of behavior, and consequences for the victim. The AIM-Log also had items for participants to document their assigned study code, date, hours worked during their shift, and number of patients assigned that shift. The log was based on a similar tool used in inpatient psychiatric settings that was adapted based on input from the literature and experts.[10]

Event Counters

Patient care staff participants carried handheld real-time event counters each shift to immediately record verbal or physical aggression events. Participants recorded the characteristics of each event on the AIM-Log as soon as possible after the event. The total numbers of verbal and physical events were recorded as the shift progressed, and workers were encouraged to review and complete any missing data by the end of the shift. Counters have previously been used to document real-time aggression event rates and worker aggression exposure rates.[10,16]

Data Collection Procedures

Immediately prior to data collection, extensive training was conducted to ensure measurement fidelity. Research team members provided RN and PCA participants with didactic sessions on how to collect accurate data using an event counter and the AIM-Log, which included definitions of each item on the log and clear descriptions of aggressive

AIM-Log Screenshots

Figure 1: The screenshots show the Aggressive Incident and Management Log (AIM-Log). Page 1 is used for reporting event counters; page 2 is used to record the characteristics of events. The photo shows AIM-Log event counters. For permission to use the AIM-Log, contact Dr. Iennaco at joanne.iennaco@yale.edu.

events. The use of case scenarios allowed each participant to simulate collecting data, which were cross-checked for accuracy by the research team. The data collection period was 14 consecutive days. Participants carried an event counter and the AIM-Log during each shift worked and deposited their AIM-Log in a secure locked cabinet on their unit. To support participation, logs were reviewed for completeness by research team members each day except on weekends. Frequent reminders and review sessions about the importance of accurate use of data collection tools were also provided to participating staff. Whenever an aggressive event was recorded, a research team member accessed the EHR to extract patient information, which was de-identified immediately after extraction. AIM-Logs were reviewed to identify events reported by multiple participants—events reported by multiple participants in the same 15-minute period were flagged for review. Multiple reports of the same event were not submitted, likely because of differ-

ing patient assignments and that not all staff members participated.

Data Analysis

AIM-Log data were used to calculate rates for both patient aggressive events and patient care staff exposure to these aggressive events. The patient aggression rate was calculated by dividing the total number of aggressive events recorded on the AIM-Log by the total number of occupied beds (patient-days) during the 14-day data collection period on each unit. Patient-days information was extracted from unit reports. Patient care staff exposure rate was calculated by dividing the total number of aggressive events by the total number of participants' hours worked for the 14 days as recorded on the AIM-Logs. Separate identification of these rates is important, as not all nurses on a given unit are exposed to every patient aggressive act. The patient aggression rate provides the frequency of aggression perpetrated

by patients and visitors on a unit. On the other hand, the staff exposure rate shows the frequency of aggression experienced by the patient care staff. The higher the rate, the greater the frequency of staff experiencing patient or visitor aggressive acts.

Characteristics of staff and events from surveys and AIM-Logs were analyzed using descriptive statistics; t-tests and chi-square tests were performed to determine differences by role and hospital using a p value of $p \leq 0.05$ for significance. The power analysis indicated that for a 14-day data collection period, 30% of eligible staff ($n = 65$ [45 RNs and 20 PCAs]) would need to enroll in the study to provide 80% power to detect significant differences between groups.

Human Subjects Protection

The cohort study was approved by the Institutional Review Boards (IRBs) of both hospitals. Patient care staff provided written informed consent before completing the demographic forms. Both IRBs granted waivers for obtaining patient consent.

RESULTS

Patient Care Staff Characteristics

A total of 138 patient care staff participated, yielding a 65.1% response rate based on the total of 212 invited staff. The sample was composed of 25.4% ($n = 35$) of partici-

Table 1. Characteristics of Workers in AIMS Study ($N = 138$ workers)

Characteristic	Total	Community Hospital $n = 35$ (25.4%)		Academic Hospital $n = 103$ (74.6%)	
		RN	PCA	RN	PCA
Total Number of Workers, n (%)	138	24 (68.6)	11 (31.4)	78 (75.7)	25 (24.3)
Age in Years (N = 135), Mean (SD)	36.8 (12.3)	39.4 (12.7)	37.3 (16.0)	36.4 (11.0)	35.5 (14.0)
Gender, n (%)					
Female	126 (91.3)	22 (91.7)	8 (72.7)	73 (93.6)	23 (92.0)
Male	12 (8.7)	2 (8.3)	3 (27.3)	5 (6.4)	2 (8.0)
Race, n (%)*					
American Indian	1 (0.7)	1 (4.2)	–	–	–
Asian	9 (6.7)	3 (12.5)	–	5 (6.6)	1 (4.2)
Black	29 (21.5)	1 (4.2)	5 (45.5)	11 (14.5)	12 (50.0)
White	96 (71.1)	19 (79.2)	6 (54.5)	60 (78.9)	11 (45.8)
Ethnicity, n (%)†					
Hispanic	12 (9.0)	1 (4.2)	1 (9.1)	5 (6.7)	5 (21.7)
Not Hispanic	121 (91.0)	23 (95.8)	10 (90.9)	70 (93.3)	18 (78.3)
Shift, n (%)					
A.M.	60 (43.5)	11 (45.8)	5 (45.5)	37 (47.4)	7 (28.0)
P.M	56 (40.6)	11 (45.8)	4 (36.4)	31 (39.7)	10 (40.0)
Rotating	22 (15.9)	2 (8.3)	2 (18.2)	10 (12.8)	8 (32.0)
Hours/Week, n (%)*					
24	23 (16.7)	2 (8.3)	5 (45.5)	12 (15.4)	4 (16.0)
32	22 (15.9)	11 (45.8)	3 (27.3)	2 (2.6)	6 (24.0)
36	80 (58.0)	11 (45.8)	2 (18.2)	59 (75.6)	8 (32.0)
40	13 (9.4)	–	1 (9.1)	5 (6.4)	7 (28.0)
Experience in Role in Years, Mean (SD)	12.2 (10.2)	16.3 (11.5)	12.8 (10.5)	11.7 (10.1)	9.2 (8.0)
Unit Experience in Years,† Mean (SD)	7.4 (7.9)	8.21 (8.7)	7.36 (8.7)	8.1 (8.2)	4.5 (4.7)
Experience with Aggressive Patient Behavior, n (%)					
Yes	132 (97.8)	23 (95.8)	11 (100)	75 (98.7)	23 (95.8)
No	3 (2.2)	1 (4.2)	–	1 (1.3)	1 (4.2)
Aggressive Behavior Management Education, n (%)†					
Yes	56 (41.8)	13 (54.2)	6 (54.5)	24 (32.0)	13 (54.2)
No	78 (58.2)	11 (45.8)	5 (45.5)	51 (68.0)	11 (45.8)
RN Education, n (%)					
ADN	18 (17.6)	3 (12.5)	–	15 (19.2)	–
BSN	76 (74.5)	20 (83.3)	–	56 (71.8)	–
MSN or Higher	8 (7.8)	1 (4.2)	–	7 (9.0)	–
RN Certification, n (%)					
Yes	50 (49.0)	8 (33.3)	–	42 (53.8)	–
No	52 (51.0)	16 (66.7)	–	36 (46.2)	–

* $p \leq 0.001$.
† $p \leq 0.05$.
AIMS, Aggressive Incidents in Medical Settings; PCA, patient care assistant; SD, standard deviation; ADN, associate degree in nursing; BSN, bachelor of science in nursing; MSN, master of science in nursing.

Table 2. Characteristics of Patients Who Were Aggressive (n = 56, extracted from medical record)

Characteristic	Total	Community Hospital	Academic Hospital
Total, n (%)	56	24 (42.9)	32 (57.1)
Age in Years, Mean (SD)	68.4 (17.01)	68.7 (16.96)	68.2 (17.32)
Gender, n (%)			
Female	36 (64.3)	16 (66.7)	20 (62.5)
Neurocognitive History,* n (%)			
Yes	16 (28.6)	9 (37.5)	7 (21.9)
Alzheimer's Disease	3 (5.4)	–	3 (9.4)
Dementia or Traumatic Brain Injury	9 (16.1)	5 (20.8)	4 (12.5)
Other	4 (7.1)	4 (16.7)	–
Psychiatric Diagnosis, n (%)†			
Yes	15 (26.8)	10 (41.7)	5 (15.6)
Schizophrenia or Psychotic Disorder	3 (5.4)	1 (4.2)	2 (6.3)
Bipolar Disorder	4 (7.1)	4 (16.7)	–
Depressive Disorder	3 (5.4)	2 (8.3)	1 (3.1)
Personality Disorder	1 (1.8)	1 (4.2)	–
Other Psychiatric Disorder	4 (7.1)	2 (8.3)	2 (6.3)
Psychotropic Medication and Psych Diagnosis, n (%)†			
Yes	22 (39.3)	13 (54.2)	9 (28.1)
Substance Use History, n (%)			
Yes	5 (8.9)	1 (4.2)	4 (12.5)

* Neurocognitive history included a diagnosis of Alzheimer's disease, dementia, traumatic brain injury, or other neurocognitive disorders.
† $p < 0.05$.
SD, standard deviation.

pants from the community hospital and 74.6% (n = 103) from the academic hospital (Table 1). Almost three quarters of the sample (73.9%, n = 102) was made up of RNs, and 26.1% (n = 36) were PCAs of similar age (M = 36.8 years), hospital experience (M = 12.1 years), gender (91.3% female, n = 126), race (71.1% white, n = 96) and ethnicity (91.0% non-Hispanic, n = 121). A significant difference between the hospitals was found, as the academic hospital staff reported working more 12-hour shifts (36 hours per week) than the community hospital. In addition, more academic hospital PCAs were Black compared to RNs (50.0% [n = 12] vs. 14.5% [n = 11], $X^2 = 20.8961$, df = 3, $p = 0.0001$), and of Hispanic ethnicity (21.7% [n = 5] vs. 6.7% [n = 5], $X^2 = 4.139$, df = 1, $p = 0.04$). Other trends included the academic hospital having more certified RNs (not statistically significant), less experienced PCAs (4.5 vs 7.4 years), and fewer RNs receiving aggressive behavior management education compared with the community hospital (32.0% [n = 24] vs. 54.2% [n = 13], $X^2 = 3.817$, df = 1, $p = 0.05$) (Table 1).

Characteristics of Patients Perpetrating Aggressive Events

A total of 56 different patients perpetrated aggressive events, with a mean of 2.5 events per patient (range 1–11). These patients had a mean age of 68.4 years (range 37–92), and 64.3% (n = 36) were of female gender (Table 2). A current psychiatric diagnosis was identified in 15 (26.8%) patients, and psychotropic medication use was identified in 22 (39.3%) patients. Both current psychiatric diagno-

sis and psychotropic medication use were more likely in the community hospital compared with the academic hospital ($\chi^2 = 4.7$, df = 1, $p = 0.0294$; $\chi^2 = 3.899$, df = 1, $p = 0.0483$, respectively). Finally, only 8.9% (n = 5) of those having an aggressive event had a substance use history identified, most often alcohol use disorder (5.4%, n = 3).

Characteristics of Aggressive Events from AIM-Logs

A total of 642 AIM-Logs were returned at the end of each shift worked by 124 staff (mean of 5.2 logs returned per participant), with 255 logs from the community hospital (39.7%) and 387 logs from the academic hospital (60.3%) (Table 3). Based on the AIM-Log documentation, RNs and PCAs were not exposed to an aggressive event during 496 shifts. However, aggressive events were recorded during 146 shifts documented on AIM-Logs (22.7%). Between the two hospitals, aggressive event reporting was similar, with aggressive events reported in 23.1% (n = 59) of AIM-Logs from the community hospital and 22.5% (n = 87) from the academic hospital (Table 3). There were differences; namely, more academic hospital participants (80.5%, n = 70) worked 12-hour shifts than did community hospital participants (27.1%, n = 16) and reported experiencing 3 or more events per shift more often than community hospital participants.

Rate of Patient Aggressive Events

There was a mean daily census of 105 patients during the study period (19 to 22 beds occupied per unit). A total of

Table 3. Characteristics of Aggressive Events (from AIM-Log)

Characteristic	Total	Community Hospital	Academic Hospital
Number of AIM-Logs Returned, n (%)	642	255 (39.7)	387 (60.3)
No Event Reported	496 (77.3)	196 (39.5)	300 (60.5)
Event Reported	146 (22.7)	59 (23.1)	87 (22.5)
Number of Events, n (%)	n = 146	n = 59	n = 87
1	106 (72.6)	42 (71.2)	64 (73.6)
2	25 (17.1)	11 (18.6)	14 (16.1)
3	11 (7.5)	5 (8.5)	6 (6.9)
4	3 (2.1))	1 (1.7)	2 (2.3)
5	1 (0.7)	–	1 (1.1)
Event Type, n (%)	n = 145	n = 59	n = 86
Verbal	101 (69.7)	44 (74.6)	57 (66.3)
Physical	29 (20.0)	12 (20.3)	17 (19.8)
Both	15 (10.3)	3 (5.1)	12 (14.0)
Verbal Events, n (%)	n = 146	n = 59	n = 87
0	17 (11.6)	6 (10.2)	11 (12.6)
1	75 (51.4)	28 (47.5)	47 (54.0)
2	26 (17.8)	16 (27.1)	10 (11.5)
3	20 (13.7)	9 (15.3)	11 (12.6)
6	3 (2.1)	–	3 (3.5)
9	4 (2.7)	–	4 (4.6)
15	1 (0.7)	–	1 (1.1)
Physical Events, n (%)	n = 146	n = 59	n = 87
0	83 (56.8)	35 (59.3)	48 (55.2)
1	40 (27.4)	20 (33.9)	20 (23.0)
2	18 (12.3)	4 (6.8)	14 (16.1)
4	4 (2.7)	–	4 (4.6)
13	1 (0.7)	–	1 (1.1)
Hours Worked, n (%)*	n = 146	n = 59	n = 87
4	4 (2.7)	1 (1.7)	3 (3.4)
8	47 (32.2)	33 (55.9)	14 (16.1)
9	5 (3.4)	5 (8.5)	–
12	86 (58.9)	16 (27.1)	70 (80.5)
16	4 (2.7)	4 (6.8)	–
Shift, n (%)†	n = 140	n = 59	n = 81
Days	71 (50.7)	31 (52.5)	40 (49.4)
Evenings	34 (24.3)	19 (32.2)	15 (18.5)
Nights	35 (25.0)	9 (15.3)	26 (32.1)

* $p < 0.001$.
† $p < 0.05$.
 AIM-Log, Aggressive Incident and Management Log.

179 aggressive events were recorded using event counters during the 14-day study period, resulting in a rate of 2.54 aggressive events per 20 patient-days. Most events involved verbal aggression ($n = 141$), resulting in a rate of 2.00 verbal aggression events per 20 patient-days. Physical aggression events ($n = 60$) resulted in a rate of 0.85 physical aggression events per 20 patient-days. Extrapolating the per-patient-day rate to events per 20 patient-days offers a rate based on a typical inpatient medical unit census, thus providing, on average, the number of patient events per day on a 20-bed inpatient medical unit (Table 4).

Rate of Patient Care Staff Aggression Exposure

The total rate of nursing staff aggression exposure was 1.17 events per 40 hours worked, based on a total of 179 reported events using counters over 6,127 hours worked by nursing staff during the study period (Table 4). The verbal aggres-sion exposure rate was 0.92 events per 40 hours worked, based on 141 verbal aggression events recorded. The physi-cal aggression exposure rate was 0.39 per 40 hours worked, based on 60 physical aggression events recorded.

Characteristics of Aggressive Events

AIM-Logs identified characteristics of 206 individual events, identifying from 0 to 5 aggressive events. Most (72.6%) AIM-Logs reported 1 event ($n = 106$), 17.1% re-ported 2 events ($n = 25$), 7.5% reported 3 events ($n = 11$), and few ($n = 4$) reported more than 3, for a total of 206 individual events with characteristics reported on a total of 146 AIM-Logs (Table 3). Nearly all AIM-Logs report-ing aggressive events specified whether the events were ver-bal (69.7%, $n = 101$), physical (20.0%, $n = 29$), or both (10.3%, $n = 15$). The number of verbal events reported

Table 4. Number of Aggression Events, Rate of Patient Aggression, and Rate of Patient Care Staff Aggression Exposure[*]

	Number of Patient Aggression Events Counted	Patient Aggression Event Rate[†]	Staff Aggression Exposure Rate[‡]
Total Aggressive Events	179	2.54	1.17
Verbal Aggression	141	2.00	0.92
Physical Aggression	60	0.85	0.39

[*] Based on 6,127 hours of work. Count data and hours worked obtained from page 1 of the Aggressive Incident and Management Log.
[†] Rate per 20 patient bed unit per day (or 0.1272 events per patient-day).
[‡] Rate per 40-hour work week.

ranged from 0 to 15 per shift, with 51.4% reporting 1 (*n* = 75), 17.8% 2 (*n* = 26), 13.7% 3 (*n* = 20), and 5.5% reporting more than 3 events (*n* = 8). A total of 83 AIM-Logs (56.9%) did not report a physical event that shift, with the remainder reporting 1 (27.4%, *n* = 40) or 2 (12.3%, *n* = 18), and 5 AIM-Logs reporting more than 3 events (3.4%) (Table 3).

Shift worked and the number of patients the participant cared for during their shift were associated with the occurrence of events. Almost all of the AIM-Logs (95.9%, or 140 of 146) had shift worked documented by the participant. Most aggressive events occurred on the day shift (50.7%, *n* = 71), whereas evening or night shift aggressive events were fewer in comparison, specifically 24.3% (*n* = 34) and 25.0% (*n* = 35), respectively. The mean patient assignment of participants was 5.8 patients (range 2–15). There were significant differences in patient assignment by role and hospital. RNs had a mean of 4.9 patients assigned, whereas the assignment of PCAs was nearly doubled (mean 9.4 patients) (*t* = -8.36, df = 50.124, *p* < 0.0001). RNs in the community hospital had a mean of 5.9 patients assigned vs. 4.0 patients in the academic hospital (*t* = 9.68, df = 96, *p* < 0.0001). Importantly, a significant difference in aggressive events was found based on the number of patients assigned, with a mean of 6.3 patients (range 3–15) when an aggressive event occurred vs. 5.7 (range 2–15) without an event (*t* = -2.12, df = 201.6, *p* = 0.0348).

Event severity rated by participants averaged 2.45 (range: 1 = low to 5 = high) and was not significantly different by role. Events involving a body part indicated the hand was often used (*n* = 50, 34.2%), and less frequently, feet (*n* = 9) and/or teeth (*n* = 2), and 1 involved all body parts. Most events (89.7%, *n* = 130) did not involve object use, although 4 involved a cup, 2 spitting, and 1 a weapon. Nearly all events (95.9%, *n* = 139) were perpetrated by a patient, while 6 involved a family member.

A precipitant to aggression was identified in 108 events (74.0%). Precipitants included administering medications (18.5%, *n* = 27), waiting for care (17.1%, *n* = 25), offering food or drink (15.8 %, *n* = 23), refusing care (15.1%, *n* = 22), and engaging patient in mobility activities 330 (11.6%, *n* = 17) (Figure 2). Less frequent precipitants were related to procedures (6.8%, *n* = 10), waiting for medi-

cation (6.2%, *n* = 9), equipment (4.1%, *n* = 6), bathing (2.7%, *n* = 4), and intravenous care (2.1%, *n* = 3). The target of the event was the person reporting in 67.1% of events (*n* = 98), an RN in 41.8% of events (*n* = 61), a PCA in 19.2% (*n* = 28), and another person in 8.9% (*n* = 13); no events identified a patient or the room as the target (Figure 3).

Patient care staff managed aggressive events by using one or more interventions. Talking to the patient was involved in managing 109 events (74.7%), and in 75.2% of those (*n* = 82) talking was the only intervention. Other interventions included calmly removing the patient from the situation (18 events, 12.3%), administering intravenous or intramuscular medication (14 events, 9.6%), calling security (10 events, 6.8%), giving oral medications (5 events, 3.4%), and applying restraints (2 events, 1.4%) (Figure 4). Patient care staff exposed to aggressive events experienced consequences in 50.7% of events (*n* = 74), including feeling anxious (35.6%, *n* = 52), feeling threatened (26.7%, *n* = 39), and pain (5.5%, *n* = 8) (Figure 5). Two events (1.4%) required medical treatment, involving visiting occupational health services or the emergency department.

Participant confidence in managing the aggressive event was a mean of 6.8 (standard deviation [SD] = 3.0, 0 = not confident to 10 = extremely confident). No significant differences in confidence levels were found by role overall. In the community hospital, RN mean confidence was 7.4 vs. 6.5 in the academic hospital, but the difference was not significant (*t* = 1.58, df = 94, *p* = 0.1165). The perceived level of difficulty in caring for the patient involved in the event was identified as a mean of 5.1 (SD = 2.5), with a range of 0 (very easy) to 10 (very difficult). There was a nearly significant difference by role, with a mean of 4.9 for RNs and a mean of 5.8 for PCAs (*t* = -1.90, df = 134, *p* = 0.0593).

DISCUSSION

The results from this study align with numerous prior studies confirming that both physical and verbal aggression exist in health care systems. The AIMS study advances the measurement of workplace violence, as it provides both aggression incidence rates and worker aggression exposure rate calculations.
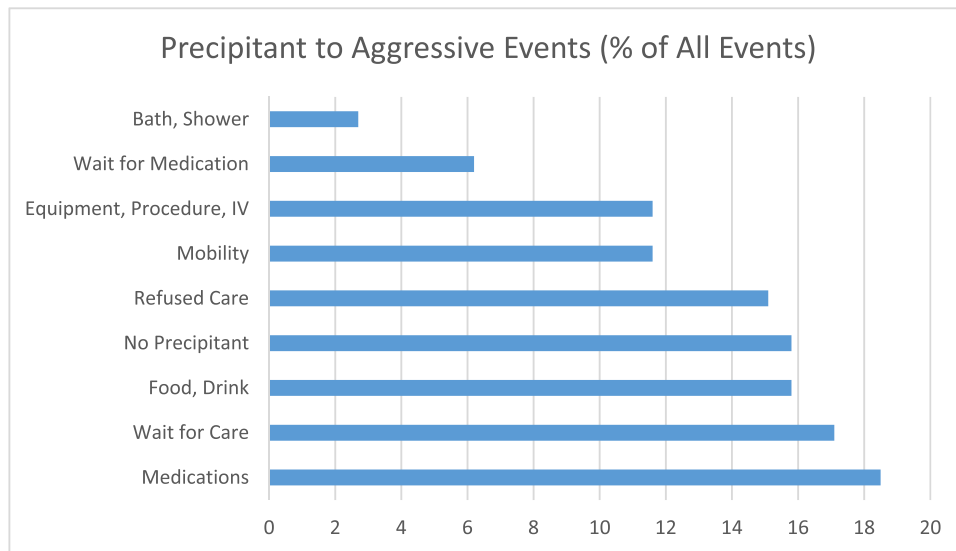
Precipitant to Aggressive Events (% of All Events)

Figure 2: This graph shows activity that precipitated aggressive events ($N = 146$ aggressive events recorded on the Aggressive Incident and Management Log [AIM-Log]). Multiple responses were possible. Aim-Log Options "Equipment," "Procedure," and "IV Therapy" are combined.

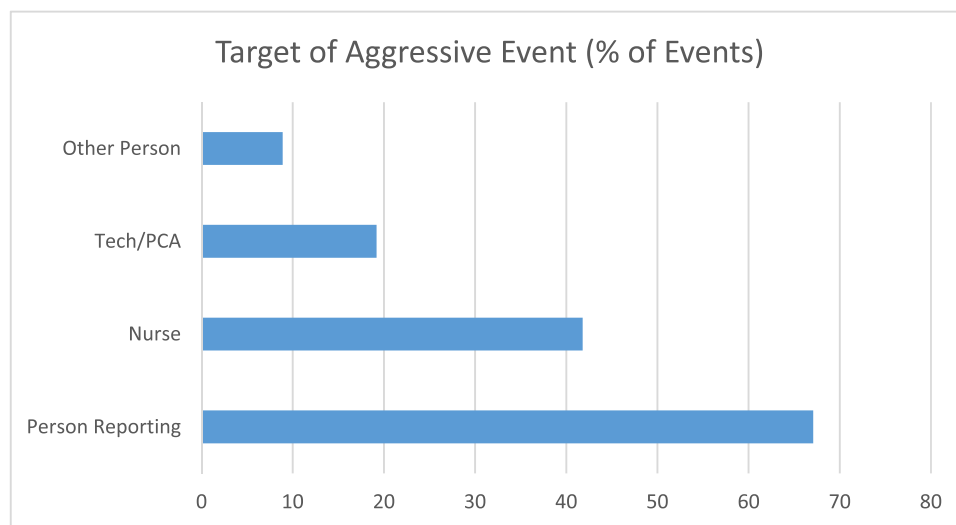## Target of Aggressive Event (% of Events)

Figure 3: This bar graph shows the targets of aggressive event ($N = 146$ aggressive events). Multiple responses were possible. Aggressive Incident and Management Log (AIM-Log) options "Patient," "Other Patient," and "Wall, Floor or Door" were not identified as the target of any aggressive events. PCA, patient care assistant.

When considering the aggression incidence rates obtained in this study, the patient care staff participants recorded events daily; most prior studies have calculated rates based on retrospective data collection, varying from days to years, using various surveys, including incident reporting systems. For example, Chapman et al. reported that 75% and 100% of nurses in medical inpatient settings in one hospital in Australia reported physical and verbal aggression events, respectively, with an average of 19.74 events over the preceding 12 months.[17] If this rate is extrapolated to full-time hours worked in a year, workers in this study were exposed to 60.77 events per worker in one year, with 47.87 verbal events and 20.37 exposures to physical aggression per year. As many studies have noted, underreporting

is a major problem in understanding the extent of workplace violence exposure,[9] and clearly the longer the retrospective period reported on, the more likely events are underreported.

This study provided clear definition of events as well as careful training on what would be considered an event and how to record events, which may have resulted in patient care staff more actively recognizing aggressive events. Participants were not relieved of any normal work activities on the days they participated in data collection, meaning this was work added to their already full assignments. The study procedures normalized reporting of events that, in addition to the real-time counting of events promoting recall, may have contributed to greater event reporting than in other
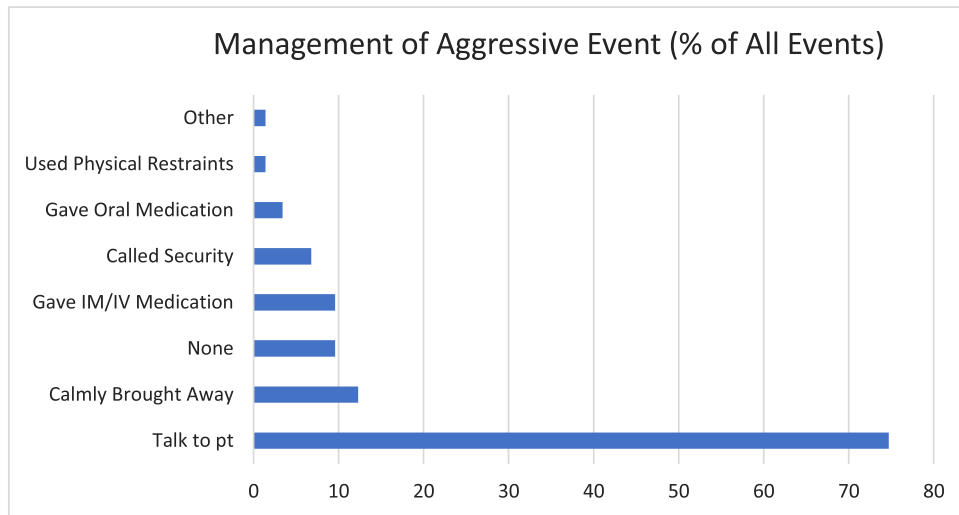
Management of Aggressive Event (% of All Events)

Other
Used Physical Restraints
Gave Oral Medication
Called Security
Gave IM/IV Medication
None
Calmly Brought Away
Talk to pt

0 10 20 30 40 50 60 70 80

Figure 4: This graph shows actions taken to manage aggressive events (*N* = 146 aggressive events). Multiple responses were possible. IM, intramuscular; IV, intravenous; pt, patient.
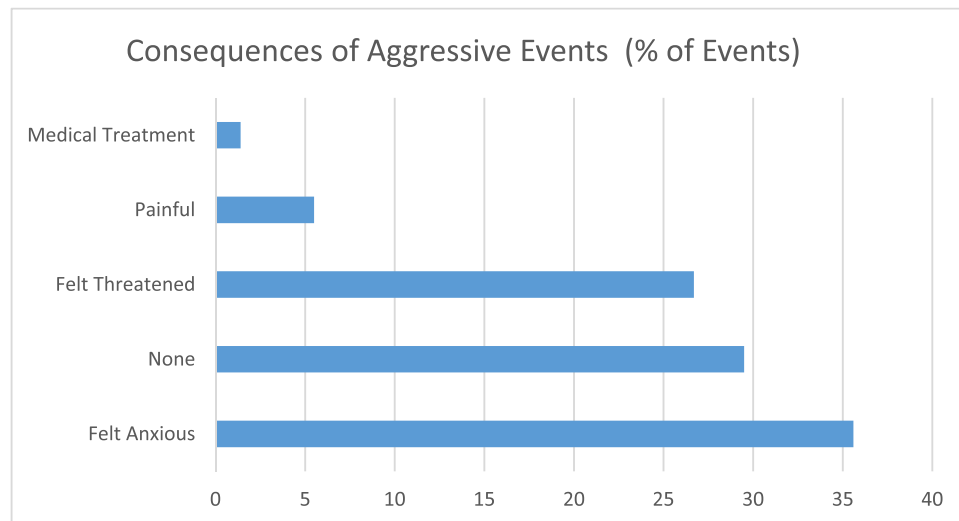
Consequences of Aggressive Events (% of Events)

Medical Treatment
Painful
Felt Threatened
None
Felt Anxious

0 5 10 15 20 25 30 35 40

Figure 5: This bar graph shows consequences of aggressive events (*N* = 146 aggressive events). Multiple responses were possible.

studies. For example, in a study based on reported rates of incidents in the past year, a rate of 16.1 assault events per 100,000 patient-days of care was identified in Veterans Health Administration medical inpatient units based on a survey of past year reported incidents by hospitals.[18] This would compare to a rate of 4,264.4 physical aggression events per 100,000 patient-days found in this study, which exemplifies the underreporting involved with relying only on incident reports for rate calculation. Furthermore, the ease of data collection using tools established in this study are likely to be far simpler and easier than lengthy event reports, which could deter reporting in the first place.

Accurate measurements of exposure rates require timely documentation as well. Our study advances measurement of exposure rates, as it included recordings of the severity of the events. Most events were not considered high-severity events and did not result in coercive intervention such as

restraint, offering information on a continuum of severity. Information about events with effective prevention, de-escalation, and intervention would not be available if only events resulting in restraint, injury, or incident report were evaluated. To our knowledge, this is the first study that provides quality improvement leaders with a process to collect all three measurements (incidence, exposure, and severity). Using event counters and AIM-Logs may assist with The Joint Commission's 2022 revised workplace violence prevention standards requiring organizations to develop programs that include data analysis, training and education, and post-incident strategies.[19]

This study measured precipitants of the aggressive events. The three most common precipitants were administering medications, waiting for care, and receiving food or drinks. These findings align with prior studies that found actions involving dietary trays and feeding patients[20] and

waiting times[21] were common precipitants. Leaders can use the AIM-Log as part of debriefings after aggressive incidents to document common precipitants in their settings. Collectively, leaders can incorporate these findings into their training and education to provide staff with information on and safety strategies to manage high-risk activities.

This study found that verbal aggressive events were more frequent than physical, which aligns with numerous prior studies. Of importance, studies report that consequences of verbal abuse and threats may be worse and more serious than physical.[22,23] The patient care staff reported feelings of anxiety or feeling threatened as common consequences of aggressive event exposure. Collectively, these findings can assist leaders to develop post-incident strategies to help clinicians manage such symptoms. Through using the AIM-Logs as debriefing tools, leaders can document such consequences to justify the need for additional resources (for example, employee assistance programs, peer-to-peer support, pastoral care) to help staff. Managing the psychological consequences of such events is critical, as the evidence clearly supports that such events contribute to lower engagement, high turnover, and burnout.[24,25]

Strengths and Limitations

The primary strength of this study is that it simultaneously measured incidence, exposure, and severity of aggressive events in real time between two different hospital settings, community-based and academic. The prospective cohort study design allowed for collection of aggressive event information in real time and limited the impact of recall bias that has been problematic in other studies. Power analyses were conducted to identify the minimum sample size and length of follow-up in which aggressive events would be expected to occur. The exposure of interest, verbal and physical aggression, was clearly defined, and careful training of patient care staff in use of the new tool provided a strong foundation for data collection. However, we also acknowledge four limitations.

The first limitation involves differences in the number of events reported via counter compared to events reported via the AIM-Logs. This occurred due to workers differently reporting the number of events from the counter, which were counted as events that occurred across the shift, compared to events descriptively recorded using the AIM-Log at a later point. It is possible that as staff recalled events descriptively, they did not include some physical or verbal events counted previously, which can be considered a form of underreporting events. It is also possible that some events were reported as physical only or verbal only and event characteristics may have been forgotten later in the shift.

Second, although the rates of events identified in this study were similar across the settings, differences in hospital locations and shift structures may explain some of the differences found. The community-based hospital is located near a psychiatric hospital and possibly had a higher rate of psychiatric diagnoses and psychotropic medications that could contribute to higher aggression rates. In addition, the academic hospital had greater frequency of more than three reported events per shift, which may be explained by longer shift lengths allowing more time for events to occur. Last, although job titles were the same between the hospitals, actual roles may differ slightly, which could explain some differences.

Third, the results should be considered with some potential biases. An observational design was used instead of an experimental design that would provide higher rigor and less subjectivity. Sampling bias may have occurred given that participation was voluntary and patient care staff may have self-selected based on their interest in the topic or prior experiences with workplace violence. A data collection period of 14 days was chosen for recording aggressive events using counters and AIM-Logs in this study. A power analysis was used to determine the required sample size of workers using a 5-day reporting period based on prior studies of worker aggression exposure. Using a 14-day period was expected to ensure that aggressive events would be recorded and would provide more than the minimum number of one to two physical aggression events previously identified.[26,27] Given the average length of stay of approximately three days on these units, we also expected to minimize shifts in aggressive event rates due to individual patients or day-to-day events on units. Finally, these issues were balanced with concern that a decline in reporting would occur over time and that a longer period of data collection adding to patient care staff paperwork and workload might be considered onerous.

Last, this study was completed prior to the COVID-19 pandemic, so results may not reflect current aggression trends or differences given worker turnover. Some sources suggest that aggression rates have increased with the pandemic; for example, one study found that 27.4% of RNs reported an increase in WPV during the pandemic.[28]

CONCLUSION

This prospective cohort study measured the incidence of patient aggression and worker aggression exposure in a multisite inpatient medical setting using real-time event counters and an AIM-Log to characterize events. These measures provide a more accurate account of aggressive events in inpatient medical settings—a problem that affects both patient and worker safety. Aggressive events occur on a daily basis in most inpatient medical settings, suggesting that more attention must be paid to the nature of those events and to prevention and management of patient aggression. Quality improvement leaders can use the AIM-Logs to enhance current data analyses or as post-event debriefing tools to understand common precipitants and severity levels. These findings provide insight into areas for future research on preventing aggression and understanding its sequelae on health care workers.

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