

Impact of Patient-Engaged Video Surveillance on Nursing Workforce Safety

Patient Aggression/Violence

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ABSTRACT

Background: Health care workers are 4 times more likely to suffer violence than workers in other industries.

Purpose: The aim was to examine types of patients' verbal/physical abuse against the nursing workforce observed through patient-engaged video surveillance (PEVS) and interventions initiated by monitor technicians.

Methods: A descriptive study was conducted to analyze all types of patient-initiated abuse, physical and verbal, reported from 73 hospitals and patient response to PEVS.

Results: Of 150 434 patients whom RNs enrolled into 24-hour PEVS, 5034 patients (3%) were identified by RNs as at risk for aggressive/violent behavior as their primary or secondary reason for PEVS enrollment, and 32 (0.60%) patients exhibited such behavior. A total of 221 patients demonstrated aggressive/violent behaviors, 32 (15%) were identified as at risk, and 189 (85%) were not. However, 5002 (99%; 5002/5034) of the patients identified as a risk for aggressive/violent behaviors did not exhibit these behaviors.

Conclusions: Patient-engaged video surveillance is an effective method to track and trend patient aggression toward nursing staff, increasing patient and nursing workforce safety. Because 99% of the patients who exhibited aggressive/violent behavior were not identified by RNs as at risk, organizations should consider adding violence risk tools as part of patients' admission assessment.

Keywords: nurses, occupational safety, video surveillance, workplace violence

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The data reported in this research study were extracted from the AvaSure, LLC, national database. Patricia A. Quigley, PhD, MPH, MS, APRN, is an independent contractor and Fall Prevention Expert and a member of the AvaSure, LLC Advisory Board. This author has no direct influence on the vendor database, data entry or management, or data analysis. Lisbeth Votruba, MSN, RN, is vice president of Clinical Quality and Innovation at AvaSure, LLC. AvaSure is the producer of the Patient Engaged Video Surveillance (PEVS) software used in hospitals. This author has no influence on data entry or management, or statistical analysis. Jill Kaminski, MS, is clinical data system and analyst at AvaSure, LLC. She led the study and produced the PEVS software used in hospitals. She is a statistician employed by AvaSure, LLC and is responsible for database design and testing, development of product data entry education tools used by clients, statistical analysis, and dissemination of results. This author has no influence on data entry, which occurs at the patient, unit, and hospital levels.

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Workplace violence (WPV) across all industries, including health care, continues to increase in the United States. The National Institute for Occupational Safety and Health refers to WPV as violent acts, such as physical assaults, and threats, such as verbal abuse, directed toward people at work or on duty.¹ Of great concern, health care workers are 4 times more likely to suffer violence than workers in other industries.² The Joint Commission emphasizes the urgency of organizations to monitor and trend WPV because the prevalence is unknown. Everyday occurrences of verbal abuse are commonly overlooked and underreported, whereas heinous, violent events make the news.³ Speroni et al⁴ reported that 2.1% of their hospital system nurses reported WPV injuries to employee health, whereas 76% of them reported experiencing violence. This represents a large, underreported delta between reported injuries and experienced violent events. To address this, The Joint Commission calls for tracking and analysis of all

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types of abuse including those that do not result in injury, such as near misses and verbal abuse. The Occupational Safety and Health Administration also recommends analyzing near misses to identify patterns.²

As a result of these factors, health care organizations are challenged to capture previously unreported events in a culture where nurses often believe that these events are just part of their job or that nothing will change if reported.⁵ Prior research has relied on survey responses based on nurse recall and reporting by freewill.^{4,6} Only 1 study about patient-engaged video surveillance (PEVS) has reported the incidence of verbal and physical abuse against the nursing workforce.⁷ This study expands on prior research that detailed gender, types, and rates of assault and violence, and the effectiveness of monitoring technicians' actions to increase nursing workforce safety.

PATIENT-ENGAGED VIDEO SURVEILLANCE

Video surveillance in hospitals has historically occurred in emergency department holding areas and intensive care units. Cameras are installed in patient rooms, monitor screens are placed in busy nurses' stations, and patient observation is a collateral assignment to unit secretaries or telemetry technicians. In contrast, PEVS is a more interactive form of video surveillance with dedicated and trained monitoring staff using a hospital workstation to monitor multiple patients simultaneously. Bedside clinical nurses select patients for PEVS on the basis of nursing assessment; they identify patients who are most at risk for falls and other adverse events, who are often those with mental status impairment. Monitoring staff become familiar with patients' behavioral patterns and proactively intervene before patients' behaviors escalate. Through a 2-way audio communication system, they verbally redirect patients, contact caregivers, and, if necessary, trigger an alarm. They also document patient observation, patient interactions, and adverse events prevented within the system.

Published articles on the outcomes of PEVS report an effective reduction of overall fall and injury rates. One study has measured actual observed and prevented patient aggression and violence against the nursing staff via PEVS.⁷ Evidence shows that when patients most at risk for falls are selected for observation, and falls

are prevented for the observed patients, overall hospital and/or care unit fall and injury rates decrease.⁸⁻¹³ These studies also report significant cost savings due to reducing falls, falls with injuries, and one-to-one sitter costs.^{8-10,12,13}

Patient-engaged video surveillance is a leading innovative patient safety technology that provides evidence of patient aggression and violence against the nursing workforce. Using PEVS creates a safe environment for the nursing staff; monitor technicians detect escalating patient behaviors that warrant immediate action and warn staff. Furthermore, surveillance data are used to report, trend, and track these behaviors for quality improvement and workforce safety. An in-depth, descriptive analysis of a national data set was completed to better inform nursing professionals and the health care industry about improving workplace safety.

Research questions

Through analysis of large-scale program evaluation data, a descriptive study was conducted to answer the following research questions:

1. What percentage of patients enrolled in PEVS due to aggressive/violent behavior had actual assault incidents, compared with the group enrolled for reasons other than aggressive/violent behavior?
2. What are the differences in gender, alarms rates, verbal interventions, and response times between patients who had an observed violent incident and patients who did not?
3. What are the frequencies and types of verbal and physical abuse experienced by nursing staff?
4. How frequently did monitoring staff prevent near-miss aggressive/violent incidents through verbal redirections or alarms?

METHODS

The same PEVS system was implemented across 73 hospitals. Hospitals reported at least 1 documented physical or verbal incident through the same national data reporting system. Data were collected from the national data reporting system between July 1, 2017, and April 30, 2019 (21 months). AvaSure's TeleSitter is the PEVS program implemented: this is a patient-engaged telehealth solution that includes either a permanently installed or mobile monitoring

device in the patient room. An audio-video feed is transmitted across the hospital's secured wireless network to a workstation where a trained monitoring staff member can interact with up to 16 patients at once. The primary bedside nurse selects appropriate patients for PEVS based on nursing judgment and with the guidance of hospital-specific policies, working with the monitor staff to set up an individualized PEVS plan of care. The authors are not aware whether nurses from the 73 hospitals used a risk-for-aggression screening tool to select patients for PEVS. During surveillance, the monitoring staff observe the patient's agitating behaviors and verbally engage the patient to redirect and/or prevent escalation. In the case a patient does not respond, and there is an urgent or emergent observed behavior, a PEVS alarm is triggered. When monitoring staff observed a verbal or physical abuse event, a short, 500-character, free-text description of what was observed is documented into the PEVS record.

MEASURES

Data collection

As video-monitoring staff observed and intervened, data were captured automatically from each patient's PEVS electronic record into a national database. The data were stored securely via cloud for ease of data export and analysis with RStudio. The 73 participating hospitals in this study were selected on the basis of the presence of intervention data logging. All participating hospitals had an executed agreement allowing for the analysis and publication of aggregate data. On a monthly basis, AvaSure, LLC (Belmont, Michigan) securely exported raw data from the hospitals' servers. Data did not contain protected health information, as defined by the Safe Harbor method.¹⁴ Data were then aggregated to provide program metrics and national benchmarking for subscribers.

Key metrics

Monitoring staff software interactions were automatically captured to provide patient engagement and event metrics including: (1) verbal interventions: occurrences of monitoring staff using the talk button to speak directly to patient; (2) PEVS alarm: occurrences of monitoring staff activating the alarm; and (3) alarm response time: a measure of the amount of time elapsed

between activation and deactivation of the alarm.

The software also allowed monitoring staff to report actual events with a brief description of the circumstances or avoided events and which of their interactions likely redirected the patient. The 2 main types of reported abusive incidents are (1) physical abuse: aggressive behavior that may or may not result in injury to either the patient or the caregiver, and (2) verbal abuse: the use of abusive or demeaning language. Only abusive events by a patient toward the nursing staff were analyzed. Abusive events between patients and visitors were excluded from this study.

Verbal abuse category examples

The free-text descriptions from the monitoring staff were reviewed separately by 2 authors and placed in predetermined categories. If there was a nonagreement on a category, the third author made the final determination. The verbal abuse incident categories and examples include the following:

1. Profane language: offensive language such as swearing or curse words, for example, "said the f-word 20 times in 5 minutes to telesitter and nursing staff."
2. Derogatory language: derogatory remarks and language that was hurtful and belittling, for example, "Verbally abusing sitter. Calling her names, using sexually inappropriate insults."
3. Intimidation/yelling: verbalizing in a loud tone that may result in an escalating verbal incident, for example, "Patient started yelling and throwing things across the room."
4. Threats/threaten to kill: stated or implied threats ranging from minor threats to threats to kill, for example, "Threatening to hit nurse repeatedly, both verbally and by waving fist next to RN's face."

Physical abuse category examples

The physical abuse incident categories and examples include the following:

1. Physical contact: observed aggressive physical contact, for example, "One of the nurses went in to help the patient with getting back in bed; the patient then shoved the nurse hard throwing her across the room."

2. Combative event: flailing and attempts to make violent physical contact, for example, "Patient sat up and swung his hand at the nurse."
3. Spitting/biting: monitor staff observed the patient spitting or biting the caregiver, for example, "Spitting at the nurses while they are trying to toilet him."
4. Throwing objects: using a physical object in the room to throw at the caregiver, for example, "Patient pulled off restraint and threw it at the nurse."

RESULTS

Between July 1, 2017, and April 30, 2019, a total of 150 434 patients were selected for monitoring from PEVS. These patients were monitored for a total of 9 477 342 hours, during which 221 patient abusive events were perpetrated on the nursing workforce. Monitoring staff reported preventing 7915 abusive incidents by either verbally redirecting the patient or by triggering the PEVS alarm.

Percentage of at risk for aggressive/violent behavior patients compared with actual assault incidents

Of the 150 434 patients selected for video monitoring, nurses identified 5034 (3%) as a risk for aggressive/violent behavior and the remaining 97% as not a risk. A total of 221 (0.15%, 221/150 434) patients exhibited aggressive/violent behavior toward the nursing workforce; 32 (15%) were identified as a risk, and 189 (85%) not a risk on enrollment into PEVS (Table 1).

Differences in gender, alarm rates, verbal interventions, and response times by group

Of the 221 patients who exhibited abuse, 131 were male patients (59%), 51 (23%) were fe-

male, and 40 (18%) unknown gender. Verbal interventions are 2-way communications between the patient and the monitor staff. Monitor technicians verbally intervened 27.4 times per day compared with 11.9 times per day for the patients without abuse incident. Thus, monitor technicians engaged the abusive patients 15.5 times more per day, more than double compared with those who did not have an abusive incident documented. Also, monitor technicians activated the stat alarm 4.9 times per day for the abuse patients, compared with 1.7 times per day for patients who did not exhibit an abusive behavior, a 188% increase from those who did not have a documented abusive incident. For the abusive events that were preceded by an alarm, hospital staff's response to these alarms was 13.0 seconds, 2.9 seconds faster than alarms for nonabusive events.

Frequencies and types of verbal and physical abuse experienced by nursing staff

Over the 21 months, a total of 320 patient abuse incidents were observed and documented by the monitor technicians, 127 verbal (40%) and 193 physical (60%). Most of the verbal incidents, 41%, involved the patient using profanity toward the caregiver. If patients did not use profane language, they were often using intimidating language or yelling at the caregiver (33%). Derogatory remarks (13%) and threats/threats to kill (13%) occurred less frequently. Of the 17 threats/threats to kill, 7 or 41% were actual "threats to kill" the caregiver. The most frequent physical incident involved physical contact initiated by the patient (50%). Combative events occurred 39% of the time. A small percentage (11%) of incidents involved the patient throwing objects, spitting, and/or biting a caregiver (Table 2).

Table 1. Abuse/Violent Incident by Reason for Admission to PEVS

Factors	Identified as Potentially Violent by RN	Identified as Not Potentially Violent by RN	Total
Patients who were physically/verbally abusive	32	189	221
Percentage of abusive patients	0.60	0.10	0.10
Patients who were not physically/verbally abusive	5002	145 211	150 213
Total	5034	145 400	150 434

Table 2. Verbal and Physical Incidents

Incidents	n (%)
Verbal	127 (40)
Profane language	52 (41)
Intimidation/yelling	42 (33)
Threats/threaten to kill	17 (13)
Name calling/derogatory remarks	16 (13)
Physical	193 (60)
Physical contact	96 (50)
Combative	76 (39)
Throwing objects	14 (7)
Spitting/biting	7 (4)
Total	320 (100)

Prevented abusive incidents and verbal interventions

The monitor staff have the option to report any abusive incidents they may have prevented due to an intervention. Over the 21 months, the monitor staff at the 73 hospitals documented 7915 abusive incidents they prevented. Eighty-nine percent of these incidents were prevented by use of a verbal intervention and 11% by use of alarm activation.

DISCUSSION

Across and within health care systems, the integration of technology at the point of care has been frustratingly slow, and harm is still occurring at epidemic proportions.¹⁵ The integration of PEVS has sufficient evidence of effectiveness for improving patient safety. This study extends support for PEVS for nursing workforce safety. The scale of impact at a national level will expand only in health care organizations committed to intentionally mitigate and eliminate causes of harm. To gain the full benefit of PEVS, organizations should support structures and processes for successful adoption, integration, and efficacy.

Applied to reducing aggression and violence against the nursing workforce, monitor technicians need to have adequate training to use verbal interventions to de-escalate such behaviors. This study has quantified actual and prevented patient aggressive/violent behavior, but it is unknown how many monitor technicians had clinical training to recognize, report and safeguard both patients and nursing staff. The PEVS documents patient aggression/violence, but the selection and training of monitoring technicians

are hospital-based. These data support the importance of a clinical training program for the monitor technicians, especially considering the high number of observed incidents among patients that RNs did not enroll in PEVS because of risk for such behavior. Monitor technicians are the essential eyes on patients to detect onset of such incidents.

In addition, health care organizations and the nursing profession need to agree on the importance of risk for patient aggression/violence screening on admission, developing structures and processes for RN clinical assessment and care planning. The patients selected by nurses as being a potential risk for violence were somewhat more likely than others to perpetrate violence (0.6% vs 0.1%). However, 85% of patients (189/221) who exhibited violence were not identified by nurses as a risk for violence. The reasons why nurses enrolled patients in PEVS due to risk for assault/violent behavior are unknown. More male than female patients were violent. This suggests that gender is an important variable to include in risk-for-aggression scales. Patients who were violent also required more verbal interactions and alarms than other PEVS patients. Yet, bedside staff responded almost 3 seconds faster to alarms on these patients, suggesting that bedside staff are aware and concerned with the threat to their colleagues. Although multiple aggression/violence risk tools exist, their inclusion has not become a standard of care, except in mental health. Clinical education programs can be expanded to assess RN's competencies and educational needs to increase knowledge and skills about prevention, detection, and management of patient aggression and violence.

Leadership within organizations is better informed about the incidence and prevalence of such patient behaviors through PEVS. Although violent behaviors are reported, nonviolent patient behaviors against nursing workforce are underreported or accepted. The data provided by the PEVS software program provide real-time, observed, and accurate data needed to reengineer patient and nursing workforce safety. In addition, this safety program can be expanded beyond the nursing workforce to include safety of other clinical team members and family. Combative events in which the patient attempted but failed to physically assault a caregiver should be diligently tracked and trended as important "near-miss" events.

In this study, there were fewer verbal abuse incidents reported than physical abuse incidents. There may be a tendency for monitoring staff to report only the highest level of violence that has occurred and therefore neglect to report verbal abuse that occurs in conjunction with physical abuse. The large reported number of avoided abusive events (7915) demonstrates the effectiveness of monitoring staff to verbally de-escalate, warn staff before entering a patient room, and summon help as needed.

Future directions

The findings of this national large-scale descriptive study build on previous program evaluation data that confirm the benefit of PEVS technology for both patient and nurse workforce safety. This study adds increasing evidence that continuous observation and timeliness of response are key factors in preventing assault and violent events. Yet, more research is needed to increase workforce safety. This study confirms the importance of PEVS and monitor technicians to accurately collect data needed to track and trend patient assault/violence in health care. The contribution of PEVS technology adds to increasing patient and nurse workforce safety. Successful de-escalation and prevention of patient-initiated abusive and violent events are a new patient safety outcome that has yet to be reported accurately in health care literature.

Several research areas are recommended. One area is testing the effectiveness of nurse-administered risk-for-violence scales to predict the probability of patient aggressive/violent behaviors to recommend enrollment in PEVS. Nursing judgment alone to predict patient violence is neither sensitive nor specific. Qualitative research to understand clinical reasoning would be enlightening. Accurate prediction of these behaviors would result in individualized interventions implemented by nurses, monitor technicians, and other members of the interdisciplinary team to proactively prevent agitation, anger, aggression, and assault on patients and the nursing workforce.

Another area where research is needed is testing the effectiveness of a competency-based clinical training for monitoring staff—in particular, including verbal de-escalation training. Patient-engaged video surveillance near-miss data could be used for earlier identification. Escalation of response is a way to proactively stay ahead of

minor events before they become events that cause a staff injury.

Finally, the effect on patient assault/violence is unknown on the health, well-being, and retention of nurses. Injury reports to Occupational Safety and Health Administration and nurse surveys about past experiences are insufficient to determine the true negative impact to the nursing workforce. The threats that persist after the patient/caregiver relationship has ended are unnerving to the individual or the care unit targeted.¹⁶

CONCLUSION

Patient-engaged video surveillance is an effective method to track and trend patient aggression toward nursing staff, increasing patient and nursing workforce safety. Because 85% of the patients (189/221) who exhibited aggressive/violent behavior were not identified by RNs as a risk, organizations should consider adding violence risk tools as part of patients' admission assessment. This evidence-based study showing the outcomes of PEVS on this cohort of patients increases understanding about the effectiveness of using PEVS with patient-initiated abusive events. Patient-engaged video surveillance, a nurse-led technology program, is effective in increasing both patient and nursing workforce safety and should be expanded within and across health care settings.

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