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The Power of Self-Compassion: JEN

ABSTRACT (ENGLISH)

In the emergency department or other emergency care settings, there is very little downtime. Contrary to inferences made by my state representatives that nurses relax and play cards during shifts, we all know the reality of our care settings. Or this moment can take place at unexpected times, such as when we are logging into our electronic medical record, and instead of experiencing frustration that the program is not moving quickly enough, we use that moment to contemplate.

FULL TEXT

In the emergency department or other emergency care settings, there is very little downtime. Contrary to inferences made by my state representatives that nurses relax and play cards during shifts, we all know the reality of our care settings. We are required to work hard with limited resources every day. We are the safety net for our communities, and we address all patients that present to us, whatever the circumstances, because, unlike other hospital units, the emergency department has no cap for census.

We know that emergency nurses face a high rate of burnout.[1,2] The struggles of increased workload and situations such as workplace violence are often cited as reasons for this. And let's face it, how many times have you taken care of a critically ill patient or had a patient who has just passed away and you walk out of the patient's room to go directly into another room to care for another patient?

Recently, I attended a meeting with other leaders from my hospital. We talked about compassion, specifically discussing the idea that if you cannot practice self-compassion, then you cannot express compassion to others. A presenter at the meeting described a useful technique we can all use to exercise more self-compassion. He talked about the importance of taking the time to stop and reflect throughout the busy day: to simply be still in the moment and breathe.

This led me to reflect back on a practice we followed in an emergency department where I had previously worked. Anytime we had a patient who passed away, we all would take a few moments before we left the room: just a bit of time to think about the event and realize we had just cared for someone's loved one. If the patient did not have loved ones present at the time, we would recognize that the person we had just cared for was loved by someone, and they would be mourning the loss. This gave us time to stop and reflect before moving on to care for our other patients.

We are just beginning to see the end of winter. As we know, this time of year, in addition to the seasonal holidays, increases stress for many people. We also faced another stressful flu season. Our lives are busy with day-to-day nursing operations; however, adding these extra stressors takes an additional toll on us, no matter how experienced we are or how "strong" we believe we are.

I challenge us all to take a moment to consciously "Pause"[3] and take a breath throughout our days, especially after facing a critical situation or the death of a patient. I also ask you to encourage your coworkers to engage in this practice, and when you notice they're under stress, remind them to take a moment to reflect and take a deep breath. This moment can be as simple as when we have walked out of a room and are gelling with hand sanitizer, and we simply stand and take that deep breath as we rub in the gel. Or this moment can take place at unexpected times, such as when we are logging into our electronic medical record, and instead of experiencing frustration that the program is not moving quickly enough, we use that moment to contemplate.

As we know, One Person Can Make a Difference, so consider the power of a moment of self-compassion, take that

moment to be still and reflect and encourage others to do the same.

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Retention of Tourniquet Application Skills Following Participation in a Bleeding Control Course: JEN

ABSTRACT (ENGLISH)

Introduction

The American College of Surgeons' Stop the Bleed program has trained more than 1 million individuals to recognize and treat external hemorrhage. Central to this training is tourniquet application. No published studies review the retention of this skill after initial class participation.

Methods

One hundred fourteen volunteers agreed to participate. A random sample of 57 was selected and 46 participated. Upon return 6 months later, each participant demonstrated tourniquet application. An observer compared the application process with steps on a checklist. Each step completed correctly was tallied, and the total score for all 10 steps was computed as a percentage correct between 0% and 100%.

Results

The baseline score on the tourniquet skill test was 100% following initial training. At 6 months, mean scores were lower, 69% (SD = 31%) ($\chi 2 = 52.09$, df = 1, $P < 0.001$). Fourteen volunteers (30%) attained a score of 100%, and 28 volunteers (61%) achieved a passing score. Bleeding was stopped or reduced to non–life-threatening levels by 34 participants (74%). Participants with passing scores were more likely to stop or reduce the bleeding than those with failing scores (97% vs 35%; $\chi 2 = 20.99$, df = 1, $P < 0.001$). Of the 17 volunteers who failed, 18% stopped the bleeding, 18% slowed bleeding to a non–life-threatening level, and 64% were unable to control bleeding.

Discussion

At 6 months, 39% of participants were unable to successfully apply a tourniquet, and 26% were unable to control life-threatening bleeding. This study demonstrates that refresher training is needed within 6 months of initial training.

FULL TEXT

Contribution to Emergency Nursing Practice

••The current literature on the skill retention of tourniquet application following participation in a bleeding control course indicates a lack of data supporting appropriate recommendation for refresher training.

••This article contributes to the knowledge that there is a considerable skill decay 6 months after participating in a bleeding control course.

••Key implication for emergency nursing practice found in this article is that all nurses teaching tourniquet application skills as part of the bleeding control class offer refresher training within 6 months of initial course completion.

Introduction

In the United States, traumatic injury is the leading cause of death among individuals aged between 1 and 44 years and is among the most common causes of death among individuals aged 45 to 64 years.[1] Twenty percent of all civilian trauma deaths are considered preventable, and within this population, uncontrolled hemorrhage accounts for 64% of deaths.[2-4] External hemorrhage has been increasingly recognized as a major cause of potentially preventable death following severe injury. A comprehensive review of preventable deaths within the US military by the Tactical Combat Casualty Care Committee led to the establishment of evidence-based guidelines that resulted in major decreases in mortalities from combat casualties.[5] A related civilian guide for mass shootings was subsequently developed, named the Hartford Consensus.[6] The Hartford Consensus deliberations meetings were led by the American College of Surgeons. The consensus guidelines were developed by representatives from several first responder, professional medical, and government organizations following the US 2012 Sandy Hook Elementary School active shooter incident and deaths in 2012. The overriding goal of this consensus was maximizing survival during a mass casualty incident using the principles described in the acronym THREAT: threat suppression, hemorrhage control, rapid extrication of victims, assessment by medical professionals, and transport to definitive care.[6]

Following the release of the Hartford Consensus in October 2015,[6] the American College of Surgeons Committee on Trauma in collaboration with several professional stakeholder groups developed a training curriculum and initiated the national Stop the Bleed (STB) campaign with the support of the Obama Administration.[7] Among several proactive recommendations was to encourage first responders and the lay public to become trained, equipped, and empowered to step forward and intervene in a bleeding emergency. The program purports to consider bystanders at the scene of an incident as it occurs and empowers them to act as immediate responders, thus providing initial bleeding assessment and intervention until first responders arrive.[7] One of the key components of the STB initiative is baseline education and training in the use of the commercial tourniquet (CTQ) to stop extremity hemorrhage when pressure alone does not work. Although the program has progressively provided education and training to more than 1,076,000 individuals worldwide,[8] there are no recommendations regarding time intervals for refresher training to maintain confidence and competence in CTQ application. The rationale for this study was to ascertain whether CTQ application skills were sufficiently maintained 6 months after participation in an STB course and to provide recommendations for refresher training on the basis of results.

The goal of this study was to determine to what degree the skill of CTQ application was retained 6 months after participation in an STB class. The research question was, how many STB participants have retained tourniquet application skills after 6 months? It was hypothesized that tourniquet application skills would deteriorate within 6 months of completing an STB course.

Methods Design and ethical considerations

This study was a single group, prospective direct observational study. The protocol was approved by the Queen Mary University of London's Ethics Review Committee (reference number: QMREC2206a). In addition, this project was reviewed and approved by the legal counsels of Somerset County, New Jersey, and the Borough of Somerville, New Jersey. Informed consent for study participation was obtained for all participants.

Study Site

This study took place at 2 locations, the headquarters of the Somerville Emergency Medical Services in Somerville, New Jersey, and the Somerset County Emergency Services Training Academy in Hillsborough, New Jersey.

Sampling and Inclusion and Exclusion Criteria

All participants volunteering for inclusion in this study completed the American College of Surgeons–sponsored STB

program and were able to successfully complete all skill steps in sequence on a tourniquet simulator, resulting in the cessation of extremity hemorrhage. Participants were adult volunteers (aged 18 years or older) who successfully completed an STB class presented by the principal investigator.

A total of 157 STB class participants were solicited to volunteer. One hundred fourteen agreed to volunteer after their respective classes. A random sample of 57 (50%) was selected, and all volunteers agreed to participate in the study. Volunteers agreeing to participating in the 6 month follow up were added to an Excel spreadsheet and then 57 numbers were selected by a random number generator. None of the volunteers knew that their CTQ skills were going to be observed. At the time of the class, all agreed to return in 6 months for STB refresher training. Exclusion criteria for participation included younger than 18 years (0 participants), participation in another STB-like program (1 participant), and refusal to consent for inclusion in the study (0 participants).

Primary Outcome

The primary outcome of this study was the determination of CTQ application skill retention 6 months after attending an STB course.

Data Collection

A standardized checkbox data collection checklist was developed and reviewed by 2 other bleeding control instructors (Figure 1). The data to be collected paralleled the procedure for CTQ application as outlined in the American College of Surgeons Committee on Trauma's STB curriculum.[7] Participant number was assigned to each volunteer to maintain anonymity and for accounting purposes.

Study participants presented for refresher training 6 months (±1 week) after completing their initial program. Following informed consent, each participant was isolated and observed by the investigator during an attempt to apply a CTQ (Combat Application Tourniquet, CAT Resources, LLC, Rock Hill, SC) to a tourniquet simulator (BCon Trainer, Techline Technologies, Willow Grove, PA). As the participant proceeded with the application of the tourniquet, the observer compared the steps in the CTQ application process with the steps on a data collection form.

VARIABLE SCORING

Each step of the observation that was completed correctly was tallied, and the total score for all 10 steps computed as a percentage correct between 0% and 100% and transferred to a master spreadsheet for ease of data analysis. During the initial training session, all steps had to be successfully demonstrated to complete the training. At 6 months, the scores of 0% to 60% were considered failures, and scores of 70% and higher were considered successes. This scoring system was selected as it paralleled the common academic scoring system used in the US. Minimal deviation was defined as the volunteer's ability to demonstrate at least 70% of the skill procedure steps and stop the bleed on the tourniquet simulator. The control of bleeding was scored as a dichotomous variable: bleeding controlled or bleeding not controlled. If bleeding was not controlled, ongoing bleeding was rated life threatening or non–life threatening. Catastrophic failure was defined as the failure to stop or slow considerable bleeding on the tourniquet simulator. Specific errors were recorded as comments.

Data Analysis

Data collection checklists were transcribed into Microsoft Excel. Tourniquet skill scores were treated as continuous data; descriptive statistics were calculated as means, SDs, medians, interquartile range (IQR), and percentages. Bleeding control ratings were used to stratify the skill test scores for chi-square analysis, and the proportions of participants succeeding in controlling bleeding were calculated as percentages. Specific errors that had been recorded as comments were analyzed thematically.

Results

Of the 57 volunteers agreeing to participate, 46 presented on the specified date and time assigned for the refresher

session. All 46 volunteers consented to data collection, and a complete dataset was obtained for each volunteer. Figure 2 shows age distribution, and Figure 3 shows the sex demographics of STB participants. The age and sex of study volunteers was similar to those of the STB participants (age: $\chi^2 = 0.379$, df = 5, $P = 0.99$; sex: $\chi^2 = 0.028$, df = 1, $P = 0.87$).

Table 1 summarizes the CTQ application skill steps, which were identical to those taught in the STB curriculum completed 6 months earlier.[7] Of the 46 volunteers participating in this study, the baseline score on the CTQ skill test was 100%, but at 6 months, the mean test score was significantly lower at 69% (SD = 31%) ($\chi^2 = 52.09$, df = 1, P Figure 3).

Table 2 stratifies participants' skill scores by bleeding control. Bleeding was stopped or reduced to non–life-threatening levels by 34 participants (74%), and those with passing scores were more likely to stop or reduce the bleeding than those with failing scores (97% vs 35%; $\chi^2 = 20.99$, df = 1, P Figure 4 shows the distribution of test scores at the 6-month follow up.

Table 3 provides the frequency of 8 critical errors that occurred when attempting to place the CTQ (n = 62; mean errors per participant: 4.4 [range, 0-10]). The most common error was placing the CTQ too low (32%), followed by applying the strap too loose (18%).

Discussion

A reduction in CTQ application skill occurred within 6 months after the successful completion of the American College of Surgeons' STB program. Although 61% of the participants successfully applied at least 70% of the CTQ skill steps, 26% showed catastrophic failure. Fundamental errors in CTQ application observed in this study were placing the CTQ too low on the extremity, applying the strap too loose, failing to thread the strap through the CTQ buckle, lack of physical strength to turn the windlass sufficiently, and not assessing to see whether bleeding stopped when finishing the application process. All participants had previously been taught and successfully demonstrated all 10 skills steps in CTQ application. In addition to 11 of the 17 participants with failing scores (65%), 1 of the 29 participants (3%) with a passing score on the CTQ application portion of the evaluation permitted life-threatening bleeding to continue. In the case of the participant who passed the skill process but failed to stop life-threatening bleeding, the participant had placed the CTQ too low on the extremity and did not have the strength to turn the windlass more than 3 revolutions. In addition, 4 other participants had trouble turning the windlass to completely stop the flow of blood although they did not have this issue when demonstrating this skill during the STB class. In none of these instances did the study participant follow the skill step of stating that they would apply a second CTQ proximal to the first. More emphasis on this skill step should be integrated into future STB classes.

A scoring checklist was developed for this study (Figure 3). The steps in this checklist parallel the procedure for CTQ application as outlined in the American College of Surgeons Committee on Trauma's STB curriculum.[7] In this study, each step on the checklist was weighted equally; however, after data analysis, 1 individual was able to achieve a score of 70 (indicating successful skill step completion) without achieving satisfactory bleeding control. Further investigation revealed that the participant was able to matriculate most of the application skills but did not have the strength to turn the windlass to stop severe bleeding.

The results of this study parallel those of similar trials regarding medical skill retention. Several of the critical errors observed in this study were similar to those reported by Baruch et al.[9] In their study of 179 untrained layperson applications using the CAT, Baruch et al[9] found that of the 134 errors observed in tourniquet application, too much slack was noted 54% of the time, followed by too few turns of the windlass (22%), misunderstanding of the strap and buckle mechanisms (11%), and incorrect tourniquet placement (11%). The present data are consistent with those reported by Goralnick et al.[10] Goralnick et al[10] compared the outcomes of 4 different in-person hemorrhage-control

training programs with 303 participants and found that although all 4 programs provided adequate bleeding control training, on retesting at 3 to 9 months later, only 54.5% of the participants retained enough skills to successfully demonstrate competence in CTQ application.

Adding to the notion of skill retention, a number of studies cite similar retention loss for several psychomotor and knowledge skill courses. In a study of the retention of knowledge and skills in first aid and resuscitation by airline cabin crews, Mahony et al[11] found a marked decay in skill retention in 35 subjects at 12 months following recurrent first-aid and resuscitation training. Another study assessed cardiopulmonary resuscitation skill retention and self-confidence in preclinical medical students.[12] These investigators concluded that both confidence and skills deteriorate considerably within 1 year of training, reaching unacceptable levels.

In addition, skill retention among medical professionals demonstrates a marked reduction in competence within 1 year of initial or recurrent training. In a study by Gass and Curry,[13] 39 medical professionals (19 nurses and 20 physicians) were pre- and posttested in basic cardiopulmonary resuscitation and then retested at 6 months (12 nurses and 13 physicians) and 12 months (12 nurses and 6 physicians). Both knowledge and skills showed considerable decay at the 6-month assessment and had essentially reverted to pretraining levels at the 1-year mark. Similarly, Binkhorst et al[14] assessed the retention of knowledge and skills in pediatric, basic life support within a group of pediatricians. In this study, 58 pediatricians and pediatric residents were assessed between 3 months and 2 years after the completion of a standard, pediatric basic life support training. As time from the training advanced, knowledge and, in particular, skill retention deteriorated, reaching the highest level 2 years or more following the last participatory training session. Although the deterioration in knowledge and skills demonstrated a linear increase from 3 months to 2 years, there was marked decay in skill competence at the 6- to 12-month time interval. In another analysis, by de Rujter et al,[15] data were collected on the retention of first-aid and basic life support skills in undergraduate medical students in the Netherlands at 1 and 2 years after participating in first-aid and basic life support trainings, respectively. There were 2 cohorts in this study, the first was retested 1 year after the completion of the course, and the second cohort was evaluated 2 years after training. Ninety-four students participated in the 1-year cohort, whereas 66 students were available for the 2-year cohort. Results demonstrated a marked decrease in skills for both first aid (100% failure) and basic life support (100% failure).

Regardless of training (layperson or professional), the literature shows that skill retention drops substantially at 6 to 12 months following the initial teaching session. If asked, will participants return for refresher training? In this study, 46 of 57 individuals did return for 6-month refresher training when asked. On the basis of the requests I made to my learner population during the span of this study (n = 157), 72% were willing to return for a refresher, and of this, 81% returned. Although there is no requirement for the lay population to refresh their skills, I continue to offer all the participants of my STB program the opportunity to attend a 20-minute, hands-on refresher session every 6 months. To date, 58% of all participants have attended at least 1 refresher in the 16 months I have been offering such an opportunity. There are no data in the literature to compare this rate of return to other volunteer-oriented first aid–related courses. A 57% rate of return demonstrates the perceived importance of maintaining the skills taught as part of the STB curriculum.

Limitations

There are several limitations to this study. The sample size was small, limited to 2 testing sites at a single time point, and the STB course instructor was the principal investigator of the study and performed all the follow-up testing. To better characterize the rate of skill degradation, the study should be replicated with a larger sample size by other trainers, preferably at 3-, 6-, and 12-month follow-ups. In particular, it would be of interest to learn whether both a 100% score on the skill test predicts the ability to stop simulated, life-threatening bleeding as it did in this study and

the characteristics associated with perfect test scores. This study was conducted in a low-stress environment. The successful completion of CTQ application might be reduced if studied under conditions more typical of the stressful, chaotic conditions encountered in real life. Replicating this environment and studying CTQ application success could give better insight as to how participants would perform during a real incident. In this study, I did not assess whether the participants remembered that there are other means to mitigate bleeding control if a CTQ is not available. In addition, it does not assess the ability of the participant to apply an improvised tourniquet if a CTQ is not available. Although most participants in this study (73%) did purchase or have access to a CTQ, it may not be readily available, and other methods of bleeding control would be required. STB does discuss alternative means for hemorrhage control, and future research should include the evaluation of the retention of these skills.

Another limitation was the time interval used to reevaluate CTQ application skills: refresher training at 12 months may be more realistic. However, the results showed a significant degradation in CTQ application skills within 6 months. More than one third (39%) of the volunteers did not adequately apply the CTQ to stop severe hemorrhage completely and 26% did not stop or slow life-threatening hemorrhage.

This prospective, observational study is the first to assess CTQ retention skills following participation in an STB program. As such, replication is needed using a larger cohort of participants and recruitment of participants completing other STB programs.

Implications for Emergency Nurses

This study demonstrates that 6 months after training, 26% of participants who showed competence in CTQ application were no longer able to apply this device to stop catastrophic bleeding. These data have implications for emergency nurses teaching bleeding control courses as refresher training must be arranged at regular intervals to assure ongoing competence. Although this study did not specifically address health care professional competence in CTQ application, on the basis of the skills retention literature,[9-15] I feel it is reasonable to assume that health care professionals should regularly practice CTQ application.

Conclusions

This study demonstrates that 6 months after training, 30% of participants taking part in the STB program had a perfect recall of the CTQ skill test, and 74% were able to control bleeding to a non–life-threatening level; however, 39% of participants were unable to pass the CTQ skill test, and 26% of the participants were unable to control life-threatening bleeding. Given the fact that these data are consistent with the outcomes of other medical-skill retention studies, I recommend that the American College of Surgeons develop a refresher training curriculum and recommend refresher training sessions at least 6 months following initial training, as annual training may be insufficient to maintain CTQ application skills.

Author Disclosures

Conflicts of interest: none to report.

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Tourniquet application steps	Correct	Incorrect
Identified uncontrollable external bleeding	46	0
Applies the tourniquet to the extremity (inserts through loop or fastens around extremity)	39	7
Positions the tourniquet at a proper location	26	20
Pulls the self-adhering back tight and securely fastens back on itself as tight as possible	27	19
Secures strap so as not adhere the band past the windlass clip	30	16
Twists the windlass rod until bleeding stopped	28	18
Secures or locks windlass in windlass clip	35	11
Secures the strap through windlass clip and around as far as it will go	27	19
Secures the windlass time tag across the clip	34	12
Verbalized need to note the time of application of tourniquet	26	20

Tourniquet skill mastery score	Bleeding control			
Bleeding stopped	Bleeding no longer life-threatening	Life-threatening bleeding continues	Total	Fail
3	3	11	17	Pass
25	3	1	29	Total

Common critical errors in tourniquet application	Number
Strap applied too loose	11
Tourniquet placed too low (“high and tight”)	20

Tourniquet placed directly over wound	3
Strap not secured back against itself	6
Not enough strength to turn the windlass to completely stop bleeding	5
Did not thread strap through buckle	6
Did not tighten the windlass till bleeding stopped	6
Did not clip windlass into windlass clip	5

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Esophageal Perforation After Cervical Spine Fusion Presenting With Dysphagia and a Burning Sensation: JEN

ABSTRACT (ENGLISH)

Anterior cervical spinal surgery is, at present, one of the most effective clinical methods of treating cervical spinal stenosis.1 Dysphagia occurs in 71% of patients during the first 2 weeks after surgery and gradually decreases with time; the use of steroid medications can significantly reduce the incidence and severity of postoperative dysphagia.2,3 When a patient who has been taking steroids continues to experience dysphagia or burning throat pain, strong consideration must be given to other rare postoperative complications. [...]of triage, the patient appeared in no distress and was classified as category III according to the Taiwan Triage and Acuity Scale (a 5-level triage scale modified from the Canadian Triage and Acuity Scale [CTAS], had a Glasgow Coma Scale score of 15, and the following vital signs: temperature of 38.2°C (100.8°F), respirations of 18/min, pulse of 108/min, and blood pressure of 108/62 mm Hg. Laboratory tests showed an increased white blood cell count of 10.66/mm3 with 79.0% of segmented neutrophils, elevated C-reactive protein (CRP) of 24.52 mg/dL, and erythrocyte sedimentation rate (ESR) of 34 mm/h. The patient was subsequently discharged from the hospital 42 days after readmission.Discussion Anterior cervical spine surgery is a common procedure for treatment of cervical spondylosis with spinal stenosis, and it has a high rate of success with long-term effectiveness.1 Possible complications of the procedure include vocal-cord paralysis (incidence: 0.07%), postoperative hematoma (incidence: 0.1 to 0.5%), wound infections (incidence: 0.1% to 1.6%), esophageal perforation (incidence: 0.2% to 1.15%), dural tear and cerebrospinal fluid leakage

(incidence: 0.3% to 13%), and dysphagia (incidence: 71%).1,2 One of the most notable aspects of this case was that although the patient presented with the common complication of dysphagia, his problem turned out to be the rare and potentially fatal complication of esophageal perforation.

FULL TEXT

Contribution to Emergency Nursing Practice

••Esophageal rupture is an uncommon but potentially lethal complication following anterior cervical spine fusion. Recognition of this complication may be difficult, as dysphagia and a burning sensation in the throat are common following this surgery, and the symptoms may be dismissed as part of the normal postoperative course.

••This article presents an actual case of a patient with this complication after anterior cervical spine fusion and a discussion of subsequent treatment.

••Key implications for emergency nursing practice are to inform emergency nurses of the symptoms and signs of life-threatening esophageal perforation, which may be masked by administration of steroids.

Anterior cervical spinal surgery is, at present, one of the most effective clinical methods of treating cervical spinal stenosis.[1] Dysphagia occurs in 71% of patients during the first 2 weeks after surgery and gradually decreases with time; the use of steroid medications can significantly reduce the incidence and severity of postoperative dysphagia.[2,3] When a patient who has been taking steroids continues to experience dysphagia or burning throat pain, strong consideration must be given to other rare postoperative complications. If such complications are not identified and treated promptly, the patient may face a life-threatening condition. The authors present a case in which the focus of pathology was determined by relying on medical history queries, physical examination, laboratory tests, and radiologic imaging.

The patient in this case developed burning throat pain and dysphagia less than 4 hours after discharge from the hospital following anterior cervical fusion. He was readmitted after returning to the emergency department of that hospital and was hospitalized for 42 days until recovery. This case study provides a description of the patient's clinical manifestations, diagnosis, and treatment process. We hope that this case presentation will provide emergency nurses with a better understanding of the possible postoperative complications and the care needed for patients receiving this type of surgery, thus facilitating early recognition and prompt treatment of the problems.

Case Report

A 57-year-old man underwent anterior cervical discectomy and C3-C7 spinal fusion because of spondylosis with stenosis. The patient exhibited gagging and dysphagia while receiving liquid food on the third postoperative day. Although the patient's symptoms were relieved with oral steroids (prednisoLONE 10 mg every 12 hours), he still experienced occasional gagging while ingesting a large mouthful of food. Nine days after surgery he was able to eat small amounts of liquid food without gagging and was discharged from the hospital after re-evaluation by the physician. However, he returned to the same hospital's emergency department less than 4 hours after arriving home because of dysphagia and burning throat pain. The pain was localized over the left side of his neck and was accompanied with a sensation of swelling and slight reddening of the skin. The patient also reported gagging and severe pain during swallowing, especially when ingesting liquid food. The burning pain was unlike his earlier symptoms, was not relieved by analgesics, and his appetite had worsened.

In addition to the cervical spinal stenosis, the patient's medical history included open surgery for a bleeding duodenal ulcer at age of 17 and hypertension without regular medical control; he was a long-term smoker (1.5 pack of cigarettes per week for 40 years) and had been a long-term consumer of alcohol, which he stopped 2 years ago.

He had no travel history during the 3 months before hospitalization, and there was no family history of any congenital anomaly. The patient had not been taking any regular medication.

At the time of triage, the patient appeared in no distress and was classified as category III according to the Taiwan Triage and Acuity Scale (a 5-level triage scale modified from the Canadian Triage and Acuity Scale [CTAS], had a Glasgow Coma Scale score of 15, and the following vital signs: temperature of 38.2°C (100.8°F), respirations of 18/min, pulse of 108/min, and blood pressure of 108/62 mm Hg. The 6-cm surgical wound on the left side of the patient's neck appeared slightly red and swollen; there was marked local tenderness with a pain score of 5/10 on visual analogue scale, but no fluid or purulent discharge was noted. The skin on the right side of the neck was intact without swelling, the jugular veins were not engorged, and the neck was protected with a cervical collar. There was no hoarseness or tonsil swelling, and the trachea was slightly deviated to the right. The respirations were smooth and regular, with clear breath sounds bilaterally. The exterior of the thoracic cage appeared normal, without subcutaneous emphysema. An old surgical scar approximately 13 cm in length was located near the midline of the abdomen above the navel. There were no focal neurologic deficits or sensory loss. No other abnormal physical findings were noted.

Laboratory tests showed an increased white blood cell count of 10.66/mm^3 with 79.0% of segmented neutrophils, elevated C-reactive protein (CRP) of 24.52 mg/dL, and erythrocyte sedimentation rate (ESR) of 34 mm/h. Procalcitonin (PCT) was found to be 5.45 ng/mL (normal is less than 2 ng/mL); thus, sepsis was highly suspected. An anteroposterior cervical spine x-ray film revealed locally swollen soft tissue with an air shadow over the left side of his neck; the lateral view confirmed that there was no loosening of the fixating implants (Figure 1 [indicated by arrows]). The chest x-ray film revealed no active lung pathology or abnormal heart size, but the trachea was slightly displaced to the right side. Electrocardiographic examination revealed normal sinus rhythm and right bundle-branch block. A computed tomography (CT) scan of the neck revealed extensive abscess formation involving the lower esophageal area, extending to the cervical spine and bilateral axilla (Figure 2 [indicated by arrows]), with air collection in front of the fixating implants.

Based on the above-mentioned medical history, physical examination, and laboratory results, a preliminary diagnosis of wound and deep neck infection with sepsis was made—possibly due to esophageal rupture—and the patient was readmitted immediately after placement of a nasogastric (NG) tube for gastric decompression. Oral intake and NG feeding were restricted except for medications. Hydration was supported intravenously with 1,000 mL of normal saline and 1,500 mL of Taita No. 5 (a glucose and electrolyte solution) per day. Empirical antibiotics were initiated with amoxicillin sodium 500 mg/clavulanic acid 100 mg, 1,200 mg immediately and every 8 hours, and gentamicin 160 mg immediately and once a day by intravenous (IV) drip. A pain score of 3/10 to 5/10 was controlled with lysine acetylsalicylate (a form of IV aspirin) 500 mg IV every 6 hours.

Surgery was performed urgently on the day of hospitalization, and intraoperative flexible laryngovideoscopy revealed a 5-mm perforation in the cervical esophagus. The abscess was debrided, and the esophageal perforation was sutured. Wound and blood cultures revealed *Viridans streptococci*, and the antibiotic regimen was changed to meropenem 1,000 mg IV every 8 hours and vancomycin 1,000 mg every 12 hours. Parenteral nutrition (PPN) consisting of Clinimix N9G15E 1,500 mL was administered. The patient developed a fever of 38.3°C (100.9°F) 7 days postoperatively, and turbid content with some air was found in the wound drainage tube. An oral methylene blue test was performed, suggesting a leakage at the site of repair.

The operative site was debrided again 11 days after admission, during which the implants were removed, and a sternocleidomastoid rotational muscle flap reconstruction was performed. Further wound cultures identified *Pseudomonas aeruginosa* and *Burkholderia cepacian*; however, no anaerobic species were found. Antibiotics were

subsequently changed to moxifloxacin 400 mg by IV drip once daily and cefoperazone sodium 500 mg/sulbactam 500 mg) 4 gm by IV drip every 12 hours. The patient's condition improved after the second surgery, and he was transferred to a general ward 1 week later, after endotracheal tube extubation. A repeat oral methylene blue test was negative for leakage, and the drainage tube was removed 2 days later. Oral intake was begun, and the nasoduodenal tube was then removed. The patient was subsequently discharged from the hospital 42 days after readmission.

Discussion

Anterior cervical spine surgery is a common procedure for treatment of cervical spondylosis with spinal stenosis, and it has a high rate of success with long-term effectiveness.[1] Possible complications of the procedure include vocal-cord paralysis (incidence: 0.07%), postoperative hematoma (incidence: 0.1 to 0.5%), wound infections (incidence: 0.1% to 1.6%), esophageal perforation (incidence: 0.2% to 1.15%), dural tear and cerebrospinal fluid leakage (incidence: 0.3% to 13%), and dysphagia (incidence: 71%).[1,2] One of the most notable aspects of this case was that although the patient presented with the common complication of dysphagia, his problem turned out to be the rare and potentially fatal complication of esophageal perforation.

The 4 main causes of esophageal perforation are iatrogenic, spontaneous, chemical, and traumatic. Iatrogenic injury is the most common cause, accounting for 44% of all cases and has a mortality rate of 3.92%.[4,5] Esophageal perforation following anterior cervical spinal surgery may be caused by erosion due to implant impingement, and the most common location is at the cervical esophagus in the throat.[5]

Early diagnosis of esophageal perforation after cervical spine surgery must rely on a high level of clinical suspicion and appropriate physical examination. A confirmative diagnosis depends on lateral x-ray image of the cervical spine, which may reveal subcutaneous emphysema, soft-tissue swelling, enlargement of the retropharyngeal space, or displacement of implants. Flexible laryngovideoscopic examination enables direct visualization of the site of perforation, and contrast CT scan can help to detect accumulation of abscess or dislocation of implants.[6]

Early or tiny esophageal perforations can generally be treated conservatively with antibiotics and fasting; however, surgical treatment may be required in the case of relatively large perforations.[7] Different types of surgical treatments—including direct suture repair or flap reconstruction—should be considered, depending on the size of perforation, severity of infection, and time of injury. Methylene blue can be injected into the throat during debridement to detect any perforation.[8] Studies show that direct repair has a 70% success rate, and further surgeries will be necessary if initial treatment fails;[7] on the other hand, flap reconstructive surgery has a higher success rate of 83%.[9] Secondary complications of esophageal perforation include wound dehiscence, malnutrition, mediastinitis, esophageal stenosis, osteomyelitis, and tracheoesophageal fistula. According to Kang et al, delayed treatment of esophageal perforation may increase the mortality rate to as high as 60%.[9]

Dysphagia is common following anterior cervical spinal surgery during the first 2 weeks after surgery but usually resolves slowly in a few months.[1] The most common cause of dysphagia is overstretching of the esophagus during surgery, which often causes local ischemia in the wall of the pharynx and esophagus. Other possible causes include edema, hematoma, and infection.[10] The use of steroids can significantly reduce the incidence and severity of postoperative dysphagia.[3] The patient in this case experienced dysphagia on the third day after his initial surgery and tended to gag when consuming liquid food; this may have been caused by local ischemia or edema. His symptoms were eased after steroid treatment, which might have masked the underlying problem.

The most notable features of this case were the warning signs of dysphagia and burning throat pain. Steroid therapy was effective in relieving his symptoms but might have also decreased the alertness for esophageal perforation. Accordingly, we recommend that when a patient experiences dysphagia, fever, or abnormal throat pain after anterior

cervical spinal surgery, clinical signs and symptoms should be assessed carefully, and the possibility of esophageal perforation must always be kept in mind to reduce morbidity and mortality.

In summary, emergency nurses must have full knowledge and awareness of postoperative complications, quickly identify abnormal clinical symptoms, and facilitate timely treatment. We hope that this case provides emergency nurses with a better understanding of complications that may occur in a patient who has had an anterior cervical spine procedure and also enable them to fully employ their professional care and coordination skills to ensure the highest quality in clinical care.

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DETAILS

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Tailoring a Comprehensive Bundled Intervention for ED Fall Prevention: JEN

ABSTRACT (ENGLISH)

Introduction

Falls in the emergency department pose an important challenge for patient safety. Multifactorial fall prevention bundles have been associated with a reduction in patient falls in the inpatient setting. The purpose of this project was to tailor and implement a comprehensive fall prevention bundle in our emergency department.

Methods

Fall bundle components for this intervention were selected on the basis of a review of fall prevention research and included fall risk assessment, safe ambulation, safe toileting, staff communication, early warning, and patient education. The fall risk assessment was tailored to the emergency department through an appraisal of select inpatient fall risk assessments, literature search for ED-specific fall risk factors, and a site-specific chart review, after which pertinent fall risk factors were integrated into a modified screening. Fall prevention materials that were both practical and applicable to the emergency department and facilitated patient safety along each bundle domain were selected for implementation at our site.

Results

The tailored fall prevention bundle was championed by the interdisciplinary ED Fall Prevention Team and implemented over the course of 5 months in 1 emergency department. Education on fall prevention equipment was delivered in a peer-to-peer format, and an online module was designed to guide staff through the new fall risk assessment. The fall prevention bundle was adopted into clinical practice after staff education was completed, and the fall risk screening was merged into the electronic medical record.

Discussion

ED fall prevention requires a comprehensive bundled approach, which includes a fall risk screening and multifactorial interventions that are tailored to the ED setting. Successful implementation relies on the involvement of front-line staff from the design through the delivery of the bundled fall prevention measures. Continued inquiry and innovation in ED fall prevention will help provide a safer health care environment and improve patient outcomes.

FULL TEXT

Contribution to Emergency Nursing Practice

••The current literature on fall prevention indicates that multifactorial bundles are effective in reducing patient falls in the acute care setting.

••This article contributes a detailed description of the process to tailor a fall prevention bundle to emergency department clinical practice.

••Key implications for emergency nursing practice found in this article include how comprehensive fall prevention measures in the emergency department can be successfully implemented with a bundled approach through the engagement of front-line staff.

Introduction

Falls in the emergency department account for 6% of hospital-wide falls and often result in use of additional resources, unplanned hospitalization, and poor patient outcomes.[1,2] When compared with other areas of the hospital, a fall in the emergency department is more likely to result in injury or death.[1] Multicomponent fall prevention bundles have been associated with a reduction in falls and fall-related injuries in the acute care setting.[3,4] The purpose of this project was to describe how we tailored and initially implemented a comprehensive fall prevention bundle in our emergency department.

Rationale and Essential Elements of the Tailored Fall Prevention Bundle

Combining fall prevention measures into a multicomponent bundle has been associated with a reduction in fall risk by up to 30% in the acute care setting.[3,4] Evidence-based components of fall prevention bundles include (1) assessment of fall risk, (2) application of multifactorial interventions, and (3) embedding fall prevention into unit culture.[3,4] Use of an appropriate tool to assess fall risk is a fundamental component of a fall bundle.[3,4] Fall risk factors found on inpatient tools include a history of falls, mental status, mobility, medications, continence, and use of intravenous (IV) therapy or tethering equipment.[5] Some risk factors are impractical to assess in triage, such as toileting ability, and others are not applicable on arrival, such as an IV or tethered equipment. Furthermore, fall risk factors unique to the emergency department, such as intoxication, are lacking from inpatient tools and may account for up to 20% of ED falls.[2,6] Addition of ED-specific risk factors to a fall risk assessment may improve the detection of at-risk patients in the emergency department.[2] Two ED fall risk assessments adapted from inpatient tools have been published, and further work is needed to establish their validity and reliability.[14–17]

Multifactorial interventions aimed to improve staff communication, facilitate safe ambulation and toileting, educate patients, provide early warning, and prevent injury are the second key aspect of fall prevention bundles.[3,4] Use of fall wrist bands, fall door signage, electronic medical record alerts, bedside commodes, gait belts, and nonskid socks are shown to reduce a patient's risk of falling in the inpatient setting.[3,4,18,19] When these measures have been implemented in the emergency department, a reduction in patient falls has resulted.[14,20]

The third key aspect of a fall prevention bundle is embedding fall prevention into unit culture, which begins with an accurate assessment of departmental readiness for change.[5] Involvement of ED leadership and the use of front-line staff from the design to the delivery of a fall prevention bundle is key in creating positive change.[14,20] Performance auditing and dissemination of fall prevention data helps to sustain a culture of patient safety.[14]

Thus, a comprehensive approach to fall prevention necessitates the use of fall risk assessment, multifactorial interventions, and a culture of fall prevention. Failure to incorporate all 3 aspects or overemphasis on 1 area of fall

prevention may lead to varying results.[16,20] Bundling these aspects into a fall prevention intervention provides a balanced approach, which may provide the best outcomes.

Our Process

We conducted a literature review with quality appraisal of select existing falls risk assessments, integrated findings from a previously conducted site-specific chart review, reviewed the ED-specific risk factors from available inpatient fall risk assessment tools, adopted a modified and tailored bundled intervention for our site, delivered a staff education on the bundle, and implemented the initial intervention in 1 emergency department. This report focuses on describing the process to tailor a falls bundle intervention for our site. This project was considered exempt by Rush University Medical Center's Institutional Review Board.

Intervention Site and Context

The project was implemented at a 676-bed Midwestern urban academic medical center over the course of 5 months, from August to December, 2017. This academic medical center holds Magnet designation and is a comprehensive stroke center that specializes in the treatment of neurological disorders. The emergency department within this medical center is a 60-bed unit with 74,000 patient visits per year and serves both adult and pediatric populations.

The Intervention Team

The interdisciplinary ED Fall Prevention Team was appointed to implement the fall prevention bundle and comprised of 5 bachelor's-prepared nurses with 1 to 12 years of ED experience and 4 nurse aides with 1 to 3 years of ED experience. This intervention was coordinated by 1 of the nurses as a doctoral project and facilitated by the master's-prepared Unit Director with the oversight of 2 doctoral-prepared faculty members from Rush University's College of Nursing.

Tailoring Fall Bundle Interventions To The Emergency Department

The ED Fall Prevention Bundle infographic was created to visually depict the domains of the bundle (Figure 1). These domains were selected from evidence-based inpatient multifactorial interventions and approved by the ED Fall Prevention Team as both practical and adaptable to the emergency department.[3,4] Staff communication was improved with fall risk wristbands and door signage. Safe ambulation was promoted through nonskid socks, gait belts, and individualized staff assistance. Safe toileting was encouraged with bedside commodes and early warning with bed-exit alarms. Patient education was provided by placing "Call, Don't Fall" signage in every room and with patient teach-back to reinforce understanding.

To facilitate the use of multifactorial interventions, the ED Fall Prevention Team identified the most central and convenient area to place fall prevention materials within the department. Wristbands were placed in triage and nonskid socks and door signage were placed in each patient's room. Commodes were placed in strategic areas throughout the department. Bed-exit alarms and gait belts were placed in the medication room, which is in a central location.

Tailoring The Fall Risk Assessment To The Emergency Department

To improve the identification of at-risk patients and to make the fall risk assessment more applicable to the emergency department, selected modifications were made. Before this intervention, the emergency department used an adapted version of the Schmid fall risk screening.[11] To best inform the needed changes, appraisal of select existing fall risk assessments and a review of literature focusing on ED-specific fall risk factors was conducted (Table 1).[2,6-15] A review of ED falls in the last fiscal year yielded additional fall risk factors, such as weakness and impulsivity, which accounted for 10% and 2% of falls, respectively. A comprehensive list of ED fall risk factors was generated and agreed upon using a nominal process with the ED Fall Prevention Team, departmental, and organizational nursing leadership (Table 2).

Intoxication is an ED-specific fall risk factor found both in clinical practice and research and was marked for inclusion.[2,6] Age alone was not considered a strong enough predictor and was not substantiated in the chart review. Disagreement on the definition and ability to assess alterations in elimination in triage excluded this risk factor. As a center for neurological care, presence of diagnosis affecting comprehension and coordination was a common site-specific risk factor. Thus, the new ED fall risk screening included the following factors: history of falls in the past 3 months including today, confusion/disorientation, intoxication/sedation, dizziness/weakness, history of neurological diagnosis, use of assistive gait device, and unsteady gait ([Figure 2]). The presence of any 1 risk factor qualified the patient as having fall risk. A positive triage screening then prompted additional documentation by the primary RN for application of individualized fall precaution interventions. Interrater agreement for the new fall risk assessment was conducted by 2 members of the ED Fall Prevention Team using 10 real-time triage patients and was measured at 98.3%.

Education And Communication On The Fall Bundle

In preparation for the upcoming change a month-long communication campaign was launched, and the ED Fall Prevention Bundle infographic was prominently displayed in e-mail communications, unit-based poster displays, and buttons worn by staff. The ED Fall Prevention Team took the lead in presenting the change to fellow staff members at shift-change huddles and at nursing shared-governance meetings to demonstrate the peer-lead design and support for this intervention. Additional points to facilitate staff buy-in included highlighting that new fall prevention measures were integrated into standard ED workflows, new documentation was streamlined and required less mouse strokes to complete, and new fall prevention materials were conveniently placed. To create a sense of urgency for this intervention, benchmark data of our emergency department's unsatisfactory performance were disseminated to staff.

After the completion of the communication campaign, staff education on fall prevention equipment began and consisted of short lessons on different aspects of the fall bundle, including fall precaution application, gait belt training, bed alarm utilization, and postfall patient management. Each month focused on a different topic and the lessons were delivered in a peer-to-peer format with return demonstration when necessary. To promote participation, each member of the ED Fall Prevention Team was assigned a list of specific ED staff members to educate during that month. By the end of implementation, 92% (n = 114) of staff participated in equipment education. Competency was assessed using equipment checklists provided by the manufacturer, and staff scored an average of 98%.

For fall risk assessment education, a different educational modality was used, namely, an online learning module, which was designed to visually guide staff through the new screening. A posttest consisting of 10 different patient-based triage scenarios was placed at the end to assess competency. The module was completed by 82% (n = 70) of nursing staff with a 97% posttest average.

The ED Fall Prevention Bundle was incorporated into clinical practice after education was complete and the new fall risk assessment was merged into triage documentation. To celebrate the bundle implementation, a 3-day "ED Fall Fair" was held to showcase the positive changes and recognize the ED Fall Prevention Team who spearheaded this initiative.

Discussion

We have detailed our process for tailoring a fall prevention bundle from evidence-based research findings and implemented those elements that were practical for our emergency department. Furthermore, we adapted our fall risk assessment through appraisal of research literature and select existing falls risk assessments as well as from chart review data into a screening that is more applicable to our practice setting.

Use of the interdisciplinary ED Fall Prevention Team in the design and delivery of the fall prevention bundle was instrumental in the success of this initiative. The peer-to peer interaction between the ED Fall Prevention Team and staff was both educational and promoted buy-in through role modeling the new standard of care. Fall prevention screening and fall precaution application are now considered standard practice and part of the annual employee performance appraisal. Additional measures to maintain the culture of fall prevention created by this intervention include public recognition for staff excelling in fall prevention measures and dedicated fall prevention education for new hires.

Intervention Effectiveness and Recommendations for Quality Improvement Research

Evaluation of the ED Fall Prevention Bundle is ongoing at our site and includes analysis of bundle metrics, such as the extent of fall risk screening, fall precaution application, and the rate and type of patient falls. Early results at the end of 6 months of evaluation were promising with 96% of ED arrivals screened in triage, 86% of at-risk patients with fall precautions applied, and a quarterly fall rate reduced to 0.27 falls per 1,000 visits with no fall-related injuries (Supplementary Material). Long-term outcomes are yet to be determined. The continued involvement of the ED Fall Prevention Team in matters related to patient safety and dissemination of individual and unit-wide performance measures maintains the fidelity of this intervention. Validation of the bundle through a rigorous single-site or initial multisite design is the next step in determining the impact of this quality improvement initiative.

The most immediate cost savings from improved fall prevention can be measured by the decreased diagnostics and procedures ordered after a fall.[2,6] In the 6 months before implementation, 19 different diagnostics tests (8 head computed tomographies [CTs], 3 C-spine CTs, 1 L-spine CT, 4 upper extremity radiographs, 1 pelvis radiograph, and 2 electrocardiograms) were ordered by providers after a fall. In the 6 months postimplementation, 3 postfall head CTs were ordered. Using the fair price value for these diagnostics, this represents a cost saving of $6,840. A cost-savings projection is provided and can be individualized to other sites by applying local data (Table 3).

Limitations

Use of a more integrative process to ascertain fall risk factors for inclusion, such as the Delphi method, would have been a more structured way to obtain group consensus on which items to include on our ED falls risk assessment tool.[21] We assessed content validity by utilizing the input of departmental and organizational nursing leadership, and a formal determination with content validity index should be made, along with establishing the sensitivity, specificity, and positive predictive value of the tool.[22]

Conclusion

Fall prevention in the emergency department can be accomplished through a bundled approach that includes fall risk assessment and multifactorial interventions aimed to improve staff communication, promote safe ambulation and toileting, and provide early warning for unsafe actions. Involvement of bedside staff in the design and delivery of fall prevention measures is instrumental to successful implementation and creating a culture of safety. We provided our process to tailor a fall prevention bundle to our emergency department. Continued emphasis on fall prevention in the emergency department in research and clinical practice will help provide a safer health care environment.

Author disclosures

Conflicts of interest: none to report.

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Supplementary Material

Supplementary Material

Supplementary material related to this article can be found at https://doi.org/10.1016/j.jen.2019.11.010.

Tool/source	Level of evidence	Design	Fall risk factors	Tool metrics
Inpatient fall risk assessments				
Hendrich falls risk model II[7]	Level IV	Random enrollment of 355 cases and 780 controls were assessed intrinsic and extrinsic fall risk factors	Confusion/disorientation/impulsivity Symptomatic depression Altered elimination Dizziness/vertigo Gender Antiepileptic/benzodiazepine use Timed get-up-and-go score	Sensitivity: 75% Specificity: 74% Reliability: 0.98
Hester Davis scale (HDS)[8]	Level III	Prospective study of 1,904 patients on a neuroscience unit	Age Date of last known fall Mobility Mental status Medications Toileting needs Volume/electrolyte status Communication/sensory Behavior	Sensitivity: 90.0% Specificity: 47.1% Reliability: 0.90
Morse falls risk assessment tool[9,10]	Level IV	Retrospective review of 100 patients who fell compared with 100 randomly selected patients who had not fallen	History of falls Secondary diagnosis Use of ambulatory aid Intravenous therapy Altered mobility Overestimates own ability/forgets limitations	Sensitivity: 78%-83% Specificity: 29%-83% Reliability: 0.96

Schmid fall risk assessment[11]	Level IV	Retrospective review of 102 patients who fell was compared with 102 patients who did not fall	History of falls Altered mobility Altered mentation Frequency, diarrhea, or needs assistance with toileting Use of anticonvulsants/sedatives or psychotropics/hypnotics	Sensitivity: 95% Specificity: 66% Reliability: 0.88
STRATIFY falls prediction[12,13]	Level IV	Retrospective case-control study of 116 patient falls compared with control patients who had not fallen	History of falls Agitation Visually impaired Need of frequent toileting Impaired mobility/transfer ability	Sensitivity: 66% Specificity: 57% Reliability: n/a
ED fall risk tools				
KINDER1 fall risk assessment tool[14,17]	Level III	Adapted from unknown inpatient fall risk assessment implemented at single-site, evaluated over 1 year	History of falls Age Altered mentation Impaired mobility Nursing judgment	Sensitivity: 73% Specificity: n/a Reliability: n/a
Memorial ED fall risk assessment tool (MEDFRAT)[15–17]	Level III	Adapted from the Conley Fall Risk Assessment implemented at single-site, evaluated over 1 year	History of falls Confused or disoriented Intoxicated or sedated Impaired gait Mobility assisted device used Altered elimination	Sensitivity: 52% Specificity: n/a Reliability: 0.7

Category	Fall risk factor	Marked for inclusion
Fall history	Fallen within past 3 months[*,†]	Yes
Fallen today[*,†,‡]	Yes	Review of systems
Dizziness[†,§]	Yes	Weakness[†]
Yes	Medical history	Age >70[‡]
No	Depression[§]	No

Neurological diagnosis (ie, seizure, CVA) [†,§]	Yes	Syncope[§]
No	Altered elimination[*,§]	No
Mental status and behavior	Confused/disoriented[*,†,‡,§]	Yes
Intoxicated/illicit substances[*,†,‡,§,¶]	Yes	Sedated/sedating medications[*,†,§,¶]
Yes	Impulsive[†]	No
Ambulation	Use of assistive gait devices[*,†,‡]	Yes

		ED falls (%)	Cost estimates[*]
Diagnostic imaging and testing	Radiograph upper extremity	21.0[†]	$70-$170
Radiograph hip/pelvis	2.7[‡]-5.2[†]	$90-$230	CT Brain (noncontrast)
5.5[‡]-42.1[†]	$360-$950	CT C-Spine (noncontrast)	15.7[†]
$440-$1,150	CT L-spine (noncontrast)	5.2[†]	$450-$1,200
EKG	2.8[‡]-10.5[†]	$420-$1,100	Procedures
Wound care	3.6[‡]-16.8[§]	Variable, depending on size and depth	Laceration repair

Month	ED fall risk screening		
Total ED visits	Total screened	Percent screened for fall risk (%)	January
6,853	6,096	89.0	Februar y
5,883	5,510	93.7	March

6,460	6,165	95.4	April
6,154	5,882	95.6	May
6,245	6,005	96.2	June
5,873	5,664	96.4	July

	ED fall precaution application data							
Month	Patients audited	Fall band	Cart in low position	Side rails up	Call bell in reach	Nonskid footwear	Sign on door	Fall precaution rate (%)
February	105	97	102	92	94	64	50	79
March	100	91	100	95	90	67	63	84
April	100	93	100	100	97	81	66	90
May	100	97	99	95	96	78	61	88
June	100	94	99	93	88	86	50	85
July	110	102	109	96	99	98	66	86

Quarter	Total visits	Number of falls	Fall rate	Number falls with injury	Falls with injury rate
Q1	18,459	9	0.49	3	0.16
Q2	18,191	10	0.55	1	0.05
Q3	19,196	9	0.47	0	0.00
Q4	18,272	5	0.27	0	0.00

DETAILS

Subject:	Emergency medical care; Patient education; Intervention; Falls; Prevention programs; Clinical medicine; Risk factors; Communication; Patients; Risk assessment; Equipment; Chart reviews; Gait; Clinical outcomes; Prevention; Innovations; Health education; Interdisciplinary aspects; Nursing; Education; Inpatient care; Clinical assessment; Emergency services; Medical screening
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Customizing Physiologic Alarms in the Emergency Department: A Regression Discontinuity, Quality Improvement Study: JEN

ABSTRACT (ENGLISH)

Introduction

Clinical alarms promote patient safety by alerting clinicians when there is an indication or change in a condition requiring a response. An excessive volume of alarm fires, however, contributes to sensory overload and desensitization, referred to as alarm fatigue, which has significant implications when alarms are missed. This evidence-based, practice project aimed to implement and evaluate a program that reduces the number of clinically nonactionable, physiologic alarms in an emergency department. Although alarm fatigue is an important negative consequence, the focus of this project is not on alarm fatigue but on measures to reduce the volume of clinically nonactionable alarms that lead to alarm fatigue. The Iowa Model was used as a conceptual framework.

Methods

This project involved adjusting default alarm settings and implementing an education plan on the safe use of alarms. The sample population included all patients on physiologic monitors at an emergency department. Retrospective data were collected, and regression discontinuity design was applied to compare the rate of alarm fires triggered by the physiologic monitor between pre- and postimplementation of an alarm protocol.

Results

A significant change in the rate of alarm fires occurred with an estimated reduction of 14.96 ($P = 0.003$). There were no reports of adverse outcomes such as a delay in responding to a change in patient condition or delay leading to cardiopulmonary arrest.

Discussion

A reduction in nonactionable, physiologic alarms was attained after implementing multimodal strategies inclusive of adjusting default settings, staff education on managing alarms, and emphasis on staff accountability.

FULL TEXT

Contribution to Emergency Nursing Practice

••The purpose of this practice improvement project was to implement interventions that tailor monitor default settings for the emergency department and empower staff to customize alarm settings.

••This article contributes to reducing the rate of physiologic alarms, which we assumed were nonactionable alarms because of the nature of our intervention.

••Key implications for emergency nursing practice found in this article are the importance of customizing alarms on the basis of the unique needs of individual patients, educating staff on alarms, adjusting default settings, and integrating shared governance to reduce potentially nonactionable alarms.

Introduction

The excessive number of physiologic alarms resulting in alarm fatigue and resulting patient safety concerns have gained national attention. The Joint Commission (TJC)[1] estimates that approximately 85% to 99% of alarms are nonactionable, meaning they do not require clinical intervention or actions by a clinician. Nonactionable and/or false alarms have been linked to a decrease in overall clinician response time.[2] Previous exposure of clinicians to repeated alarms that do not require attention leads to a psychologic mechanism linked to delayed response time to subsequent alarms.[2]

Between March 1, 2010, and June 30, 2010, there were 33 alarm-related deaths attributed to physiologic monitors in the United States Food and Drug Administration Manufacturer and User Facility Device Experience database.[3] TJC[1] reported 98 alarm-related events in their Sentinel Event database between January 2009 and June 2012. Of these 98 events, 80 resulted in death, 13 in permanent loss of function, and 5 in additional length of stay or added care. Ninety-four of these events occurred in hospital areas such as telemetry, intensive care, general medicine, and the emergency department.[1] Subsequently, TJC[4] reported the following medical equipment–related sentinel events: 9 in 2014; 14 in 2015; 10 in 2016; and 9 in 2017. Reporting of sentinel events is voluntary and, therefore, likely underrepresents the proportion of actual events.[1,4] These sentinel events may be preventable harms that are inflicted, without intent, by clinicians who acclimate to an environment with perpetual alarm noise pollution. Consequently, in January 2014, clinical alarm safety became a national patient safety goal[5] and remained an annual goal.[6–8]

In 2015, the medical center for this project site purchased new monitors equipped with technology to extract data from the server. In January 2017, the first data analysis was completed for December 2016 and continued to be completed monthly. The emergency department had the highest volume of all physiologic alarms triggered from the bedside monitor for 13 of 15 months, among 18 reported units from December 2016 to February 2018; for the other 2 months, they were the second highest. Patients are at risk of adverse events when clinicians work in a caring environment polluted with noise from frequent, nonactionable alarms.[3] Therefore, addressing the safe use of alarms aligns with the medical center's goal 1: to keep patients safe.[9]

Available Knowledge

Supplemental Figures 1-3 present details of the literature search methods and analysis of literature findings using Mosby's Level of Evidence.[10,11] Most previously published articles address alarms management in inpatient settings; only a few articles specifically address the emergency department. An integrative review[12] found that few alarms (5%-13%) require clinician response and emphasized the need to focus on reducing clinically irrelevant alarms to address alarm fatigue. Because of limited randomized controlled research studies on this topic, most evidence originates from single descriptive case studies, systematic reviews of descriptive studies or qualitative surveys, expert committee reports or the opinion of authorities, and other reviews of the literature.

The volume of nonactionable alarms in an already heavily distracted environment can result in the staff becoming desensitized to alarms. The emergency department is most vulnerable to alarm desensitization, given its unique and generally chaotic environment.[13] Furthermore, patients in the emergency department are thought to be monitored for a longer duration than clinically indicated in this setting, contributing to the additional volume of noise.[13,14]

Various approaches were identified in the current literature to address alarm overload (Table 1). A common recurring

strategy to reduce alarm fatigue is to empower staff to customize alarms according to the patient's condition, regardless of the type of patient-care setting,[14-17] so alarms become actionable[17,18] and clinically relevant.[12] Drew et al[19] described alarm overload and justified customizing alarms, as there were an average of 211 alarms per hour for an intensive care patient with atrial fibrillation and rapid ventricular response with a 6-day stay. For example, if a patient presents to the emergency department with atrial fibrillation and a rapid ventricular response of 140 beats per minute, the upper heart rate limit can be adjusted to 145 and returned to the baseline default once controlled with treatment. Otherwise, upper heart rate limit alarms will repeatedly sound, resulting in desensitization to alarm fires. These alarms are considered nonactionable as the clinician is already aware of the patient's condition. Subsequently, if the heart rate increases to 150 beats per minute, beyond the customized upper-high-limit threshold, the alarm becomes actionable and alerts the staff that the heart rate is increasing and the patient may not be responding to treatment.

Another strategy is to change preset default settings to fit the needs of the patient population.[13,14,16,17] An appropriate default setting for the intensive care unit (ICU) will differ from the emergency department owing to the differences in patient population needs and workflow. The emphasis in the emergency department is to prioritize, stabilize, and determine patient disposition in a short time frame. Therefore, priority alarms are those requiring immediate attention. Drew et al[19] completed an observational study involving 461 ICU patients and found that 88.8% of 12,671 alarms were false positive and 93% of 168 were true ventricular alarms that did not necessitate treatment. Modifications to the default settings were subsequently completed to minimize audible messages or alarms.

Forming an Alarm Committee that includes frontline caregivers and makes evidence-based practice (EBP) decisions is another strategy to reduce nonactionable alarms.[15,18] A multidisciplinary team approach provides a method to analyze and address cardiac telemetry alarm fatigue.[20] Another endorsed strategy is reducing the number of patients who are on monitors by assessing the clinical indication for ongoing monitoring.[13-15] A final recommended strategy is to provide education about alarm devices,[15] specifically on how to adjust alarm parameters, alternatively referred to as customization.[21] Training on proper lead placement is likewise necessary[21] to avoid false alarms influenced by lead placement such as apnea in a patient who is breathing.[14] Education on skin preparation and daily replacement of fresh, gel-containing electrodes to obtain maximum accuracy in electric signal, is vital.[15]

Conceptual Framework

A conceptual framework that focuses on the application of EBP is the Iowa Model,[22] as shown in Figure 1. A key feature of this model is the use of existing organizational committees to facilitate EBP, which aligns with the current project. At the study setting, an existing, system-wide, multidisciplinary Alarms Management Committee chaired by the Advanced Practice Register Nurse (APRN) investigator provided project oversight. In addition, project activities were reported to the Critical Care Shared Governance Committees whose responsibilities were to review and approve practice recommendations before implementation.

The model follows an algorithm that starts with an assessment of triggers on the basis of clinical inquiries for seeking knowledge or evidence to reach conclusions. Such triggers have been categorized by Titler et al[22] as problem-focused or knowledge-focused triggers. The high volume of physiologic alarms at the emergency department represented an example of a problem-focused trigger. Our knowledge-focused trigger was identifying alarm management as a national patient safety goal[5] owing to documented, unsafe situations.

Another aspect of the Iowa Model includes the formation of a team. Input from nursing and medicine ED stakeholders is vital for decision making and to facilitate change by positively influencing others. In addition, the Iowa Model[22] describes piloting the change in practice. It was only feasible for us to implement the change in the entire unit.

Population, Intervention, Comparison, and Outcome

The following Population, Intervention, Comparison, and Outcome questions were created to guide the practice change for this project. Among patients with physiologic monitors in the emergency department (P), will our unit intervention to customize physiologic monitor alarms and adjust default settings (I), compared with current practice (C), result in a reduction in the total number of physiologic monitor alarms (O)? Because of the nature of our intervention, our project team assumed that the reduction of overall alarms would represent a reduction in clinically nonactionable, physiologic alarms.

Specific Aims

The purpose of this EBP project was to implement and evaluate a protocol to reduce the number of clinically nonactionable, physiologic alarms in the emergency department. The objective was to compare the rate of overall, physiologic monitor alarms from the baseline, hospital-wide, default setting used in the emergency department to a postintervention adjustment of default monitor settings specifically for the ED population. The aim was to test the rate of overall, physiologic monitor alarms before and after an intervention to educate nursing staff to customize physiologic monitor alarms.

Methods Project Design

The project design was a single-unit, quality improvement intervention with preintervention and postintervention measurements that compared postintervention data with data of a historic control period, using weekly benchmarks as the unit of analysis. This project was granted exempt status by the medical center's institutional review board. The target patient population meeting inclusion criteria were all patients placed on a physiologic monitor regardless of diagnosis. The exclusion criterion was no monitoring in patients. The staff meeting inclusion criteria were all bedside nurses employed in the emergency department. The staff meeting exclusion criterion included all nonbedside nursing staff in the emergency department.

Context

The emergency department was a 36-bed, level I, trauma-designated unit within a 505-bed, tertiary-care medical center located in Honolulu, Hawaii. The medical center is TJC accredited and is the only magnet facility in Hawaii, which is an institutional recognition of excellence from the American Nurses Credentialing Center. Approximately 104 nursing staff are employed in the emergency department, and there are roughly 180 patient encounters per day. The unit is led by a nurse manager and 2 operational managers. There is 1 charge nurse and a minimum of 2 physicians on duty.

Interventions

The interventions for this quality improvement project included (1) changing physiologic monitor default settings from the hospital-wide preset to new ED-specific settings and (2) educating and empowering staff to customize alarms. All phases of the interventions and intervention planning were integrated with shared governance committees to include frontline emergency nurse representation. Our intervention was tailored to address meaningful and realistic strategies for the fast-paced and unpredictable workflow.

The project team consisted of a core group of bedside nurses, a clinical-ladder nurse stakeholder (a nurse with clinical bedside career advancement), emergency nursing and physician leaders, biomed staff, and the APRN investigator. This core group identified proposed changes, which required approval by the shared governance committee. The educational intervention implementation was led by the clinical-ladder nurse and reinforced by a group of super users. Super users are bedside nurses who have received more in-depth training on how to manage alarms.

Staff engagement was critical to the success and leveraged existing marketing strategies to maintain transparent

communication with staff through their ED Unit Council (UC). Baseline alarm data were shared with the UC members who evaluated the high-volume, problematic, recurring alarms. Recommendations from the literature, specifically on nonactionable alarms, were the focus of discussions. The ED UC was involved in decision making on all proposed default changes before obtaining final approval ([Table 2]).

[Table 2] summarizes the default settings that were changed in the emergency department. The ED UC identified that low-priority premature ventricular contraction (PVC) alarms were a major source of nonactionable alarms within the medical center and the emergency department. The ED UC's problem identification was similar to the findings of the study by Drew et al.[19] Therefore, several low-priority, nonactionable PVC alarms were targeted and turned off as a default alarm. Ventricular rhythms requiring a clinician's response would be triggered by the actionable, high-priority ventricular tachycardia alarm and/or PVCs per minute alarm that is defaulted at 10 per minute.

Persistent atrial fibrillation was the second-highest recurring alarm identified by Drew et al.[19] Therefore, irregular rhythm and atrial fibrillation were turned off as default alarms because actionable alarms would be triggered by the heart rate alarm. However, staff were taught to turn on the atrial fibrillation alarm for anyone presenting with sinus rhythm with transient ischemic attack or signs of a stroke.

ST segment settings for leads V and modified chest lead set at ±2 mm were not changed for this project, but the default threshold for the limb leads was changed by ±1.0 mm to ±2 mm, and the staff were taught how to customize ST segment alarms according to patient condition. This decision was justified by the findings of our literature review. Majority of ST segment alarms (91%) were estimated to be nonactionable in a 16-bed ICU that averaged 200 ST alarms per day despite having a ±2-mm alarm threshold,[19] which reflected the importance of addressing ST segment alarms. Moreover, the pause threshold was changed from 2.0 to 2.5 seconds.

The next intervention stage for this quality improvement project was to educate and empower emergency nurses to customize monitor settings for each patient. Nurses at the medical center are empowered to customize alarms per policy. Quick reference tools were created by the clinical-ladder nurse and the APRN investigator to support staff in troubleshooting nonactionable alarms. The ED UC members provided feedback on all quick reference materials ([Figures 2] and [3]) developed for staff education before the clinical-ladder nurse stakeholder and super users commenced training. This document included how to troubleshoot repeated false apnea alarms by customizing the default apnea time and/or switching from the automatic to manual detection mode to adjust the detection line. The project team relied on the clinical-ladder staff-nurse stakeholder to implement education. The clinical-ladder staff-nurse stakeholder was selected by the project team that subjectively evaluated this individual and informal leaders of the unit. This stakeholder worked individually with the super users using a train-the-trainer model. Collectively, these individuals trained their peers during available downtime or real time as the opportunity arose during clinical care staff time. Staff members were asked to document that they had received the education content and acknowledge their role in the safe use of alarms. This staff accountability step was supported by the ED leadership. To assure sustainability and integration among new ED staff, the ED clinical educator created a process of incorporating the content as a core topic for training new-to-specialty nursing staff.

With regard to managing the number of alarms, we included a vital signs (VS) mode strategy. We educated the staff to evaluate patient criteria for monitoring and to use the VS mode instead of the arrhythmia-monitoring feature. The VS mode provides the capability for the monitor to obtain blood pressure, heart rate, and oxygen saturation values that, similar to arrhythmia monitoring, populates into the electronic medical record through device integration. We anticipated that using the VS mode to collect such information instead of placing the patient on the arrhythmia-monitoring feature would decrease the number of potential arrhythmia alarms.

Furthermore, to minimize false pulse oximetry readings, the ear clip sensor or a specialized sensor that minimizes

false alarms was made available to improve readings in patients with low-perfusion states. Alarm trends were posted in the emergency department to provide staff with ongoing feedback.

Measures

We measured the daily rate of all physiologic alarm events (alternatively known as fires) in the emergency department. Alarms triggered by the physiologic monitor were defined according to priority. Red alarms were high-priority alarms, representing potentially life-threatening situations such as asystoles. Yellow alarms indicated low-priority alarms, such as missed beats. Inoperative alarms were technical alarms that indicated the monitor is unable to reliably detect alarm conditions. Raw alarm data were not identifiable by patient name or medical record number and were retrieved monthly from the server by biomedical staff. For this project, data consisted of the number of alarm fires for all 36 monitored ED beds for 28 days of each month. Twenty-eight days were selected to standardize the number of days per calendar month. The retrieved data were categorized by weeks and included the number of total alarm fires during the week and the number of average daily patient visits. The start of the baseline period was selected in relation to a house-wide-education self-learning module that was implemented in July 2017 and vendor education starting in November 2017. Therefore, the start of the baseline data collection period was 6 months before initial training or December 2016. Combined with the 6 months of postimplementation data, the study period was defined as December 2016 to March 2019.

The implementation period was delayed from the planned project timeline, as described in the limitations. After receiving input from all stakeholders, specific, default alarm settings to modify were identified and presented to the Critical Care Committee for approval on September 20, 2018. The default changes were completed by the biomedical staff on October 4, 2018, providing 6 months of postimplementation data by the end of the study period. Ongoing communication with the ED managers was maintained throughout the postimplementation period to ensure there were no adverse events reported related to physiologic monitoring. Lessons learned were evaluated through the existing UC shared governance structure. UC members have a communication tree with assigned peers that they use for dissemination and feedback of information.

Statistical Analyses

Exploratory data analysis was performed by the Biostatistical Analyst investigator using descriptive statistics, including frequencies, means, and SDs. Default alarm setting changes were completed in October 2018. To assess changes in the number of alarm fires in the emergency department since the implementation of the default settings, a regression discontinuity design was applied to the weekly report of the number of alarm fires divided by the average monitor-patient encounters in the emergency department to account for the variability in patient encounters. The significance level was set at 0.05. All analyses were performed using the R version 3.6.0 (R Core Team, 2019).

Results

During the study period from December 2016 to March 2019, the average rate of alarm fires was 174.93 (SD = 12.89). The average rate of alarm fires before the interventions began was 178.39 (SD = 11.55), whereas the average rate of alarm fires after the interventions were implemented was 161.54 (SD = 8.03) (Figure 4), which depicted the regression discontinuity analysis. There was a significant change in the rate of alarm fires after the completion of the interventions with the estimated effect of –14.96 in the rate of alarm fires (P P = 0.001). There was an upward trend in the rate of alarm fires postintervention; however, it was not significant (P = 0.106). To date, as of 7 months postintervention, there were no patient safety reports related to physiologic alarms. A total of 82% of the nurses documented the completion of training.

Lessons Learned

Staff continued to refer to the quick reference guides introduced during the education roll-out, which remain posted

in the department for easy access. Through their UC, ED staff nurses reported that they had identified more potentially serious and meaningful alarms requiring action since the elimination of nonactionable and nuisance alarms.

The importance of staff commitment and accountability, which become barriers if lacking, was emphasized in project implementation. Having a strong group of committed stakeholders was a substantial facilitator for the project. The collaboration and communication among all team members were critical to this project's success. Each team member contributed to this project by openly sharing their ideas from the perspective of their individual roles. Each discipline was well represented at each meeting, and all members collectively worked toward a common goal. The clinical-ladder staff stakeholder acted as a project champion by introducing and facilitating the intervention. The super users and train-the-trainer model became a barrier or challenge to take advantage of, at times, owing to the sustained, fast-paced setting in the emergency department.

Discussion

Our project demonstrated a reduction in alarm fires following the implementation of a protocol to reduce the rate of physiologic alarms, which we assumed were clinically nonactionable because of the nature of our interventions. The reduction in alarm fires before the implementation of default changes and interventions reached significance and may be attributed to previous, isolated, education-only attempts in July 2017 and November 2017. Following staff education and completion of default changes and other interventions in October 2018, the reduction in alarm fires was substantial and significant. Although there was an upward, linear line postproject intervention, this change did not reach significance. ED staff maintained the improved reduction of nonactionable alarms that was observed following the implementation of interventions for 6 months. However, this does raise concerns that the intervention may not have sustainability over time without additional reinforcement or sustained re-education.

Education alone was not sufficient to sustain a practice change. Therefore, it was imperative to implement and hardwire other strategies from the literature, including systems and workflow practices. Customizing alarms to the needs of patients was a common, recurring theme mentioned in the literature to address nonactionable alarms. However, concerning the emergency department's uniquely different patient-care focus and workflow compared with inpatient units, it was essential to address default settings to reduce nonactionable alarms. Numerous references in the literature emphasized the relevance of modifying default settings so that alarms become more actionable according to the needs of the patient care setting.[13,14,16,17,19] Before this project, default settings at the medical center were standardized regardless of the unit's setting. Patients in the emergency department placed on monitors had identical, default alarm settings as those in the inpatient areas, resulting in alarms that may not necessitate a clinician's response given the uniquely different patient-care setting. Therefore, adjusting default settings in the emergency department was a high-priority intervention to reduce nonactionable alarms.

Staff, through the ED UC feedback structure, expressed that alarms were more clinically relevant. This concern was a reflection that staff members were being resensitized to alarms, an awareness that was lost as a result of the high volume of nuisance alarms before project implementation, which places patients at risk for harm when alarms are missed.

Creating a renewed culture was vital for project sustainability. Strategies to enhance sustainability included ongoing unit-based activities to support the goal of house-wide alarm reduction established by the Critical Care Nursing Committee. Monthly data and adverse patient outcomes related to alarms continued to be reviewed vigilantly by the UC and could lead to further adjustment of default parameters. Staff accountability and support continued to be emphasized via nursing leadership and super users.

The importance of approaching the problem of multiple nonactionable alarm fires using multimodal strategies and

through an interprofessional, collaborative manner, cannot be overemphasized. Having a respected ED clinical-ladder nurse representing the bedside nurses, along with physician and nursing leaderships, contributed to successfully creating a renewed standardized culture for the safe use of alarms by collectively incorporating several innovative practice changes. A particular strength of our project is its novel contribution to the literature through the application of regression discontinuity analysis.

Limitations

A limitation of this EBP project was the short postintervention period despite an effort to adhere to a timeline. This time period was shorter than that planned as a natural disaster resulted in delayed approval from the Critical Care Committee for the default changes because the committee's meeting was cancelled. Additional analysis using a longer period of postintervention data is needed to confirm the sustainability of the intervention's impact.

There was no strategy to purposefully schedule at least 1 super user for each shift during and immediately following the implementation period. The outcome data, therefore, reflect total alarm fires for the month regardless of the presence or absence of a super user on duty. Finding the opportune time for super users to reinforce training among their peers is another limitation of this project design. The inability to assess the appropriateness of the practice change before adopting it to the entire unit was another limitation. Furthermore, this project was conducted at 1 specialty unit, and therefore, results may not be generalizable to other units.

Finally, this study was conducted using 1 physiologic monitoring system, which may have alarm features that differ from other systems. We measured the total number of physiologic alarms and assumed that a reduction in the total number meant that the nonactionable alarms were decreasing. Future study is warranted to directly measure nonactionable alarms.

Implications for Emergency Nurses

Nurses working in fast-paced emergency departments are inundated with noise from multiple devices with alarms that contribute to distraction and alarm overload and fatigue. Such conditions may lead to a delayed or no response to alarms, placing patients at risk of an unsafe event. It is, therefore, imperative to implement strategies to control nonactionable, physiologic alarms so that alarms can become more meaningful and clinically relevant.

In addition to the customization of alarms, 2 key points for emergency nurses are to (1) assess for the appropriateness of physiologic monitoring for each patient and (2) review criteria for the discontinuation of monitors. Being proactive in such activities can influence the number of patients being placed on monitors and ultimately the total number of alarm fires, which could improve patient safety in emergency departments.

Conclusions

This project demonstrated success in the reduction of total physiologic alarms specific to an ED setting. Our intervention was designed to reduce nonactionable, physiologic alarms, which is not covered extensively in the literature. In addition to the basic universal strategy of customizing alarms by nurses, the success of this EBP project was attributed to the concurrent implementation of other evidence-based, recommended interventions as mentioned in the literature. This intervention included staff education on troubleshooting alarms and the adjustment of default settings that align with the unique needs of the heavily distracted ED milieu. Other contributing factors to the success of this project were leadership support in emphasizing professional accountability and the involvement of bedside staff nurses through their UC.

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Conflicts of interest: none to report.

Appendix

Supplementary Data

To access the supplementary material accompanying this article, visit the online version of the *Journal of Emergency Nursing* at www.jenonline.org.

Intervention	Description
Customize alarms	Adjust alarms according to patient's condition, so alarms are actionable
Default settings	Adjust unit default settings according to the needs of the patient population
Alarms committee	Have a multidisciplinary system-wide team to provide oversight and make evidence-based practice decisions
Criteria for monitoring	Monitor patients on the basis of clinical indications; discontinue when appropriate
Staff education	Provide staff education on alarm customization, troubleshooting, electrode placement, and skin preparation

Parameter	Original default	Changed to
Heart rate	60	50
Atrial fibrillation*	On	Off
Irregular rhythm	On	Off
ST alarms (mm)		
Leads I, II, III, aVR, aVL, and aVF	± 1.0	± 2.0
Leads V and MCL	± 2.0	No change

Pause (seconds)	2.0	2.5
PVC†		
Nonsustained	On	Off
Ventricular rhythm‡	On	Off
Run PVCs	On	Off
R on T PVCs	On	Off
Ventricular bigeminy	On	Off
Ventricular trigeminy	On	Off

DETAILS

Subject:	Desensitization; Emergency medical care; Quality management; Patient safety; Fatigue; Discontinuity; Accountability; Cardiac arrhythmia; Intervention; Empowerment; Evidence-based nursing; Noise; Alarms; False alarms; Intensive care; Heart rate; Emergency services; Quality control; Quality improvement
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Code Critical: Improving Care Delivery for Critically Ill Patients in the Emergency Department: JEN

ProQuest document link

ABSTRACT (ENGLISH)

Problem

Although certain critically ill patients in emergency departments—such as those experiencing trauma, stroke, and myocardial infarction—often receive care through coordinated team responses, resource allocation and care delivery can vary widely for other high-acuity patients. The absence of a well-defined response process for these patients may result in delays in care, suboptimal outcomes, and staff dissatisfaction. The purpose of this quality improvement project was to develop, implement, and evaluate an ED-specific alert team response for critically ill medical adult and pediatric patients not meeting criteria for other medical alerts.

Methods

Lean (Lean Enterprise Institute, Boston, MA) principles and processes were used to develop, implement, and evaluate an ED-specific response team and process for critically ill medical patients. Approximately 300 emergency nurses, providers, technicians, unit secretaries/nursing assistants, and ancillary team members were trained on the

code critical process. Turnaround and throughput data was collected during the first 12 weeks of code critical activations (n = 153) and compared with historical controls (n = 168).

Results

After implementing the code critical process, the door-to-provider time decreased by 62%, door to laboratory draw by 76%, door-to-diagnostic imaging by 46%, and door-to-admission by 19%. A year later, data comparison demonstrated sustained improvement in all measures.

Discussion

Emergency nurses and providers see the value of coordinated team response in the delivery of patient care. Team responses to critical medical alerts can improve care delivery substantially and sustainably.

FULL TEXT

Contribution to Emergency Nursing Practice

••The current literature on care coordination and resource allocation for critically ill medical patients indicates that this area is in need of improvement.

••This article contributes recommendations for improved timeliness and communication during care of critically ill medical patients.

••Key implications for emergency nursing practice found in this article are that the ED-specific alert models used for trauma, stroke, and other disease processes can improve the efficiency of care delivery and resource utilization for other critically ill patients.

Introduction

Emergency departments are in constant states of triage. The unrelenting influx of patients requires nurses and providers to assess and reassess frequently so that patients who cannot wait to be seen are prioritized. In 2015, 136.9 million ED visits occurred nationwide; 1.5 million of those visits resulted in critical care admission.[1] Although ED visit trends are on the rise and well documented, data regarding changes in acuity are sparse. California ED visits from 2002 to 2009 increased approximately 25%, and high-intensity visits increased 87%, despite an increase in the state's population of only 6%.[2]

Increases in patient volume and severity of illness, combined with the crowding and staffing issues many emergency departments experience, greatly increase the risk of medical errors and delays in care. Many hospitals have medical alert systems in place that enable a quickly activated multidisciplinary team to respond and stabilize patients experiencing a time-sensitive deterioration in health status. In addition to bringing care to the patient quickly, the establishment of team responses allows an organization to dedicate staff to such processes. Such efforts have been shown to improve delivery of care, including decreased door-to-computed tomography (CT) time for acute stroke, door-to-intervention time for ST-elevation myocardial infarction (STEMI), and improved outcomes for trauma patients.[3-5]

Problem

Although stroke, STEMI, and trauma alerts were used frequently at our facility, ED staff expressed concern that critically ill patients not meeting existing team alert criteria were not afforded the same level of response or priority of care. Data analysis validated this concern. In the year before project implementation, existing team alerts, such as trauma, sepsis, stroke, and STEMI, represented 2.1% of total patient volume (1,688 alerts and 80,555 visits). However, high-acuity patients (Emergency Severity Index [ESI] 1 and 2) accounted for 18.7% (15,069 patients) of the total yearly patient volume. Retrospective chart review from the 3 months preceding implementation was performed on 168 patients who were critically ill upon ED arrival but did not fall into the other alert categories. The

review evaluated multiple criteria: care delivery location, door-to-medical screening examination, door to laboratory draw and result, door-to-diagnostic imaging (DI) order and completion, door-to-intubation, and door-to-admission order and transfer to inpatient bed. Comparison with similar data points on patients with activated medical alerts revealed some dramatic findings. For example, the door-to-DI order and result for stroke-alert patients' median times were 10 minutes and 32 minutes, respectively; the critically ill patient sample averaged 17 and 78 minutes. In addition, patients with STEMI and trauma alerts were roomed in resuscitation rooms 98% of the time, whereas only 29% of critically ill medical patients received care there.

Available Knowledge

Our literature review, using search terms *critical alert*, *stroke alert*, *STEMI alert*, *trauma alert, medical alert*, *team response*, and *emergency department alert* resulted in 1 identified study that detailed an emergency response team for ED patients presenting with airway, breathing, circulation, or disability problems.[6] Although this study focused on intensive care unit (ICU) admissions and mortality rate, it sparked the idea that an ED-specific medical alert-response process could be created.

Purpose

The purpose of this quality improvement project was to develop, implement, and evaluate an ED-specific alert team response for critically ill adult and pediatric medical patients not meeting criteria for other medical alerts.

Methods Context

This practice improvement project occurred in a suburban 34-bed adult and pediatric emergency department experiencing 83,000 visits annually. The facility is a designated level II trauma center, a primary stroke center, and a STEMI-receiving center. Because it was part of a continuous improvement process, hospital policy allowed for the project to be exempt from Institutional Review Board approval.

Intervention

A rapid cycle improvement project was planned using Lean (Lean Enterprise Institute, Boston, MA) methodologies; the goal of the Lean approach is to optimize flow and eliminate waste.[7] A *kaizen* workshop was deemed to be the most appropriate strategy for this project. A *kaizen* workshop is an expert-facilitated intense 5-day session during which key stakeholders (*kaizen* team) identify and implement significant process improvements for a specific problem. After testing the process, potential improvements are identified, and the process is standardized.[7] Our *kaizen* team was composed of emergency and critical care RNs, respiratory therapists, and nursing administration. High performing staff were recommended by their supervisors for participation in the project. Participant work schedules were adjusted to enable participation, and participants were compensated for their time. The *kaizen* team was charged with developing and implementing an improved process for the care of critically ill/high-risk patients with medical problems presenting to the emergency department. The term *code critical* was used to describe the health care team response. The *kaizen* team activities included reviewing data, flow charting existing care processes, observing ED flow, and designing the code critical experiment. Based on data analysis, the scope of the Lean *kaizen* was initially limited to patients with respiratory distress, unresponsiveness, or shock.

Team decisions included designated bedding, levels of alerts, patient criteria for the alert, composition of the response team, and evaluation metrics. It was determined that all patients meeting existing team response criteria (STEMI, stroke, sepsis), as well as the code critical patients, would receive care in the trauma/resuscitation bay. Two levels of alerts would be called: Code Critical Level 1 included conditions rated ESI 1, such as cardiac arrest, unprotected airway, or near drowning; Code Critical Level 2 included conditions more likely to be ESI level 2, such as respiratory distress and symptomatic arrhythmias. The response team would consist of immediately available ED staff including the technician, nurse, provider, and the phlebotomist and respiratory therapist assigned to emergency

department. Code Critical Level 1 response also included a “standby” notification to alert services such as pharmacy, DI, chaplain, and the rapid response team (RRT) that may be needed. The alerts would be called overhead in the emergency department and paged out by the operator to staff members not physically located in the emergency department.

Once the criteria and response were established, the team performed an experiment on the final day of the *kaizen*. One-on-one education was provided for staff members working that day, and they were then observed during a code critical alert. Although the alert appeared promising, this observation identified that additional work was necessary to create a sustainable alert.

Intervention Finalization Stage

ED leadership reviewed the code critical criteria developed by the group and determined that the dual-level alert added complications and confusion, both with alert activation and desired team response. It was decided to have only 1 level of activation and a standard response team based on the most likely initial patient needs. [Table 1] lists the code critical alert team members. [Table 2] identifies the criteria for code critical activation.

Successful project implementation necessitated involvement of ancillary departments in the finalization of the code critical process. Collaborative meetings ensured that the alert and expected response was feasible and that staff education would occur before the established go-live date. Laboratory, respiratory therapy, and DI already had designated staff assigned to ED code response 24 hours a day; code critical was simply added to their list of alerts. ED technician work assignments already included code response. ED provider response was similar to response to other alerts and based on shift start time and provider availability. Using projected volume of medical and trauma alerts, the ED leadership team received approval for additional RN staffing, allowing a designated nurse on each shift to respond to medical alerts. This position was in addition to the assigned trauma nurse so that resources were not diverted from other areas. If multiple alerts were activated at the same time, additional resources would be obtained from wherever possible—ED floats, leadership, and inpatient ancillary services—and care delivery prioritized by level of patient need.

Team members receiving a page only, such as intravenous therapy, were expected to be aware of patient arrival and potential resource needs. If available, they could respond to the bedside and assess if services were needed. Otherwise, they would be contacted as needed. Chaplain services and social work notifications were unique, as these departments do not have 24-hour in-house coverage. Chaplain services preferred to receive the page around the clock as a “heads up,” so they might be called in for support. Social Work wished to be alerted, as well, for potential patient follow-up during working hours.

ED staff and physicians were educated to the new process through staff meetings, daily huddles, and 1-on-1 interactions. Alert activation, patient placement, and expected team roles were all discussed. During go-live, ED leadership was on site to support staff and encourage alert activation. Staff rounding was performed daily to determine effectiveness of alert activation and staff satisfaction with the process.

Study of the Intervention

We used a single-site quality improvement intervention design, comparing postintervention patients with preintervention historical controls. Outcomes were measured for 1 calendar quarter before intervention, 1 calendar quarter postintervention, and a 1-month duration at 1-year postimplementation for follow-up.

Measures

Evaluation metrics included care-delivery location, door-to-medical screening examination, door-to-laboratory draw and result, door-to-DI order and completion, door-to-intubation, and door-to-admission order and transfer to inpatient bed. Number of alerts per day were also tracked to justify continued staffing of the designated alert RN. Descriptive

statistics were used to analyze the results.

Results

All code critical activations (n = 153) were tracked for the first 12 weeks of use. Room assignments and turnaround times were compared with patients who met similar criteria in the same quarter 1 year before implementation (n = 168). Significant improvements were made in all areas. Before implementation, only 29% of patients received care in the resuscitation bay; postimplementation, this was 92.8%. Door-to-medical screening examination time decreased 62%, from 13 to 5 minutes. Door-to-laboratory draw time dropped 76% from 29 to 7 minutes, and door-to-laboratory result time decreased 45%, from 51 to 28 minutes. Door-to-DI time decreased 59%, from 17 to 7 minutes; and door-to-imaging result time decreased 46%, from 78 to 42 minutes. Also important for ED throughput, admission order time and time to inpatient bed improved. Door-to-admission order entry decreased 9%, from 176 to 160 minutes. Before implementation, the median time-to-ICU bed for this group of patients was 313 minutes. In the first quarter postimplementation, this dropped 19% to 252 minutes. ED throughput is a multifaceted issue, but this substantial effect from 1 intervention was well appreciated.

As staff became more comfortable with the code critical criteria and realized the benefits of activation, average monthly activations rose from 45 to 80. Given the possibility of drift after implementation of a new process, data were collected for 10 months postimplementation to determine if improvements had been sustained. The Figure shows median times for care delivery, comparing pre-code critical implementation with the first-quarter postimplementation and the same categories 1 year later. Most improvements were sustained. Door-to-departure to admission bed times increased slightly to 271 minutes; however, that was still lower than the preintervention numbers. This was not unexpected, as data were evaluated during winter surge, when patient volumes and acuities were both higher. Although ED and hospital patient volume affected throughput times, code critical remained effective at getting resources to the bedside in a timely fashion.

Discussion

Although there is little existing literature regarding alerts such as code critical, there is substantial evidence that team responses improve care delivery. Stroke-alert activation leads to decreased door-to-CT and door-to-thrombolysis times.[3] STEMI alert activation improves door-to-electrocardiogram and intervention time.[4] Although this project used different metrics to evaluate effectiveness, it reflected the same findings: that focused team responses improve the efficiency of care delivery. The outcomes observed were consistent with what was expected by the team, although the extent of improvement exceeded expectations. One opportunity cost anticipated by the ED leadership team was diversion of RN resources, as the trauma RN, float RN, or fast-track RN was initially expected to respond to code critical. Tracking data related to patient volume allowed the team to receive approval for additional positions to have a dedicated resource nurse for critical alerts who would float until needed.

Collaboration was essential to the success of this project. By involving key stakeholders in ancillary departments from the outset, the team was able to ensure that the resulting process and policy met the needs of all parties. This ownership also resulted in a go-live that required little administrative or bedside support. The success is also reflected in sustainability as demonstrated by the increased number of alerts called per month and maintenance of improved response times. Further studies are needed to determine if there is any impact on length of stay or mortality.

Limitations

One limitation to this process is that chart review occurred retrospectively. There was opportunity for provider variation regarding alert activation; there may have been other cases where code critical activation could have been appropriate, but resources were not available to review the charts of all patients admitted to the ICU from the

emergency department. Our code critical process would also benefit from evaluation by additional emergency departments to identify feasibility in the face of varying conditions and resource allocation.

Implications for Emergency Nursing

Process improvement is much more likely to be successful if clinical staff members are engaged in the process. ED staff can provide valuable insight and innovative solutions for streamlining patient care and improving efficiency. By engaging staff in the development process and allowing them to identify barriers to care delivery, ED leadership can ensure that the final product is one that staff supports and owns. Engaging ancillary team members increases that ownership and facilitates identifying additional issues that may have been missed. When developing new processes, it is important to use a structured approach. Barrier identification, care-delivery mapping, and resource-availability determination can allow teams to design processes more likely to be successful and sustainable. Using a rapid-cycle improvement design can provide timely feedback and adaptation, allowing optimization of the new process.

Conclusions

As ED volumes and acuity increase, more innovative solutions will become necessary to deliver efficient, high-quality patient care. Although resource availability and staffing might vary among emergency departments, optimizing responses is possible in all. Early collaboration with ancillary departments and bedside staff can clarify the need. Applying the principles of medical alerts—such as stroke, STEMI, and trauma—to other patients requiring immediate intervention can improve turnaround times, expedite medical decision making, and decrease ED length of stay. This project resulted in significant and sustained improvements in all metrics, having a positive effect on patient care. Metric analysis can assist ED leadership is substantiating the business case for additional resources. Engaging end users in process-improvement efforts can enhance both the likelihood of success as well as staff satisfaction with—and ownership of—the outcomes.

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Author Disclosures

Conflicts of interest: none to report.

ED Provider
Laboratory
Respiratory therapist
Emergency nurse x 2
ED technician
Chaplain

X-ray technician
IV therapy (page only)
Social worker (page only)
Pharmacist (page only)
Nursing supervisor (page only)
Rapid response team RN (page only)

Code critical criteria include but are not limited to the following:•Cardiac arrest/postarrest return of spontaneous circulation•Acutely altered mental status/ Glasgow Coma Scale <13 or drop >2•Unstable vital signs•Shock presentationoSystolic blood pressure <80 mm Hg, mean arterial pressure <65 mm Hg, heart rate <50 or >130 (adult parameters)oActive profound bleeding, signs of poor perfusion (altered mental status, delayed capillary refill, weak pulses)•Unprotected airway•Severe respiratory distress/impending arrestoBradypnea or tachypnea (age dependent)oContinuous positive airway pressure en routeoIntubated en routeoOxygen saturation <90% with high-flow oxygenoSevere accessory muscle use/increased work of breathing•Drowning/near drowning•Symptomatic arrhythmia (supraventricular tachycardia, atrial fibrillation, bradycardia)•Severe allergic reaction•Active seizure

DETAILS

Subject:	Laboratories; Workforce planning; Patients; Emergency medical care; Quality management; Stroke; Resource allocation; Sepsis; In care; Nursing administration; Data analysis; Nurses; Myocardial infarction; Teams; Quality of care; Medical screening; Departments; Technicians; Pediatrics; Critical care; Secretaries; Emergency services
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Document 7 of 28

Complexities of Identifying Posterior Cerebral Artery Cerebrovascular Stroke: JEN

ProQuest document link

ABSTRACT (ENGLISH)

Delays in treatment are associated with long-term disability as well as substantial financial burdens.3 On average, patients will incur $21,500 in acute-care hospital bills alone.4 The most recent estimate of financial burden from 2012 reports that the United States spends 34 billion dollars in indirect and direct costs related to care of patients

with stroke. According to the National Health Interview Survey, more than 73% to 90% of people were able to identify the most 5 common cardiovascular-related signs and symptoms and “would call 9-1-1 right away if someone was having a stroke.” According to the American Heart Association (AHA), best-practice stroke guidelines include having a stroke protocol in place for pre-hospital and hospital providers. Hospitals should have a goal of door-to-CT scan within 20 minutes and a door-to-needle time of less than 60 minutes if the patient is eligible for tissue plasminogen activator (t-PA) intravenous therapy (IV-tPA).13 Care should be taken to obtain a blood glucose reading as well to ensure that hypoglycemia is not imitating a stroke.

FULL TEXT

Contribution to Emergency Nursing Practice

••The current literature on identification of posterior cerebrovascular arterial (PCA) strokes indicates that, because of their infrequent presentation, these strokes often are misdiagnosed.

••This article contributes a succinct presentation of a PCA stroke and key clinical manifestations for which the ED nurse should maintain a high suspicion of PCA stroke.

••Key implications for emergency nursing practice found in this article are the timely identification of PCA stroke-like symptoms to identify and treat these patients efficiently.

Posterior cerebral artery (PCA) strokes can result in devastating permanent disabilities for patients. Although the mortality rate from stroke dropped from the fourth to the fifth leading cause of death, especially for people above age 65,[1] 795,000 Americans will still experience a new or a recurrent stroke each year. The most recent statistics estimate that stroke will account for 130,000 deaths per year, and someone will die of a stroke every 4 mintues.[1,2] Regardless of the type of stroke—hemorrhagic or ischemic—the consequence of delay in treatment can lead to serious long-term disability as well as substantial financial costs associated with hospitalization and long-term rehabilitation.[3] Early identification and treatment are critical for these patients. Delays in treatment are associated with long-term disability as well as substantial financial burdens.[3] On average, patients will incur $21,500 in acute-care hospital bills alone.[4] The most recent estimate of financial burden from 2012 reports that the United States spends 34 billion dollars in indirect and direct costs related to care of patients with stroke. Timely identification and initiation of therapeutic treatment is vital for reducing the financial burden but, more importantly, lessening the life-long debilitating health outcomes associated with stroke events.

Most strokes occur outside a hospital setting, making public awareness of stroke signs and symptoms paramount for early identification and intervention. According to the National Health Interview Survey, more than 73% to 90% of people were able to identify the most 5 common cardiovascular-related signs and symptoms and “would call 9-1-1 right away if someone was having a stroke.”[5] The 5 most common symptoms are sudden numbness on the face, leg, or arm; sudden confusion and difficulty speaking; sudden vision loss or vision impairment; sudden dizziness or loss of coordination; and sudden headache with no apparent cause.[5] These common signs and symptoms are helpful when used to identify a more common stroke involving anterior circulation. However, strokes that affect the posterior circulation may present with more subtle symptoms such dizziness, nausea or vomiting, and sight disturbances. These symptom subtleties and commonalities with other disease processes add to the challenge in early identification of a posterior stroke.[6-8]

Identification of posterior circulation stroke (PCS) can be delayed when compared with the more common stroke involving the anterior circulation (ACS) because of the difference in clinical presentation. Only 12% to 25% of ischemic strokes affect the posterior cerebral circulation. The posterior cerebral circulation consists of vasculature

that supplies the brainstem (medulla, pons, and midbrain), the thalamus, the hippocampus, the cerebellum, and parts of the occipital and temporal lobes (including the visual cortex).[7,9-12] This case study will present and discuss a patient with atypical signs and symptoms of stroke who was later diagnosed with a PCS via a magnetic resonance imaging (MRI) scan.

Case Study

A 63-year-old woman presented in the emergency department with a chief complaint of upper right quadrant abdominal pain. The patient had a past medical history of end stage renal disease (ESRD) secondary to unclear etiology, 2 renal transplants, type 2 diabetes mellitus (on insulin), and recurrent urinary tract infections. On initial assessment in the emergency department, the patient appeared pale and hypertensive with an initial blood pressure reading of 219/60 mm Hg. The patient was also complaining of pain at the surgical incision site of her recent kidney transplant several days before her ED presentation. She also complained of nausea and vomiting since her discharge from the hospital after transplant. The patient had 1 episode of vomiting while waiting in triage before she was assigned to a room in the emergency department. While in the emergency department, the patient had become increasingly drowsy and complained of not being able to see the nurse or gurney and requiring significant assistance from the wheelchair to the gurney. Further assessment and evaluation were conducted, including a blood glucose check, which registered at 275 mg/dL. The patient also began hallucinating objects that were not in the room. Additional assessment findings included no facial asymmetry, intact speech, and strong equal grip with equal foot flexion and extension. Within 30 minutes of being evaluated by an ED physician, the patient became increasingly unresponsive, with decreasing pulse oximetry of 89% to 90% on room air. Additional changes to the patient while in emergency department included speech impairment, decline in mental status, and deviated left gaze. No evidence of hemorrhage or infarction was noted in the head computed tomography (CT) scan while the patient was in the emergency department, which meant that a lumbar puncture (LP) could be performed to rule out meningitis. At the time of this patient's visit, MRI was not readily available for ED use.

Continued assessment and evaluation of the patient performed by the medical staff included an LP, which was negative for meningitis. The patient's blood pressure remained hypertensive but did improve with medication. She remained tachycardic with a heart rate between 110 and 120. Blood cultures were obtained and antibiotics administered prophylactically. A general overview of basic laboratory studies included a slightly elevated white blood cell count at 12.2 10^9/L and a hemoglobin and hematocrit within normal limits (WNL). The metabolic panel was WNL except for the elevated glucose at 287 mg/dL. Troponin was slightly elevated at 0.03 ng/mL. Urine analysis showed the following: yeast 2+, bacteria 1+, WBCs 10 (high power field [HPF]) and red blood cells 140 (HPF). The patient's ammonia level was slightly elevated at 52 µmol/L. Arterial blood gas results demonstrated an uncompensated metabolic acidosis with a pH of 7.13, pCO2 of 64, a pO2 of 96, and a bicarbonate level of 21.1. The patient was admitted to the intensive care unit (ICU) after spending a little over 8 hours in the emergency department. During the patient's ICU stay, an MRI of the brain was obtained with results indicating "an acute infarct within the right occipital lobe," which would indicate a PCS.

The patient spent 17 days hospitalized as an inpatient and then was sent to an outpatient rehabilitation facility for approximately 2 weeks. The patient is now recovering at home, her visual loss is resolved, and her short-term memory is improving.

Literature Review

Time is critical when it comes to treating patients with stroke and stroke-like symptoms. According to the American Heart Association (AHA), best-practice stroke guidelines include having a stroke protocol in place for pre-hospital and hospital providers. The time a patient presents at a hospital setting until the start time of the thrombolytic agent

is often referred to as door-to needle-time. Hospitals should have a goal of door-to-CT scan within 20 minutes and a door-to-needle time of less than 60 minutes if the patient is eligible for tissue plasminogen activator (t-PA) intravenous therapy (IV-tPA).[13] Care should be taken to obtain a blood glucose reading as well to ensure that hypoglycemia is not imitating a stroke.

Patients who are presenting with symptoms of PCA ischemic stroke may fall outside the accepted door-to-needle time for administration t-PA. This may be attributed partially to the rarer clinical manifestations of PCS versus the signs and symptoms of more common ACS ([Table]). One emergency department found that, of the 252 patients treated with t-PA, there was a significant treatment time delay for those patients with PCS compared with ACS.[11] The time delay was specific to the minutes between when the ED physician evaluated the patient and the time the physician initiated a neurology consult. There was no treatment time difference between the 2 groups from the time the neurologist was consulted and the t-PA therapy was initiated.[11]

Another possible reason for the delay is that patients with PCS have atypical symptoms and a significantly lower National Institutes of Health and Stroke Scale (NIHSS) median score than patients with ACS.[11] The lower NIHSS score in patients with PCS may be because these patients sometimes indicate symptoms of nausea and vomiting, which are not captured effectively in the NIHSS. One study found a significant difference in NIHSS scores between ACS and PCS, with a mean score of 8.2 and 3.8, respectively.[6]

In addition, studies have shown that CT scans may be inadequate when it comes to detecting strokes of posterior circulation.[14-16] This study reported a sensitivity of 83% (181 of 217; 78% to 88%) for MRI compared with CT sensitivity of 26% (56 of 217) for the diagnosis of any acute ischemic stroke.[17] Other studies document similar results regarding the inefficiency of noncontrast-agent CT in the detection of strokes originating specifically in the posterior cerebral circulation.[16-20]

Discussion

For the patient in this case study, the care provided did not meet all stroke-management recommendations, which was almost entirely due to the failure of staff to maintain a high index of suspicion for stroke. The patient spent more than 20 minutes in the waiting room, and, by the time she was assessed by an ED physician, she had significantly fallen out of the 20-minute door-to-imaging (CT or MRI) window. The patient's symptoms of nausea and vomiting, coupled with a current elevated blood pressure (219/60 mm Hg) should have alerted the triage nurse to maintain a high index of suspicion for PCS. Because MRI was not readily available for ED use at the time of this patient's treatment, that could have caused a delay in treatment. Future patients who may present similarly may benefit from advocating for an MRI even if the CT scan is negative for stroke.

Conclusions

As demonstrated in the literature review and in the case study, improvements are needed to ensure that patients with PCS are identified promptly and receive thrombolytics if warranted. Besides the initial physical assessment by the evaluating health care provider, tools—such as the NIHSS and CT scan—are used to quantify the severity of the stroke as well as assessment by the neurologist. Although NIHSS is a reliable and well-validated stroke scale, the 15 items in the scale may favor the symptoms associated with strokes in the anterior circulation, making it more challenging for the evaluating physician to confer a proper diagnosis of stroke.[21] The NHIISS may not be sensitive enough to capture the most common symptoms associated with PCS, which are ataxia, dizziness, nausea or vomiting, and sight impairement.[6-8,10,15,22] Although the NIHSS is the most widely used scale for patients suspected of having acute stroke events, and the preferred instrument by the American Stroke Association (ASA), patients with PCA tend to score lower on the NIHSS, possibly contributing to delay in therapeutic treatment.[11,13,16,21,23,24]

The current stroke guidelines published by the AHA and the ASA for the management and treatment of acute

ischemic stroke recommend either a noncontrast-agent CT scan of the brain or an MRI scan of the brain before administration of thrombolytic therapy.[13,14] Although a brain MRI scan may be more sensitive in detecting acute ischemic stroke, most hospitals continue to use noncontrast-agent CT scans for patients for whom stroke is suspected, as CT scan time is much shorter than an MRI scan time. However, 1 study found an MRI protocol that can provide detail image of the brain in 6 minutes.[25]

With the differences in clinical presentations, PCS is more likely to be misdiagnosed or delayed compared with ACS. Differences in clinical manifestations can erroneously influence the initial assessment and triage and can skew the confidence of the provider in the instrument used to quantify the presence, absence, or severity of the stroke. There are limitations to the diagnostic tools available as well, including that of a CT being more likely to miss the diagnosis of PCS. Although the prevalence of PCS is much less than anterior posterior circulation stroke, health care providers can do better to ensure that posterior circulation strokes are identified quicker by maintaining a high index of suspicion for patients who are reporting symptoms of PCS such as dizziness, visual changes, difficulty walking, nausea, and vomiting,[6-8] especially when these symptoms are accompanied with a history of hypertension or elevated blood pressure.[1] Revising existing tools and examining and implementing MRI protocols to better detect the elusive PCS may also aid in the earlier diagnosis and treatment of PCS.

Supplementary Data

Data Profile

Selected anterior circulation stroke symptoms	Selected posterior circulation stroke symptoms
Confusion	Nausea
Deficits in movement	Vomiting
Decreased auditory comprehension	Dizziness Trouble with vision

DETAILS

Subject:	Vomiting; Patients; Emergency medical care; Hospitals; Nausea; Stroke; Transplants &implants; Intravenous therapy; Health care expenditures; Identification; Blood pressure; Magnetic resonance imaging; Hypertension; Glucose; Meningitis; Metabolism; Acute services; Disability
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Advanced Practice Registered Nurses in the Emergency Care Setting: JEN

ABSTRACT (ENGLISH)

APRNs have existed for more than 50 years and are established members of emergency care teams throughout the United States (US) and in many countries worldwide.2-6 Nearly a decade ago, the Institute of Medicine identified APRNs as necessary for the future of health care delivery in the US.7,8 Since then emergency departments (EDs) in the US and abroad have become increasingly overcrowded, in part due to their status as a health care safety net for those who cannot access a primary care provider.9,10 It is estimated that EDs provide more than 47% of all hospital-associated health care in the US.9 As a result, there is currently a substantial mismatch between the need for emergency services and the available resources to provide that care.10 APRNs have been identified as particularly important for bridging this gap in both urban and rural settings.11-14 The regulatory landscape for APRNs in the US continues to evolve, and APRNs who work in the emergency care setting face a few unique licensing and certification challenges. The Consensus Model's licensing paradigm could create barriers to APRN practice in the emergency care setting because it would require APRNs who treat the full population of the emergency care setting to complete three courses of graduate study and to obtain and maintain three certifications (eg, Family Nurse Practitioner, Adult-Gerontological Acute Care Nurse Practitioner, and Pediatric Acute Care Nurse Practitioner).1,17 CNSs, for whom there are fewer courses of study than for NPs, would be required to have and maintain 2 licenses (Adult-Gerontology CNS and Pediatric CNS), but they would be restricted to either primary or acute care.18ENA Position The following are the positions of the Emergency Nurses Association (ENA): APRNs are established members of the emergency care team and are critical to the future of quality health care across the US and worldwide. Background The emergency care setting is unique when compared to most other practice settings in that its patient population consists of all ages and all combinations of medical history and chief complaint, rather than a narrow subset of them, as is the case with most other specialties (eg, pediatric oncology, adult cardiology, etc).19 Although some APRNs only treat a subset of the patients in the emergency care setting, for example, only pediatric patients or only adults with urgent or chronic needs, other APRNs are called upon to treat all patients and conditions, from nonemergent, episodic chronic care to acute, complex, life-threatening traumatic and medical conditions.2,20-23 APRNs are licensed and regulated by state law, and reciprocity across state lines is determined by each state. The Consensus Model's proposal that US states license APRNs as "primary care" or "acute care" APRNs, along with its stipulation that an APRN only be allowed to expand his or her scope of practice by completing another graduate program of study, stands in contrast to how APRNs are currently licensed and regulated today.24-29 In nearly all states, APRNs are licensed at the role level, and the scope of practice is determined not only by formal education and national certification but by clinical experience as well.30 Degree-granting programs are designed to prepare APRNs for entry-level competency, and postgraduate training after one's formal course of education confers clinical expertise.6,29,31-34 It is, therefore, no surprise that APRNs who are currently providing safe and effective primary and acute care across the country are certified as family nurse practitioners (FNPs), acute care nurse practitioners (ACNPs), Adult NPs, Pediatric NPs, Adult-Gerontological NPs, Adult-Gerontological CNSs, and Pediatric CNSs, among others.15,21,35,36 The Consensus Model has been a powerful force for raising the quality of APRN education and training in the US and has successfully championed full practice authority for APRNs in all states.15 Regardless of the outcome of these and future discussions over whether and how to implement the Consensus Model's definitions of primary care, acute care, and scope of practice, APRNs will continue their long tradition of providing safe, effective care in the emergency care setting, and ENA will remain committed to interprofessional collaboration and advocacy on their behalf.Resources Advanced Practice Registered Nursing Consensus Work Group, The National Council of State Boards of Nursing APRN Advisory Committee.

FULL TEXT

Description

Advanced practice registered nurses (APRNs) are clinicians licensed as nurse practitioners (NPs), clinical nurse specialists (CNSs), certified registered nurse anesthetists (CRNAs), or certified nurse-midwives (CNMs).[1] All are educated and trained at the postgraduate level to diagnose, treat, and prescribe medications for complex medical conditions. Nearly all APRNs who practice in the emergency care setting, which includes both in-hospital and out-of-hospital environments, are NPs or CNSs. APRNs have existed for more than 50 years and are established members of emergency care teams throughout the United States (US) and in many countries worldwide.[2-6]

Nearly a decade ago, the Institute of Medicine identified APRNs as necessary for the future of health care delivery in the US.[7,8] Since then emergency departments (EDs) in the US and abroad have become increasingly overcrowded, in part due to their status as a health care safety net for those who cannot access a primary care provider.[9,10] It is estimated that EDs provide more than 47% of all hospital-associated health care in the US.[9] As a result, there is currently a substantial mismatch between the need for emergency services and the available resources to provide that care.[10] APRNs have been identified as particularly important for bridging this gap in both urban and rural settings.[11-14]

The regulatory landscape for APRNs in the US continues to evolve, and APRNs who work in the emergency care setting face a few unique licensing and certification challenges. First, all APRNs in the US are licensed at the state level, and their scope of practice differs from state to state. In many states, APRNs are restricted from practicing to the full extent of their education and training.[15,16] The Consensus Model for APRN Regulation is a proposed solution to this problem in the form of standardized education, certification, licensure, and accreditation of all APRNs and APRN programs in the US.[1,7] However, the Consensus Model has also proposed that states license APRNs in a way that enforces a scope of practice definition of “primary care” and “acute care” that is not currently practiced today. The emergency care setting is unlike nearly all other practice settings in that its patients are all ages with all combinations of medical history and chief complaint. The Consensus Model’s licensing paradigm could create barriers to APRN practice in the emergency care setting because it would require APRNs who treat the full population of the emergency care setting to complete three courses of graduate study and to obtain and maintain three certifications (eg, Family Nurse Practitioner, Adult-Gerontological Acute Care Nurse Practitioner, and Pediatric Acute Care Nurse Practitioner).[1,17] CNSs, for whom there are fewer courses of study than for NPs, would be required to have and maintain 2 licenses (Adult-Gerontology CNS and Pediatric CNS), but they would be restricted to either primary or acute care.[18]

ENA Position

The following are the positions of the Emergency Nurses Association (ENA):

1. APRNs are established members of the emergency care team and are critical to the future of quality health care across the US and worldwide.

2. Advanced practice emergency nursing is a unique specialty that requires many of its practitioners to treat the episodic primary and acute care needs of all patient populations.

3. There is a need for a single population focus that will educate and license APRNs to treat the episodic acute care needs of patients across the lifespan within the framework of the Consensus Model.

4. ENA is a stakeholder in the Consensus Model for APRN Regulation and is committed to working collaboratively with others to ensure the future of APRNs in emergency care settings.

5. ENA, in collaboration with other key stakeholders, will continue to develop and update scopes of practice, standards of practice, and core competencies for APRNs practicing in the emergency care setting.

6. There is a need for more specialty education for APRNs as such, ENA can focus on efforts to provide educational offerings and serve as content experts for education programs that educate and train APRNs for roles in the emergency care setting.

Background

The emergency care setting is unique when compared to most other practice settings in that its patient population consists of all ages and all combinations of medical history and chief complaint, rather than a narrow subset of them, as is the case with most other specialties (eg, pediatric oncology, adult cardiology, etc).[19] Although some APRNs

only treat a subset of the patients in the emergency care setting, for example, only pediatric patients or only adults with urgent or chronic needs, other APRNs are called upon to treat all patients and conditions, from nonemergent, episodic chronic care to acute, complex, life-threatening traumatic and medical conditions.[2,20-23]

APRNs are licensed and regulated by state law, and reciprocity across state lines is determined by each state. There is no nationally standardized scope of practice, with the result that many states restrict APRNs from practicing to the full extent of their education and training. The Consensus Model for APRN Regulation has proposed to standardize the accreditation, education, certification, and licensure of APRNs and APRN programs throughout the US with the goal of achieving full practice authority for APRNs in all states. It has proposed that APRNs be certified in 1 of 4 roles (NP, CNS, CRNA, or CNM) and 1 of 6 population foci (family/individual across the lifespan, adult-gerontology, pediatrics, neonatal, women's health/gender-related, or psychiatric/mental health).[1] Under the Consensus Model, APRNs must (and may only) be licensed in a role and a population focus. Although they may also validate expertise by becoming certified in a specialty area (eg, as an emergency nurse practitioner), specialty certification cannot expand an APRN's scope of practice past that designated by the role and population focus.[1]

Within the Consensus Model's framework, the family/individual-across-the-lifespan population focus would allow APRNs to treat patients of all ages, but their scope of practice would be restricted to primary care, defined as "…comprehensive, chronic, continuous care that is characterized by a long term relationship between the patient and primary care [NP]."[17(p3)] This "…includes continuous care for patients with stable acute and/or chronic conditions."[17(p3)] Acute care certification can be obtained only in the adult gerontology or pediatrics foci ("Acute care," as envisioned by the Consensus Model, is "…care that is characterized by rapidly changing clinical conditions"—that is, "…care for patients with unstable chronic, complex acute, and critical conditions.")[17(p3)] As a result, the Consensus Model requires an APRN treating the whole patient population of the emergency care setting to have and maintain 3 certifications (Family, Pediatric Acute Care, and Adult-Gerontological Acute Care). CNSs would be required to have and maintain 2 certifications (Adult and Pediatric), as there is no family population focus for CNSs,[18] and they would have to choose primary or acute care. An acute-care-across-the-lifespan population focus would go a long way toward solving this problem, and the Consensus Model contains within itself a pathway to creating a new population focus.

The Consensus Model's proposal that US states license APRNs as "primary care" or "acute care" APRNs, along with its stipulation that an APRN only be allowed to expand his or her scope of practice by completing another graduate program of study, stands in contrast to how APRNs are currently licensed and regulated today.[24-29] In nearly all states, APRNs are licensed at the role level, and the scope of practice is determined not only by formal education and national certification but by clinical experience as well.[30] Degree-granting programs are designed to prepare APRNs for entry-level competency, and postgraduate training after one's formal course of education confers clinical expertise.[6,29,31-34] It is, therefore, no surprise that APRNs who are currently providing safe and effective primary and acute care across the country are certified as family nurse practitioners (FNPs), acute care nurse practitioners (ACNPs), Adult NPs, Pediatric NPs, Adult-Gerontological NPs, Adult-Gerontological CNSs, and Pediatric CNSs, among others.[15,21,35,36]

The Consensus Model has been a powerful force for raising the quality of APRN education and training in the US and has successfully championed full practice authority for APRNs in all states.[15] Regardless of the outcome of these and future discussions over whether and how to implement the Consensus Model's definitions of primary care, acute care, and scope of practice, APRNs will continue their long tradition of providing safe, effective care in the emergency care setting, and ENA will remain committed to interprofessional collaboration and advocacy on their behalf.

Resources

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Traffic Safety and Older Drivers: JEN

ProQuest document link

ABSTRACT (ENGLISH)

Older adults, defined as individuals aged 65 years and older, comprise the fastest-growing segment of the United States population, with a projected increase to 53 million by 2030.1 As the older adult population continues to grow, the number of older drivers will increase.2 It is anticipated that there will be an increase in fatalities and injuries from motor vehicle crashes (MVCs) among older drivers.3 Currently, MVC is ranked as the second leading cause of injury-related death, after falls, among persons 65 years and older.4 Common age-related changes that impact functional abilities, in addition to medical conditions and medications, can heighten an older driver's crash risk.3 A decreased physiologic reserve to respond to injury increases the risk of morbidity and mortality in this population.3 In addition, these normal age-related changes complicate the assessment of older patients with trauma.5 Thus, caring for this special population is a clinical challenge for emergency nurses.5Age-Related Changes and Impact on Driving Safety Aging is associated with declining functional abilities and increased susceptibility to injury in traffic crashes.6,7 Age-related changes in the human body, including the deterioration of sight and hearing and the onset of muscle, joint, and skeletal disorders,5 contribute to an older person's propensity for crash involvement and injury.6 Changes in strength and cognition, medical conditions and comorbidities, and medication effects, which are especially impairing for older drivers, contribute to the decline in some functional abilities and can interfere with the ability to perform driving tasks and navigate complex roadway situations.6,7 Driving is a complex task involving visual, motor, and cognitive skills that may be affected by age-related changes, even with healthy aging.8 These changes may become particularly evident in stressful or complex driving tasks, such as turning left, merging, or changing lanes.6 However, with large individual differences in the onset and degree of functional impairments, it is a driver's performance rather than chronological age that determines fitness to drive.6Cognition and Reaction Times Although older minds can be just as sharp as younger ones, they do react more slowly; moreover, as a person gets older, his or her brain needs more time to process information.8,9 Cognition is the mental function or process of acquiring knowledge and comprehension associated with thinking, understanding, remembering, judging, problem solving, and information processing.8 Cognition involves sensory experiences and memories.8 Furthermore, cognition is the ability to remember information, recognize and respond to traffic signs and pavement markings, or the ability to focus and make sound decisions quickly to avoid a crash.8 Cognition does not act in isolation.9 There is a constant interaction between the physiological system and cognitive performance.9 Declines in physiological performance, such as processing of visual information, exacerbate the effects of aging on cognitive functioning.9 Perceptually, an older driver may have difficulty seeing and determining the speed and distance of the traffic into which he or she needs to merge.9 On the motor function level, older adults may have difficulty turning their necks, instead relying on the side and rearview mirrors to perceive the traffic around them.9 Cognitively, because of declines in attention and working memory, they may have difficulty integrating all the information needed to make a decision on the appropriate time to merge into the traffic flow.9 When they do respond, the response may be slower than that required by the situation.Visual Impairment With aging, a person experiences visual impairment, including reductions in visual acuity and contrast sensitivity, an increase in glare sensitivity, and reduced peripheral vision.8 These age-related impairments are important for driving as 80% to 90% of traffic-relevant information is sensed through the eyes.8 The most frequent error made by older drivers who are involved in crashes is inadequate surveillance.10 Inadequate surveillance includes looking at but not fully perceiving another vehicle and failing to scan thoroughly at intersections, which could exacerbate problems with information gathering and processing.10Injuries Older adults are at a disadvantage compared with younger people when it comes to their ability to tolerate injury in MVCs.7 Aging results in increased fragility and frailty.7 Fragility refers to the ability to tolerate a physical insult (eg, the ability to tolerate crash forces).7 Fragility increases beginning around middle age and continues to progress with age.6 Frailty is the diminished ability to recover from injuries and resume the level of daily life activity once enjoyed before being injured.7 Age-related fragility and frailty increase the likelihood that an older, crash-involved driver will sustain a fatal or serious injury.3 The more fragile a person, the more severe the injury they will sustain, given similar physical crash conditions.11 In addition, the more frail the driver, the higher the likelihood of death for a given injury.11 Physiological changes associated with aging increase an older driver's susceptibility to injury and, specifically, predispose this population to chest injuries.12 Older drivers are more

vulnerable to injury in a crash because skeletal structures are more easily injured, and the consequences of any physical insult are likely to be more serious compared with that in younger drivers in similar crash conditions.7 This increased vulnerability is because the energy required to cause an injury decreases with age due to a loss of mass, strength, and flexibility.5 A similar crash load from an airbag or steering wheel to the chest of a young male may result in a chest contusion or fracture, while it may cause a life-threatening aortic rupture if applied to an older adult.12 Medical conditions, such as osteoporosis, reduce the tolerance of the musculoskeletal system to crash forces and increase the likelihood of sustaining an injury or a more severe injury as a result of MVCs.7 A study exploring injuries in adults aged 65 years and older involved in MVCs found that this population experienced a high frequency of bony structure injuries, such as rib cage and sternal fractures, accompanied by increases in morbidity and mortality.12 These findings may be because of age-related geometric changes occurring in the proportion of rib cage structures, such as the cortical bone and rib slope, which inevitably predispose older adult MVC victims to fractures.11Injury Prevention The expected increase in the number of older drivers on the road is certain to lead to increased injuries and deaths unless emergency health care professionals successfully intervene to prevent harm and prepare for the unique care needs of older adults.13 The main goal of traffic safety and injury prevention in the older adult population is to prevent MVCs and injury. Improvements in vehicle technology, such as side impact protection, lane departure warning, and seat belt design, are helping older drivers walk away from crashes that might have killed their parents or grandparents.3,14 Seat belt designs found in cars before 2006 were reported to cause rib and other injuries to older drivers.15 By 2008, all new car models sold in the US were equipped with pretensioners and load limiters, developed with a deeper understanding of biomechanics and human tolerance limits, making seat belts safer and more effective in restricting an occupant’s motion within the vehicle to minimize injurious contact with interior vehicle components and other occupants.15 Seat belt pretensioners retract the seat belt to remove excess seat belt almost instantly on sensing that the vehicle has crashed.15 When forces on the shoulder belt increase compared with the tension in the seat belt above a predetermined level, corresponding to a relatively low risk of injury, load limiters allow the belt to give in or yield while controlling the tension in the belt. Load limiters especially benefit older occupants who are more vulnerable to high belt loads.15 A simple form of a load limiter is a fold sewn into the seat belt webbing. The stitching holding the fold is designed to pull apart when a certain amount of force is applied to the seat belt; as the stitches are ripped out, the webbing unfolds, allowing the occupant slightly greater forward motion.15 Although 3-point seat belts are acknowledged to be highly successful countermeasures for reducing risks of death and injury, seat belt injuries are the primary source of chest injury among elderly occupants.12 The effect of aging is more severe in seat belt loading than in blunt impact force.12 Seat belt force is concentrated on the bone, rather than on the soft tissue.11 As a person ages, the bone deteriorates more rapidly than soft tissue.11 This change does not imply that seat belt use is harmful to older occupants; it just means that seat belts can be a relatively less effective restraint for older adults compared with that for younger occupants.11 Side airbags with head and torso protections, as well as inflatable seat belts found in the rear seats in some vehicles, provide a better benefit to the older adult occupant.16 An inflatable seat belt is a cylindrical bag that stretches from the buckle to approximately the shoulder of an occupant and is designed to provide additional protection to passengers

FULL TEXT

Older adults, defined as individuals aged 65 years and older, comprise the fastest-growing segment of the United States population, with a projected increase to 53 million by 2030.[1] As the older adult population continues to grow, the number of older drivers will increase.[2] It is anticipated that there will be an increase in fatalities and injuries from motor vehicle crashes (MVCs) among older drivers.[3] Currently, MVC is ranked as the second leading cause of injury-related death, after falls, among persons 65 years and older.[4] Common age-related changes that impact functional abilities, in addition to medical conditions and medications, can heighten an older driver’s crash risk.[3] A decreased physiologic reserve to respond to injury increases the risk of morbidity and mortality in this population.[3] In addition, these normal age-related changes complicate the assessment of older patients with trauma.[5] Thus, caring for this special population is a clinical challenge for emergency nurses.[5]

Age-Related Changes and Impact on Driving Safety

Aging is associated with declining functional abilities and increased susceptibility to injury in traffic crashes.[6,7] Age-related changes in the human body, including the deterioration of sight and hearing and the onset of muscle, joint, and skeletal disorders,[5] contribute to an older person's propensity for crash involvement and injury.[6] Changes in strength and cognition, medical conditions and comorbidities, and medication effects, which are especially impairing for older drivers, contribute to the decline in some functional abilities and can interfere with the ability to perform driving tasks and navigate complex roadway situations.[6,7] Driving is a complex task involving visual, motor, and cognitive skills that may be affected by age-related changes, even with healthy aging.[8] These changes may become particularly evident in stressful or complex driving tasks, such as turning left, merging, or changing lanes.[6] However, with large individual differences in the onset and degree of functional impairments, it is a driver's performance rather than chronological age that determines fitness to drive.[6]

Cognition and Reaction Times

Although older minds can be just as sharp as younger ones, they do react more slowly; moreover, as a person gets older, his or her brain needs more time to process information.[8,9] Cognition is the mental function or process of acquiring knowledge and comprehension associated with thinking, understanding, remembering, judging, problem solving, and information processing.[8] Cognition involves sensory experiences and memories.[8] Furthermore, cognition is the ability to remember information, recognize and respond to traffic signs and pavement markings, or the ability to focus and make sound decisions quickly to avoid a crash.[8] Cognition does not act in isolation.[9] There is a constant interaction between the physiological system and cognitive performance.[9] Declines in physiological performance, such as processing of visual information, exacerbate the effects of aging on cognitive functioning.[9] Perceptually, an older driver may have difficulty seeing and determining the speed and distance of the traffic into which he or she needs to merge.[9] On the motor function level, older adults may have difficulty turning their necks, instead relying on the side and rearview mirrors to perceive the traffic around them.[9] Cognitively, because of declines in attention and working memory, they may have difficulty integrating all the information needed to make a decision on the appropriate time to merge into the traffic flow.[9] When they do respond, the response may be slower than that required by the situation.

Visual Impairment

With aging, a person experiences visual impairment, including reductions in visual acuity and contrast sensitivity, an increase in glare sensitivity, and reduced peripheral vision.[8] These age-related impairments are important for driving as 80% to 90% of traffic-relevant information is sensed through the eyes.[8] The most frequent error made by older drivers who are involved in crashes is inadequate surveillance.[10] Inadequate surveillance includes looking at but not fully perceiving another vehicle and failing to scan thoroughly at intersections, which could exacerbate problems with information gathering and processing.[10]

Injuries

Older adults are at a disadvantage compared with younger people when it comes to their ability to tolerate injury in MVCs.[7] Aging results in increased fragility and frailty.[7] Fragility refers to the ability to tolerate a physical insult (eg, the ability to tolerate crash forces).[7] Fragility increases beginning around middle age and continues to progress with age.[6] Frailty is the diminished ability to recover from injuries and resume the level of daily life activity once enjoyed before being injured.[7] Age-related fragility and frailty increase the likelihood that an older, crash-involved driver will sustain a fatal or serious injury.[3] The more fragile a person, the more severe the injury they will sustain, given similar physical crash conditions.[11] In addition, the more frail the driver, the higher the likelihood of death for a given injury.[11] Physiological changes associated with aging increase an older driver's susceptibility to injury and, specifically, predispose this population to chest injuries.[12] Older drivers are more vulnerable to injury in a crash because skeletal structures are more easily injured, and the consequences of any physical insult are likely to be more serious compared with that in younger drivers in similar crash conditions.[7] This increased vulnerability is because the energy required to cause an injury decreases with age due to a loss of mass, strength, and flexibility.[5] A similar crash load from an airbag or steering wheel to the chest of a young male may result in a chest contusion or fracture, while it may cause a life-threatening aortic rupture if applied to an older adult.[12]

Medical conditions, such as osteoporosis, reduce the tolerance of the musculoskeletal system to crash forces and increase the likelihood of sustaining an injury or a more severe injury as a result of MVCs.[7] A study exploring injuries in adults aged 65 years and older involved in MVCs found that this population experienced a high frequency of bony structure injuries, such as rib cage and sternal fractures, accompanied by increases in morbidity and mortality.[12] These findings may be because of age-related geometric changes occurring in the proportion of rib cage structures, such as the cortical bone and rib slope, which inevitably predispose older adult MVC victims to fractures.[11]

Injury Prevention

The expected increase in the number of older drivers on the road is certain to lead to increased injuries and deaths unless emergency health care professionals successfully intervene to prevent harm and prepare for the unique care needs of older adults.[13] The main goal of traffic safety and injury prevention in the older adult population is to prevent MVCs and injury. Improvements in vehicle technology, such as side impact protection, lane departure warning, and seat belt design, are helping older drivers walk away from crashes that might have killed their parents or grandparents.[3,14] Seat belt designs found in cars before 2006 were reported to cause rib and other injuries to older drivers.[15] By 2008, all new car models sold in the US were equipped with pretensioners and load limiters, developed with a deeper understanding of biomechanics and human tolerance limits, making seat belts safer and more effective in restricting an occupant's motion within the vehicle to minimize injurious contact with interior vehicle components and other occupants.[15]

Seat belt pretensioners retract the seat belt to remove excess seat belt almost instantly on sensing that the vehicle has crashed.[15] When forces on the shoulder belt increase compared with the tension in the seat belt above a predetermined level, corresponding to a relatively low risk of injury, load limiters allow the belt to give in or yield while controlling the tension in the belt. This action is typically done by spooling the belt out of the retractor in a controlled manner, maintaining a constant restraining force as it absorbs energy.[15] This action avoids concentrating too much force on the occupant's chest. Load limiters especially benefit older occupants who are more vulnerable to high belt loads.[15] A simple form of a load limiter is a fold sewn into the seat belt webbing. The stitching holding the fold is designed to pull apart when a certain amount of force is applied to the seat belt; as the stitches are ripped out, the webbing unfolds, allowing the occupant slightly greater forward motion.[15]

Although 3-point seat belts are acknowledged to be highly successful countermeasures for reducing risks of death and injury, seat belt injuries are the primary source of chest injury among elderly occupants.[12] The effect of aging is more severe in seat belt loading than in blunt impact force.[12] Seat belt force is concentrated on the bone, rather than on the soft tissue.[11] As a person ages, the bone deteriorates more rapidly than soft tissue.[11] This change does not imply that seat belt use is harmful to older occupants; it just means that seat belts can be a relatively less effective restraint for older adults compared with that for younger occupants.[11] Side airbags with head and torso protections, as well as inflatable seat belts found in the rear seats in some vehicles, provide a better benefit to the older adult occupant.[16] An inflatable seat belt is a cylindrical bag that stretches from the buckle to approximately the shoulder of an occupant and is designed to provide additional protection to passengers seated in the rear seats of certain vehicle models.[17] In a crash, it can cover 5 times the area of a regular seat belt, spreading crash forces over a wider area of the chest and lessening head excursion.[17]

Improvements in the health of older adults, partly due to an emphasis on preventive medicine[5] and physical conditioning, are helping reduce their risk of MVCs and allowing older adults to fare better when they experience crashes.[3] In addition, older adults are benefiting from the new vehicle crashworthiness, enhanced and timely emergency medical services, excellent trauma care, and better access to health care.[3,5] It is of utmost importance to keep older drivers mobile and safe.[5] Being able to drive helps older adults maintain their mobility and independence and thus maintain their cognitive and mental health.[9] Injury prevention education can be essential in preventing MVCs among older adults.[18] The Centers for Disease Control and Prevention has specified recommendations for how older adults can stay safe on roads; these include reviewing their medications with their physicians or pharmacists for side effects and interactions that can inhibit driving abilities to reduce the risk of car crashes.[19]

Implications for Emergency Nurses

Aging is inevitable. Older adults face a number of challenges associated with natural aging, including sensory, perceptual, cognitive, and motor declines that may impact driving. Because of the increase in the elderly population, older drivers represent a substantial proportion of American drivers.[1] However, with preventive medicine and improved health care, older adults are now living longer than earlier generations.[5] Although the outlook for older adults is improved, the fact remains that motor vehicle injuries are the fourth leading cause of injury-related ED visits among older drivers and a reason for the increase of geriatric patients seen in emergency departments and trauma bays.[20,21] The fragility and frailty that accompany aging are major threats when it comes to surviving crashes and are leading contributors to older drivers' fatality rates.[22] This susceptibility to serious injuries can be substantial from even relatively minor mechanisms of injury or trauma.[5] Emergency nurses must understand that preexisting conditions and concomitant diagnoses may minimize the presentation of an injury.[5]

Detection of injuries in older adults involved in MVCs is likely to continue to be a challenge for emergency nurses. The mechanism of injury and vital signs can be misleading triage tools in older adult trauma patients.[5] Physiological changes and comorbidities may increase the severity of injuries, incidence of complications, and mortality rate in this population.[5] The use of medications, such as anticoagulants, may quickly raise the severity of an injury.[5] In addition, older adults may be undertriaged in the field. Underestimation of injury severity by both emergency medical services and emergency nurses could increase the morbidity and mortality among older adults. Injured older adults who may initially appear stable can rapidly decompensate after arriving in the emergency department.

Appropriate triage, early recognition of injury, and early aggressive management of all injured older adults can improve patient outcomes.[5] Older adults who experience MVCs may not be appropriately assessed because instruments, such as the injury severity score (ISS), and some triage protocols have not been modified to capture the higher physiologic consequences to trauma in this population.[23–25] ISS is an anatomical scoring system that provides an overall score for patients with multiple injuries.[26] An abbreviated injury scale score is allocated to 1 of 6 body regions, and the score of the 3 most severely injured regions is squared and added to obtain an ISS score.[26] Triage protocols that rely heavily on physiologic data, such as ISS, may not accurately identify the presence or severity of injuries in elderly victims of MVCs. To avoid missing severe trauma in the older injured adult, a low ISS may need to be used.[5,23] A high index of suspicion for missed, delayed presentation, or occult injury when assessing patients could be beneficial as there could be more to the problem than what the patient initially presented with to the emergency department.[23]

The emergency department plays a critical role in treating acute medical problems in older adults, and injury visits are an important subset of this care. The care of geriatric patients will continue to be a special consideration for emergency nurses.[23] Emergency nurses need to be aware of the unique vulnerabilities seen in the geriatric population, especially related to trauma.[5] Recognizing the interaction between comorbid conditions, physiologic changes associated with aging, medications, and the most common patterns of traumatic injuries will prepare emergency nurses to anticipate and recognize trauma in geriatric victims of MVCs and improve their outcomes.[5,27]

DETAILS

Subject:	Load; Physiology; Cognitive functioning; Population; Aging; Seat belts; Problem solving; Contusions; Cognition; Traffic; Injuries; Information gathering; Biomechanics; Age differences; Older people; Cognitive ability; Human body; Cognition &reasoning; Visual impairment; Fatalities; Flexibility; Ability; Frailty; Drugs; Death &dying; Bones; Age; Prevention; Decision making; Automobile safety; Individual differences; Activities of daily living; Fractures; Design; Automobile driving; Surveillance; Technology; Adults; Airbags; Emergency medical care; Emergency services; Clinical decision making; Auditory processing
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Emergency Nursing Review Questions: March 2020: JEN

ABSTRACT (ENGLISH)

The parents state that the baby was doing well at home until experiencing 45-second episodes of lethargy during 2 breast-feeding attempts over the last 4 hours. Correct answer: B Shingles is an acute localized infection caused by the varicella zoster virus. A patient may also have significant coronary artery disease (B) but would not be diagnosed with only the presence of an S4 heart sound.

FULL TEXT

These review questions are based on the Emergency Nursing Core Curriculum and other pertinent resources to emergency nursing practice. They offer emergency nurses an opportunity to test their knowledge about their practice.

Questions

1. A patient, 32-weeks pregnant, arrives at the emergency department after a motor vehicle crash. She complains of cramping abdominal pain and dizziness, and her vital signs are within normal limits. Along with fetal monitoring, which of the following tests would be immediately indicated during her assessment?

•**A.**Kleihauer-Betke test

•**B.**Internal cardiotocography

•**C.**Pulmonary function test

•**D.**Urinary protein assay

2. A patient presents with a rash on the lower back with small vesicular-type lesions in a linear pattern and localized on one side of the back. The patient is tender over the lumbar dermatome region. The patient works as a home health aide with a team specializing in oncology. On discharge, which of the following statements would indicate that the patient understands the care of the rash?

•**A.**The doctor told me that the rash was not contagious, and I could not transmit it to others.

•**B.**I am not to work until the blisters are scabbed and crusted over.

•**C.**There is no medication to help, only cool compresses and over-the-counter lotion.

•**D.**I should expect to experience chicken pox within the next few weeks.

3. During an initial assessment of an older adult patient, a distinctive atrial gallop or S4 heart sound is heard. You would suspect:

•A.no significant pathology because an S4 sound is normal in the aging process.

•B.significant coronary artery disease.

•C.congestive heart failure.

•D.mitral valve prolapse.

4. A 4-day-old infant, delivered without complications at full term, arrives at the emergency department. The parents state that the baby was doing well at home until experiencing 45-second episodes of lethargy during 2 breast-feeding attempts over the last 4 hours. Your assessment reveals a well-appearing infant, resting quietly. Airway, breathing, circulation, and vital signs are all within normal limits. The infant cries when undressed. What is the most appropriate initial intervention?

•A.Complete blood count with differential

•B.Blood glucose

•C.Urinalysis

•D.Blood culture

Answers

1. Correct answer: A

The Kleihauer-Betke test is indicated (A) to detect fetal blood within maternal circulation or transplacental hemorrhage. This blood test should be done on any trauma patient who is pregnant regardless of Rh compatibility. Cardiotocography (B) or fetal monitoring would be indicated but not placement of an internal electrode in a nonlaboring, intact membrane patient in the emergency department. A pulmonary function test (C) would not be indicated with the presenting trauma. A urine protein assay (D) would be useful for evaluation of toxemia with pregnancy.[1]

2. Correct answer: B

Shingles is an acute localized infection caused by the varicella zoster virus. The presenting symptoms would be highly suspicious for shingles. The vesicle fluid would be considered contagious until the lesions are crusted over, and the patient should not work until the blisters are scabbed (B). The vesicle fluid is considered contagious (A), although transmission is considered low. Various medications including antivirals and pain medications can be used (C), especially during the early phases of the virus. There is no association with chicken pox outbreak following shingles (D).[2]

3. Correct answer: C

An atrial gallop or S4 heart sound is an abnormal heart sound resulting from a noncompliant left ventricle, usually caused by fluid overload or diagnostic heart failure (C). An S4 is an abnormal heart sound (A) and is indicative of fluid overload or an incompetent left ventricle. A patient may also have significant coronary artery disease (B) but would not be diagnosed with only the presence of an S4 heart sound. A patient would exhibit a heart murmur if they had significant mitral valve prolapse (D).[3]

4. Correct answer: B

Blood glucose (B) would be indicated initially. The mental status of a newborn is often difficult to accurately assess. When a baby is born, they are neurologically immature. Newborns are prone to hypoglycemia if they are not feeding well, or their metabolic demand is increased owing to illness. Hypoglycemia can manifest in a variety of symptoms including apnea, hypothermia, jitteriness, high-pitched cry, loss of tone, and seizures (usually atypical owing to their immature brain). A complete blood count with differential (A), urinalysis (C), and blood culture (D) are all important components of a septic workup in a newborn, but the glucose would be indicated initially.[4]

DETAILS

Subject:	Chicken pox; Emergency medical care; Blood tests; Breastfeeding &lactation; Infants; Vital signs; Coronary vessels; Heart failure; Cardiovascular disease; Glucose; Hypoglycemia; Lethargy; Fetal monitoring; Core curriculum; Mitral valve prolapse; Nursing; Shingles; Urinalysis; Babies; Emergency services; Coronary artery disease
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One Stop: Examining the Reasons Patients Use the Emergency Department for Nonurgent Care and the Barriers They Face: JEN

ABSTRACT (ENGLISH)

Introduction

Despite the plethora of research on the use of emergency department services for nonurgent primary health care, the vast majority of this research is quantitative in nature. To date, there is little research that reports on the problem from the patients' perspective and/or lived experience, which compromises health care providers' understanding of the essence of the problem as described by the patients. Thus, this study will provide a qualitative description of nonurgent ED visits from the patients' perspective. Specifically, this study answers the following research questions: 1) What are the reasons for patients and/or caregivers visiting the emergency department for nonurgent health conditions? and 2) What are the barriers experienced by patients and/or caregivers when seeking access to health care?

Methods

A qualitative descriptive design with face-to-face interviews of 33 consenting participants was conducted at 4 emergency departments. All interviewed participants were triaged as nonurgent patients by the ED personnel.

Results

Three themes surfaced from the data regarding reasons for using the emergency department: 1) Practitioner referral; 2) Efficacy of care; and 3) Time saver. When describing barriers that participants experienced when seeking care outside of the emergency department for their nonurgent conditions, 3 themes that emerged are lack of primary care provider, financial difficulties, and lack of comprehensive care outside the emergency department.

Discussion

The results of the study can help inform patient-centered care and future policy initiatives that will address the practices and barriers contributing to nonurgent ED visits.

FULL TEXT

Contribution to Emergency Nursing Practice

••The current literature on ED use indicates that a substantial proportion of ED visits are for nonurgent health care.

••The main finding of this research is that multiple patient- and system-related factors/barriers contribute to nonurgent ED use.

••Key implications for emergency nursing practice found in this article are the need for better understanding of the problem, advocacy for patient-centered innovative solutions, and future research investigating strategies for decreasing the numbers of ED visits for nonurgent care.

Introduction

The use of ED services in the province of Ontario has been steadily increasing with nearly 5.5 million visits in 2014/2015 and an increase of 14.4% since 2008/2009.[1] Of the 5.5 million documented ED visits, just over 30% were for low-acuity conditions, which translated into 1.78 million potentially avoidable ED visits in 2014/2015.[1] These statistics are consistent with American and worldwide studies that have reported that between one third[2-4] and one half[5,6] of all ED visits are nonurgent. This is disconcerting because high acuity, life-threatening events require immediate attention, and frequent use of emergency departments for nonurgent medical conditions compromises the efficiency of the emergency departments in providing emergency care.[7] In addition, ED crowding can result in long wait times, treatment delays, diversion of ambulances to other hospitals, poor health outcomes, and increased risk of death.[8-10] Another concern is the financial impact of ED use for nonurgent health care which has been reported as being significant.[11]

A number of studies have reported on the demographics of patients who are triaged as nonurgent ED users. The most recent Canadian study evaluating demographic factors associated with nonurgent visits to the emergency department reported that patients triaged as nonurgent were mostly middle-aged and unemployed.[12] In more recent United States studies, Behr and Diaz[13] reported increased frequency of ED visits among the nonemployed and part-time employees. McCormack et al,[6] reported that females were nearly 41% more likely to visit the emergency department for nonurgent reasons than their male counterparts. They also reported that all age groups were more likely to visit the emergency department than those aged 50-65 years and that urban patients were more likely to visit the emergency department for nonurgent reasons than rural patients.[6] McHale et al,[14] however found that males were slightly more likely to attend than females. Several studies[7,14] found that low urgency visitors to the emergency department most often occurred during business hours when most primary care clinics were open.

While gaining a better understanding of the predictors of ED use for nonurgent visits from a quantitative perspective is critical, understanding the patient's perspective of why they visit the emergency department for nonurgent conditions is equally important for a comprehensive understanding of these factors (ie, triangulation of quantitative and qualitative literature). However, there is scarcity in qualitative research pertaining to the understanding of this phenomenon.[15,16] This manuscript provides qualitative descriptive insights from patients and their families/caregivers regarding the issues of nonurgent ED visits in southwestern Ontario. Specifically, this manuscript focused on participant responses to the following 2 questions: 1) What are the reasons for patients and/or caregivers visiting the emergency department for nonurgent health conditions? and 2) What are the barriers experienced by patients and/or caregivers when seeking access to health care for their health conditions?

Methods Research Design

A qualitative descriptive design,[17,18] guided by the consolidated criteria for reporting qualitative research,[19] was completed on a sample of 33 participants (ie, 30 patients and 3 caregivers). This design included face-to-face interviews to elicit qualitative information about the participants while they were utilizing the emergency department. Upon written informed consent, participants took part in semi-structured, face-to-face audio-recorded interviews. Participants were asked, "Please share using your own words, what brought you to the emergency department

today?" and "What are the reasons you came to the emergency department for health care?" In addition, participants responded to the question, "What are some of the barriers or challenges you experience when seeking health care outside from the emergency department?" Additional questions included, "What else would you like to share about your health care experience today?" and "Please tell me more…" Eight interviews were conducted at 3 of the 4 emergency departments, and 1 emergency department had 9 participants interviewed. The numbers of interviews completed at the emergency departments were discussed in advance with the research team, by all 4 of the hospital administrations based on time and room space availability, and interview numbers were consistent for all 4 emergency departments. All of the emergency departments were located in our local health district in southwestern Ontario, serving a population of urban and rural communities (1 urban hospital, 2 farming community hospitals, and 1 rural hospital). Institutional research ethics approval was obtained from the respective university and hospital Research Ethics Boards.

Data Collection

Data collection took place during peak times of ED visits (eg, daytime, weekday hours, when primary care offices were open). Using purposive sampling,[20,21] the interviewer invited all eligible patients triaged by the emergency nurse as nonurgent, to participate in the study. Patients were eligible to participate if they spoke and understood the English language, as the interviewer only spoke English and the triage nurse also spoke English. The interviews and written consents were written in English, as the most recent 2011 census data collected for southern Ontario indicated that 98.8% of the population most often spoke English at home.[22] Inclusion criteria were participants of 18 years or older, patients under the age of 18 if they had a caregiver (parent or legal guardian) present with them, and triage by an emergency room nurse as nonurgent. The authors interviewed 2 different caregivers who were parents of minor children. One of these children had both parents present and were therefore simultaneously interviewed as one unit. All nonurgent ED patients who met the above criteria were approached. Three individuals declined participation in the study because they needed to return to work after their lunch hour. Written informed consents were completed by participants prior to the commencement of an interview that lasted approximately 45 minutes. Participants were informed both verbally and in the written consent form that participation was voluntary. If participants chose to stop the interview or only answer some of the interview questions asked of them, their current ED care and subsequent ED care would not be affected. Participants knew that if they chose to stop the interview before the end of the interview, they would still receive a coffee gift card for their time.

The face-to-face semi-structured interviews took place in a private room adjacent to the emergency department. Interviews were conducted after participants were seen by a triage nurse and occurred either while the patient waited to be seen by an emergency room physician and/or nurse practitioner or after being seen and prior to their discharge from the emergency department. The interviews were completed by one of the researchers during the daytime hours of 8:00 am to 5:30 pm. Interviews were conducted over a 4-day period; one day in each emergency department until saturation of data was achieved. Interviews were digitally recorded, with patient knowledge and consent. Each participant was given a $15 gift card at the end of the interview in appreciation for their participation. Interviews continued until saturation of data was achieved. Participants gave detailed rich descriptions[17,23] (ie, detailed contextual account of experiences) during each interview. The interviews were transcribed by a skilled transcriptionist, and once the transcripts had been reviewed for accuracy, and thematic analysis completed, the digital recordings of the interviews were deleted.

Data Analysis

Data were analyzed by hand and grouped for patterns in meaning and overall themes.[17,18,23] Three research team members reviewed the transcriptions independently for coding similarities and met together several times each week

to discuss patterns and themes from the data. Overall themes were grouped together according to meaningful patterns and several themes emerged that were common among patients.[23] Coding discrepancies were discussed among team members for consensus. The transcribed interviews and other observational field notes were triangulated and coded according to their patterns of similarity, relationships to each other, and relationships to the study.

Trustworthiness maintains research rigor, establishing the quality of research findings. Peer review by research team members, triangulation of data, and member checks (during the normal course of the observation and interviews)[24] examined patterns of meaning among participants and provided credibility.[24] Rich description from the interviews showed transferability and wider applicability of the findings to other contexts. Details provided in the data collection strategies, analysis, and audit trail were part of dependability. Peer debriefing with all team meetings reduced bias potential and added confirmability to the study findings.[24]

Results Sample Characteristics

Thirty-three adults participated (12 men and 21 women) and their ages ranged between 19 and 72 years, (M = 40.3 years; SD = 17.3). Among the 21 women, 2 were caregivers who brought their children to the emergency department for nonurgent visits. One of these women was accompanied by her husband.

Reasons for Using the Emergency Department to Receive Nonurgent Health Care

In describing the participants' *reasons for using the emergency department to receive nonurgent health care*, 3 themes surfaced and were grouped together according to patterns in meaning: 1) Practitioner referral, 2) Efficacy of care, and 3) Time saver.

Practitioner Referral

Twelve participants described how they had called their primary care provider (PCP) for an appointment but were instead referred to the emergency department for care. One participant with a wrist injury called her physician's office to get an appointment. "To speed the process along, he [the physician] directed me to go to the Emerg [emergency department]…" (P-4). Four of the 12 participants said that they had tried to seek care at their physician's office but after a quick assessment, they were sent directly to the emergency department for additional assessments. One participant stated that she asked the triage nurse if her family physician had called ahead to let the emergency triage nurse know that she was being sent by the physician for additional assessment and the participant was told no (P-31). Another participant described waiting to see their PCP only to be directed to the emergency department, "so we went to the doctor's at 1 PM, we were told to come back at 3:30 PM and we waited until 4 and we were told [by the PCP] we couldn't be seen today, and we needed to go to the emergency" (P-16).

Efficacy of Care

Almost half (16 of 33) of the participants referred to the efficacy of the emergency department. One participant said, "I went to a walk-in clinic and I didn't quite get everything I needed…I got worried and scared, so that's why I came to the hospital" (P-1). Another participant stated, "…everything is here [in the emergency department], the x-ray is here, the blood work is here, the everything is here, the casts, so you don't gotta go to 3 different spots to get this done, and that done, and this done, that's what makes it way more convenient" (P-29). Another participant said that "sometimes you walk out of the clinic and you still don't know what's wrong, and sometimes after the walk-in clinic visit, we end up having to come in here [to the emergency department], so maybe we could have come here first" (P-23). One participant stated, "But the antibiotics aren't working, and my husband said, 'go to the clinic,' but I said, I don't think the clinic can do for me what the hospital can…" She continued, "…I thought it was easier just to come here [to the emergency department]. And they're here [specialists]" (P-5).

Time Saver

Twenty-six (79%) of participants described needing to wait several days or weeks for an appointment to see their PCP and so going to the emergency department saved time. “If I call my doctor, I have to wait a week to even get in to go see him, and I might have to wait here 2-3 hours [in the emergency department], but it’s still better than waiting a week” (P-13). Twelve participants said they were at the emergency department to receive their tests all in one day, as it was more efficient and convenient to receive health care in this way, “I just killed two birds with one stone by coming to the emerg [emergency department]…I would have had to go back and forth, back and forth” (P-25). Another participant stated, “they dealt with the problem instead of having to, you know, book an appointment and having to come back, like in 3 or 4 days. They try to do it that day and get it over with, so you don’t have to keep coming back” (P-13). A patient’s father said, “I know a nurse in this emergency department so I called ahead to see what the wait was like before bringing him [his son] in [to the emergency department]” (P-10). Another said, “I came here knowing it was quicker, knowing I would get this checked today as opposed to making an appointment” (P-14). Ten participants reported using the emergency department because they “want to get looked at right away” (P-32). Four other participants voluntarily shared they would drive an additional 30 minutes to receive care if it meant faster care once they arrived at that emergency department.

Barriers they Have Experienced When Trying to Obtain Health Care

Participants described at length their reasons for seeking *one stop* health care and the barriers they experienced when seeking care outside of the emergency department for their nonurgent conditions; and 3 themes emerged from these descriptions: 1) Lack of PCP; 2) Financial difficulties; and 3) Lack of comprehensive care outside the emergency department.

Lack of PCP

Statements by 7 of the 33 participants identified that lack of a PCP was a barrier to obtaining health care outside of the emergency department. These participants explained that they visited the emergency department because they had a “bandage that fell off” and needed to be replaced, a “pain in both legs,” “stomach cramps, but no vomiting,” “coughing and sneezing,” and “pain in their back for five days.” They explained that without a family doctor, when they needed health care they would “go from hospital to hospital” (P-27). One participant explained the reason he presented to the emergency department was because “I don’t have a family doctor but I want one” (P-30). Two college students required doctors’ notes to return to school after missing classes and an exam for having the flu. They shared their frustrations because they knew they did not require a bed in the emergency department, but without a local health care provider, their school required a note before they could return. All of these 7 participants expressed frustration with not having a PCP and needing to use the emergency department. One participant had been waiting for 2 years for a new doctor as his PCP had retired a few years ago, so he uses the emergency department for health care (P-15). Another shared that he uses the emergency department because his physician had closed his practice and there was no one to take his place. He said, “I don’t get sick very often, but when you’re sick, you need to be seen right away…when I did have a family doctor it used to take months and months to be seen…you need to be seen right away, not later down the road” (P-18).

Financial Difficulties

A recurrent theme described by participants was financial difficulties. One participant explained in detail the process of going to see his PCP and then being told by the PCP to return later in the day. He reported that he paid for parking at both locations, took time off work to drive his wife and son to this appointment so that the wife did not have to pay for 3 different cab rides to receive health care, “…so we wasted all day and if we would have come here first [emergency department], like first thing in the morning, we could have been out by lunch, even if there was a little bit of a wait. It’s extremely frustrating, extremely” (P-16). Eleven participants said their employers did not have

additional health benefits so if they missed a day of work it was a day without pay and very costly. One participant stated, “if I don’t work, I don’t get paid so I need to be seen and receive health care right away” (P-18) providing this explanation for why he visited the emergency department instead of seeing his PCP, which might require a couple of visits to get all of the tests done. Another commented on the need to hurry along their care so they could get back to work, because they “punch in and punch out, so they are not getting paid [while getting care]” (P-23). Three caregivers commented that attending the emergency department was not as costly as driving to see their PCP: “…daughter’s regular doctor is over an hour away, so this was much more convenient” (P-29).

Lack of Comprehensive Care Outside the Emergency Department

The one problem per visit rule was an issue that 20 participants identified with PCP care. These participants explained that this rule made it difficult for them to decide which problem to discuss during a single visit “cuz they all might be related,” (P-26) explained one participant. Twenty-six participants with PCPs described feeling rushed by their physician during their office visits; “...it feels like they are herding cattle” (P-31). Twenty-three of the 33 participants and caregivers interviewed (70%) wanted to obtain care in one place to reduce the back and forth required to complete diagnostics and follow up once reports are sent to their PCP. As one participant stated, going to the emergency department avoids having to go for “lab work one day, then a few days later find out the results, then a few weeks or months later, you’re referred to a specialist….everything is here; I can get everything here in one stop” (P-32).

Discussion

When describing the reasons for using the emergency department for nonurgent health care, 3 themes emerged in this study: practitioner referral, efficacy of care, and time saver. Consistent with the literature,[4,25-27] 36% of participants (12 of 33) in this study suggested that they were referred to the emergency department by their PCP. In fact, according to Redstone et al,[28] 50% of patients who attended the emergency department during the weekdays were advised to go there by their PCP. Birmingham et al[29] reported that 28% of frequent ED users reported their regular doctor had advised them to go to the emergency department. Further, there seems to be a consistent pattern across both quantitative and qualitative studies that suggest referral from another care provider influences the decision of patients to present at the emergency department for nonurgent visits. In order to decrease nonurgent visits, further discussions with PCPs and clinicians might help determine the rationale for these referrals and identify solutions to keep patients out of the emergency department.

Participants in this study also stated that they preferred a one stop experience and overwhelmingly explained that their usage of the emergency department was due to the lack of timely and comprehensive primary care in the community. Previous studies have also reported that patients view the emergency department as a convenience.[4,26,30] Similarly, Kraaijvanger et al[31] described that patients went to the emergency department because they preferred not to wait for appointments with their PCP and because the emergency department was always accessible to provide immediate care. Consistent with our findings, Redstone et al[28(p374)] found that patients who attended the emergency department did so because, “they were not able to get an appointment with their PCP quickly enough and that only 23% were offered an appointment at all.” These findings are alarming and need to be addressed. Unless timely and quality primary healthcare can be provided in the community, it is unlikely that a decrease in ED visits will occur.

Even though 26 participants indicated they have a PCP, all indicated that they visited the emergency department when most PCP offices were open. However, lack of access to regular primary care was cited as a barrier by those who did not have a PCP. This finding was similarly noted by Usher-Pines et al[4] who conducted a systematic review in which they reported an association between poor access (difficulty obtaining health care, not having a regular

physician) and nonurgent ED use. Furthermore, participants in our study expressed frustration that by waiting for their PCP, they would be missing work time and that this creates a significant financial burden to them. This frustration is consistent with those reported in other studies. For example, in Birmingham et al,[29] participants reported that they had difficulty taking time away from daily responsibilities such as work and family in order to attend medical appointments. Additionally, other studies described that patients reported having to wait too long to see their PCP,[27] or were unable to get an appointment at a clinic.[32]

Participants in this study also believed that the emergency department was the best place to access care for their health concerns because of the long wait time to see a PCP or because of the perceived notion that better care was available in the emergency department compared to what a PCP could provide. The inability to get a same- or next-day appointment with a PCP was reported by Redstone et al.[28] In addition, Birmingham et al[29] noted that 48% of frequent ED users reported that they felt they received better health care quality in the emergency department than from their PCP.

Limitations

The research findings were obtained from a one-time semi-structured, face-to-face audio-recorded interview. As a result of the open-ended nature of the questions, responses from patients are limited to their thoughts at the time of the interview and may not have included all their thoughts about the topic. The stress of being in the emergency department and of being interviewed may have limited the articulation and depth of the participants' thoughts. Conducting the interviews at 4 hospitals provided insights into patients in this region but may limit the variation and transferability of the findings. Since we only had one-time access to the participants (during their emergency department visits), this was a one-time interview with each participant. Multiple follow-up interviews with patients at different dates, and during different months of the year would help to verify the research findings, and longitudinal follow-up would help to determine if these thoughts expressed by participants and themes persist over time. Additionally, health care in Ontario is free of charge and based on a universal health care system, and therefore these themes may not be applicable to different regions with varied fees for health services. Finally, this study did not include a review of medical records to corroborate findings reported in the interview.

Implications for Emergency Nurses

Due to the clinical and financial burden of nonurgent ED visits, gaining a better understanding of the reasons for these visits and the barriers to accessing primary care is important for health care providers. Patients reported that they had been referred to the emergency department by their PCPs. It would be helpful to gain better insights from practitioners and staff in the PCP offices to learn more about their criteria for referring patients to the emergency department versus being seen in the PCP office.[25] An understanding of which patients are referred to the emergency department and the rationale behind why they were instructed to go to the emergency department might help provide opportunities for changing the practice of primary health care providers. In addition, understanding the reasons leading to nonurgent use of the emergency department is important so that nurses may have a better appreciation of this phenomenon. Such appreciation will enable nurses to better assist and understand the needs of these patients as opposed to blaming them.

Two of the themes that arose from our qualitative interviews evolved around the emergency department being more efficacious and that it was a time saver. Exploring the differences between the efficacy and efficiency of primary care versus emergency department care might help to uncover areas in the existing health care models that could be changed to better improve services for patients in the community. In addition, opening more clinics with access to timely medical laboratories and diagnostics, like an emergency department, may alleviate the pressure of ED overuse. In addition, training of PCPs to include emphasis on the importance of patient-centered care that could

increase patients' trust and use of primary care systems may prove beneficial. Offering education to patients such as an emergency nurse help line might alleviate the burden on emergency departments if patients could phone and ask about their health condition and which care facility would best meet their needs –be they urgent or nonurgent. Roth[33] found that 86% of presenting medical problems were resolved without an ED visit by using an integrative telemedicine program.

Exploring which services are underutilized in the community would be helpful as patients could be directed to these facilities instead of the emergency department. Having a greater understanding of the services nonurgent ED users would access in the community would be important for nurses to direct these patients to receive the appropriate care in the community. In addition, emergency nurses could use their knowledge and lived experience to better advocate for evidence-based solutions to help resolve some of these issues.

Emergency nurses have the unique opportunity to be the initial gatekeepers when patients arrive to the emergency department. These emergency nurses provide the assessment and subsequent triage designation, and they listen to the reasons that patients experience barriers when seeking health care. Focus groups of patients and nurses could be created to expand health care providers' understanding of the challenges and solutions associated with seeking, receiving, and providing health care in the emergency department. Future changes to primary healthcare delivery can be informed by the valuable feedback and insights provided by the participants from our study, those patients and caregivers who use the emergency department for nonurgent care. A large-scale follow-up study, using mixed methods and inclusive of nurse practitioners and physicians working in the emergency department, would provide additional perspectives regarding patients seeking nonurgent health care.

Conclusions

This study examined the reasons why patients and their caregivers visited the emergency department for their nonurgent health conditions and the barriers they experienced when seeking primary care. Practitioner referral, efficacy of care, and saving time are 3 driving forces for nonurgent use of the emergency department. Lack of PCP care, financial difficulties as well as lack of comprehensive care outside of the emergency department were identified as barriers to seeking primary care outside the emergency department. The results of the study provide insights that can help future initiatives to address the practices and barriers contributing to nonurgent ED visits. This research highlights important findings to inform patient-centered care.

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Author Disclosures

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DETAILS

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Retrospective Diagnosis of Congenital Long QT Syndrome in a Patient With Febrile Syncope: JEN

ABSTRACT (ENGLISH)

A brief primary survey revealed the following: orbital ecchymosis bilaterally with swelling of the lower lip and small mucosal laceration without active bleeding, c-collar in place, no chest wall tenderness, lungs clear, no heart murmur, mild suprapubic tenderness, and moving all extremities purposefully. Because of his age and head trauma, the patient was quickly expedited to computed tomography where he had his head, cervical spine, and facial bones examined. Follow-up testing concluded that the patient had an underlying congenital long QT syndrome (c-LQTS).Long QT Syndrome Etiology LQTS is a common genetic disorder that predisposes patients to sudden cardiac death, with a prevalence of 1 in 2,000 live births.1 The pathognomonic feature is a prolonged QT or corrected QT (QTc) interval on an ECG, >470 ms in men, >480 ms in women, and oftentimes much longer.2 QT prolongation is associated with a number of important illnesses, such as stroke, myocardial infarction, metabolic derangements, renal failure, and hypothyroidism.3 This prolongation, which functionally represents an elongation of the ventricular repolarization, is common in critically ill patients and is associated with up to a 300% increase in mortality.3 The common pathway of sudden cardiac death secondary to LQTS is the following: Examples include diuretics, which can deplete stores of potassium, and medications with anorexia side effects, which can prevent adequate potassium repletion through diet. [...]syncope in the elderly may be due to TdP as a result of the medical and social etiology, rather than a genetic mutation.Assessment and Monitoring The case presented in this article demonstrates clinician vigilance and vigor needed for diagnosing LQTS prior to the sentinel event, which is death or fatal ventricular dysrhythmia 50% of the time. The Schwartz score uses a combination of ECG findings (QTc interval, T-wave alternans, notched T waves, and relative bradycardia) and clinical and family histories.10 Depending on the level of suspicion, additional clinical testing includes stress ECG testing, provocative drug testing, Holter monitoring, and sometimes genetic testing on the index case.3 Once a diagnosis is made, molecular genetic testing can be performed to determine the exact abnormality followed by familial cascade screening of first degree relatives.Prevention and Treatment Treatment for LQTS is multimodal and targeted toward both the genotype and phenotype.11,12 First, there is an emphasis on avoiding known triggers including QT-prolonging medications, electrolytes aberrancies, and extra cautiousness during exercise and illness that increase the risk of fever.11 Athletes are recommended to seek consultation from an LQTS specialist before returning to sports.11 Pharmacotherapy includes initiation of a β-blocker, even in most asymptomatic patients, except those with explicit contraindications such as severe asthma, bradycardia, and atrioventricular nodal blockade.11 The mechanism of β-blocker protection against LQTS is its

FULL TEXT

Contribution to Emergency Nursing Practice

••The current literature on congenital long QT syndrome (LQTS) indicates that the diagnosis is often missed in the emergency department and has a wide range of presentations.

••This article contributes information on LQTS for the purpose of increasing awareness of the subtle presentation of LQTS and the implication for familial testing, particularly the unique presentation of a febrile older adult.

••Key implications for emergency nursing practice found in this article are the signs in a patient's history that suggest LQTS as a possible underlying pathology in patients who present with syncope, seizures, and/or sudden cardiac arrest and the recognition of the high-risk features.

Patient Case Presentation

A 72-year-old man presented to a level-1 urban trauma center by ambulance after a witnessed syncopal event. The syncope was sudden and without prodrome, resulting in facial injuries. He was feeling well until the day before when he developed fever and chills. History was obtained from his family who witnessed the event and emergency medical services because the patient did not recall the events preceding the syncope. The patient's medical history included hypertension and prostate cancer with robotic prostatectomy.

Triage and initial physical examination were remarkable for temperature, 38.6°C (101.4°F); blood pressure 137/82 mm Hg; heart rate 88 beats per minute; respiratory rate 18 breaths per minute; and oxygen saturation 98% on room air. On examination, he was febrile, awake, and conversant. A brief primary survey revealed the following: orbital ecchymosis bilaterally with swelling of the lower lip and small mucosal laceration without active bleeding, c-collar in place, no chest wall tenderness, lungs clear, no heart murmur, mild suprapubic tenderness, and moving all extremities purposefully.

Because of his age and head trauma, the patient was quickly expedited to computed tomography where he had his head, cervical spine, and facial bones examined. Routine laboratory tests, including blood and urine cultures for possible sepsis, and a 12-lead electrocardiogram (ECG) were obtained. The ECG at this time was notable for a corrected QT-interval of 538 ms without other prominent derangement. When he returned to the ED resuscitation room after imaging was completed, the nurse noted that the patient was unresponsive. The emergency nurse placed the patient on the cardiac monitor, which demonstrated an undulating wide complex tachycardia consistent with torsades de pointes (TdP). The emergency nurse administered 1 precordial thump and promptly defibrillated the patient with 200 biphasic joules. The patient immediately regained consciousness and returned to a normal sinus rhythm.

The emergency care team administered empiric antibiotic coverage with intravenous (IV) cefTRIAXone, IV crystalloid fluids, and oral acetaminophen. The patient was admitted to the cardiac critical care unit for further monitoring of his dysrhythmia and sepsis. He was ultimately diagnosed with *Escherichia coli* sepsis, based on the results of both urine and blood cultures.

The patient had an uneventful stay in the critical care unit. He was started on an oral β-blocker. His IV antibiotics were transitioned to oral cefdinir. A more comprehensive family history was obtained, which revealed the patient had previously passed out twice with fever. His biological son had died unexpectedly in his sleep at the age of 30. In addition, his biological niece had died in infancy. Her crib death had been previously attributed to sudden infant death syndrome. The patient was referred for genetic testing and cardiology follow-up for possible implantable cardioverter-defibrillator placement. Follow-up testing concluded that the patient had an underlying congenital long QT syndrome (c-LQTS).

Long QT Syndrome Etiology

LQTS is a common genetic disorder that predisposes patients to sudden cardiac death, with a prevalence of 1 in 2,000 live births.[1] The pathognomonic feature is a prolonged QT or corrected QT (QTc) interval on an ECG, >470 ms in men, >480 ms in women, and oftentimes much longer.[2] QT prolongation is associated with a number of important illnesses, such as stroke, myocardial infarction, metabolic derangements, renal failure, and hypothyroidism.[3] This prolongation, which functionally represents an elongation of the ventricular repolarization, is

common in critically ill patients and is associated with up to a 300% increase in mortality.[3] The common pathway of sudden cardiac death secondary to LQTS is the following: TdP, a form of polymorphic ventricular tachycardia that occurs when a prolonged QT interval causes a R-on-T phenomenon in which the subsequent R wave lands on the late T wave, inducing ventricular tachycardia (Figure 1).

c-LQTS is the result of 16 disease-causing mutations associated with 15 separate genes.[4] There are 3 main types of LQTS involving mutations in potassium and sodium channels (Figure 2). The remainder of LQTS constitute ≤1% of the total cases and encompass mutations affecting other electrolyte gating channels, adapter proteins, which link the cell membrane to the overall cytoskeleton, or kinase activity.[4] Most cases are inherited via an autosomal dominant pattern, meaning subsequent generations have up to a 50% risk of inheriting this disease from a parent. There is variable expressivity and incomplete penetrance; those who have the genetic mutation, therefore, may not ever have symptoms or even manifest prolonged QTc on their ECG. LQTS is an elusive diagnosis, in part, because of this variable genetic penetrance, such as in the phenotypic expression across generations of this family. Most patients with LQTS experience diagnosable signs and symptoms in childhood and adolescence, but these cases may be mistaken for benign syncope and seizure.

LQTS is rare in the elderly. Prolonged QTc is still problematic in this age group and is primarily related to polypharmacy and electrolyte derangements, rather than congenital. In addition to the direct effects of medications on the QT interval, many medications exert an indirect effect through potassium depletion. Examples include diuretics, which can deplete stores of potassium, and medications with anorexia side effects, which can prevent adequate potassium repletion through diet. Thus, syncope in the elderly may be due to TdP as a result of the medical and social etiology, rather than a genetic mutation.

Assessment and Monitoring

The case presented in this article demonstrates clinician vigilance and vigor needed for diagnosing LQTS prior to the sentinel event, which is death or fatal ventricular dysrhythmia 50% of the time. Clinician critical thinking and awareness are essential, as LQTS may present as benign syncope or seizure, and the diagnosis is often missed.[5] When preemptory symptoms occur, they are often prompted by medications (Table 1), electrolyte derangements, exercise, fever, and even seeming benign events such as sleep and emotional responses.[4] These triggers depend on the type of LQTS; LQT1 is predominantly triggered by exercise, and LQT2-LQT3, largely by emotions, medications, and sleep.[4]

A commonly cited mnemonic, DOSE, can assist clinicians in determining who may be acutely at risk of developing TdP: Drug (medications that predispose to TdP), Overdose (medications that cause bradycardia or that predispose to TdP), Slow rhythm (slower rhythms have longer repolarization periods and can lead to TdP), and Electrolyte derangement (see Table 1).[5]

The list of medications that can cause prolongation of the QT are many, however, several are worth discussing because of their prevalence in the emergency department (Table 2).[6-8] Electrolyte derangements that prolong QT intervals include hypokalemia, hypomagnesemia, and hypocalcemia. Conditions predisposing patients to these electrolyte abnormalities include malnutrition/dehydration, gastrointestinal illness, diuretic therapy, and disorders of calcium metabolism such as primary and acquired hypoparathyroidism.

Morbidity from TdP is linked to the result of a 2- or 3-hit hypothesis: the congenitally prolonged QT interval is worsened by a combination of electrolyte derangement, medications, exercise, and/or emotional stress. An example would be an athlete with LQTS suffering from dehydration and hypokalemia, in which subsequent exercise may cause TdP and sudden cardiac death. Up to 20% of patients with LQTS will have normal QTc on a standard ECG and suffer sudden cardiac death on the initial presentation of disease.[2] A number of otherwise unexplained

drownings may be explained by the effects of temperature mediated surprise and/or exercise-induced QTc prolongation.[9]

Diagnosis

Diagnosis is rarely made on the first encounter. Once there is suspicion for c-LQTS, the Schwartz score can be used to calculate a risk of having LQTS and the need for further diagnostic testing ([Table 3]). The Schwartz score uses a combination of ECG findings (QTc interval, T-wave alternans, notched T waves, and relative bradycardia) and clinical and family histories.[10] Depending on the level of suspicion, additional clinical testing includes stress ECG testing, provocative drug testing, Holter monitoring, and sometimes genetic testing on the index case.[3] Once a diagnosis is made, molecular genetic testing can be performed to determine the exact abnormality followed by familial cascade screening of first degree relatives.

Prevention and Treatment

Treatment for LQTS is multimodal and targeted toward both the genotype and phenotype.[11,12] First, there is an emphasis on avoiding known triggers including QT-prolonging medications, electrolytes aberrancies, and extra cautiousness during exercise and illness that increase the risk of fever.[11] Athletes are recommended to seek consultation from an LQTS specialist before returning to sports.[11]

Pharmacotherapy includes initiation of a β-blocker, even in most asymptomatic patients, except those with explicit contraindications such as severe asthma, bradycardia, and atrioventricular nodal blockade.[11] The mechanism of β-blocker protection against LQTS is its antiadrenergic properties, which not only decrease the risk of tachydysrhythmias but also decrease the QT interval. In the largest trial to date comparing β-blockers, none were substantially superior, except in the case of LQT2 in which nadolol would be the drug of choice.[12] Clinical symptoms while on β-blockers connotes an increased risk, and other therapies that can be considered include other medications (such as mexiletine), cardiac sympathetic denervation, and/or placement of an implantable cardioverter-defibrillator.[11]

In acute management, commercial cardiac monitoring equipment to continuously measure QT intervals is available; however, guidelines on its use limit recommendations to those patients started on antiarrhythmic medications, which predispose to TdP, or in those patients with known prolonged QT who are started on other medications, which may prolong the interval.[13] Whereas these represent general guidelines, there are many clinical scenarios in the emergency department in which QT monitoring may be appropriate, including initiation of antiarrhythmic agents or addition of antipsychotics.

Patient Case Conclusion

After hospital discharge, the patient was seen by electrophysiology specialists, and genetic samples for channelopathies testing were sent to a specialized laboratory. He was started on nadolol, and all family members were tested. He eventually received an implantable cardioverter-defibrillator, and his symptomatic family members were diagnosed and treated. His sepsis resolved with appropriate antibiotic treatment and hospital and follow-up care.

Emergency Nursing Implications

LQTS is a complex disease with presentation possible at any point of life. Emergency clinician critical thinking and vigilance for LQTS can save the lives of both patients and their family members. This critical thinking and vigilance should focus on clues in the patient history, ECG and cardiac monitoring, and relevant pharmacotherapy ([Table 2]). We recommend emergency clinicians use the ASK, MONITOR, TREAT, AND REFER process for LQTS. ASK if any family members passed away suddenly. If the patient has experienced a syncopal event with no prodrome, ASK if they have started any new medications recently. MONITOR the ECG. If the QTc is prolonged, maintain cardiac

monitor and/or consider continuous QTc monitoring if history is highly concerning. TREAT to replace electrolytes, hydrate, and do not administer any medications that could further prolong the QTc interval. REFER the patient to cardiology for consideration of genetic testing when appropriate and provide family resources if the LQTS disease diagnosis is made. In 1 study, only 53% of families were properly informed of an inherited cardiac condition.[14] This highlights the need for family counseling and guidance around this issue. More provider and patient resources about LQTS and other forms of sudden arrhythmia death syndromes can be found at the Sudden Arrhythmia Death Syndrome Foundation website, http://www.sads.org.[15]

Author Disclosures

Conflicts of interest: none to report.

Mnemonic	Meaning
D	Drug (QTc prolonging drugs)
O	Overdose
S	Slow rhythm
E	Electrolyte disturbance

Class/category	Medication examples
Antiemetics	
5-HT3 antagonists	Ondansetron, granisetron
Dopamine antagonists	Metoclopramide, prochlorperazine
Antipsychotics	
Butyrophenones	Haloperidol, droperidol
Phenothiazines	chlorproMAZINE, fluPHENAZine
Atypicals	OLANZapine, risperiDONE, qUEtiapine, ziprasidone
Antibiotics	

Macrolides	Azithromycin, erythromycin, clarithromycin
Fluoroquinolones	ciprofloxacin, levoFLOXacin, moxifloxacin
Extended spectrum β lactams	Piperacillin-tazobactam, ampicillin-sulbactam
Antifungal medications	fluconazole, ketoconazole
Antidepressants	
Tricyclics	Amitriptyline, nortriptyline
Selective serotonin reuptake inhibitors	Citalopram, sertraline
Analgesics	
Mu receptor agonists	Methadone, traMADol
Nonsteroidal anti-inflammatories	Ketorolac, celecoxib
Antiarrhythmics	
Class Ia	Procainamide, quiNIDine
Class III	Amiodarone

ECG finding	Score, points
QTc duration* (Bazett formula)	
≥480 ms	3
460-479 ms	2
450-459 ms (men only)	1
Torsades de pointes	2
T-wave alternans	1
Notched T wave in 3 leads	1

HR <2nd percentile for age	0.5
Clinical history	
Syncope[†]	
With stress/exertion	2
Without stress	1
Congenital deafness	0.5
Family history[‡]	
Family member with definite LQTS	1
Unexplained sudden cardiac death <age 30	0.5

DETAILS

Subject:	Asthma; Emergency medical care; Sleep; Long QT syndrome; Medical diagnosis; Sports; Sepsis; Mutation; Hypothyroidism; Electrocardiography; Congenital diseases; Side effects; Bleeding; Fever; Births; Patients; Electrolytes; Trauma; Cardiac arrhythmia; Heart beat; Death &dying; Bones; Athletes; Diet; Chest; Consultation; Older people; Bradycardia; Pharmacology; Myocardial infarction; Adapter proteins; Defibrillators; Etiology; Critical care; Diuretics; Genetic testing; Ultrasonic imaging; Diagnostic tests; Relatives; Anorexia
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Instrucciones de Alta por Video: Effectiveness of Video Discharge Instructions for Spanish-Speaking Caregivers in the Pediatric Emergency Department: JEN

ABSTRACT (ENGLISH)

Introduction

Although evidence supports the addition of video discharge instructions to improve caregiver knowledge among English-speaking caregivers of children in the pediatric emergency department, there is no evidence about the effectiveness of videos for Spanish-speaking caregivers. The purpose of this study was to test whether Spanish video discharge instructions added to standard written and oral discharge instructions would result in improved knowledge and satisfaction among caregivers compared with written and oral instructions alone.

Methods

Spanish videos were created for fever, gastroenteritis, and bronchiolitis. A quasi-experimental, consecutive-sample, pre–post-test design was used with an audio computer-assisted survey platform to provide surveys in Spanish. The intervention group received written and oral instructions + video, whereas the comparison group received written

and oral instructions alone.

Results

Data were collected from 150 caregivers. Caregivers who were given written and oral instructions + video showed significant knowledge improvement regarding their child's diagnosis and treatment (+19.3% and +23.6%, respectively, among standard participants; $P < 0.001$). Moreover, videos did not significantly improve caregivers' knowledge regarding illness duration and when to seek further care. Regardless of the discharge instruction format, no significant difference was observed in the helpfulness of the instructions (-1%; pre vs post, 84% vs 80%; $\chi 2 = 0.35$; $P = 0.58$).

Discussion

Study results demonstrate that when tailored to reflect diagnosis-specific education, video discharge instructions can improve Spanish-speaking caregiver knowledge about discharge education compared with written and oral instructions alone. Videos can be integrated to standardize the ED discharge process as an adjunct to nurse-provided written and oral instructions with an interpreter for Spanish-speaking families.

FULL TEXT

Contribution to Emergency Nursing Practice

••The current literature on video discharge instructions indicates that using videos or other technology as an adjunct to standard written and oral discharge instructions improves patient or caregiver understanding and knowledge about emergency department aftercare among English speakers.

••This article contributes to the finding that the use of video discharge instructions shows significant knowledge improvement among Spanish-speaking caregivers about their child's diagnosis and treatment when being discharged from the pediatric emergency department.

••Key implications for emergency nursing practice found in this article are that videos are an effective way to improve knowledge among Spanish-speaking caregivers and that they can be created to reflect diagnosis and facility- and community-specific information.

Introduction

An effective discharge from the pediatric emergency department educates caregivers (parents, family members, and guardians) regarding their child's diagnosis, prognosis, treatment plan, and the expected course of illness.[1,2] Evidence has shown that standard written and oral discharge instructions (WODIs) from the emergency department may not be equally effective for all caregivers.[2,3] Studies have found limited comprehension of traditional discharge instructions among Spanish-speaking patients, which can lead to poor treatment compliance, inadequate follow-up, and ED readmission.[2,3] Discharge instructions are often not fully understood by patients and caregivers, making it difficult for families to manage aftercare.[3,4] In a busy and sometimes chaotic emergency department, there is often limited time to provide patient-tailored discharge instructions and use a validated teach-back method for assessing comprehension. One study found that on average, providers spent only 4 minutes giving discharge instructions, and there were limited opportunities for patients to ask questions.[5]

Even when standardized written discharge instructions are used, oral discharge instructions may be incomplete or open to the interpretation of the nurse. For example, less experienced pediatric emergency nurses may provide less complete instructions. Although providing a trained interpreter is the best practice for providing discharge instructions, even the most seasoned interpreter or nurse may find providing discharge instructions complicated. In addition, nurses may over- or underestimate the health literacy of caregivers and may not cover information they think the caregiver should already know. In a recent study of caregivers who returned to the emergency department

within 72 hours, approximately 41% reported that they had received incomplete WODIs regarding diagnosis, illness duration, and home care.[6] Moreover, Gutman et al[7] found that among Spanish-speaking caregivers of children being discharged from the pediatric emergency department, even those with whom professional interpreters were used frequently missed topics such as instructions on when to return to the emergency department and follow-up. Recently, there has been a focus on including technology with discharge instructions as both a patient preference and a way to increase patient understanding and improve patient safety.[8] A recent systematic review by Hoek et al[9] determined that standard oral discharge instructions may not be enough to educate patients at discharge and advocated for the addition of written instructions or video to augment instructions for ED aftercare. Although recent evidence has supported the addition of video discharge instructions (VDIs) to improve caregiver knowledge among English-speaking caregivers of children being discharged from the pediatric emergency department,[3,10-13] there is limited evidence demonstrating that VDIs are also effective for Spanish-speaking caregivers. VDIs ensure that the information shared with caregivers during discharge is standard and complete for every person, could potentially reduce errors that develop when a provider or nurse is not experienced at educating patients, and addresses health literacy concerns.

Objectives

The purpose of this study was to test whether Spanish VDIs in addition to WODIs resulted in greater improvement in knowledge than WODIs alone among Spanish-speaking caregivers of children discharged from the emergency department. We hypothesized that caregivers who received VDIs + WODIs would show a significantly greater improvement in pre- versus postintervention knowledge about their child's diagnosis, treatment, illness duration, and when to seek further care than those who received WODIs. The secondary aim was to answer the research question "Do caregivers who receive VDIs + WODIs perceive that their instructions are more helpful than caregivers who receive only WODIs?" We hypothesized that caregivers who received VDIs + WODIs would report significantly higher perceived helpfulness of the instructions than those who received WODIs alone.

Methods Study Design

The study employed a 2-group consecutive-sample, quasi-experimental, pre–post-test design. After triage, but before being seen by the provider, participants completed a diagnosis-specific, 5-question pretest survey that assessed knowledge about their child's diagnosis, treatment, illness duration, and when to seek further care. During their visit, participants in the intervention group received VDIs about their child's specific diagnosis followed by standard WODIs. The comparison group received standard WODIs only. All participants were given WODIs by an in-person staff interpreter or through the hospital's phone interpreting service. After receiving discharge instructions, caregivers completed the same diagnosis-specific, 5-question post-test survey with 1 additional question about their satisfaction with their visit.

Sample Size and Setting

The study was conducted in a medium-sized suburban hospital, with a level III trauma center, which serves approximately 16,000 pediatric patients annually. Sample size estimates were calculated using Stata 12.1[14] (StataCorp LP) with a power of 80% (type II error rate = 20%) and a level of significance of 5% (alpha, type I error rate = 5%). It was estimated that 128 participants were required to determine a statistically significant difference. Recognizing that a Spanish caregiver population may exhibit differences in disease knowledge levels before intervention, data were collected from 150 caregivers (n = 75, standard care group; n = 75, intervention group). The participants were caregivers of children who accessed emergency services for 1 of the 3 most common illnesses seen in the pediatric emergency department: fever, gastroenteritis, and bronchiolitis. Inclusion criteria were as follows: caregivers (1) choosing Spanish as their primary language during triage; (2) with children aged between

1 month and 21 years being treated; (3) with children with an initial complaint of either fever, gastroenteritis, or bronchiolitis; and (4) aged >18 years. Exclusion criteria were caregivers (1) with children triaged at an emergency severity index 2 or above (on a scale of 1-5), indicating that they needed emergent care; (2) unable to provide consent; and (3) leaving before discharge instructions were provided.

Data Collection and Management

The study used the Tufts Audio Computer-Assisted Self-Interview (ACASI) software to collect data.[15] The team chose ACASI primarily because it addresses literacy concerns as questions and response options are displayed as text on computer screens and can simultaneously be read aloud to the participant.

ACASI-based surveys (1) increase data validity for sensitive measures by eliminating social desirability and interviewer bias; (2) increase participant privacy; (3) have functionality for illiterate participants; (4) can be programmed in Spanish; (6) generate less missing data and good nonresponse rates; (7) reduce staff time required for data collection for interviewing; and (8) eliminate costly, time-intensive, and inaccurate data entries.[16] Multiple studies have found that ACASI has good reliability and validity, with a review by Brown et al showing strong evidence that ACASI-administered interviews resulted in lower rates of reporting bias than comparison methods.[17]

Data collection was completed by a team that included a clinical nurse educator, the clinical director, designated staff nurses, and a clinical technician. All team members underwent system institutional review board training and completed online education about the basic principles of research. The team held a kick-off meeting in which research policies and procedures were reviewed and the study protocol was described. The team trialed the ACASI system and consent process several times before beginning data collection to reduce errors in using computer platforms. To improve fidelity of the intervention, data collectors did not enroll their own assigned patients into the study. Instead, they collected data of caregivers with patients assigned to their colleagues.

Three diagnosis-specific surveys were created. The surveys contained 5 questions that assessed knowledge regarding a child's diagnosis (1 question), treatment (2 questions), duration of illness (1 question), and when to seek further care (1 question). The questions were created for a previous quality-improvement project and did not have reliability information available. The questions directly correlated with the information taught in the VDIs. The post-test survey included a sixth question, "How satisfied were you with the discharge education you received today?" and offered answers on a Likert scale with answers ranging from "Not helpful at all" to "Extremely helpful."

Procedure

At the beginning of their ED visit, caregivers who met the inclusion criteria watched a short video in Spanish that described the study and provided information about informed consent. In most cases, a Spanish interpreter who had been trained to be part of the research study was present, and she answered any questions the potential participant had about the study. If the interpreter was not available, after the consent video concluded, the screen of the tablet went to an interactive screen through which the potential participants were able to signal the nurse that they needed to have questions answered before continuing. The data collector would then wait to start data collection until a Spanish interpreter was available before continuing the study protocol. After watching the consent video, the ACASI platform was programmed to welcome the participant to the study, highlight again the purpose of the study, and then confirm that the caregiver understood the study and gave consent to participate in it. If the participants indicated on the screen that they did not understand the purpose of the study or did not give consent, the program stopped and alerted the data collector to call the interpreter to answer questions. The caregivers had full control during data collection to replay questions, navigate forward and backward, and to change their answers multiple times. Skip patterns were automated so that only pertinent questions were asked. At every point in the data collection process, the participant had the opportunity to stop the survey or ask for help.

Intervention

Spanish VDIs were created for the 3 most commonly seen diagnoses: fever, gastroenteritis, and bronchiolitis.[18] Videos were originally created for a previous English VDI project on the unit through a collaborative interprofessional writing process by nurses, pediatricians, and child life services. Video scripts were created to be readable to a below-fifth-grade reading level. To adapt the original videos, the team engaged hospital translation services. The new videos featured a Spanish-speaking translator who was well known in the local community. Text and visuals were changed as necessary to convey information to the Spanish-speaking population. Each video lasted approximately 5 minutes and included information about the child's diagnosis, treatment, illness duration, and when to seek further care. The videos were loaded on tablet computers that were available in each patient room to help entertain and distract pediatric patients. Tablets were cleaned between patients as a part of room maintenance. Data collection occurred for the intervention group first. When the designated sample size was attained, the videos were removed from the tablets in the patient care rooms, and the control group data were collected. In total, data were collected for 14 months: between July 2017 and September 2018. If caregivers refused the intervention or did not complete both their pre- and post-test surveys, their data were removed from the study. In addition, if caregivers had missing data (for example, if they skipped 1 or more questions on their pre- or post-test survey), their data were dropped from the study. Data collection continued until sample size was met.

Human Subjects Protection Measures

The research team complied with all human subjects' protection regulations and obtained approval for the study from the Inova Loudoun Hospital Institutional Review Board (IRB#16-2325). The caregiver was given a written Spanish-language copy of the consent and contact information for Spanish-speaking study subjects. In addition, subjects had the opportunity to ask questions, aided by an interpreter, before consenting to the study. On all screens used on the data collection platform, there was a button labeled "Stop" in Spanish. If caregivers used this button at any time during the survey, they had the option of speaking with the data collector and an interpreter or stopping the survey and being removed from the study.

Data Analysis Procedures

Caregiver knowledge is presented as means, SDs, medians, and percentiles (25th and 75th) for continuous data or as frequencies and percentages for categorical data. Interquartile ranges (25th-75th percentile) were used to evaluate caregiver knowledge by group. Group demographic comparisons were accomplished via the chi-square and *t* tests, where appropriate. Improvements in postinstruction knowledge were evaluated for all caregiver participants using a 2-way analysis of variance (ANOVA) approach. All 2-way ANOVA models contained a group factor (VDIs vs WODI), a time factor (pre vs post), and a group-by-time interaction effect. Caregiver knowledge was compared between the VDI and WODI groups using a similar 2-way ANOVA approach. Our first analyses included the entire cohort, with secondary analyses examining diagnosis groups (ie, gastroenteritis, fever, and bronchiolitis) and question type (ie, diagnosis, treatment, duration, and when to seek further care). All data analyses were performed using SAS 9.4[19] with statistical significance assumed for $P = 0.05$, 2 tailed.

Results

One hundred fifty-five caregivers (51.6% female; 48.4% male) participated in the survey. Table 1 describes sample characteristics. Eighty caregivers received WODIs, and 75 caregivers received VDI intervention. During the study duration, there were an estimated 925 caregivers who could have been screened for study eligibility. However, data collection only occurred when there was a trained, data collection staff member working and when the unit census was manageable enough for the staff to collect data. Of those approached, 9 caregivers refused to participate in the study. A total of 47 gastroenteritis caregivers (18, WODIs; 29, VDIs), 89 fever caregivers (52, WODIs; 37, VDIs), and

19 bronchiolitis caregivers (10, WODIs; 9, VDIs) were included. Overall, significant improvements in knowledge scores were observed after WODIs or VDIs were provided (preinstructions, 39.3% vs postinstructions, 53.0%; *F* = 32.06; *P* Figure presents the overall knowledge level, pre- and postinstructions, by study group. After comparing interquartile ranges (25th-75th percentiles) across timing and the study groups, the narrowest range was observed for pre-VDIs, reflecting the observed improvement in knowledge scores. Within groups, knowledge among VDI participants improved significantly (+19.3%; pre vs post, 38.7% vs 58.1%) compared with that among standard participants (+8.2%; pre vs post, 39.9% vs 48.1%; *F* = 16.7; *P* P P = 0.01), and bronchiolitis (post vs pre, 61% vs 37%; F = 3.67; *P* = 0.05).

Knowledge Regarding Child's Treatment

Both VDI and WODI participants demonstrated increased knowledge regarding their child's treatment. Caregiver knowledge regarding the child's treatment improved significantly (+14.7%; pre vs post, 44.6% vs 59.3%; *F* = 24.51; *P* F = 8.57; *P* = 0.01).

Knowledge Regarding Child's Illness Duration

Both VDI and WODI participants demonstrated increased knowledge regarding their child's illness duration. Caregivers' knowledge regarding their child's illness duration improved significantly (+12.9%; pre vs post, 28.0% vs 40.9%; *F* = 24.67; *P* F = 1.60; *P* = 0.21).

Knowledge Regarding When To Seek Further Medical Care

Both VDI and WODI participants demonstrated increased knowledge regarding when to seek further medical care. Caregivers' knowledge regarding when to seek further medical care improved significantly (+9.6%; pre vs post, 48.6% vs 58.2%; *F* = 7.34; *P* = 0.01) over the course of the study. Between groups, VDI participant knowledge regarding when to seek further medical care did not significantly improve (+14.4%; pre vs post, 49.7% vs 64.1%) compared with standard participant knowledge (+4.9%; pre vs post, 47.5% vs 52.4%; group × time; *F* = 1.79; *P* = 0.18).

Caregivers in the WODI group as well as in the VDI group rated discharge instructions favorably ([Table 2]). For both the VDI and WODI groups, the highest percentage of participants citing discharge instructions as very or extremely helpful (≥4) was observed among the bronchiolitis participants (88.8% in both groups). No statistically significant differences in caregivers' perceived helpfulness were observed among any diagnosis groups.

Discussion

This study found that in general, discharge instructions by providers and nurses in the pediatric emergency department improved knowledge, whether it came in a video or in a standard written and oral format. These findings highlight the importance and value of understandable, effective discharge instructions for caregivers leaving the pediatric emergency department with an ill child. More importantly, study findings indicate that VDIs do a better job of educating caregivers about a child's diagnosis and treatment than WODIs alone. This finding is consistent with an earlier study regarding the effectiveness of VDIs among English-speaking caregivers.

Although caregiver knowledge about the diagnosis and treatment improved significantly following VDIs, caregiver knowledge about illness duration and when to seek further care did not significantly improve. Understanding illness duration is an important part of setting caregiver expectations about home management and when to seek further care at the emergency department or primary care provider. However, previous studies have also shown that caregivers returning to the emergency department have insufficient understanding of illness duration and when to seek further medical care.[3,13] Discussing illness duration is a critical piece of discharge instructions, particularly as a previous study has found that instructions about illness duration are associated with increased satisfaction with ED care.[6] In addition, a previous project using these same videos has shown that English-speaking caregivers do not

understand more about illness duration after VDIs, indicating that either the prototype video does not adequately address illness duration or that illness duration is too patient-specific to be included in VDIs.[12]

In addition, study results indicate that Spanish-speaking caregivers find discharge instructions very or extremely helpful, whether they are provided face-to-face or have an additional video component. A similar result was found in an earlier, evidence-based project of English-speaking caregivers.[12] This was a surprise to the research team; the assumption was that in the current technology environment, younger parents might prefer a fast-paced, online learning component without the forced interaction of a nurse or provider. A recent study by Sheele et al[20] on adult English-speaking patients being discharged from an emergency department found that most patients who were surveyed preferred video instructions or a combination of VDIs + WODIs. This finding may underscore the importance Spanish-speaking families place on patient-specific information, community resources, and the value of speaking with professionals.

Limitations

There are several limitations to this study. First, a consecutive sample of caregivers without randomization limits the generalizability of the study. However, because the nurses trained to collect data were only able to do so when the unit census allowed, it was difficult to use a more robust sample-recruitment method. In addition, having these nurses collect data limited our ability to track every patient who came through and who met the eligibility criteria. Second, it is possible that because the team collected the VDI + WODI (intervention) sample first and the WODI-only sample later, there may have been something that changed the way the nurses delivered WODIs to the 2 groups, which would affect the validity of study findings. Moreover, it is possible that because the nurses on the unit were not “blinded” to whether their patients were receiving the intervention or standard discharge teaching, it might have changed the way they delivered their WODIs. Third, not all diagnoses were recruited equally into the sample, which may have affected study findings. Finally, although we chose the most frequently seen diagnoses for inclusion in the sample, there was a possibility that videos about different diagnoses would result in different findings, which limited the generalizability of these findings to caregivers receiving discharge education about only fever, gastroenteritis, or bronchiolitis.

Implications for Emergency Nurses

The results from this study demonstrate that when tailored to reflect diagnosis-specific education, VDIs can improve Spanish-speaking caregiver knowledge about discharge education more than just WODIs alone. Videos allow caregivers to grasp discharge education at their own pace during their ED visit and prepare their questions, which can potentially improve treatment compliance and follow-up and reduce ED readmissions. Most children in the United States are cared for in emergency departments that are not pediatric-specific and may have low pediatric readiness scores.[21,22] In settings where children are seen infrequently or nurses have limited pediatric experience, VDIs could be an effective tool for nurses to educate families about topics they do not feel familiar teaching.

Conclusions

Delivering discharge instructions that help families achieve successful home care of an ill child is one of the most important aspects of an ED visit. Imparting accurate information about a child’s diagnosis, treatment, illness duration, and when to seek further care is critical to a caregiver’s confidence about taking a child home and to the success in managing the child’s illness to prevent complications and reduce family stress as well as child’s pain and discomfort.

VDIs can be integrated into nursing practice to standardize the ED discharge process and can act as an adjunct to nurse-provided WODIs with an interpreter for Spanish-speaking families. However, creating and disseminating VDIs is expensive and time consuming. This was a nurse-led project and took a substantial number of nurse hours to

complete in addition to extra funding to have the videos translated and recorded. Moreover, access to tablets in every room to show VDIs is expensive, and the technology required nurses to frequently troubleshoot the equipment. The resources needed to create a similar project in another emergency department might be prohibitive. Moreover, when the study was completed and VDIs were shown to be an effective education tool, unit nurses were reticent to adopt VDIs as a standard part of their practice. They perceived VDIs as requiring additional time, although if the video was started at the outset of a visit, it allowed the caregiver time to think about their questions and absorb the teaching. In addition, nurses were frustrated when the videos did not work the first time and felt that they were too complicated to integrate into their standard workflow.

Although VDIs did not improve satisfaction among Spanish-speaking caregivers, they offer an option to innovate and diversify the education options provided to the families for whom we care. Future studies should focus on how to improve knowledge about illness duration, when to seek further care, and how to use technology in a way that improves or enhances caregiver satisfaction.

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Author Disclosures

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Parameter	VDI (n = 75), mean (SD) and n (%)	WODI (n = 80), mean (SD) and n (%)	χ^2 or t test (degrees of freedom)	P value
Child age (years)	2.8 (SD = 3.2)	3.1 (SD = 3.4)	t (153) = −0.62	0.54
Child sex				
Male	38 (50.7)	37 (46.3)		—
Female	37 (49.3)	43 (53.8)	χ^2 (1, N = 155) = 0.30	0.58
Caregiver age (years)	31.9 (SD = 6.9)	33.2 (SD = 8.8)	t (153) = −0.99	0.32
Caregiver sex				
Male	8 (10.7)	8 (10.0)		—
Female	67 (89.3)	72 (90.0)	χ^2 (1, N = 155) = 0.02	0.89
Diagnosis				

Fever	37 (49.3)	52 (65.0)		—
Bronchiolitis	9 (12.0)	10 (12.5)		—
Gastroenteritis	29 (38.7)	18 (22.5)	χ^2 (2, N = 155) = 4.99	0.08

	WODI		VDI + WODI		Comparison by group	
Diagnosis	Mean response	% Very/extremely helpful (≥4)	Mean response	% Very/extremely helpful (≥4)	Mean response, P value	% Very/extremely helpful, P value
Gastroenteritis	4.00	77	4.31	79	Z = −1.19, P = 0.24	χ^2 (1, N = 47) = 0.05, P = 0.82
Fever	3.96	80	4.17	86	Z = 0.66, P = 0.66	χ^2 (1, N = 89) = 0.54, P = 0.46
Bronchiolitis	4.22	89	4.22	89	Z = −0.29, P = 0.77	χ^2 (1, N = 19) = 0.01, P = 0.99
All diagnoses	4.00	80	4.23	84	Z = 1.29, P = 0.20	χ^2 (1, N = 155) = 0.32, P = 0.57

DETAILS

Subject:	Patients; Emergency medical care; Health education; Bronchiolitis; Medical diagnosis; Computer aided design--CAD; Knowledge; Data collection; Caregivers; Children &youth; Illnesses; Polls &surveys; Gastroenteritis; Interpreters; Pediatrics; Nurses; Helpfulness; Health literacy; Consent; Emergency services; Video recordings; Quasi-experimental methods
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Finding Funding Support for Your Dissertation Research or Clinical Practice Project: JEN

ProQuest document link

ABSTRACT (ENGLISH)

[...]other industry partners provide grant opportunities, and many of these can be contacted directly for guidance. [...]industry partners may provide alternative means of research and clinical practice support, such as datasets, devices, or therapeutic products free of charge. NIH's federal grants to support student research training are typically labeled as F and T followed by 2 numbers (eg, F31 or T32).5 The F31 or Ruth L. Kirschstein National Research Service Award has a variable budget, which covers student stipends, tuitions, fees and other expenses such as health insurance and professional conference attendance.6 Although the F31 mechanism will not directly cover the expenses for dissertation research, the stipend received, if awarded, could be allocated to fund the dissertation. Funder Type Description Maximum funding Maximum duration ENAF Seed grants Small research projects to provide pilot data for larger projects $500 1 year Research grants Small research projects to advance emergency nursing practice $6,000 1 year ANF Nursing research grants Research projects by new or experienced researchers in clinical practice or academia to enhance patient care or advance nursing science $25,000 1 year AACN Impact research grants Research focused on critical-care clinical research and priority areas such as nurse certification and healthy work environments $50,000 2 years NSF Special programs for graduate students Dissertation research projects from an array of scientific disciplines $16,000 2 years AHRQ Health Services Research Dissertation Program Projects conducted by PhD candidates to support health services' dissertations aligning with the mission of AHRQ $40,000 17 months IIR Medical education grants Projects focused on medical and health care–related educational activities Not listed Not listed Table Select nursing foundation research and clinical practice project grant opportunities

FULL TEXT

With tuition expenses ever increasing, it is important for doctoral students to obtain funding for their dissertation research and clinical practice projects. These projects may never be completed without financial assistance from other individuals or entities. Although some individuals may opt to pay for projects from their personal funds, seeking external funding is typically recommended and needed. The merits of obtaining external funding include (1) increased credibility that an external agency has determined your project to have clinical and scientific importance warranting the funding (eg, grant); (2) demonstration of high achievement of academic efforts; and (3) the requirements to ensure that the project can be completed. The drawbacks of seeking external funding include the time required to write a competitive grant proposal and the knowledge that some funding agencies may only fund a small proportion of the proposals they receive (some lower than 1 in 10).[1] In this article, we identify potential internal or intramural and external or extramural funding sources. We provide information about where emergency nursing readers in graduate school could submit a grant to fund dissertation research or a clinical practice project. Although funding agencies and grant amounts vary considerably, we focus on a selection of grants supporting clinical and research projects for doctoral students.

Internal Funding Sources

There is a variety of funding sources within employer and university settings. An advantage of these funding sources is that they may be less competitive, meaning your chances of receiving the funding would be greater than those if submitting to an external funding agency (see "External Funding Agencies"). In larger health systems, there may be a formal grant submission system. In smaller health systems, you may need to submit a formal proposal to the hospital board of directors or hospital health foundation, requesting funds for the project. Alternatively, you could negotiate with a hospital administrator to provide funds from a discretionary budget to pay for project expenses. Regardless of the path chosen to obtain funds, it is crucial you provide an explanation about how the project will directly benefit the patient population, improve care, and potentially lead to health-system cost savings in the long term. In addition, Grants.gov provides guidance on how to address the impact of or the need for your project to the funding agency that can be used to structure your internal funding proposal.[2] In academic settings, funds may be available at the school or university level to support your dissertation research or clinical practice project. Exploring these options can provide the necessary funds to complete the project.

External Funding Agencies

There are extensive opportunities for external funding. Potential funders are usually private foundations, industries,

or governmental entities. A few examples of private foundations are the Emergency Nurses Association Foundation, American Nurses Foundation, American Association of Critical-Care Nurses, and Sigma Foundation for Nursing. Many of these associations and association-affiliated foundations have local chapters, that fund small grants independent of their parent associations. Membership of the association that you are seeking funding from may be a requirement to receive funding. Be sure to check grant requirements. It is noteworthy for readers seeking predoctoral project funding that the Emergency Nurses Association Foundation and American Nurses Foundation have committed to funding both dissertation research and clinical practice projects. Larger private foundations include the Robert Wood Johnson Foundation, American Heart Association, and Bill and Melinda Gates Foundation. Internationally, examples of large funding agencies include the United Kingdom Medical Research Council, Wellcome Trust, Canadian Institutes of Health Research, German Research Foundation, and Japan Science and Technology Agency.[3] Of the top 41 funding agencies in the world, the largest funder is the National Institutes of Health (NIH), United States. NIH spent more than $26 billion in 2013 on research, representing approximately 60% of all research expenditures from these 41 funding agencies.[3] The specific mechanisms to fund predoctoral-degree research have been described in detail below. A select list of external funding agencies and types to seek for funding dissertation research or clinical practice projects is described in the [Table].

Industry-sponsored research is another potential funder. For example, Bayer Global provides a variety of grants including education-focused grants.[4] For this particular funding opportunity, you would need to focus the dissertation research or clinical practice project on the educational outcomes of your study population (eg, demonstration of competency using simulation). In addition, other industry partners provide grant opportunities, and many of these can be contacted directly for guidance. Moreover, industry partners may provide alternative means of research and clinical practice support, such as datasets, devices, or therapeutic products free of charge. You will need to transparently report and minimize potential bias or conflict of interest when partnering with industry for research or clinical practice projects.

Several US federal agencies support doctoral students' research, including NIH, National Science Foundation, and Agency for Healthcare Research and Quality. NIH's federal grants to support student research training are typically labeled as F and T followed by 2 numbers (eg, F31 or T32).[5] The F31 or Ruth L. Kirschstein National Research Service Award has a variable budget, which covers student stipends, tuitions, fees and other expenses such as health insurance and professional conference attendance.[6] Although the F31 mechanism will not directly cover the expenses for dissertation research, the stipend received, if awarded, could be allocated to fund the dissertation. The National Science Foundation supports graduate student research through the Graduate Research Fellowship Program. The mechanism for predoctoral Agency for Healthcare Research and Quality support is the Grants for Health Services Research Dissertation Program (R36). Some federally sponsored grants are awarded to individual students, whereas others are awarded to institutions to recruit students interested in receiving training in a particular area of research. For example, 1 university center currently has funding to support students through a T42 grant mechanism. With this mechanism, dissertation and clinical practice projects can be funded up to $20,000.[7] Typically, only dissertation and other research studies would be funded; however, some of these programs have funded clinical practice projects in the past. Information on previously funded projects can be found at https://federalreporter.nih.gov/. Information on current calls for proposals can be found at https://grants.nih.gov/grants/oer.htm.

Grant Expenses

Funding agencies vary regarding the expenses that can be charged to a grant. Federal agencies have strict policies on allowable and unallowable costs. In general, most funding agencies will allow the following expenses to be charged to the grant: equipment and supplies (eg, glucometer and trauma care supplies), laboratory testing fees, consultation costs (eg, statistician), publication costs (eg, poster printing and open access journal fees), and travel directly related to the project (eg, mileage reimbursement and conference expenses to present findings). Some grants may allow you to be paid a stipend or salary as the principal investigator (person leading the project) from grant expenses. When salaries are allowable charged expenses, the grant may support salary expenses for other

persons to assist you with data collection and analysis. We recommend always checking with your organization's sponsored projects expert if one is on staff or with the funding agency to verify what expenses are allowable before submitting your grant application.

Conclusions

As an emergency nurse in a doctoral program, you need to consider obtaining grant funding to support your dissertation research or clinical practice projects. External funding reflects both the importance of the subject being studied and the quality of your grantsmanship. Multiple sources are available to you as an emergency nurse to fund your projects. It is important during the grant writing phase, and especially before submitting the grant, that you understand what expenses are permitted by the grant. Do not be afraid to be creative in exploring funding options.

Author Disclosures

Conflicts of interest: none to report.

Funder	Type	Description	Maximum funding	Maximum duration
ENAF	Seed grants	Small research projects to provide pilot data for larger projects	$500	1 year
	Research grants	Small research projects to advance emergency nursing practice	$6,000	1 year
ANF	Nursing research grants	Research projects by new or experienced researchers in clinical practice or academia to enhance patient care or advance nursing science	$25,000	1 year
AACN	Impact research grants	Research focused on critical-care clinical research and priority areas such as nurse certification and healthy work environments	$50,000	2 years
NSF	Special programs for graduate students	Dissertation research projects from an array of scientific disciplines	$16,000	2 years
AHRQ	Health Services Research Dissertation Program	Projects conducted by PhD candidates to support health services' dissertations aligning with the mission of AHRQ	$40,000	17 months
IIR	Medical education grants	Projects focused on medical and health care–related educational activities	Not listed	Not listed

DETAILS

Subject:	Government agencies; Emergency medical care; Government grants; Graduate students; Clinical medicine; Patients; Funding; Research &development expenditures; Clinical research; Dissertations &theses; Health insurance; Nurses; Health services; Grants; Medical education; Fees; Certification; Associations; Candidates; Cost control; Nursing; Clinical nursing; Scholarships &fellowships; Emergency services; Professional practice
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FULL TEXT

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••Go to http://www.ena.org/publications/jen/ce_articles/default.asp and follow the instructions to take your CE test(s) online. There is only one correct answer for each question.

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Development of the National Early Warning Score-Calcium Model for Predicting Adverse Outcomes in Patients With Acute Pancreatitis: JEN

ABSTRACT (ENGLISH)

Introduction

This study aimed to develop a new model on the basis of the National Early Warning Score to predict intensive care unit admission and the mortality of patients with acute pancreatitis.

Methods

Patients diagnosed with acute pancreatitis in the emergency department were enrolled. The values of the National Early Warning Score, Modified Early Warning Score, and Bedside Index of Severity in Acute Pancreatitis in predicting intensive care unit admission and mortality of patients with acute pancreatitis were evaluated.

Results

A total of 379 patients with acute pancreatitis were enrolled; 77 patients (20.3%) were admitted to the intensive care unit and 14 (3.7%) died. The National Early Warning Score and calcium level were identified as independent risk factors of intensive care unit admission. Serum calcium exhibited a moderate correlation with National Early Warning Score (r = -0.46; P <0.001), Modified Early Warning Score (r = -0.37; P <0.001), and Bedside Index of Severity in Acute Pancreatitis (r = -0.39; P <0.001). A new model called National Early Warning Score-calcium was developed by combining National Early Warning Score and calcium blood test result, which had larger areas under the curve for predicting intensive care unit admission and mortality than the other 3 scoring systems.

Discussion

A new model developed by combining National Early Warning Score and calcium exhibited better value in predicting the prognosis of acute pancreatitis than the models involving National Early Warning Score, Modified Early Warning Score, and Bedside Index of Severity in Acute Pancreatitis alone.

FULL TEXT

DETAILS

Subject:	Medical records; Emergency medical care; Medical prognosis; Pleural effusion; Serum; Pancreatitis; Regression analysis; Risk factors; Calcium; Blood pressure; Mortality; Severity; Blood tests; Glucose; Pain; Acute; Oxygen saturation; Creatinine; Emergency services; Intensive care
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Call to Action: The Need for Best Practices for Boarding the Pediatric Intensive Care Patient in the Emergency Department: JEN

ABSTRACT (ENGLISH)

Introduction In 2015, children presented to emergency departments in the United States more than 30 million times, accounting for more than 20% of all ED episodes.1,2 Increases in critically ill patients and the overall population of children with special health care needs (CSHCN) who reside at home have led to a subsequent rise in patient acuity.3 The current status of crowding in emergency departments and hospitals directly affects the care of these pediatric patients, leading to boarding of those requiring intensive care unit (ICU)–level care in the emergency department until appropriate beds become available.4 Leading experts and governing bodies have identified this boarding and crowding as a major public health concern and a threat to patient safety.3,5 These experts and government bodies call for research to address both these concerns and other deficiencies that may exist in pediatric emergency care.3,5 Boarding the ICU patient, or the act of keeping a patient who requires critical care in the emergency department beyond the time of disposition (admit or transfer), reduces the quality of care and potentially increases mortality in adults.3,4,6 With only 4,044 available pediatric ICU (PICU) beds and 90% of tertiary hospitals in the US reporting crowding, resources for children requiring critical care after presentation to the emergency department are in short supply. [...]it is important to examine the impact, outcomes, and potential improvements for pediatric boarders requiring ICU-level care.Clinical Concerns Little is known about the outcomes of pediatric boarders, and the data currently available show conflicting results because of the variations in study design and limitations of observational and case studies.6,7 Some previous studies have suggested commonalities between the effects of both inpatient and ED crowding on ED occupancy rates, the number of pediatric patients boarding in the emergency department, and the overall ED boarding time.1,7 Additionally, limited studies in mixed adult and pediatric emergency departments have demonstrated increased mortality in patients with longer lengths of stay, including those requiring admission.8,9 Although this has not been thoroughly examined in dedicated pediatric emergency departments and could be influenced by adult ED boarding populations, as the majority of children are cared for by general community emergency departments, pediatric mortality warrants further attention.10,11 Given the limited pediatric literature, evaluation of current adult data demonstrates potential outcome-based impacts and clinical concerns for the PICU boarder. Adult patients who meet the ICU criteria are best cared for within the physical ICU itself.12 Associations can be seen between delays to ICU admissions (particularly more than 6 hours) and increased hospital length of stay and ICU mortality.12 Increased costs of care and rates of invasive procedures such as insertion of central lines and mechanical ventilation have also been observed.3,12 Additional clinical concerns focus on the overall safety and risk for decreased quality of care while in the emergency department. [...]crowding also increases the number of patients who leave without being seen (LWBS) by a physician. [...]LWBS rates can be used to measure the consequences of ED crowding.7 In pediatrics, for every percent increase in LWBS, an associated 9-fold increase in PICU admissions has been reported in recent literature; possible explanations include both the negative effects of crowding on patient outcomes and increased resource devotion to ICU-level patients impacting the LWBS rates.6Potential Mitigating Strategies The American Academy of Pediatrics' Committee on Pediatric Emergency Medicine noted that solutions to ED boarding are complex, expensive, and resource intensive.4 The Emergency Nurses Association acknowledged that there is no single set of solutions to ED boarding because of the vast differences between facilities;18 however, numerous potential alleviating factors are offered by governing bodies and described in the literature. Emergency providers, emergency nursing leadership, and appropriate inpatient stakeholders must be actively engaged in examining flow processes both within the emergency department and in inpatient wards to determine opportunities for improvement.18,20 Flow metrics and goals should be established and accompanied by focused quality projects to address any identified inefficient practices.19 The known best practices for ED patient flow that should be considered for implementation include immediate bedding, quick registration, split flow (a process aimed at quickly facilitating the care of both emergency and urgent patients), integration of ordering providers in triage, and use of electronic tracking systems.19,20 Inpatient capacity management must be assessed, and early discharge, specialized operating room, and bed management techniques that optimize flow should be considered.19 Use of daily hospital-wide, multidisciplinary operational huddles aimed at safely maximizing patient flow has also been described in the literature to positively affect flow.21 When considering hospital diversion, the American College of Emergency Physicians has suggested that it should be utilized only

when internal resources are exhausted but known outside resources may be available.20 Adequately addressing patient flow issues takes time and, therefore, requires simultaneous efforts to improve the care of PICU ED boarders while they are still in the emergency department.

FULL TEXT

Contribution to Emergency Nursing Practice

••The current literature on boarding patients who require intensive care indicates that similar challenges and safety concerns may exist in pediatric and adult populations. However, there is a paucity of literature that comprehensively addresses pediatric implications.

••This article contributes a literature review on clinical concerns and discussion of potential improved interventions. It identifies the need for focused research for better understanding of overall impact and identification of best practices for pediatric intensive care unit boarders.

••Key implications for emergency nursing practice found in this article are recognition of the risks involved in boarding pediatric patients requiring intensive care and the need to proactively mitigate these risks, ensuring appropriate resources for all patients who present for care.

Introduction

In 2015, children presented to emergency departments in the United States more than 30 million times, accounting for more than 20% of all ED episodes.[1,2] Increases in critically ill patients and the overall population of children with special health care needs (CSHCN) who reside at home have led to a subsequent rise in patient acuity.[3] The current status of crowding in emergency departments and hospitals directly affects the care of these pediatric patients, leading to boarding of those requiring intensive care unit (ICU)–level care in the emergency department until appropriate beds become available.[4] Leading experts and governing bodies have identified this boarding and crowding as a major public health concern and a threat to patient safety.[3,5] These experts and government bodies call for research to address both these concerns and other deficiencies that may exist in pediatric emergency care.[3,5] Boarding the ICU patient, or the act of keeping a patient who requires critical care in the emergency department beyond the time of disposition (admit or transfer), reduces the quality of care and potentially increases mortality in adults.[3,4,6] With only 4,044 available pediatric ICU (PICU) beds and 90% of tertiary hospitals in the US reporting crowding, resources for children requiring critical care after presentation to the emergency department are in short supply. Therefore, it is important to examine the impact, outcomes, and potential improvements for pediatric boarders requiring ICU-level care.

Clinical Concerns

Little is known about the outcomes of pediatric boarders, and the data currently available show conflicting results because of the variations in study design and limitations of observational and case studies.[6,7] Some previous studies have suggested commonalities between the effects of both inpatient and ED crowding on ED occupancy rates, the number of pediatric patients boarding in the emergency department, and the overall ED boarding time.[1,7] Additionally, limited studies in mixed adult and pediatric emergency departments have demonstrated increased mortality in patients with longer lengths of stay, including those requiring admission.[8,9] Although this has not been thoroughly examined in dedicated pediatric emergency departments and could be influenced by adult ED boarding populations, as the majority of children are cared for by general community emergency departments, pediatric mortality warrants further attention.[10,11]

Given the limited pediatric literature, evaluation of current adult data demonstrates potential outcome-based impacts

and clinical concerns for the PICU boarder. Adult patients who meet the ICU criteria are best cared for within the physical ICU itself.[12] Associations can be seen between delays to ICU admissions (particularly more than 6 hours) and increased hospital length of stay and ICU mortality.[12] Increased costs of care and rates of invasive procedures such as insertion of central lines and mechanical ventilation have also been observed.[3,12] Additional clinical concerns focus on the overall safety and risk for decreased quality of care while in the emergency department.

In 2002, the Joint Commission reported that half of all sentinel events secondary to delays in treatment occur in emergency departments. Furthermore, ED crowding is cited as the root cause in 31% of these cases.[7] Pediatric patients are at an increased risk of harm, given the need for age-specific and weight-based medication dosing. CSHCN are at a higher risk, given their complex, high-acuity needs and often tenuous stability, with delays in care of even 5 to 10 minutes potentially causing irreversible problems.[1,13] Published research on adult participants also describes harm through demonstrated increased rates of hospital-acquired infections including surgical site infections and ventilator-associated pneumonia, conditions that also occur in pediatric patients.

Numerous factors place the pediatric patient in the emergency department awaiting ICU admission at risk for decreased quality of care. Specialized skills and knowledge are required to appropriately care for ICU patients of various ages, and varying critical care skill levels can be observed in both emergency nurses and providers.[3] In general, ED staff are trained in initial assessment and stabilization. Additionally, they are equipped to provide brief, episodic care, not ongoing longitudinal ICU care.[12,14] Additionally, clinical staffing models may not be able to support the same one-to-one care that is provided in the ICU, given the crowding and high patient acuity.[3] These knowledge, physical, and staffing gaps have resulted in delays in recognition and intervention for organ dysfunction, sepsis, infection, pain, or change in condition.[12,15,16]

When an emergency department is required to board a PICU patient, care is affected beyond the individual patient. Given the increased utilization of resources and attention required in caring for a critically ill child, during high-census time periods, care to other patients may be delayed.[17] Furthermore, as boarders occupy ED beds for a prolonged period of time, they cause outflow delays and crowding.[7] Johnson and Winkelman[15] reported that crowding directly leads to additional delays and increased mortality secondary to inadequate resources with subsequent reduction in the quality of care provided. Such crowding also increases the number of patients who leave without being seen (LWBS) by a physician. Thus, LWBS rates can be used to measure the consequences of ED crowding.[7] In pediatrics, for every percent increase in LWBS, an associated 9-fold increase in PICU admissions has been reported in recent literature; possible explanations include both the negative effects of crowding on patient outcomes and increased resource devotion to ICU-level patients impacting the LWBS rates.[6]

Potential Mitigating Strategies

The American Academy of Pediatrics' Committee on Pediatric Emergency Medicine noted that solutions to ED boarding are complex, expensive, and resource intensive.[4] The Emergency Nurses Association acknowledged that there is no single set of solutions to ED boarding because of the vast differences between facilities;[18] however, numerous potential alleviating factors are offered by governing bodies and described in the literature. Interventions must be data driven and problem oriented.[18] Improvement of best practices can be categorized into focused quality improvement on patient flow, adoption of ED boarding care best practices (when it must occur), and prevention through engagement at the primary care level.[4,18,19] At this time, there is little evidence available to make distinct recommendations on the care of the PICU ED boarder.[18] However, given commonalities in the effects of crowding between adult and pediatric patients, it is important to consider and evaluate all available options for feasibility and potential impact.

As previously discussed, patient flow through both the emergency department and hospital directly affects the

practice of having to board ED patients. Emergency providers, emergency nursing leadership, and appropriate inpatient stakeholders must be actively engaged in examining flow processes both within the emergency department and in inpatient wards to determine opportunities for improvement.[18,20] Flow metrics and goals should be established and accompanied by focused quality projects to address any identified inefficient practices.[19] The known best practices for ED patient flow that should be considered for implementation include immediate bedding, quick registration, split flow (a process aimed at quickly facilitating the care of both emergency and urgent patients), integration of ordering providers in triage, and use of electronic tracking systems.[19,20] Inpatient capacity management must be assessed, and early discharge, specialized operating room, and bed management techniques that optimize flow should be considered.[19] Use of daily hospital-wide, multidisciplinary operational huddles aimed at safely maximizing patient flow has also been described in the literature to positively affect flow.[21] When considering hospital diversion, the American College of Emergency Physicians has suggested that it should be utilized only when internal resources are exhausted but known outside resources may be available.[20]

Adequately addressing patient flow issues takes time and, therefore, requires simultaneous efforts to improve the care of PICU ED boarders while they are still in the emergency department. Chalfin[22] noted that optimal critical care services are those that respond to and care for the patient wherever and whenever the need arises. The ideal system rapidly identifies potential ICU patients and then expeditiously facilitates required care and interventions.[23] The American College of Emergency Physicians has suggested that care of these patients should be led by an appropriate inpatient provider and if transfer to the inpatient unit is delayed, the hospital must supply supplemental nursing staff to care for them.[20] Clear delineation of responsibility between the emergency department and admitting team must occur; this can be further facilitated through the use of customizable “holding orders/order sets.”[24] Close attention should be given to ordering of unfamiliar medications, especially with CSHCN.[13] Given that critical care patients require a higher level of care, attention to safety, initiation of evidence-based interventions, and addressing nursing educational gaps are of utmost importance. Nursing care should include harm-prevention efforts such as adherence to guidelines for prevention of ventilator-associated pneumonia, central line–associated bloodstream infections, catheter-associated urinary tract infections, hospital-acquired pressure injury, and other hospital-acquired infections.[25] Such interventions may include creation of ED standards for elevation of head of bed, safe central line access, and frequent skin assessment with associated methods for pressure reduction. Frequent monitoring to ensure optimization of hemodynamics, as well as initiation of a sedation scoring tool with associated interventions, should also be incorporated into the care the emergency nurse provides to PICU ED boarders.

Finally, proactive prevention of ED boarding starts at the primary care level. The Committee on Pediatric Emergency Medicine[4] has described a model of working to build capacity to manage care outside the emergency department. Primary care providers should provide age-appropriate anticipatory guidance on how to manage acute illness or injury. This should include a review of when to call the office, poison control, or 911, as well as what situations require urgent care or ED services. By educating and empowering parents and caregivers before an event, unnecessary ED visits may be prevented, thereby decreasing the overall ED crowding burden.

Nursing Practice Implications

Outside of their role as care providers, emergency nurses are key facilitators of ED flow, and any improvement efforts require their participation and leadership for success. Emergency nurses must first understand how crowding affects overall practice and ED boarding and then work to comprehensively alleviate these issues.[15] Nursing action plans must address appropriate staffing, education, protocols, and equipment for caring for boarded patients of all ages.[19] Special attention should be paid to pediatric-specific concerns, including increased risk for medication errors, unique needs of CSHCN, and pediatric caveats to early recognition of those at risk for organ failure.

Future Directions

Further research is needed to better understand the true epidemiological impact of pediatric patients throughout the health care system. This should include the overall ED boarding burden as compared with adult populations, the impact of delayed transfers to tertiary centers, and the ED boarding phenomenon occurring in dedicated pediatric emergency departments. To further examine PICU-specific outcomes, larger cohort studies evaluating the same population with the same measures are required. These data from large cohort studies can be used to develop clinical care practice initiatives that can be implemented within the ED environment. Given the current limitations to pediatric-specific ICU boarding practices, evidence-based practice projects influenced by related adult-specific care practices should be considered. To enhance quality of care, identification of appropriate methods to support emergency nurses in real-time at the point of care should be developed, such as just-in-time tip sheets or designated clinical resources within the hospital. Finally, nursing-driven improvement to both ED patient flow and inpatient flow must be prioritized to free up appropriate available personnel resources to facilitate safe acuity-based staffing ratios.

Conclusion

As the number of children requiring emergency care continues to outpace the number of available resources, it is imperative that emergency nurses are aware of and work to mitigate the effects of boarding a pediatric patient requiring ICU-level care. Safe care of these patients demands an understanding of their unique risks and vulnerabilities and a proactive approach to optimizing outcomes. Until further research can more clearly inform best practice, emergency departments should look to governing bodies and applicable adult literature for guidance on maximizing the care of these vulnerable patients.

Author Disclosures

Conflicts of interest: none to report.

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Optimizing Patient Outcomes in Emergency Cardiac Care Through Advances in Technology: Nurse Scientists in Action: JEN

ABSTRACT (ENGLISH)

Cardiovascular disease is the top killer in the United States and worldwide, and cardiovascular emergencies account for approximately 10% of all ED visits in the US.1,2 More than 8 million patients with chest pain and/or anginal

equivalent symptoms (eg, shortness of breath and diaphoresis) present to emergency departments each year, accounting for the second most common cause of ED visits for adults.2 In 2019 alone, it was estimated that every 40 seconds, 1 American would suffer from an acute myocardial infarction, nearly 720,000 would suffer from a new coronary event, and approximately 335,000 would have a recurrent cardiac event.3 Emergency nurses are often the first point of contact for individuals presenting with cardiac symptoms. AF is the most frequent arrhythmia seen in the emergency department, and if left untreated, individuals are at increased risk of mortality, stroke, left ventricular dysfunction, and heart failure.19 AF is treated with beta blockers or calcium channel blockers; yet, patients in the emergency department often receive doses exceeding guideline-recommended doses. [...]the number of nonactionable alarms decreased with no reports of adverse patient outcomes.

FULL TEXT

This issue of the *Journal of Emergency Nursing (JEN)* is focused on cardiovascular disease, a growing concern among our aging population and beyond. Cardiovascular disease is the top killer in the United States and worldwide, and cardiovascular emergencies account for approximately 10% of all ED visits in the US.[1,2] More than 8 million patients with chest pain and/or anginal equivalent symptoms (eg, shortness of breath and diaphoresis) present to emergency departments each year, accounting for the second most common cause of ED visits for adults.[2] In 2019 alone, it was estimated that every 40 seconds, 1 American would suffer from an acute myocardial infarction, nearly 720,000 would suffer from a new coronary event, and approximately 335,000 would have a recurrent cardiac event.[3] Emergency nurses are often the first point of contact for individuals presenting with cardiac symptoms. We are required to differentiate rapidly between life-threatening conditions and non–life-threatening ones and determine accurately which course of treatment will result in optimal patient outcomes.[4]

Acute coronary syndrome (ACS) is a spectrum of clinical syndromes (ST-elevation myocardial infarction, non-ST elevation myocardial infarction, and unstable angina) reflecting the progression of coronary artery occlusion.[5] Time is of the essence as myocardial infarction ensues after 20 minutes, and complete necrosis of myocardial cells can occur after 2 to 6 hours with total artery occlusion.[6,7] Prolonged ischemic time (duration and extent of ischemia) is associated with poor outcomes (eg, death and heart failure).[8] Early symptom recognition and intervention to restore blood flow to the affected artery within 30 minutes have the potential to prevent or minimize these events.[9,10] ACS is often an elusive and challenging diagnosis that depends on rapid assessment, triage, and risk stratification.[11] Emergency nurses are charged with identifying and recognizing quickly individuals who present with symptoms suggestive of ACS. Symptom recognition and timely reperfusion minimize ischemic time, salvage the myocardium, preserve left ventricular function, and improve survival.[12–16] We rely on assessment and triage for rapid clinical decision making, such as the acquisition of an electrocardiogram (ECG) within 10 minutes of presentation to the emergency department.[13,17] I suspect it is the combination of the excitement and challenge of these encounters that draws many of us to the field of emergency nursing.

Technology offers us new opportunities to refine the assessment and triage of cardiac patients in the emergency department. In this issue of *JEN*, we learn about the innovative ways in which clinicians are integrating rapidly evolving technology to advance patient care and improve outcomes. Pon et al[18] report on their quality improvement project to evaluate the causes of high dilTIAZem dosing for individuals presenting to the emergency department with atrial fibrillation (AF). AF is the most frequent arrhythmia seen in the emergency department, and if left untreated, individuals are at increased risk of mortality, stroke, left ventricular dysfunction, and heart failure.[19] AF is treated with beta blockers or calcium channel blockers; yet, patients in the emergency department often receive doses exceeding guideline-recommended doses. After identifying that nearly 70% of initial dilTIAZem doses were outside the recommended range (weight-based), Pon et al[18] developed and tested a novel text message notification system to monitor dilTIAZem dosing in their emergency department. The authors provided staff education after identifying knowledge deficit as a primary reason for these medication errors. Pon et al[18] improved care for ED patients with AF through technology.

Another way technology is evolving quickly is through cardiac monitoring. Cardiac monitoring, which includes 12-

lead ECG and bedside monitors, enables clinicians to detect arrhythmias, myocardial ischemia, and QT-interval measurements in real time. Cardiac monitoring was first introduced nearly 60 years ago for critically ill patients and focused on heart rate measurement and fatal arrhythmia detection.[20] Today, cardiac monitoring technologies are evolving quickly and being implemented across a variety of settings, including prehospital. Emergency nurses rely on the information provided by monitor devices for minute-to-minute clinical decision making. When individual parameters fall outside alarm thresholds for a few seconds, alarms are triggered in either audible or visual text message format. Many of these alarms are false or clinically irrelevant, leading to alarm fatigue. Alarm fatigue is a national patient safety hazard issue and occurs when nurses are desensitized by numerous alarms, which can lead potentially to patient injury or death.[21]

In this issue of *JEN*, we learn about strategies to manage alarm fatigue in the emergency department. Fujita and Choi[22] conducted a practice improvement project to implement and evaluate a program to reduce the number of clinically nonactionable physiological alarms in the emergency department. Using the Iowa Model of Evidence-Based Practice to guide their framework, Fujita and Choi[22] adjusted alarm default settings and implemented an education plan regarding safety and alarms. As a result, the number of nonactionable alarms decreased with no reports of adverse patient outcomes. The authors should be commended because this is the first project to our knowledge that addresses this complex and critical patient safety issue in the ED setting.

My clinical experiences as an emergency nurse directly inform my program of research, which aims to enhance the diagnostic accuracy of ACS and other time-sensitive cardiovascular conditions through noninvasive monitoring. I became intrigued by physiological monitoring at my first job in a rural emergency department, when local emergency medical services began transmitting ECGs from the field. I witnessed how ECGs provided critical information regarding the patients before their arrival at the hospital, which is a highly vulnerable period for individuals suffering from acute myocardial ischemia/infarction.[23,24] As a nurse scientist, I continue to be curious about how technologies not only provide physiological data regarding an individual but also have the potential to enhance access to life-saving care. This may be demonstrated by the use of drones to deliver automatic external defibrillators in hard-to-reach places.[25,26]

As articles in this issue of *JEN* illustrate, we are exploring innovative strategies that integrate an array of technology to optimize care and outcomes for patients with cardiovascular conditions, and beyond. I think it is important to note that these technologies will not replace our critical skills of triage and risk stratification, but rather augment them. Our work to improve patient outcomes, however, is far from done. Research in emergency cardiac care remains challenging and limited by a variety of barriers. These include, but are not limited to, time constraints, physical symptoms, emotional stress, and cognitive impairment.[27] There are not clear or established ethical standards to consenting conscious individuals in the emergency setting. Emergency research, moreover, inherently crosses a wide range of conditions, many in which patients are not conscious. I believe emergency nurses are in a position to lead this charge and conduct future research that informs clinical decision making. I suspect we will continue to embrace the challenges, and the fast pace that emergency nursing promises us, through research, innovation, and patient care.

DETAILS

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Creating the Future: Collaborative Practice Between Emergency and Critical Care Nurses: JEN

ABSTRACT (ENGLISH)

In a classic multihospital study in which the outcomes of intensive care were evaluated,1 important differences were found between predicted and observed death rates. Additional outcomes associated with collaboration among health care providers included decreased patient complaints, fewer errors in patient care, increased patient satisfaction, possible decreased patient care costs, improved job stability and satisfaction, and improved quality of patient care.2,3 We are aware of the repercussions of lack of collaboration. Emergency nursing is characterized by patients of diverse ages and acuity levels with unpredictable health problems. The emergency nurse often focuses on prevention—the ED visit may be the patient's only encounter with the health care system.

FULL TEXT

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I was angry enough to cuss. I put down the telephone receiver after calling the cardiac care unit (CCU) to give report. I was told "The nurse is not ready to receive report" and "will call back when ready." I was going to discuss the issue with the CCU receiving nurse, but I could not get her to come to the phone. "She is busy," explained the unit clerk who took the call. Of course, by this time I was furious because I did not have the time to go to the bathroom but somehow did manage to assess my patients! I mentally noted the time. I would fix that CCU nurse! She would hear from me every 5 minutes until she *took* report. Better yet, I would show up in the unit unannounced and she could just deal with the patient.

Does this scenario sound familiar? I would bet that the CCU nurse could share a similar story—from a different perspective. Something to the effect of, "That ED nurse is always calling me! Doesn't she know I have got to move Mr. Weber out before I can accept the new patient? Housekeeping only moves so fast."

On the way home that evening, I thought about the battles that ICU and emergency nurses fight. I would like to share some of the insights that I have gained from battles I have participated in during 14 years of emergency and ICU nursing experience and from the literature in this area.

Concept of Collaboration

For collaboration to occur between emergency and critical care nurses, each nurse must have a basic level of understanding and acceptance of the other's practice area. There must be mutual respect for each person's practice area. Collaboration involves assertiveness (meeting personal needs) and cooperation (meeting the needs of others); it allows us to accomplish more than we could do individually.

In a classic multihospital study in which the outcomes of intensive care were evaluated,[1] important differences were found between predicted and observed death rates. In some institutions, patients who were expected to die because of the severity of their condition recovered. In other institutions, patients who were expected to recover had additional complications or died. The differences in outcome appeared to be related to the interaction and communication between nurses and physicians. Additional outcomes associated with collaboration among health care providers included decreased patient complaints, fewer errors in patient care, increased patient satisfaction, possible decreased patient care costs, improved job stability and satisfaction, and improved quality of patient care.[2,3]

We are aware of the repercussions of lack of collaboration. Patients and families may be uncomfortable with displays of animosity between members of different departments; they may feel less trust if it seems to them that staff members themselves do not trust each other. Self-fulfilling prophecy is another problem. Nurses in the other unit may perform as they are "expected" to do. For example, the critical care nurse may in fact *not* tell the emergency nurse when the bed is ready. Ultimately, lack of collaboration decreases nursing's own power base to enact system changes.

Ironically and unfortunately, nurses who collaborate with those in another unit may be viewed as "traitors" because they do not support the views of most of the nurses in their department. How did this situation arise?

Sources of Conflict

The emergency nurse works on the principle of triage. Not all ED patients are given the same "level" of care or the same degree of nursing resources. At times, it may be best to find an alternative setting for the patient to receive care (such as a clinic). Unlike the ICU, the emergency department is a patient-controlled, not nurse-controlled, environment. Census is unpredictable. There are many nonnursing and general nursing functions (such as restocking linen and moving patients) as well as critical care functions. Emergency nursing is characterized by patients of diverse ages and acuity levels with unpredictable health problems. The emergency nurse often focuses on prevention—the ED visit may be the patient's only encounter with the health care system.

In comparison, intensive care nursing developed in the 1960s with the advent of CPR, better treatment of hypovolemic shock, better prehospital transport services, technologic interventions that required closer observations than could be achieved on the floor, and organ transplantation. Patients were admitted for nursing care.[4]

Technologic advances have created increased specialization and fragmentation, so each unit focuses on specific patient problems. Patients may remain for a long time and the ICU nurse may encounter more patients who die. Critically ill patients require constant individual nursing attention and a smaller nurse to patient ratio. Fewer patients are able to communicate verbally.

Emergency nursing originated to assist the physician whereas critical care nursing originated to monitor the patient. Emergency nurses therefore function frequently in an interdependent role and critical care nurses function more independently under protocols and standing orders. The critical care nurse may not understand why an emergency nurse did not initiate an action and only later "get" an order and may therefore view the emergency nurse as passive. However, the emergency nurse deals with a multitude of physicians. Emergency nurses feel a strong responsibility to get each patient "accepted by a physician" and medically treated, in addition to providing nursing care. Bridges cannot be burned or medical care for the patient may be compromised.

Emergency nurses may not be viewed by critical care nurses as providing holistic care. The emergency nurse's interaction with the patient and family may be so brief and episodic as to preclude an accurate assessment of psychosocial and spiritual needs. The critical care nurse has more opportunity to foster a stable interpersonal relationship. The emergency nurse may view the critical care nurse as simply a "machine manager." Technology may have been the reason for creating the ICU, but in reality the critical care nurse uses data from many sources in formulating nursing diagnoses. The emergency nurse must have a broad knowledge base of the diversity of patient problems encountered in the emergency department. The critical care nurse usually has in-depth knowledge of a particular patient population. Each may view the other as having a knowledge deficit.

Emergency nurses have to compromise care because of the patient census. Critical care nurses may view these compromises as resulting in less than adequate nursing care because they may not understand what an unpredictable patient census does to the nurse to patient ratio.

Barriers to Collaboration

Differences between expectations of a nurse's role and its actual execution interfere with collaboration. For example, the critical care nurse may expect the emergency nurse to "clean a patient up" or the emergency nurse may expect the critical care nurse to come to get a critical patient when the emergency department is busy. Existing language, values, and behaviors may support animosity. Turning one's back to someone during a verbal report or saying, "Just leave the chart on the table," are behaviors that indicate what the other nurse has to say is not important. Repeatedly calling the ICU to see if the bed is ready indicates that the ICU staff is not trusted.

As illustrated in the scenario at the beginning, patient transfers between the emergency department and ICU can produce multiple conflicts. The timing of transfer may never be convenient for both units. The critical care nurse may believe that a patient is not ready to be transferred from the emergency department because of a still unstable condition and need for physician involvement. The emergency nurse may see the patient as stable enough to be transferred because more critically ill patients are arriving. Poor information exchange surrounding the transition of patients may produce conflict.[5]

Lack of accountability for actions may produce conflict: "It did not happen on my shift." "Someone else transcribed the order." "No one told me we were getting a new admit." Differences in basic nursing educational preparation and in qualifications for certification may discourage collaboration. Nurses may not assume the clinical competence of their peers because of the diversity of academic preparation (e.g., associate degree vs baccalaureate degree). Nurses often must prove their clinical competence.

Strategies to Enhance Collaboration

Administration and staff must work to create an environment conducive to collaboration. Interviewing staff members individually can identify sources of conflict; so can written surveys. Decentralized nursing leadership and nursing participation on decision-making committees can facilitate collaboration. Job descriptions that reflect accountability and responsibility and evaluation of nurses on these aspects can promote professional behavior. Nursing policies that influence both ICU and emergency department should be jointly developed by the two staffs. Interdepartmental committees with rotating chairs can promote collaboration. An adequate supply of equipment and a system for keeping the equipment functioning helps to eliminate controversy over equipment.

Emergency and critical care nurses can use observational time in each other's units to facilitate a better understanding of the practice area. Continuing education credit can even be given for such observation. After the experience, participants can relate perceptions of the other nurses' role to a group of both emergency nurses and critical care nurses. This encourages validation and clarification of perceptions. Joint educational offerings also allow nurses to meet one another outside of the patient care setting. This may increase the nurses' ability to see different perspectives and allow identification of common goals.

Marketing services to the community that demonstrate the interface between ICU and emergency department (e.g., comprehensive cardiac care or trauma care) may foster collaboration internally. Community projects that present a unified approach to outsiders and involve a goal of both practice areas (e.g., injury prevention programs) also promote collaboration.

We need to understand the histories and traditions of other nursing specialties. Reading journals targeted to those specialties can enhance appreciation of their clinical concerns. Clarifying personal expectations of nurses from the other unit will improve collaboration.[6] Emphasizing similarities of the practice areas may dispel myths and stereotypes. Conducting joint nursing rounds may allow the emergency nurse to appreciate the impact of interventions during resuscitation on outcomes (both positive and negative) and allow the critical care nurse to form a better picture of the emergency nurse's concerns during the resuscitation.

A short report sheet with equipment listed and necessary drug therapy could be sent to the intensive care unit

15 minutes ahead of patient transfer to allow staff time to set up and get supplies. Integrated critical care records can eliminate separate documentation and provide a formal mechanism for communication between nurses. Follow-up reports to emergency nurses would allow both departments to identify the importance of each other's clinical interventions.

In summary, we share certain commonalities regardless of practice setting. Competence, commitment, and compassion are necessary aspects of all of our nursing practices. Collaboration between emergency and critical care nurses may have unexpected benefits. United, nurses from two areas can effect more change from administration than either group could do alone.

I am saving my energy for bigger battles. In times of crisis—multicasualty events or Desert Storms—emergency and critical care nurses have united. Let us put aside our differences and focus on what we *share*. The next time you call the unit, why not invite the ICU nurse to lunch? At the very least, it will make sure that you both take the time to eat!

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Knowledge Translation of Science Advances Into Emergency Nursing Practice With the Reach, Effectiveness, Adoption, Implementation, and Maintenance Framework: JEN

ABSTRACT (ENGLISH)

The themes for this issue include ED flow and crowding,1,2 critical care,1,3–8 vascular emergencies,6,7,9,10 and cultural or organizational patient-centered care.11,12 Emergency nurses strive to develop and implement evidence-based interventions, which are often pragmatic interventions. [...]JEN readers practice in widely diverse emergency settings. To support the consistent spread of effective emergency nursing innovations across these diverse settings, this editorial introduces the Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) Planning and Evaluation Framework for integrating scientific advances with emergency nursing practice.13,14 All evidence-based guidelines and interventions, however widely adopted in our current time, were born as a single idea. There are no exclusion criteria to receive care in the emergency department. [...]frameworks that fully address generalizability are essential to understand an intervention's relevance and priority in future emergency care and ongoing prospective research. The RE-AIM Framework is often used with another planning and evaluation tool called the Pragmatic Explanatory Continuum Indicator Summary (PRECIS-2) for insights on how broadly generalizable to emergency nursing practice the project is or will be.21 As an emergency specialty, we face a timely

opportunity to improve the research and evaluation design when testing an intervention with a quality improvement or pragmatic design.22 Randomized controlled trials of interventions that randomize individual patients or randomize clinical practice sites enhance confidence in the results, but require substantial resources and may limit the real-world clinical practice generalizability.

FULL TEXT

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I'm thrilled to introduce this second issue of the *Journal of Emergency Nursing (JEN)*, published as part of the 50th anniversary celebrations of the Emergency Nursing Association (ENA). The themes for this issue include ED flow and crowding,[1,2] critical care,[1,3–8] vascular emergencies,[6,7,9,10] and cultural or organizational patient-centered care.[11,12] Emergency nurses strive to develop and implement evidence-based interventions, which are often pragmatic interventions. Moreover, *JEN* readers practice in widely diverse emergency settings. To support the consistent spread of effective emergency nursing innovations across these diverse settings, this editorial introduces the Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) Planning and Evaluation Framework for integrating scientific advances with emergency nursing practice.[13,14]

All evidence-based guidelines and interventions, however widely adopted in our current time, were born as a single idea. Nurses who provide direct patient care are positioned ideally to create care innovation ideas. Most emergency nurses are well versed in the Plan-Do-Study-Act quality improvement process of rapid, incremental, and consistent practice changes.[15] However, the process to test adequately the efficacy and effectiveness of an intervention to justify the full adoption and spread of the idea requires additional planning, testing designs, and resources. In this issue of *JEN,* Gillespie and Moon[16] provide a summary and overview of funding opportunities to test these nursing care ideas. Furthermore, when practicing emergency nurses present an idea to improve patient outcomes, several published processes and frameworks exist to guide them to refine, communicate, justify, test, and spread their new intervention. For example, in this issue of *JEN*, Fujita and Choi[10] planned their idea to customize patient monitor alarm settings by using the Iowa Model of Evidence-Based Practice to Promote Quality Care.[17] The Iowa model is reprinted in this current issue for ongoing reader reference.[10 (p. 191)] The nursing discipline uses the Iowa model frequently to improve patient care by identifying a practice problem and linking validated evidence-based solutions from a patient's and an organization's standpoint. To advance through the evidence-based process in this Iowa model, the nurses' idea or identified problem must also be a priority for the employing organization. Many brilliant and potentially impactful ideas that are generated by patients, nurses, and scientists may not align with the priorities of the emergency department or hospital organization, so other frameworks and resources are required to optimize innovations.

A myriad of research-to-clinical practice frameworks have been published. By 2012, Tabak et al[18] had already identified more than 60 theoretical models and frameworks, above and beyond quality improvement models, for the evidence-based dissemination and implementation of research-to-practice innovations. The review by Tabak et al[18] provides a convenient analysis for the reader to select a guiding project framework, depending on the level of intervention one desires to change: policy, system, community, organization, and/or individual. As a National Institutes of Health federally funded study in the United States, the Tabak et al[18] paper is publicly accessible on PubMed Central without cost to the reader at this time. A case study exemplar in this publication used the RE-AIM Planning and Evaluation Framework for a diabetes self-management intervention. Other useful, open access papers to guide the selection of an implementation framework include the works by Rankin et al[19] and Nilsen[20]. Rankin et al [19] introduce core implementation science definitions and principles, whereas Nilsen[20] categorizes several models relevant to their utility in (1) describing the process of knowledge translation to practice, (2) understanding or explaining what influences implementation, and (3) evaluating the implementation's success. RE-AIM falls into this third category as an evaluation framework to plan and measure successful implementation.[13,19,20]

RE-AIM

The RE-AIM Framework is multilevel, and generally used to plan and evaluate behavior change interventions for

individual patient, staff, and setting levels.[13,14] At the individual level the “RE-” stands for Reach, Effectiveness, and Maintenance. At the staff and/or setting level, “AIM” stands for Adoption, Implementation, and Maintenance. Table 1 includes definitions for each RE-AIM dimension and examples for emergency nursing. A visual depiction of the full RE-AIM Framework is included in the online Supplementary Figures 1 and 2, which include a link to an internet video explaining the framework. The strengths and usefulness of the RE-AIM Framework for emergency nursing interventions include the relevance to context, representativeness, and external generalizability. External generalizability refers to the extent to which an evidence-based intervention works as intended across different settings, populations, situations, and contexts. There are no exclusion criteria to receive care in the emergency department. Therefore, frameworks that fully address generalizability are essential to understand an intervention’s relevance and priority in future emergency care and ongoing prospective research.

Emergency clinicians and leaders can use the RE-AIM tool to evaluate their own novel practice innovations implemented at their site, or to critically appraise if a published intervention is applicable to their practice site.[13] If a published intervention is relevant to their practice site, emergency clinicians and leaders can use RE-AIM further to generate a plan to implement these published ideas at their site. The multilevel dimensions of the RE-AIM Framework resonate with how emergency nurses frequently solve problems, with pragmatic behavior change interventions addressing both the patient and contextual clinical environments. This type of pragmatic behavior change intervention is often undervalued, as we currently practice in a time when substantial interdisciplinary research resources and infrastructure have been committed to the development and testing of medications and medical devices. These past investments have resulted in an unbalanced overvaluation of the type of study design needed to determine the cause-and-effect relationships of an intervention, compared with projects designed to ascertain generalizability to the population level and tailored implementation across diverse clinical practice settings. Table 2 lists the generic phases of clinical trials aimed to test these cause-and-effect relationships and reduce the uncertainty of other influences causing the change in health. However, just because we have a high level of confidence that 1 particular intervention improves health, it does not mean that this intervention will be used widely in diverse practice settings, be valued by patients, demonstrate cost effectiveness, reduce health disparities, or produce the desired effect in complex patients with untested comorbidities, environmental or social risks. Emergency nursing research and practice improvement projects often address these later effectiveness-focused phases of clinical practice translation to test if the ideas work across the full range of patients who might benefit. Furthermore, many emergency nursing interventions did not begin from laboratory or animal testing research. The RE-AIM Framework is often used with another planning and evaluation tool called the Pragmatic Explanatory Continuum Indicator Summary (PRECIS-2) for insights on how broadly generalizable to emergency nursing practice the project is or will be.[21]

As an emergency specialty, we face a timely opportunity to improve the research and evaluation design when testing an intervention with a quality improvement or pragmatic design.[22] Randomized controlled trials of interventions that randomize individual patients or randomize clinical practice sites enhance confidence in the results, but require substantial resources and may limit the real-world clinical practice generalizability. Testing interventions as part of a multisite network is ideal. Example networks include the Veterans Health Administration’s Quality Enhancement Research Initiative (QUERI), the Michigan Emergency Department Improvement Collaborative (MEDIC), and the Pediatric Emergency Care Applied Research Network (PECARN).[23–25] It remains unclear how successfully direct care emergency nursing and patient priorities will integrate with the management and payer priorities in selecting topics to study in these networks. Working in a non-network setting or not having political access to network decision makers should never preclude an emergency nurse’s good intervention idea from development and testing resources. As an exemplar to disseminate a potential single-site intervention developed with limited resources for future network multisite testing, Pop et al[11] used the Template for Intervention Description and Replication (TIDieR) checklist and guide to report transparently on their falls precaution bundle.[26] *JEN* enthusiastically welcomes TIDieR-formatted submissions for our sections from emergency nurses engaged in the initial but resource-limited development, tailoring, and testing of clinical interventions. In this manner, *JEN* might

serve as a dissemination and knowledge translation vehicle to connect bright, practice-based improvement ideas yet to be tested rigorously for consideration in future expert multisite network testing designs. Regression discontinuity designs are feasible for a single site study and can be less costly and resource intensive than a randomized or step-wedge trial. See [Box 1] for more details on this design with the Fujita and Choi example.[10] Moreover, however rigorous, the clinical content of the findings in the Fujita and Choi study requires critical appraisal for clinical context and precision patient applicability. For example, whereas Fujita and Choi[10] seek to standardize overall unit care by reducing largely the number of clinically irrelevant alarms, London et al[6] call for personalized increases in QT interval monitoring for high-risk patients with rare but fatal signs and symptoms of long QT syndrome. *JEN* seeks to stimulate reasoned and scholarly debate in the balance among standardized processes with precision care.

In This Issue

The 50th anniversary reprint of the 1992 Kidd[3] commentary presents a call to action for conflict resolution, collaboration, cooperation, mutual accountability, and teamwork with our critical care nursing colleagues. Kidd distinguishes the critical care nurse's practice as more autonomous because of nurse-initiated protocols or standing orders. Fortunately, emergency nursing has evolved to greater autonomy since 1992 by developing and testing the effectiveness of nurse-initiated protocols in states and countries where it is allowed by the nurse practice regulation.[8,27,28] Leveille et al[8] investigated tailored triage nurse–initiated protocols for febrile oncology patients, with improved process outcomes in ED flow and time to care. Further research is needed to ascertain the protocol intervention's impact on patient outcomes. Patient crowding and flow are impacted by the boarding of intensive care patients as well as the volume of nonurgent emergency visits. Bornais et al[2] provide insights into the need for interventions to reduce nonurgent visits for patients who live closest to the hospital, have providers referring them to the emergency department, find that the efficacy of emergency care is superior to other options, and require convenient time-saving clinical encounters. Abbadessa[1] identified a substantial gap in the published evidence on the impact of intensive care boarding practices in the emergency department on pediatric patient outcomes. Tan et al[4] provide novel evidence regarding the need to tailor early warning score calculations and communications for patients with acute pancreatitis. This tailored score promises to inform ED flow interventions as an early identification of patients at higher risk of intensive care services or mortality. The case reviews in this issue deepen clinical reasoning with precision care interventions for critical care patients who may experience rare events by analyzing life-threatening posterior cerebral artery stroke,[7] long QT syndrome,[6] and esophageal perforation.[29]

The implementation of the RE-AIM framework includes adopting interventions for cultural considerations and context. Whereas Wood et al[30] demonstrate the effectiveness of tailoring discharge instructions with video to improve knowledge for Spanish-speaking caregivers, other recently published evidence does not support the view that general video discharge instructions for acute otitis media, for example, increase caregiver knowledge.[31] Furthermore, in this issue of *JEN,* Leclerc[12] identifies the culturally contextual and relevant need for emergency nursing education in caring for indigenous patients. Finally, the adoption domain in the RE-AIM Framework includes an evaluation of who delivered the intervention. In this issue of *JEN*, the ENA provides leadership, through a position statement, on the role of the nurse practitioner.[32,33] ENA proposes advancing and refining the education, preparation, and defined role of the acute care nurse practitioner across the lifespan. Actualizing the recommendations in this position statement promises an increased capacity to meet population care needs for prescribing providers in general emergency departments, and further implement evidence-based translation to practice. We look forward to continued publication of both patient and setting intervention advancements and innovations in future issues of *JEN*.

Appendix

Supplementary Data

To access the supplementary material accompanying this article, visit the online version of the *Journal of Emergency Nursing* at www.jenonline.org.

Dimension	Pragmatic summary questions[13,14(p. 3-4)]	Definition[13(p. 3-4)]	Emergency nursing example
Reach	"HOW do I reach the targeted population with the intervention?"	"The absolute number, proportion, and representativeness of individuals who are willing to participate in a given initiative, intervention, or program. Reasons for not participating."	Wood et al[30] estimates 925 Spanish-speaking caregivers could have been screened for eligibility, but owing to trained staff availability and unit census, 164 (18%) were approached. Of these, 9 (5%) did not consent to participate.
"WHO is (was) intended to benefit and who actually participates or is exposed to the intervention?"	Effectiveness	"HOW do I know my intervention is effective?"	"The impact of the intervention on important outcomes, including potential negative effects, quality of life, and economic outcomes. Heterogeneity of effects and reasons for success or lack of such."
Wood et al[30] demonstrated that adding video-discharge instruction, compared with usual discharge teaching care for Spanish-speaking caregivers increased knowledge about the child's diagnosis and treatment.	"WHAT is (was) the most important benefit you are trying to achieve and what is (was) the likelihood of negative outcomes?"	Fujita and Choi[10] documented no reports of adverse outcomes after implementing their intervention to customize physiological alarms.	Adoption
"HOW do I develop organizational support to deliver my intervention?" "WHERE is (was) the program or policy applied? WHO applied it?"	"The absolute number, proportion, and representativeness of: a) settings; and b) intervention agents (people who deliver the program) who are willing to initiate a program. Reasons for adoption or non-adoption."	A pharmacy resource specialist in Pon et al's[35] intervention inserted a warning text pop-up in the medication dispensing unit so that all clinical staff withdrawing intravenous dilTIAZem would receive the alert in 1 clinical setting.	Implementation

"HOW do I ensure the intervention is delivered properly?"	"At the setting level, implementation refers to the intervention agent's fidelity to the various elements of an intervention's protocol, including consistency of delivery as intended and the time required. Also includes adaptations made and the costs of implementation. At the individual level, implementation refers to the clients' use of the intervention and implementation strategies."	Pop et al[11] adapted an intervention to reduce patient falls in the emergency department by tailoring a falls prevention bundle.	"HOW consistently is (was) the program or policy delivered? HOW will (was) it be adapted? HOW much will (did) it cost? WHY will (did) the results come about?"
Wolf et al[36] identified risk for personal harm, potential legal liability, and poor guidance about follow-up interventions were barriers to emergency nurses conducting an access to firearm assessment. Note: Qualitative research is critical to address "WHY" results came about.[13]	Maintenance	"HOW do I incorporate an intervention so it is delivered over the long term?"	"The extent to which: a) behavior is sustained 6 months or more after treatment or intervention; and b) a program or policy becomes institutionalized or part of the routine organizational practices and policies. Includes proportion and representativeness of settings that continue the intervention and reasons for maintenance, discontinuance, or adaption."

Phase	Purpose	Participants
0	Preclinical safety, dose, and toxicity (basic science)	in vitro (test tube) or in vivo (animal testing)
1	Safety, dose, route (translate to humans)	<100 people, often healthy
2	Efficacy and adverse effects (translate to patients)	~100–1,000 people

3	Confirm efficacy, compare with other treatments, and monitor adverse effects (translate to patients)	>100 people, often >1,000
4	Long-term safety and efficacy, effectiveness (begin to translate to practice)	Several thousand people

DETAILS

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Commentary on Emergency Nurses Association's 2019 "Position Statement: Advanced Practice Registered Nurses in the Emergency Care Setting": JEN

ABSTRACT (ENGLISH)

Rather than viewing the missing elements for acute care across the life span in the current Consensus Model as barriers, the 2019 ENA position supports the Model, thereby recognizing that a wide variety of APRN roles can each contribute to improving the delivery of emergency care in the United States. Other nursing specialties have grappled with this issue and similarly conclude that there is a place for various areas of expertise on the interdisciplinary care team, so long as the APRNs practice within their scope.7 ENA has taken a bold step by supporting the introduction of a new population in the Consensus Model, should it come open for revision: acute care across the life span.1 Whereas current options for primary care NPs include family practice, which in most states extends across the life span, the acute care role is divided distinctly into adult-gerontology or pediatric foci. The 2019 position statement on Advanced Practice Registered Nurses in the Emergency Care Setting represents the commitment of ENA in supporting safe and effective practice to the full scope for which these professionals are educated and trained, laying the groundwork for future efforts to support APRN practice through education, advocacy, and leadership.Author Disclosures Conflicts of interest:

FULL TEXT

In August 2019, the Emergency Nurses Association (ENA) Board of Directors approved the revision of the organization's position statement, "Advanced Practice Registered Nurses in the Emergency Care Setting."[1] This statement represents the culmination of more than 3 years of work by members of the 2017, 2018, and 2019 Position Statement Committees and Institute for Emergency Nursing Advanced Practice Advisory Council. The statement helps not only to better define the role of advanced practice emergency nurses but also to provide support and guidance on issues such as educational paths and resources needed.

The 2019 position statement reflects the evolution of advanced practice registered nurse (APRN) practice, starting with the declaration that APRNs are "established members of emergency care teams throughout the U.S. and in

many countries worldwide."[1] Nurse practitioner (NP) and clinical nurse specialist (CNS) practices have become more defined by unique, specialty-specific competencies, which serve as the standard for validation of safe practice.[2,3] These standards and documents have and will continue to evolve over time. The position statement represents inclusion of APRNs within the emergency nursing community and ENA's role in supporting advanced practice. APRNs now have additional confidence in their place as members of the multidisciplinary emergency care team, rather than being viewed as an "extender" or "midlevel." Furthermore, external stakeholders, including patients and families, can better understand that APRNs bring a unique approach to patient management in the specialty setting. APRNs providing emergency care primarily include NPs and CNSs, although other roles exist, such as the certified registered nurse anesthetist and nurse midwife.[4] As within other areas of health care, APRN practice has grown dramatically in recent years to meet the challenge of increasingly older and more medically complex populations. Along with this growth has come an increase in academic graduate programs to prepare individuals in their chosen role, postgraduate programs, and continuing education.

In 2008, the Consensus Model for APRN Regulation: Licensure, Accreditation, Certification, and Education[4] was published with the intent of promoting consistency and standardization for APRNs entering clinical practice. That same year, the Institute of Medicine (now known as the National Academy of Medicine), together with the Robert Wood Johnson Foundation, launched the work, which culminated in the consensus report, *The Future of Nursing: Leading Change, Advancing Health*,[5] calling for nurses to achieve higher levels of education and to "practice to the full extent of their education and training." These 2 documents have served as an impetus for the progressive adoption of full-practice authority for APRNs in various states across the country. Currently, 22 states have established practice environments where APRNs can provide care to the full scope of their preparation.[6]

How the Consensus Model can be transitioned into advanced practice for specialties, such as emergency nursing, has been subject to various interpretations. General, or nondifferentiated, emergency departments serve pediatric, adult, and older adult patients with a wide range of acuity. The ability to provide emergency care in a general emergency department requires that APRNs have education and training to provide episodic management of conditions across the life span and the full range of acuity, from minor complaints to critically unstable conditions. For those APRNs practicing in all areas of a general, nondifferentiated emergency department, additional postgraduate certificates may be required. A specific and clarified acute care across the lifespan pathway for APRNs would enhance the Consensus Model's direct relevance to APRN care in the ED setting.

Rather than viewing the missing elements for acute care across the life span in the current Consensus Model as barriers, the 2019 ENA position supports the Model, thereby recognizing that a wide variety of APRN roles can each contribute to improving the delivery of emergency care in the United States. This support comes with the caveat that it is the responsibility of the APRNs to practice within the scope of the role and population for which they have been educated, trained, and certified in addition to their licensure and credentialing. Other nursing specialties have grappled with this issue and similarly conclude that there is a place for various areas of expertise on the interdisciplinary care team, so long as the APRNs practice within their scope.[7]

ENA has taken a bold step by supporting the introduction of a new population in the Consensus Model, should it come open for revision: acute care across the life span.[1] Whereas current options for primary care NPs include family practice, which in most states extends across the life span, the acute care role is divided distinctly into adult-gerontology or pediatric foci. Likewise, the CNS scope of practice is challenged by the lack of a population inclusive of patients across the life span. By creating a population for acute care across the life span, those desiring in-depth preparation in pediatric or adult-gerontological care can continue to take these paths, similar to the family NPs. This acute care across the life span addition would provide a means for specialties such as emergency care or orthopedic APRNs who provide episodic, acute care to patients of all ages to do so without the need for additional postgraduate education and certifications.

ENA asserts a willingness to work collaboratively with other stakeholders because the role of the APRN continues to evolve as the organization designated by the American Nurses Association representing the specialty of emergency nursing. Acting on this, ENA has applied for membership on the Consensus Model for APRN Regulation: Licensure,

Accreditation, Certification, and Education committee, which oversees implementation and evaluation of the Consensus Model. Membership would allow the organization to be more present and advocate for APRNs in emergency care, now and in the future. ENA is currently involved in revision of the competencies for both NPs and CNSs in emergency care and working with appropriate organizations to ensure that scope and standards of practice are developed and maintained.

ENA's final position in the 2019 Advanced Practice Registered Nurses in the Emergency Care Setting statement is tied to the organization's mission of excellence in providing safe practice and safe care, the pillar of knowledge. In keeping with ENA's 5-year strategic goals,[8] the Emergency Nursing Advanced Practice Advisory Council has developed various educational offerings over the past 5 years, dedicated to advanced practice education. Presessions at ENA 2019 included point-of-care ultrasound and procedural presessions and a panel discussion on Doctor of Nursing Practice project development in the emergency department. The Advanced Practice Registered Nurses in the Emergency Care Setting position statement reaffirms ENA's commitment to advanced practice education and training, with future plans for both virtual and face-to-face offerings in the near future. The 2019 position statement on Advanced Practice Registered Nurses in the Emergency Care Setting represents the commitment of ENA in supporting safe and effective practice to the full scope for which these professionals are educated and trained, laying the groundwork for future efforts to support APRN practice through education, advocacy, and leadership.

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Assessing the Impact of ED Triage Directives on Febrile Oncology Patient Wait Times: JEN

ABSTRACT (ENGLISH)

Introduction

Fever during chemotherapy is a common and potentially severe complication being increasingly evaluated in emergency departments to minimize morbidity and mortality. Streamlining triage of these patients may improve health outcomes and wait times in the health care system.

Methods

A retrospective chart review of febrile patients undergoing chemotherapy was conducted at a local emergency department to assess the impact of nurse-initiated protocols on wait times.

Results

We identified 315 patients undergoing current chemotherapy presenting with fever. Of these, 140 (44%) and 87 (28%) were initiated on the sepsis and febrile neutropenia nurse-initiated protocols, respectively. In total, 197 (63%) were admitted. The febrile neutropenia protocol had a shorter wait time from triage to disposition than the sepsis protocol (403 minutes [SD = 23] vs 329 minutes [SD = 19], t = 1.71, *P* = 0.01). Furthermore, the febrile neutropenia protocol demonstrated shorter times from both triage to lab results reported, in addition to the physician initial assessment in the admitted patient subgroup.

Discussion

Decreased wait times from triage associated with the use of a febrile neutropenia protocol could be accounted for by a lower number of lab results required through this protocol in addition to shorter physician assessment times in the admitted population. This study shows that nurse-initiated protocols may influence door-to-antibiotic time for patients undergoing chemotherapy. By having a targeted protocol for the cancer population, health care centers may be able to demonstrate decreased health care expenditure and increased resource availability. Furthermore, as the current population of patients undergoing chemotherapy is at a high risk for neutropenia, prompt management is crucial to minimize mortality.

FULL TEXT

DETAILS

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Transcultural Health Practices of Emergency Nurses Working With Indigenous Peoples: A Descriptive Study: JEN

ABSTRACT (ENGLISH)

Introduction

For decades, health inequalities have persisted among Indigenous peoples. As the Indigenous population is growing

in the cities, health care delivery in urban areas can be challenging. Emergency nurses are often the first contact in the health system, and they play a key role in the patient's experience. This study aims to describe the transcultural health practices of Canadian emergency nurses working with Indigenous peoples.

Methods

A descriptive study was conducted among 30 emergency nurses.

Results

Approximately 90% of the nurses who participated in the study had not received specific training about Indigenous health. The most common type of culturally appropriate nursing care was clinical examination (mean = 7.22), and sexuality care was the least frequent (mean = 5.47). The nurses were less confident in their ability to interview Indigenous peoples about the importance of home remedies and folk medicine (mean = 5.38).

Discussion

In summary, emergency nurses had more confidence in their ability to provide technical care than in their knowledge regarding the cultural aspects of providing care. As Indigenous populations face challenges regarding access to health care, specific interventions should be implemented to support better-quality cultural care from emergency nurses.

FULL TEXT

Contribution to Emergency Nursing Practice

••The current literature on transcultural health practices of health professionals indicates some discomfort related to knowledge and skills associated with Indigenous peoples' health care.

••This article contributes the finding that emergency nurses do not receive specific training about Indigenous health. Altogether, nurses are less confident in their communication skills with Indigenous peoples.

••Key implications for emergency nursing practice found in this article are the need for education of emergency nurses regarding disparities in care and the development of strategies to promote self-efficacy for Indigenous cultural care.

Introduction

In Canada, more than 1.6 million people self-identify as being Indigenous, which refers to First Nations, the Inuit, and the Métis.[1] The Indigenous population is growing and is seen mainly in the cities.[1,2] Education and employment opportunities remain the principal motivations for urban migration; however, access to health care services plays a role.[2] Furthermore, the number of older adults in the Indigenous population is growing. Despite the persistent health disparities between Indigenous and non-Indigenous peoples and the high rate of chronic diseases, the evidence does not indicate a higher use of health care services by Indigenous peoples.[2,3]

Health care delivery in urban areas can be challenging. For Indigenous peoples living off-community, the likelihood of experiencing difficulties in accessing first-contact services is significantly higher.[4] The predominance of the biomedical model that tends to treat only the disease and the infirmity seems to run counter to Indigenous peoples' holistic views on health (physical, mental, emotional, and spiritual well-being).[5] Thus, urban Indigenous populations could experience racism and judgment from health professionals, or they could feel that their needs are not understood.[6,7] In Canada, data obtained from the 2013 Canadian Community Health Survey[8] (n = 16,836) indicate that 48.4% of Indigenous peoples have reported experiencing discrimination and that this discrimination is a determinant of chronic disease.

In a large study conducted with an urban Indigenous population in the Province of Québec (N = 1,723), 57% of the participants felt that they had been victims of racism and discrimination by government services provided in the province.[9] Of the participants who had used government health and social services (70%), 18% reported that their

needs had not been met. In the same study, 22% of the participants indicated that they did not have accurate information about health and social services or that the government services did not meet the needs of the urban Indigenous population.[9] Because of events regarding possible discriminatory practices in the delivery of public services in Québec province, the government created the Public Inquiry Commission to examine the relationships between public service providers and Indigenous peoples.[10]

Health leaders and professionals play a key role in patients' experiences.[11] Seven of the recommendations in the Canadian Truth and Reconciliation Commission's Calls to Action[12] are related to the health of Indigenous peoples. These recommendations include the availability of appropriate health services and the need for cultural competency training for all health care professionals. Over more than 25 years, efforts have been made to incorporate cultural competence and working with vulnerable populations into the nursing and health care curricula.[13] It is even recommended that cultural competence should be an entry-to-practice level requirement.[14] In the context of working with Indigenous peoples, cultural competency and cultural safety should be rooted in an awareness of the impacts of colonialism.[15] However, the cultural safety training for health professionals who address the issue of social injustice and unequal power relation presents challenges.[16] The application of cultural safety, by creating a culturally competent environment,[14] creates some discomfort among health professionals in relation to their lack of practical knowledge.[17] In the emergency department, health professionals are continuously dealing with patients who present with acute pain, anger, hunger, tiredness, confusion, or intoxication. Thus, as Johnson and Withers[18] stressed, blaming the patient, which leads to loss of empathy, can be tempting.

To explore the sensitive topic of cultural competence in relation to health care for Indigenous populations, this study used a self-evaluation approach that is based on Jeffreys' cultural competence and confidence (CCC) model.[19] A review of the literature indicates that few instruments have been validated in French. More importantly, none has been designed specifically for Indigenous populations. Based on the issues outlined above, this study aimed to describe the transcultural health practices of emergency nurses who work with Indigenous peoples.

Conceptual Framework

Jeffreys' CCC model provided the framework for this study.[19] The CCC integrates the concepts that explain, describe, influence, and/or predict the phenomenon of learning cultural competencies. In addition, it incorporates the construct of transcultural self-efficacy as a major influencing factor. According to Jeffreys' CCC model, "cultural competence is a multidimensional learning process that integrates transcultural skills in all 3 dimensions (cognitive, practical, and affective), involves transcultural self-efficacy (confidence) as a major influencing factor, and aims to achieve culturally congruent care."[19 (p.164)]

The cognitive learning dimension includes knowledge, intellectual abilities, and skills.[19] In the present study, this dimension refers to the knowledge and comprehension of the cultural factors that could influence nursing care for Indigenous peoples. The practical learning dimension focuses on the development or practical application of motor skills.[19] In the present study, it refers to the verbal and nonverbal communication skills needed for interviewing Indigenous peoples about their values and beliefs. The affective learning dimension concerns attitudes, values, and beliefs.[19] It includes self-awareness, awareness of cultural gaps, acceptance, appreciation, recognition, and advocacy.[20] According to the CCC model, transcultural self-efficacy is the perception of confidence to perform or to learn transcultural nursing skills. The transcultural self-efficacy concept is based on Bandura's self-efficacy theory.[21]

Methods

A descriptive and quantitative study was conducted. The study was nested in a larger project to examine the health trajectory of Indigenous peoples regarding health determinants and perspectives. This study specifically evaluated nurses' perspectives.

The eligible population included nurses working in emergency departments in 3 hospitals in Québec province (N = 233). Using volunteer sampling, 30 nurses were included in the sample (13% of the total sample). Meetings were held with all the nurses to explain the project. The 3 inclusion criteria were as follows: (1) being a nurse for more than 6 months, (2) not being Indigenous, and (3) having been exposed to care for Indigenous populations. The questionnaires were left with the assistant head nurses. The completed questionnaires were returned to them in sealed envelopes. To thank the participants, each emergency department held a random drawing for a gift card. The data were collected between September 2017 and May 2018.

Instruments

Three questionnaires that could be completed within 20 minutes were distributed to the nurses. The first questionnaire examined the nurses' transcultural self-efficacy, the second questionnaire examined the nurses' cultural competence clinical evaluation, and the third questionnaire evaluated their sociodemographic characteristics.

Transcultural self-efficacy tool

The transcultural self-efficacy tool (TSET) contains 83 items that evaluate nurses' confidence in their ability to care for individuals from different cultures.[19,22] It contains 3 subscales: cognitive (25 items), practical (28 items), and affective (30 items).[19] The cognitive subscale measures confidence regarding the knowledge of the possible influence of cultural factors on nursing care. The practical subscale measures the confidence to interview patients from different backgrounds to learn about their values and beliefs. The affective subscale measures attitudes, values, and beliefs. The questionnaire uses a 10-point Likert scale (1 = not confident to 10 = totally confident). The process for the development and validation of this scale has been published.[23] A Cronbach α of 0.97 was obtained for all the subscales with the French version of the questionnaire.[24,25] In the present study, the Cronbach α values for the 3 subscales (cognitive, practical, and affective) were 0.93, 0.92, and 0.98, respectively.

Cultural competence clinical evaluation tool—employee version

The cultural competence clinical evaluation tool—employee version (CCCET—EV) is adapted from the TSET. It is comprised of 83 items that assess the dimensions of cultural competence in clinical behaviors.[19,22] The CCCET—EV contains 3 subscales: (1) culture-specific care (25 items), (2) cultural assessment (28 items), and (3) cultural sensitivity (30 items).[19] However, only the first subscale, the extent of culture-specific care, was used in the present study. This subscale evaluated the nurses' confidence in their ability to care for individuals from different cultures. It included items about physical examinations, patient education, illness prevention, and diagnostic testing. The tool used a 10-point Likert scale (1 = not confident to 10 = totally confident). In addition, the respondents had the option of selecting "A" ([clinical] area not available) or "B" (diverse clients not available). The development and validation of this scale have been previously examined.[23] A Cronbach α of 0.94 was previously reported for the French version of the subscale.[24,25] In the present study, the Cronbach α value was 0.92.

Sociodemographic questionnaire

The sociodemographic questionnaire was used in the present research to assess the nurses' personal characteristics (age, sex, and Indigenous identity), academic journeys (education level and training about Indigenous health), and nursing journeys (hospital setting, nursing experience, employment status, schedule, and experience in Indigenous communities).

IBM SPSS Statistics for Windows Version 24.0 (Armonk, NY) was used for the analysis. Descriptive analyses were performed; thus, means, frequencies, and percentages were calculated. This study was approved by the research ethics committees of the university and hospitals concerned. All participants were informed of the nature of the study and provided written informed consent.

Results

A total of 30 non-Indigenous nurses from 3 emergency departments in Québec participated in the study. Most were women (80%) aged between 31 and 50 years, with an average of 16 years of experience (Supplementary Table 1). Most of the nurses had undergraduate diplomas, and 90% indicated that they had never received training about Indigenous health.

Transcultural Self-Efficacy

The TSET was used to assess the nurses' confidence in their ability to use transcultural nursing skills to serve Indigenous populations. Supplementary Table 2 presents the results obtained from the 3 subscales of the transcultural self-efficacy questionnaire: cognitive, practical, and affective. The mean for the cognitive subscale was 6.19. The 5 items presenting the highest means were diagnostic tests (6.93), blood tests (6.93), comfort and pain relief (6.89), rest and sleep (6.86), and informed consent (6.79). The 5 items presenting the lowest means were growth and development (5.31), birth (5.39), sexuality (5.50), anxiety and stress reduction (5.66), and diet and nutrition (5.67).

The mean for the practice subscale was 5.48. The 2 items presenting the highest means were level of French comprehension (6.38) and role of elders (6.10). The 2 items presenting the lowest means were acculturation (4.34) and worldview philosophy of life (4.46). Finally, the mean for the affective subscale was 7.06. The 2 items presenting the highest means were acceptance of similarities among cultural groups (8.41) and acceptance of differences among cultural groups (8.38). The 2 items presenting the lowest means were recognition of the inadequacies in the nation's health care system (5.00) and recognition of the importance of home remedies and folk medicine (5.38).

Cultural Competence Clinical Evaluation

The CCCET—EV was used to gather data about the nurses' provision of culture-specific care to Indigenous populations. Supplementary Table 3 presents the results obtained from the cultural competence clinical evaluation. The overall mean of the subscale was 6.25. The 5 items presenting the highest means were physical examination (7.22), comfort and pain relief (7.20), diagnostic tests (7.08), blood tests (6.92), and pregnancy (6.89). The 5 items presenting the lowest means were sexuality (5.47), hygiene (5.52), illness prevention (5.62), health history and interviews (5.64), and anxiety and stress reduction (5.65).

Discussion

As previously outlined, the cognitive subscale of the TSET refers to knowledge.[19] On the one hand, the results showed that emergency nurses had more confidence regarding their knowledge of the technical aspects, such as diagnostic and blood tests, of the care they provided to Indigenous peoples. On the other hand, the results demonstrated that the nurses had less confidence regarding the care associated with birth, growth, and development. Such care is less frequent, usually transfers to another department, and has a low priority in emergency departments.[26] The item with the lowest mean was found in the practical subscale, which refers to communication skills. The nurses had more confidence in their ability to interview Indigenous peoples about their French comprehension and the role of elders. French is the first or second language of most Indigenous peoples living near the study setting. However, the results regarding the comprehension of the term "elders" should be interpreted with caution. Indeed, for aboriginal communities, elders are the bearers of knowledge. Thus, these individuals are not necessarily the oldest in the community.[27] The nurses did not have a great deal of confidence regarding the subject of worldview or acculturation. Of course, trust needs to be built before such subjects can be discussed. In other words, emergency departments might not be the best place to discuss cultural values. It is important to outline the Québec province context. More specifically, because the access to first-line services is relatively difficult, health care providers in the emergency departments deal with a heavy workload.[28] As such, almost 60% of the patients admitted to emergency rooms worldwide could have been treated by primary care

physicians because the patients were not in critical condition or in need of urgent care.[29] Moreover, the number of visits to emergency departments in Québec has been increasing, and there is a correlation with the growth of the elderly population.[29] Finally, since 2015, Québec's health system has been reformed and several organizational changes have taken place.[30]

As reported in a recent study, the affective subscale had the highest means.[31] This result suggests that nurses feel confident about their own cultures, attitudes, and beliefs. However, they do not have the confidence regarding the importance of home remedies and folk medicine. Similar results were reported in Ontario (Canada). The health care workers in that study lacked knowledge and understanding of Indigenous issues, cultures, and medicinal practices.[32] Moreover, the same qualitative study conducted in Ontario reported ambivalence about the need for culturally appropriate versus universal care. Such an analysis was not possible with the quantitative methodology used in the present study.

The results obtained from the CCCET—EV indicated that the nurses had more confidence in their ability to provide the specific types of care that are typical of emergency departments (physical examinations, comfort, and pain relief). In such situations, it is possible to apply good techniques without having cultural competency. Health care professionals are expected to provide care in a culturally appropriate manner, but clients are the only ones to determine whether the care is culturally appropriate or not.[14]

An assumption of the CCC model is that the acquisition of culturally appropriate nursing skills is influenced by nurses' perceived self-efficacy and their exposure to transcultural nursing care concepts and skills throughout their formal education.[23] The fact that 90% of nurses never received training about Indigenous health may have influenced our results. This same fact can explain the lower mean found for the practical subscale. It indicates that the nurses had less confidence in their ability to interview Indigenous peoples (practical subscale). For instance, in the United States, there is a 90-minute training session grounded in cultural competency and decolonialism for mental health professionals to increase their knowledge, awareness, and skills regarding the care of Indigenous peoples.[33] In sum, recognizing the effects of complex intergenerational traumas on health and access to health services is critical for the ability to provide cultural safety care to Indigenous peoples in emergency departments.[34]

Limitations

The main limitations of this study are related to the questionnaires that were used. The French versions of the TSET and the CCCET—EV showed good reliability; however, the European terminology could have led to some confusion for the Québecer nurses. Because the questionnaire required self-evaluation, the nurses might have rated themselves lower on skills. A low sense of self-efficacy can affect cultural competence development and assessments, but on the other side, overly confident nurses may overestimate their cultural abilities.[19] Indeed, this questionnaire is usually used with migrant populations and thus is relevant for Indigenous populations. A review of the literature indicates that the present study represents the first use of these questionnaires in relation to Indigenous populations. However, it must be noted that migrant and Indigenous populations do not share the same history in Canada. Indigenous peoples have been and are being affected by the legacy of colonialism (eg, the Indian Act and residential schools).[3] Another limitation is the small number of participants. Despite various efforts for the recruitment, the response rate was 13%, but it is not unusual to encounter response rates as low as 15%.[35] The small sample presents difficulties for generalizing the findings to other emergency departments.

Conclusions and Implications for Emergency Nurses

The study found that emergency nurses had more confidence in their ability to provide technical care than in their knowledge about the cultural aspects of care. Most nurses recruited for this study had never received training about Indigenous health; thus, the development of strategies to promote self-efficacy in cultural care would be relevant.

There is emergent training on cultural safety in Canada.[16,36] However, a training program designed specially for emergency nurses with integration of local knowledge is required.[37] Training that includes observations and clinical case studies could be an option. Because culture is not static, continuing education would be required. Other research studies should consider using a pre-post cultural educational intervention. In addition, given that emergency departments are structured to provide urgent and acute care, it could be relevant to measure the impact of having a cultural support staff.[37] Québec just received the Public Inquiry Commission's recommendations on the relationships between the Indigenous populations and specific public services departments.[38] A total of 142 calls to action aim to reestablish the trust between Québec and Indigenous peoples. Nursing schools should continue to incorporate the government action plan to create service continuums for Indigenous populations. Examples are training in Indigenous communities, small classes for Indigenous students, participation in local meetings for health service accessibility, the extension of Indigenous liaison services to urban settings, and training focused on Indigenous realities and cultural safety.[39]

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Author Disclosures

Conflicts of interest: none to report.

Appendix

Supplementary Material

To access the supplementary material accompanying this article, visit the online version of the *Journal of Emergency Nursing* at www.jenonline.org.

Variables	Values
Age (years)	
Younger than 30	5 (16.7)
Between 31 and 40	10 (33.3)
Between 41 and 50	9 (30.0)
Older than 50	6 (20.0)
Sex	
Women	24 (80.0)
Men	6 (20.0)

Education	
College training	11 (36.6)
Undergraduate	16 (53.3)
Master	3 (10.0)
Training on Indigenous health	
Yes	3 (10.0)
No	27 (90.0)
Nursing experience (years), mean (SD)	15.93 (8.76)

Questionnaire subscale and items	Mean (SD)
Cognitive subscale	6.19 (1.22)
Five items with the highest means	
1. Diagnostic tests	6.93 (1.9)
2. Blood tests	6.93 (2.0)
3. Comfort and pain relief	6.89 (1.8)
4. Rest and sleep	6.86 (2.2)
5. Informed consent	6.79 (1.9)
Five items with the lowest means	
1. Growth and development	5.31 (1.9)
2. Birth	5.39 (2.3)
3. Sexuality	5.50 (2.4)
4. Anxiety and stress reduction	5.66 (1.8)

5. Diet and nutrition	5.67 (2.1)
Practical subscale	5.48 (1.26)
Two items with the highest means	
1. Level of French comprehension	6.38 (2.4)
2. Role of elders	6.10 (2.1)
Two items with the lowest means	
1. Acculturation	4.34 (1.9)
2. Worldview (philosophy of life)	4.46 (1.8)
Affective subscale	7.06 (1.19)
Two items with the highest means	
1. Acceptance of similarities among cultural groups	8.41 (1.7)
2. Acceptance of differences among cultural groups	8.38 (1.7)
Two items with the lowest means	
1. Recognition of inadequacies in the nation’s health care system	5.00 (3.2)
2. Recognition of importance of home remedies and folk medicine	5.38 (2.4)

Questionnaire items	Mean (SD)
Culture-specific care	6.25 (1.9)
Five items with the highest means	
1. Physical examination	7.22 (2.1)
2. Comfort and pain relief	7.20 (2.4)
3. Diagnostic tests	7.08 (2.6)

4. Blood tests	6.92 (2.6)
5. Pregnancy	6.89 (2.8)
Five items with the lowest means	
1. Sexuality	5.47 (2.7)
2. Hygiene	5.52 (2.5)
3. Illness prevention	5.62 (2.8)
4. Health history and interview	5.64 (2.3)
5. Anxiety and stress reduction	5.65 (2.5)

DETAILS

Subject:	Emergency medical care; Health disparities; Population; Cultural competence; Culture; Medical personnel; Urban areas; Questionnaires; Chronic illnesses; Nurses; Confidence; Likert scale; Sexuality; Patients; Health behavior; Native peoples; Home remedies; Professional training; Cultural factors; Nursing care; Indigenous peoples; Sociodemographics; Cultural differences; Nursing skills; Clinical nursing; Education; Clinical assessment; Emergency services; Health care delivery; Health care access
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Improving Appropriate Dosing of Intravenous dilTIAZem in Patients With Atrial Fibrillation or Flutter With Rapid Ventricular Response in the Emergency Department: JEN

ABSTRACT (ENGLISH)

Introduction

Atrial fibrillation and atrial flutter are common supraventricular arrhythmias in patients who present to the emergency department. Under the American Heart Association guidelines, dilTIAZem is the calcium channel blocker frequently used by many practitioners for rate control. Currently, institution-specific data have identified that many patients receiving dilTIAZem for atrial fibrillation or atrial flutter are given initial doses that exceed the recommended dose by more than 10%, resulting in hypotension in some patients.

Methods

ED personnel were surveyed to determine their current knowledge of appropriate intravenous dilTIAZem dosing and

methods of prescribing intravenous dilTIAZem to determine the causes of higher dosing. Based on the baseline data, an intervention of adding a text alert when withdrawing dilTIAZem from the automated medication dispensing cabinet was implemented.

Results

Following the intervention, 29 patients received intravenous dilTIAZem for rate control of atrial fibrillation or flutter with rapid ventricular response. For the primary outcome, the incidence of high-dose dilTIAZem decreased by 19% ($P = 0.03$). There was no change in the secondary outcome of a reduction in hypotension ($P = 0.3$).

Discussion

The interventions of education and medication alerts resulted in a significant increase in the percentage of patients receiving appropriate doses of dilTIAZem and a nonsignificant decrease in the incidence of hypotension. This process-oriented intervention resulted in an improvement in appropriate dilTIAZem doses at our site. Rate control was not statistically significantly different between the 2 groups. Long-term sustainability of this intervention requires further study.

FULL TEXT

DETAILS

Subject:	Patients; Emergency medical care; Polls &surveys; Intervention; Appropriateness; Drugs; Pharmacy; Cardiac arrhythmia; Atrial fibrillation; Calcium; Hypotension; Prescribing; Pharmacokinetics; Data collection; Automation; Nursing; Human subjects; Nurses; Education; Dosage; Emergency services
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The power of self-compassion: JEN. (2020). Journal of Emergency Nursing, 46(2), 135. doi:https://doi.org/10.1016/j.jen.2020.01.002

In the emergency department or other emergency care settings, there is very little downtime. Contrary to inferences made by my state representatives that nurses relax and play cards during shifts, we all know the reality of our care settings. Or this moment can take place at unexpected times, such as when we are logging into our electronic medical record, and instead of experiencing frustration that the program is not moving quickly enough, we use that moment to contemplate.

Retention of tourniquet application skills following participation in a bleeding control course: JEN. (2020). Journal of Emergency Nursing, 46(2), 154-162. doi:https://doi.org/10.1016/j.jen.2019.10.020

IntroductionThe American College of Surgeons' Stop the Bleed program has trained more than 1 million individuals to recognize and treat external hemorrhage. Central to this training is tourniquet application. No published studies review the retention of this skill after initial class participation.MethodsOne hundred fourteen volunteers agreed to participate. A random sample of 57 was selected and 46 participated. Upon return 6 months later, each participant demonstrated tourniquet application. An observer compared the application process with steps on a checklist. Each step completed correctly was tallied, and the total score for all 10 steps was computed as a percentage correct between 0% and 100%.ResultsThe baseline score on the tourniquet skill test was 100% following initial training. At 6 months, mean scores were lower, 69% (SD = 31%) ($\chi 2 = 52.09$, df = 1, $P < 0.001$). Fourteen volunteers (30%) attained a score of 100%, and 28 volunteers (61%) achieved a passing score. Bleeding was stopped or reduced to non–life-threatening levels by 34 participants (74%). Participants with passing scores were more likely to stop or reduce the bleeding than those with failing scores (97% vs 35%; $\chi 2 = 20.99$, df = 1, $P < 0.001$). Of the 17 volunteers who failed, 18% stopped the bleeding, 18% slowed bleeding to a non–life-threatening level, and 64% were unable to control bleeding.DiscussionAt 6 months, 39% of participants were unable to successfully apply a tourniquet, and 26% were unable to control life-threatening bleeding. This study demonstrates that refresher training is needed within 6 months of initial training.

Esophageal perforation after cervical spine fusion presenting with dysphagia and a burning sensation: JEN. (2020). Journal of Emergency Nursing, 46(2), 220-224. doi:https://doi.org/10.1016/j.jen.2018.12.019

Anterior cervical spinal surgery is, at present, one of the most effective clinical methods of treating cervical spinal stenosis.1 Dysphagia occurs in 71% of patients during the first 2 weeks after surgery and gradually decreases with time; the use of steroid medications can significantly reduce the incidence and severity of postoperative dysphagia.2,3 When a patient who has been taking steroids continues to experience dysphagia or burning throat pain, strong consideration must be given to other rare postoperative complications. ...]of triage, the patient appeared in no distress and was classified as category III according to the Taiwan Triage and Acuity Scale (a 5-level triage scale modified from the Canadian Triage and Acuity Scale CTAS], had a Glasgow Coma Scale score of 15, and the following vital signs: temperature of 38.2°C (100.8°F), respirations of 18/min, pulse of 108/min, and blood pressure of 108/62 mm Hg. Laboratory tests showed an increased white blood cell count of 10.66/mm3 with 79.0% of segmented neutrophils, elevated C-reactive protein (CRP) of 24.52 mg/dL, and erythrocyte sedimentation rate (ESR) of 34 mm/h. The patient was subsequently discharged from the hospital 42 days after readmission.Discussion Anterior cervical spine surgery is a common procedure for treatment of cervical spondylosis with spinal stenosis, and it has a high rate of success with long-term effectiveness.1 Possible complications of the procedure include vocal-cord paralysis (incidence: 0.07%), postoperative hematoma (incidence: 0.1 to 0.5%), wound infections (incidence: 0.1% to 1.6%), esophageal perforation (incidence: 0.2% to 1.15%), dural tear and cerebrospinal fluid leakage (incidence: 0.3% to 13%), and dysphagia (incidence: 71%).1,2 One of the most notable aspects of this case was that although the patient presented with the common complication of dysphagia, his problem turned out to be the rare and potentially fatal complication of esophageal perforation.

Tailoring a comprehensive bundled intervention for ED fall prevention: JEN. (2020). Journal of Emergency Nursing, 46(2), 225-232.e3. doi:https://doi.org/10.1016/j.jen.2019.11.010

IntroductionFalls in the emergency department pose an important challenge for patient safety. Multifactorial fall prevention bundles have been associated with a reduction in patient falls in the inpatient setting. The purpose of this project was to tailor and implement a comprehensive fall prevention bundle in our emergency department.MethodsFall bundle components for this intervention were selected on the basis of a review of fall prevention research and included fall risk assessment, safe ambulation, safe toileting, staff communication, early warning, and patient education. The fall risk assessment was tailored to the emergency department through an appraisal of select inpatient fall risk assessments, literature search for ED-specific fall risk factors, and a site-specific chart review, after which pertinent fall risk factors were integrated into a modified screening. Fall prevention materials that were both practical and applicable to the emergency department and facilitated patient safety along each bundle domain were selected for implementation at our site.ResultsThe tailored fall prevention bundle was championed by the interdisciplinary ED Fall Prevention Team and implemented over the course of 5 months in 1 emergency department. Education on fall prevention equipment was delivered in a peer-to-peer format, and an online module was designed to guide staff through the new fall risk assessment. The fall prevention bundle was adopted into clinical practice after staff education was completed, and the fall risk screening was merged into the electronic medical record.DiscussionED fall prevention requires a comprehensive bundled approach, which includes a fall risk screening and multifactorial interventions that are tailored to the ED setting. Successful implementation relies on the involvement of front-line staff from the design through the delivery of the bundled fall prevention measures. Continued inquiry and innovation in ED fall prevention will help provide a safer health care environment and improve patient outcomes.

Customizing physiologic alarms in the emergency department: A regression discontinuity, quality improvement study: JEN. (2020). Journal of Emergency Nursing, 46(2), 188-198.e2. doi:https://doi.org/10.1016/j.jen.2019.10.017

IntroductionClinical alarms promote patient safety by alerting clinicians when there is an indication or change in a condition requiring a response. An excessive volume of alarm fires, however, contributes to sensory overload and desensitization, referred to as alarm fatigue, which has significant implications when alarms are missed. This evidence-based, practice project aimed to implement and evaluate a program that reduces the number of clinically nonactionable, physiologic alarms in an emergency department. Although alarm fatigue is an important negative consequence, the focus of this project is not on alarm fatigue but on measures to reduce the volume of clinically nonactionable alarms that lead to alarm fatigue. The Iowa Model was used as a conceptual framework.MethodsThis project involved adjusting default alarm settings and implementing an education plan on the safe use of alarms. The sample population included all patients on physiologic monitors at an emergency department. Retrospective data were collected, and regression discontinuity design was applied to compare the rate of alarm fires triggered by the physiologic monitor between pre- and postimplementation of an alarm protocol.ResultsA significant change in the rate of alarm fires occurred with an estimated reduction of 14.96 ($P = 0.003$). There were no reports of adverse outcomes such as a delay in responding to a change in patient condition or delay leading to cardiopulmonary arrest.DiscussionA reduction in nonactionable, physiologic alarms was attained after implementing multimodal strategies inclusive of adjusting default settings, staff education on managing alarms, and emphasis on staff accountability.

Code critical: Improving care delivery for critically ill patients in the emergency department: JEN. (2020). Journal of Emergency Nursing, 46(2), 199-204. doi:https://doi.org/10.1016/j.jen.2019.04.001

ProblemAlthough certain critically ill patients in emergency departments—such as those experiencing trauma, stroke, and myocardial infarction—often receive care through coordinated team responses, resource allocation and care delivery can vary widely for other high-acuity patients. The absence of a well-defined response process for these patients may result in delays in care, suboptimal outcomes, and staff dissatisfaction. The purpose of this quality improvement project was to develop, implement, and evaluate an ED-specific alert team response for critically ill medical adult and pediatric patients not meeting criteria for other medical alerts.MethodsLean (Lean

Enterprise Institute, Boston, MA) principles and processes were used to develop, implement, and evaluate an ED-specific response team and process for critically ill medical patients. Approximately 300 emergency nurses, providers, technicians, unit secretaries/nursing assistants, and ancillary team members were trained on the code critical process. Turnaround and throughput data was collected during the first 12 weeks of code critical activations (n = 153) and compared with historical controls (n = 168).ResultsAfter implementing the code critical process, the door-to-provider time decreased by 62%, door to laboratory draw by 76%, door-to-diagnostic imaging by 46%, and door-to-admission by 19%. A year later, data comparison demonstrated sustained improvement in all measures.DiscussionEmergency nurses and providers see the value of coordinated team response in the delivery of patient care. Team responses to critical medical alerts can improve care delivery substantially and sustainably.

Complexities of identifying posterior cerebral artery cerebrovascular stroke: JEN. (2020). Journal of Emergency Nursing, 46(2), 210-213. doi:https://doi.org/10.1016/j.jen.2019.02.001

Delays in treatment are associated with long-term disability as well as substantial financial burdens.3 On average, patients will incur $21,500 in acute-care hospital bills alone.4 The most recent estimate of financial burden from 2012 reports that the United States spends 34 billion dollars in indirect and direct costs related to care of patients with stroke. According to the National Health Interview Survey, more than 73% to 90% of people were able to identify the most 5 common cardiovascular-related signs and symptoms and “would call 9-1-1 right away if someone was having a stroke.” According to the American Heart Association (AHA), best-practice stroke guidelines include having a stroke protocol in place for pre-hospital and hospital providers. Hospitals should have a goal of door-to-CT scan within 20 minutes and a door-to-needle time of less than 60 minutes if the patient is eligible for tissue plasminogen activator (t-PA) intravenous therapy (IV-tPA).13 Care should be taken to obtain a blood glucose reading as well to ensure that hypoglycemia is not imitating a stroke.

Advanced practice registered nurses in the emergency care setting: JEN. (2020). Journal of Emergency Nursing, 46(2), 205-209. doi:https://doi.org/10.1016/j.jen.2019.12.011

APRNs have existed for more than 50 years and are established members of emergency care teams throughout the United States (US) and in many countries worldwide.2-6 Nearly a decade ago, the Institute of Medicine identified APRNs as necessary for the future of health care delivery in the US.7,8 Since then emergency departments (EDs) in the US and abroad have become increasingly overcrowded, in part due to their status as a health care safety net for those who cannot access a primary care provider.9,10 It is estimated that EDs provide more than 47% of all hospital-associated health care in the US.9 As a result, there is currently a substantial mismatch between the need for emergency services and the available resources to provide that care.10 APRNs have been identified as particularly important for bridging this gap in both urban and rural settings.11-14 The regulatory landscape for APRNs in the US continues to evolve, and APRNs who work in the emergency care setting face a few unique licensing and certification challenges. The Consensus Model’s licensing paradigm could create barriers to APRN practice in the emergency care setting because it would require APRNs who treat the full population of the emergency care setting to complete three courses of graduate study and to obtain and maintain three certifications (eg, Family Nurse Practitioner, Adult-Gerontological Acute Care Nurse Practitioner, and Pediatric Acute Care Nurse Practitioner).1,17 CNSs, for whom there are fewer courses of study than for NPs, would be required to have and maintain 2 licenses (Adult-Gerontology CNS and Pediatric CNS), but they would be restricted to either primary or acute care.18ENA Position The following are the positions of the Emergency Nurses Association (ENA): APRNs are established members of the emergency care team and are critical to the future of quality health care across the US and worldwide. Background The emergency care setting is unique when compared to most other practice settings in that its patient population consists of all ages and all combinations of medical history and chief complaint, rather than a narrow subset of them, as is the case with most other specialties (eg, pediatric oncology, adult cardiology, etc).19 Although some APRNs only treat a subset of the patients in the emergency care setting, for example, only pediatric patients or only adults with urgent or chronic needs, other APRNs are called upon to treat all patients and conditions, from nonemergent, episodic chronic care to acute, complex, life-threatening traumatic and medical conditions.2,20-23 APRNs are licensed and regulated by state law, and reciprocity across state lines is determined by each state. The Consensus Model’s proposal that US states license APRNs as “primary care” or “acute care”

APRNs, along with its stipulation that an APRN only be allowed to expand his or her scope of practice by completing another graduate program of study, stands in contrast to how APRNs are currently licensed and regulated today.24-29 In nearly all states, APRNs are licensed at the role level, and the scope of practice is determined not only by formal education and national certification but by clinical experience as well.30 Degree-granting programs are designed to prepare APRNs for entry-level competency, and postgraduate training after one's formal course of education confers clinical expertise.6,29,31-34 It is, therefore, no surprise that APRNs who are currently providing safe and effective primary and acute care across the country are certified as family nurse practitioners (FNPs), acute care nurse practitioners (ACNPs), Adult NPs, Pediatric NPs, Adult-Gerontological NPs, Adult-Gerontological CNSs, and Pediatric CNSs, among others.15,21,35,36 The Consensus Model has been a powerful force for raising the quality of APRN education and training in the US and has successfully championed full practice authority for APRNs in all states.15 Regardless of the outcome of these and future discussions over whether and how to implement the Consensus Model's definitions of primary care, acute care, and scope of practice, APRNs will continue their long tradition of providing safe, effective care in the emergency care setting, and ENA will remain committed to interprofessional collaboration and advocacy on their behalf.Resources Advanced Practice Registered Nursing Consensus Work Group, The National Council of State Boards of Nursing APRN Advisory Committee.

Traffic safety and older drivers: JEN. (2020). Journal of Emergency Nursing, 46(2), 235-238. doi:https://doi.org/10.1016/j.jen.2019.12.010

Older adults, defined as individuals aged 65 years and older, comprise the fastest-growing segment of the United States population, with a projected increase to 53 million by 2030.1 As the older adult population continues to grow, the number of older drivers will increase.2 It is anticipated that there will be an increase in fatalities and injuries from motor vehicle crashes (MVCs) among older drivers.3 Currently, MVC is ranked as the second leading cause of injury-related death, after falls, among persons 65 years and older.4 Common age-related changes that impact functional abilities, in addition to medical conditions and medications, can heighten an older driver's crash risk.3 A decreased physiologic reserve to respond to injury increases the risk of morbidity and mortality in this population.3 In addition, these normal age-related changes complicate the assessment of older patients with trauma.5 Thus, caring for this special population is a clinical challenge for emergency nurses.5Age-Related Changes and Impact on Driving Safety Aging is associated with declining functional abilities and increased susceptibility to injury in traffic crashes.6,7 Age-related changes in the human body, including the deterioration of sight and hearing and the onset of muscle, joint, and skeletal disorders,5 contribute to an older person's propensity for crash involvement and injury.6 Changes in strength and cognition, medical conditions and comorbidities, and medication effects, which are especially impairing for older drivers, contribute to the decline in some functional abilities and can interfere with the ability to perform driving tasks and navigate complex roadway situations.6,7 Driving is a complex task involving visual, motor, and cognitive skills that may be affected by age-related changes, even with healthy aging.8 These changes may become particularly evident in stressful or complex driving tasks, such as turning left, merging, or changing lanes.6 However, with large individual differences in the onset and degree of functional impairments, it is a driver's performance rather than chronological age that determines fitness to drive.6Cognition and Reaction Times Although older minds can be just as sharp as younger ones, they do react more slowly; moreover, as a person gets older, his or her brain needs more time to process information.8,9 Cognition is the mental function or process of acquiring knowledge and comprehension associated with thinking, understanding, remembering, judging, problem solving, and information processing.8 Cognition involves sensory experiences and memories.8 Furthermore, cognition is the ability to remember information, recognize and respond to traffic signs and pavement markings, or the ability to focus and make sound decisions quickly to avoid a crash.8 Cognition does not act in isolation.9 There is a constant interaction between the physiological system and cognitive performance.9 Declines in physiological performance, such as processing of visual information, exacerbate the effects of aging on cognitive functioning.9 Perceptually, an older driver may have difficulty seeing and determining the speed and distance of the traffic into which he or she needs to merge.9 On the motor function level, older adults may have difficulty turning their necks, instead relying on the side and rearview mirrors to perceive the traffic around them.9 Cognitively, because of declines in attention and working memory, they may have difficulty integrating all the information needed to make a decision on the appropriate time to merge into the traffic flow.9 When they do respond, the response may be slower

than that required by the situation.Visual Impairment With aging, a person experiences visual impairment, including reductions in visual acuity and contrast sensitivity, an increase in glare sensitivity, and reduced peripheral vision.8 These age-related impairments are important for driving as 80% to 90% of traffic-relevant information is sensed through the eyes.8 The most frequent error made by older drivers who are involved in crashes is inadequate surveillance.10 Inadequate surveillance includes looking at but not fully perceiving another vehicle and failing to scan thoroughly at intersections, which could exacerbate problems with information gathering and processing.10Injuries Older adults are at a disadvantage compared with younger people when it comes to their ability to tolerate injury in MVCs.7 Aging results in increased fragility and frailty.7 Fragility refers to the ability to tolerate a physical insult (eg, the ability to tolerate crash forces).7 Fragility increases beginning around middle age and continues to progress with age.6 Frailty is the diminished ability to recover from injuries and resume the level of daily life activity once enjoyed before being injured.7 Age-related fragility and frailty increase the likelihood that an older, crash-involved driver will sustain a fatal or serious injury.3 The more fragile a person, the more severe the injury they will sustain, given similar physical crash conditions.11 In addition, the more frail the driver, the higher the likelihood of death for a given injury.11 Physiological changes associated with aging increase an older driver's susceptibility to injury and, specifically, predispose this population to chest injuries.12 Older drivers are more vulnerable to injury in a crash because skeletal structures are more easily injured, and the consequences of any physical insult are likely to be more serious compared with that in younger drivers in similar crash conditions.7 This increased vulnerability is because the energy required to cause an injury decreases with age due to a loss of mass, strength, and flexibility.5 A similar crash load from an airbag or steering wheel to the chest of a young male may result in a chest contusion or fracture, while it may cause a life-threatening aortic rupture if applied to an older adult.12 Medical conditions, such as osteoporosis, reduce the tolerance of the musculoskeletal system to crash forces and increase the likelihood of sustaining an injury or a more severe injury as a result of MVCs.7 A study exploring injuries in adults aged 65 years and older involved in MVCs found that this population experienced a high frequency of bony structure injuries, such as rib cage and sternal fractures, accompanied by increases in morbidity and mortality.12 These findings may be because of age-related geometric changes occurring in the proportion of rib cage structures, such as the cortical bone and rib slope, which inevitably predispose older adult MVC victims to fractures.11Injury Prevention The expected increase in the number of older drivers on the road is certain to lead to increased injuries and deaths unless emergency health care professionals successfully intervene to prevent harm and prepare for the unique care needs of older adults.13 The main goal of traffic safety and injury prevention in the older adult population is to prevent MVCs and injury. Improvements in vehicle technology, such as side impact protection, lane departure warning, and seat belt design, are helping older drivers walk away from crashes that might have killed their parents or grandparents.3,14 Seat belt designs found in cars before 2006 were reported to cause rib and other injuries to older drivers.15 By 2008, all new car models sold in the US were equipped with pretensioners and load limiters, developed with a deeper understanding of biomechanics and human tolerance limits, making seat belts safer and more effective in restricting an occupant's motion within the vehicle to minimize injurious contact with interior vehicle components and other occupants.15 Seat belt pretensioners retract the seat belt to remove excess seat belt almost instantly on sensing that the vehicle has crashed.15 When forces on the shoulder belt increase compared with the tension in the seat belt above a predetermined level, corresponding to a relatively low risk of injury, load limiters allow the belt to give in or yield while controlling the tension in the belt. Load limiters especially benefit older occupants who are more vulnerable to high belt loads.15 A simple form of a load limiter is a fold sewn into the seat belt webbing. The stitching holding the fold is designed to pull apart when a certain amount of force is applied to the seat belt; as the stitches are ripped out, the webbing unfolds, allowing the occupant slightly greater forward motion.15 Although 3-point seat belts are acknowledged to be highly successful countermeasures for reducing risks of death and injury, seat belt injuries are the primary source of chest injury among elderly occupants.12 The effect of aging is more severe in seat belt loading than in blunt impact force.12 Seat belt force is concentrated on the bone, rather than on the soft tissue.11 As a person ages, the bone deteriorates more rapidly than soft tissue.11 This change does not imply that seat belt use is harmful to older occupants; it just means that seat belts can be a relatively less effective restraint for older adults compared with that for younger occupants.11 Side airbags with head and torso protections, as well as inflatable seat belts found in the rear seats in some vehicles, provide a better benefit to the older adult occupant.16 An inflatable seat belt is a

cylindrical bag that stretches from the buckle to approximately the shoulder of an occupant and is designed to provide additional protection to passengers

Table of contents: JEN. (2020). Journal of Emergency Nursing, 46(2) doi:https://doi.org/10.1016/S0099-1767(20)30014-3

Emergency nursing review questions: March 2020: JEN. (2020). Journal of Emergency Nursing, 46(2), 233-234. doi:https://doi.org/10.1016/j.jen.2020.01.001

The parents state that the baby was doing well at home until experiencing 45-second episodes of lethargy during 2 breast-feeding attempts over the last 4 hours. Correct answer: B Shingles is an acute localized infection caused by the varicella zoster virus. A patient may also have significant coronary artery disease (B) but would not be diagnosed with only the presence of an S4 heart sound.

One stop: Examining the reasons patients use the emergency department for nonurgent care and the barriers they face: JEN. (2020). Journal of Emergency Nursing, 46(2), 163-170. doi:https://doi.org/10.1016/j.jen.2019.08.007

IntroductionDespite the plethora of research on the use of emergency department services for nonurgent primary health care, the vast majority of this research is quantitative in nature. To date, there is little research that reports on the problem from the patients' perspective and/or lived experience, which compromises health care providers' understanding of the essence of the problem as described by the patients. Thus, this study will provide a qualitative description of nonurgent ED visits from the patients' perspective. Specifically, this study answers the following research questions: 1) What are the reasons for patients and/or caregivers visiting the emergency department for nonurgent health conditions? and 2) What are the barriers experienced by patients and/or caregivers when seeking access to health care?MethodsA qualitative descriptive design with face-to-face interviews of 33 consenting participants was conducted at 4 emergency departments. All interviewed participants were triaged as nonurgent patients by the ED personnel.ResultsThree themes surfaced from the data regarding reasons for using the emergency department: 1) Practitioner referral; 2) Efficacy of care; and 3) Time saver. When describing barriers that participants experienced when seeking care outside of the emergency department for their nonurgent conditions, 3 themes that emerged are lack of primary care provider, financial difficulties, and lack of comprehensive care outside the emergency department.DiscussionThe results of the study can help inform patient-centered care and future policy initiatives that will address the practices and barriers contributing to nonurgent ED visits.

Retrospective diagnosis of congenital long QT syndrome in a patient with febrile syncope: JEN. (2020). Journal of Emergency Nursing, 46(2), 214-219. doi:https://doi.org/10.1016/j.jen.2020.01.004

A brief primary survey revealed the following: orbital ecchymosis bilaterally with swelling of the lower lip and small mucosal laceration without active bleeding, c-collar in place, no chest wall tenderness, lungs clear, no heart murmur, mild suprapubic tenderness, and moving all extremities purposefully. Because of his age and head trauma, the patient was quickly expedited to computed tomography where he had his head, cervical spine, and facial bones examined. Follow-up testing concluded that the patient had an underlying congenital long QT syndrome (c-LQTS).Long QT Syndrome Etiology LQTS is a common genetic disorder that predisposes patients to sudden cardiac death, with a prevalence of 1 in 2,000 live births.1 The pathognomonic feature is a prolonged QT or corrected QT (QTc) interval on an ECG, >470 ms in men, >480 ms in women, and oftentimes much longer.2 QT prolongation is associated with a number of important illnesses, such as stroke, myocardial infarction, metabolic derangements, renal failure, and hypothyroidism.3 This prolongation, which functionally represents an elongation of the ventricular repolarization, is common in critically ill patients and is associated with up to a 300% increase in mortality.3 The common pathway of sudden cardiac death secondary to LQTS is the following: Examples include diuretics, which can deplete stores of potassium, and medications with anorexia side effects, which can prevent adequate potassium repletion through diet. ...]syncope in the elderly may be due to TdP as a result of the medical and social etiology, rather than a genetic mutation.Assessment and Monitoring The case presented in this article demonstrates clinician vigilance and vigor needed for diagnosing LQTS prior to the sentinel event, which is death or fatal ventricular dysrhythmia 50% of the time. The Schwartz score uses a combination of ECG findings (QTc interval,

T-wave alternans, notched T waves, and relative bradycardia) and clinical and family histories.10 Depending on the level of suspicion, additional clinical testing includes stress ECG testing, provocative drug testing, Holter monitoring, and sometimes genetic testing on the index case.3 Once a diagnosis is made, molecular genetic testing can be performed to determine the exact abnormality followed by familial cascade screening of first degree relatives.Prevention and Treatment Treatment for LQTS is multimodal and targeted toward both the genotype and phenotype.11,12 First, there is an emphasis on avoiding known triggers including QT-prolonging medications, electrolytes aberrancies, and extra cautiousness during exercise and illness that increase the risk of fever.11 Athletes are recommended to seek consultation from an LQTS specialist before returning to sports.11 Pharmacotherapy includes initiation of a β-blocker, even in most asymptomatic patients, except those with explicit contraindications such as severe asthma, bradycardia, and atrioventricular nodal blockade.11 The mechanism of β-blocker protection against LQTS is its

Instrucciones de alta por video: Effectiveness of video discharge instructions for spanish-speaking caregivers in the pediatric emergency department: JEN. (2020). Journal of Emergency Nursing, 46(2), 180-187. doi:https://doi.org/10.1016/j.jen.2019.11.006

IntroductionAlthough evidence supports the addition of video discharge instructions to improve caregiver knowledge among English-speaking caregivers of children in the pediatric emergency department, there is no evidence about the effectiveness of videos for Spanish-speaking caregivers. The purpose of this study was to test whether Spanish video discharge instructions added to standard written and oral discharge instructions would result in improved knowledge and satisfaction among caregivers compared with written and oral instructions alone.MethodsSpanish videos were created for fever, gastroenteritis, and bronchiolitis. A quasi-experimental, consecutive-sample, pre–post-test design was used with an audio computer-assisted survey platform to provide surveys in Spanish. The intervention group received written and oral instructions + video, whereas the comparison group received written and oral instructions alone.ResultsData were collected from 150 caregivers. Caregivers who were given written and oral instructions + video showed significant knowledge improvement regarding their child's diagnosis and treatment (+19.3% and +23.6%, respectively, among standard participants; $P < 0.001$). Moreover, videos did not significantly improve caregivers' knowledge regarding illness duration and when to seek further care. Regardless of the discharge instruction format, no significant difference was observed in the helpfulness of the instructions (-1%; pre vs post, 84% vs 80%; $\chi 2 = 0.35$; $P = 0.58$).DiscussionStudy results demonstrate that when tailored to reflect diagnosis-specific education, video discharge instructions can improve Spanish-speaking caregiver knowledge about discharge education compared with written and oral instructions alone. Videos can be integrated to standardize the ED discharge process as an adjunct to nurse-provided written and oral instructions with an interpreter for Spanish-speaking families.

Finding funding support for your dissertation research or clinical practice project: JEN. (2020). Journal of Emergency Nursing, 46(2), 263-265. doi:https://doi.org/10.1016/j.jen.2019.11.002