Reducing Inpatient Falls Through Simulations With Symptom Burden Devices

NCPD 1.5 Contact Hours

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ABSTRACT

Background: In-hospital patient falls are a persistent problem in health care, resulting in increased length of stay and nonreimbursable charges.

Local Problem: Although fall prevention programs have decreased inpatient fall rates, our hospital averages 30 falls per month.

Methods: This was a quality improvement project, including a simulation and debriefing. We performed a thematic analysis on the debriefing responses and tracked the inpatient fall rates over 8 months.

Interventions: We developed and implemented a low-cost simulation to allow bedside clinicians to experience the physiological changes experienced by patients, which contribute to inpatient falls.

Results: Fifty-one clinicians participated in the simulation; each expressed an increased understanding in the physical limitations of patients and shared at least 1 technique to help prevent falls for their patient population. The fall rate was reduced by 23.17% in the succeeding 8 months.

Conclusions: Clinicians' awareness of patients' physiological changes can be increased by a low-cost, rapid simulation, resulting in fewer falls.

Keywords: accidental falls, fall prevention, inpatient falls, simulation

In-hospital patient falls present a persistent problem for health care providers. Between 700 000 and 1 million patients fall in the hospital in the United States each year.[1] Over a quarter of these falls result in injury.[2] A single fall can extend a patient's length of stay by 6.3 days and cost $14 000 in nonreimbursable charges.[3] At our 875-bed hospital, robust fall prevention programs have helped decrease inpatient fall rates, but the hospital still averages 30 inpatient falls per month. The purpose of our quality improvement (QI) project was to determine whether leading 51 bedside care providers through a simulation of physiological changes can help these caregivers identify additional strategies to reduce falls.

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BACKGROUND

Hospitals take many steps to mitigate falls, including adopting nonslip socks, screening new patients for their risk of falls, and increasing attention to environmental factors, which lead to falls, such as standing water or uneven flooring.[4] The increased risk of falls due to physical and physiologic changes in patients as they spend time in the hospital may be harder to mitigate through environmental and screening interventions. Risk factors for in-hospital falls include gait instability, acute weakness, new medications, confusion due to noise and change in routine, and injuries.[5,6] Furthermore, many of these changes also increase the need for assistance while toileting, which patients are often unwilling to seek from their care providers.[6,7]

While older adults represent a majority of the falls at our facility, they are not the only patients who fall. Our younger trauma patients fall in-house as well. Many are being prescribed narcotic pain medications for their injuries and may be naïve to the side effects of these new

medications. Patients with traumatic brain injuries or cerebrovascular accident may experience dizziness and acute confusion while the brain heals. Use of mobility devices, various weight-bearing status changes for upper and lower extremities, surgical and injury-related pain and immobility, and the existence of tubes and drains raise the trauma patients' risk of falling significantly.[8]

A main factor contributing to falls in the hospital is simply that patients take on tasks they are accustomed to doing outside the hospital.[9] Patients do not account for their new injuries or an unfamiliar environment, which makes them take on additional unsafe behaviors, leading to an increased risk for falls.

All of these risks can be lessened with the help of attentive and empathetic care from nurses, physicians, patient care technicians (PCTs), and therapy staff.[10] Simulation training can provide professionals the empathy and communication skills needed to help patients understand their own physiological changes.[11] Simulation training involves the use of manikins and scenario-based training to promote teamwork and high-quality patient care.[12] Hollenback et al[13] found that a medical facility was able to reduce their inpatient falls by 54% by using a hospital fall risk simulation to educate staff across the different disciplines.

METHODS

This (QI) program was undertaken in an urban hospital with an American College of Surgeons Level II Trauma verification. The injury prevention nurse led planning and implementation. The simulation was conducted by the members of the Trauma Administration department including the department's manager, research coordinator, nurse clinicians, and registrars. During the planning phase of this project, we received data from the Quality Department to determine which units would most benefit from our intervention. Two medical-surgical units were identified as having high fall rates. These units, Unit A and Unit B, are similar in size and patient acuity levels. They each have 24 beds, comparable numbers of nurses and PCTs, and nurse-to-patient ratios of 1:5 during the day and 1:6 at night. Unit A primarily provides care for stroke patients or patients with neurological injuries; Unit B provides care to patients with traumatic injuries. Both units function as overflow for each other. The nurse managers for both units gave permission to their clinical staff to participate in the simulation, though only the manager for Unit A made participation mandatory.

Our simulation needed to be low-cost and take as little time away from clinicians with patient care duties. Our goals were to spend less than $250 on all materials and to keep clinicians away from their unit for less than 20 minutes. The study protocol was evaluated by our institution review board, who determined that this project does not qualify as human subjects.

Symptom burden devices

The purpose of our project was to provide participants with an opportunity to experience the hospital environment with the same set of symptoms or physical limitations as their patients. We sought to simulate these symptoms through the use of low-cost symptom burden devices, devices that can be donned, doffed, and sanitized quickly. The main symptoms we sought to simulate were vision and hearing impairment, medication-induced dizziness, and limited mobility due to pain or injury. Our symptom burden device design was based on the devices created for the Virtual Dementia Project, adapted for our patient population.[14]

Even mild or correctable vision and hearing impairment can significantly increase the risk of falling.[15] Frequently administered medications, such as opioids, antihistamines, and benzodiazepines, are associated with falls in both the geriatric and nongeriatric hospitalized populations.[16,17] To simulate the effects of dizziness and vision distortion related to these medications, we used alcohol intoxication simulation goggles (Fatal Vision Impairment Simulation Goggles from Innocorp Ltd, which estimates a blood alcohol level of 0.07-0.10).

A patient with hearing loss has a 2.39 times greater odds of falling than a person with normal hearing.[18] To simulate the effects on changes in hearing due to auditory hallucinations related to certain cognitive impairments such as Lewy body dementia, traumatic brain injury, or tinnitus, participants listened to a dementia soundtrack[19] through a set of earbuds. To further simulate the effects of hearing loss, a set of noise-dampening headphones was placed over the ears of each participant.

Reduction in the ability to grasp or move hands due to arthritis or impeded ability to use

Figure. Symptom burden devices: noise canceling headphones, Goggles, ear buds, gloves, shoe inserts, and gait belts. (Photographer: KV).

hands due to casting or splinting of orthopedic injuries can lead a patient to attempt to leave their bed.[20] Simulating this was accomplished by sewing wooden tongue depressors onto the thumb, forefinger, and middle finger of thick cotton work gloves and sewing the ring and pinky fingers together. Symptom burden devices are shown in the Figure (Supplemental Digital Content 1, available at: http://links.lww.com/JNCQ/A807, shows the devices in color). To simulate the effects of foot pain due to peripheral neuropathy or injury, shoe inserts were made from craft beads sandwiched between 2 sheets of plastic wrap, sized to fit into the shoes of the participants.

Simulation

According to a study to identify physical design elements that contribute to potential accidental falls, 4 postures were identified and ranked as significantly associated with falls: turning, grabbing, pulling, and pushing.[21] We developed a series of patient tasks to help simulate each of these postures:

1. Walk to closet, take deck of cards from the pocket of the jacket hanging inside.
2. Walk back to bed, lie back down, and place card deck on bedside table.
3. Pick up call light, turn on TV, and change channel to 20.
4. Open menu, pick an item, call Guest Services to order lunch.
5. After completion, tell the nurse that you need to go to the bathroom.

The simulation activity was divided into 3 components: simulation of patient activities while wearing symptom burden devices, postsimulation debriefing with reflective questions, and sharing collected information with each unit.

Two members of the Trauma Administration department acted as donning coaches, placing the symptom burden devices on each participant. Donning coaches explained the purpose of each piece of equipment. The volume on the dementia soundtrack was adjusted until participants had difficulty hearing instructions being given by the donning coach. The coaches were instructed to speak in a normal tone of voice with their natural speed and cadence. Because we would not be able to sanitize the symptom-burden gloves between participants, each participant wore examination gloves under the symptom-burden gloves. Each participant also wore a gait belt for safety.

The donning coaches led each participant into a mock patient room, set up with a patient bed, table, cabinet, television, and telephone. Each room had a nurse clinician acting as a bedside nurse; they were also instructed to speak to the participants in a normal volume and with their natural speed and cadence. The nurse clinicians directed participants through the series of patient tasks. The nurse clinician then escorted the participant into a room set aside for doffing and debriefing.

Postsimulation debriefing

As participants doffed their symptom burden gear, an investigator asked the following 4 reflective questions and transcribed their responses verbatim:

1. How did the devices impede your ability to perform the tasks as requested?
2. From what you have experienced during this simulation, why do you think your patients fall?
3. Based on your experience today in this simulation, what strategies have you identified that you can add to your practice to reduce inpatient falls?
4. Is there anything you would like to add?

We developed these questions to help participants reflect on their emotional responses to being asked to complete tasks with symptom burden devices. Participants were encouraged to reflect on this experience to better understand how their patients are living and coping in their daily lives. This debriefing took less than 5 minutes for each participant.

Follow-up messaging

Following the simulation, participants were given an infographic, developed by the investigators, which included information specific to their unit and patients (see Supplemental Digital Content 2, infographic, available at: http://links.lww.com/JNCQ/A808). The injury prevention nurse also shared with the managers of each unit representative responses to questions about the simulation and participants' experiences. The managers then disseminated this information to the clinical staff in their units.

Data collected

We collected the verbatim responses to the debriefing questions to perform a thematic analysis of these responses. The hospital's Quality Department provided us the number of patient falls, the number of patient days, and the fall rate per 1000 occupied bed days for the 4 months prior to the simulation and the 8 months after intervention. Each simulation was timed to help ensure a rapid simulation.

RESULTS

All 41 staff members in Unit A participated in the simulation, whereas 3 participated from Unit B. The fall rate per 1000 occupied bed days in Unit A decreased in the 8 months after the intervention by 23.17% (see Supplemental Digital Content Table 1, available at: http://links.lww.com/JNCQ/A809). The rate of falls in Unit B had an increase in fall rate of 106.19%. Based on the times participants signed in and out, participants spent an average of 16.45 minutes in the simulation.

Qualitative analysis

Fifty-one clinical staff members (37 nurses and 14 PCTs) provided responses to the 4 reflective questions during the postsimulation debrief. The responses were analyzed by the authors for recurring themes.

Impediments to activity

The first debriefing question asked participants to directly reflect on how the symptom burden devices affected their ability to complete the simulation tasks. Participants responded with comments about how they were physically and mentally affected. We defined physical responses as any response mentioning an effect on the senses. We subdivided these responses into the following categories: impaired vision, impaired hearing, impaired touch (such as inability to grasp or noting pain), and impaired balance or proprioception. Most participants (n = 45, 88.23%) commented on the physical limitations caused by the symptom burden devices.

We defined mental impediments as any stated change to the participant's psychological state. These responses were further subdivided into the following categories: impaired concentration, mental discomfort, or statement about their independence. A majority of participants (n = 27, 52.94%) noted that the symptom burden devices impacted them mentally as well.

We also noted when participants made a statement about empathizing with patients. Twelve participants (23.53%) expressed empathy in responses to the first question. Sample responses to each category and subcategory are provided in Supplemental Digital Content Table 2 (available at: http://links.lww.com/JNCQ/A810).

Contributions to falls

In question 2, we asked participants to translate their experience in the symptom burden devices to causes for patient falls. Responses were in 3 domains: physical, psychological, and environmental reasons. We defined physical reasons as any effect on the senses. In addition to the subdivisions we made for question 1, we added urinary urgency to the subdivisions. Over half of the respondents (n = 29, 56.86%) noted a physical reason that patients may fall, based on their experience in the simulation.

We defined psychological reasons for patient falls as any mental or psychological reason patients may fall. Responses are subdivided into the following categories: impaired concentration, impatience, and independence. A majority of participants (n = 32, 62.74%) recognized psychological reasons for patient falls.

Finally, we defined environmental reasons for falls as any external influence on a patient that may cause them to fall. We subdivided this theme into the following categories: hospital equipment (eg, beds and call lights), medication, and people (eg, hospital staff or patient families).

A minority of participants (n = 15, 29.41%) noted environmental reasons for patient falls. A summary of responses to question 2 can be found in Supplemental Digital Content Table 3 (available at: http://links.lww.com/JNCQ/A811).

Fall reduction strategies

Question 3 asked participants to apply what they learned and focus on what they, as clinicians, could do to reduce inpatient falls. The responses revolved around awareness of the environment and were in 2 categories: the practical environment and conceptual environment. We used the word "practical" to describe the physical environment that both the patients and the health care providers inhabit together. The physical environment includes patient care equipment, call lights, beds, bathrooms, and alarms. The word "conceptual" was used to describe the more subjective soft skills, such as listening, communicating, and educating, that health care providers use to provide a caring environment for their patients.

The responses for the practical environment all referred to methods to reduce fall hazards in the patient's room. The conceptual environment involves the skills that health care providers use to help patients cognitively and emotionally navigate through their hospitalization. These responses focused on the need for effective communication between the health care providers, patients, and families. Educating the patient and family was the primary theme in this category. A summary of participant suggestions is given in Supplemental Digital Content Table 4 (available at: http://links.lww.com/JNCQ/A812).

Additional comments

We provided a final opportunity for participants to comment on other aspects of the simulation. Approximately half of the comments from respondents (n = 25, 49.02%) reflected empathy as a result of the simulation.

DISCUSSION

Simulation-based clinical education is useful for the experienced health care provider, not just students and novices,[22] and these simulations can help providers develop empathy for their patients' situations.[11] Providing a realistic clinical environment via a mock patient room and using practical scenarios common in the medical-surgical setting may help participants develop a better understanding of the symptom burdens that patients carry. The symptom burden devices affected the participant's ability to navigate the simulation room.

The thematic analysis of the debriefing questions showed that this experience sparked feelings of insight and distress over patient perceptions, while allowing participants the opportunity to develop techniques to better protect patients. Every participant expressed an increased understanding of the physical limitations of their patients and shared at least 1 technique to help prevent falls for their patient population. This increased level of understanding and desire to help changed the behavior in participants as well, as indicated in the reduction in falls in the unit with full participation.

Limitations

This QI project was conducted with participants from only 2 medical-surgical units. Similar simulations are needed in other clinical areas, such as critical care, psychiatry, labor and delivery, and the emergency department, to demonstrate improvements in falls rate hospital-wide. For each area, it would be necessary to develop symptom burden devices germane to the patient population, such as a false pregnancy or devices that imitate the effects of antipsychotic medication. Participants noted that other caregivers may also benefit from this type of training, such as prehospital care providers, housekeeping staff, and nutrition services staff. In the future, we recommend requiring all caregivers and hospital staff receive similar simulation training.

We did not directly measure the participants' levels of empathy in this project nor did we attempt to determine the root cause of every fall that happened after this intervention to determine whether they were preventable falls. Future research would benefit from the addition of measures of empathy for patients.

CONCLUSIONS

A brief and low-cost simulation of patient experiences of their physical limitations helped reduce the fall rate on a medical-surgical unit by 23.17%. These preliminary results provide evidence that this intervention is quick and effective. Our goal is to provide simulation training to the remaining inpatient units within our hospital using the same model and tracking results for a longitudinal, multidisciplinary study.

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