Using Patient Simulation to Promote Best Practices in Fall Prevention and Postfall Assessment in Nursing Homes

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ABSTRACT

Background: Fall-related injuries rise with age and are of particular concern for frail populations living in nursing homes.

Local Problem: The Perley and Rideau Veterans' Health Centre is a large nursing home in Ontario, Canada. In 2019, we conducted internal audits of our Falls Prevention Program and identified notable variations in staff's response to a resident fall.

Interventions: We developed an in situ patient simulation program of a resident fall.

Methods: This was a mixed-methods evaluation of participants' perspectives of a simulation-based interprofessional education program for fall prevention.

Results: Participants indicated high-level support for simulation-based learning, with more than 80% of the participants expressing that they will apply these skills in the future when caring for a resident who falls.

Conclusions: Our findings indicate that simulation-based training is well received by frontline workers in a nursing home setting and can be conducted as part of a typical shift with minimal disruption to resident care.

Keywords: falls, interprofessional education, nursing homes, patient simulation

Fall-related hospitalizations and mortality rate rise with age.[1] In fact, it is one of the leading causes of injury-related hospitalizations among seniors.[2,3] In long-term care settings, such as nursing homes, where more than half of the residents are older than 85 years at the time of admission,[4] falls and fall-related injuries are a pervasive concern. Nearly half of the residents in nursing homes experience at least one fall annually[5,6]; this is twice the rate of older persons living in the community.[7,8] Furthermore, previous research have found that 40% of residents with a history of a fall are likely to fall twice or more in the same year.[9,10] In Ontario, Canada—the setting for this educational intervention—the prevalence of falls among residents in nursing homes was 17% in 2018.[11]

The prevention of fall-related injuries can be achieved through enhanced education around fall prevention for clinical care staff as well as improved safety-related practices within nursing homes.[12] For example, in the latest Clinical Best Practice Guideline on fall prevention published by the Registered Nurses' Association of Ontario, nursing assessments for fall risk and having postfall discussions or huddles were highlighted as effective strategies to prevent future falls and fall-related injuries.[13,14] However, these assessments and postfall huddles are not always or consistently performed in clinical settings.

One approach to enhance education for health care professionals is through patient simulations.

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Simulation-based educational interventions typically involve 1 or more of these modalities: partial-task trainers, standardized patients, full-body task trainers, and high-fidelity manikins.[15] In a resource-constrained environment, such as nursing homes, high-fidelity simulations[16] using life-sized computerized manikins with realistic anatomical features may be less feasible than in academic environments or acute care settings. A lower-cost hybrid approach,[17] using a trained actor representing a standardized patient—enacting a scripted scenario—and available technology may be a cost-effective way to support continuing education of nursing home staff. Research on the effectiveness of hybrid simulations has been shown to be effective in a variety of clinical settings and, specifically, for education on fall prevention.[14,18,19] In a study by Hollenback et al,[19] the researchers found that a medical facility was able to reduce its inpatient falls by 54% by using a hospital fall risk simulation to educate staff across the different disciplines. Simulation-based training has the potential to reinforce health care professionals' compliance with existing policy and procedures and creates an opportunity to introduce evidence-based strategies when caring for a resident immediately after a fall and planning future fall prevention interventions. In addition to the impact it has on clinical care, simulation training has been found to promote interdisciplinary communication and teamwork.[20]

The Perley and Rideau Veterans' Health Centre (Perley Rideau) is a large, 450-bed nursing home in Ontario that services both aging Canadian veterans and civilians. In 2019, we conducted internal audits of the Falls Prevention Program at Perley Rideau and identified variations in practice related to staff's response to a resident fall, in terms of participation as well as the identification of contributing factors related to the fall. As such, the organization decided to undertake initiatives to improve standardization in care that are measurable and will contribute to quality care and patient safety.

An in situ fall simulation training program was designed by the Fall Prevention Quality Improvement (QI) Plan Team at Perley Rideau to create a learning opportunity that differed from existing online learning modules. Specifically, we utilized a learning approach involving patient simulation that promoted best practices in fall prevention within a long-term care environment. The program was led by a registered nurse (RN) who held a formal leadership role within the organization and had completed a weeklong certification program in simulation creation and design.

METHODS

Study design

This was a mixed-methods evaluation of participants' perspectives of a simulation-based interprofessional training program. Specifically, we designed a survey to capture narrative data from open-ended responses and applied quantitative methodology to analyze Likert response items in the survey.

Simulation-based training

The simulation was designed using the Simulation Scenario Development Template developed by SIM-One,[21] a not-for-profit organization that connects the simulation community, facilities, resources, and services across Canada. The learning objectives of the simulation were created in collaboration with the Fall Prevention QI Plan Team. We designed a patient simulation program using a standardized patient modality.

Simulation setup

The Fall Prevention QI Plan Team selected nurse actors (an RN and a registered practical nurse) to role-play as the simulated resident in the scenario. Selection was based on scheduling flexibility and experience in QI and staff education and demonstrated leadership at the point of care. To prepare for the simulation, the selected nurses were educated on the objectives and provided a script of the scenario. They received 2 training sessions prior to their first simulation. Only one actor was required per simulation, as such the role was filled on the basis of the availability of the actor at the time of the scheduled simulation training. The lead nurse of our simulation design team took the role of observer and facilitator for each of the simulations.

Fall simulation

Over the span of 5 months (July-December 2019), we conducted 27 simulations on 13 units within the nursing home across day (13 simulations), evening (11 simulations), and night shifts (3 simulations). The structure of the simulation-based education activity included a prebrief

(5 minutes), the fall simulation (7-10 minutes), and a debrief (7-10 minutes).

A prebriefing is a discussion prior to the simulation-based training activity that provides instructions to participants in order to establish a psychologically safe environment. Because our simulation design reflected the spontaneity of a real-life fall and it aimed to minimize the amount of time participants spent away from their regular duties, prebriefing could not occur immediately before our simulation. Instead, we chose to prebrief our participants in 2 ways:

1. We sent a general written communication through routine organization communication pathways to all nursing team members. This communication outlined the simulation objectives, scenario, time allotment, participant roles, environment, and expected etiquette. This was meant to raise awareness of the simulations that would be occurring during the months of July to December. We re-sent the communication approximately every 2 months, as a reminder, during this period.
2. Then, on the day of the scheduled simulation, we held a short, in-person prebriefing at the start of the shift on the specific unit in which the simulation would be occurring. The same information from the email was shared again with all team members working that day. They were then informed that the simulation would occur during their shift, though the specific time was not revealed. These in-person prebrief discussions were led by the lead nurse or a selected nurse actor.

It was emphasized in both prebriefings that participation was expected of all staff members within the vicinity of where the simulation took place on the unit. The expectation of participation in the simulation was also supported in messaging from supervisors and managers on the units during the 5-month planning period.

The simulation environment was discreetly set up 10 to 15 minutes prior to the start of the simulation by the lead nurse and the nurse actor. The physical location of the simulation varied by unit and included spaces such as vacant resident rooms, reading lounges, dining rooms, and television areas. All spaces were physically on the units and represented actual resident living quarters. Details of the simulation are summarized and presented in Supplemental Digital Content, Figure 1 (available at: http://links.lww.com/JNCQ/A907).

The lead nurse's role was to observe the participants' response to the fall and take note of successes and opportunities for improvement in order to prepare discussion for the debrief. Successes and opportunities for improvement were identified on the basis of how closely the participant responses met the simulation objectives and reflected best practices in fall prevention. The lead nurse did not engage with staff members during the simulation. The simulation was declared over when one of 3 conditions were met: (1) the timer reached 10 minutes; (2) the participant team completed all phases of the simulation; or (3) the participant team had encountered significant challenges and could not carry forward in the activity despite subtle prompts from the actors.

Following the simulation, the lead nurse led the debrief discussion with the participants and utilized a blended approach to facilitation.[22] The nurse actors were also invited to the debrief to share their observations from the perspective of a resident. The debrief[23] consisted of 3 phases: the reaction phase, where participants were given an opportunity to share their thoughts and react to their experience in the simulation; a description phase, where the observer and participants briefly described the purpose of the simulation; and, finally, an analysis phase, where a deeper examination of the participant response to the fall occurred.

The average length of time of the simulation exercise, including both the simulation and the debrief discussion, was 16.3 ± 3.7 minutes and ranged between 10.0 and 23.3 minutes. This was based on data capturing the duration of 16 of 27 simulations (or 59.3%).

Simulation participants

A total of 94 frontline staff members participated in the simulations, including 18 RNs, 38 registered practical nurses, and 38 nurse aides (also known as personal support workers in Canada). Since some staff members work on multiple units and shifts, 2 participants partook in simulation training twice.

Postsimulation survey

Following each simulation, we administered a postsimulation survey to all participating team

members. The survey comprised 5-point Likert scale questions, ranging in response options from 1 (very bad) to 5 (very good), as well as open-ended questions regarding what the participant had learned (ie, "Describe 2 things that you learned from this simulation.") and the application of their learning (ie, "How do you plan to use the information you learned from this simulation in your practice?"). A copy of the Post Fall Simulation Evaluation Form can be found in Supplemental Digital Content, Figure 2 (available at: http://links.lww.com/JNCQ/A908).

Data analysis

Our analysis included data collected from 27 completed simulations. An additional 3 simulations were started but were not completed because of a resident emergency on the unit. Data from the incomplete simulations were not included in the data analysis. We descriptively analyzed the scale-based questions on the survey by presenting the percentage of participants who responded "good" or "very good" on the Likert scale questions. We performed inductive content analysis of the open-ended questions pertaining to the participants' learning and the anticipated application of their simulation-based training. One of the study's authors led the analysis by first summarizing the responses into meaningful units such as words, phrases, or sentences and then identifying key codes inductively. We only analyzed the manifested content without interpreting the latent intentions of the respondents' written text. Subsequently, 2 of the authors (D.J.A., A.T.H.) sorted and grouped the codes into major themes based on the frequency of their reoccurrence in the open-ended responses.

RESULTS

Participants' evaluation

In total, 69 of 94 participants (73.4%) responded to our postsimulation survey. As shown in the Figure, respondents indicated high-level support for simulation-based learning. Of the 69 survey respondents, 98.5% had a good (20.6%) or very good (77.9%) perception of the simulation. Similar scores were observed on Likert scale items measuring the participants' assessment of the quality of the simulated environment (97.1% responded good or very good), quality of postsimulation debrief (98.5% responded good or very good), relevance of the simulation to their own clinical practice (98.5% responded good or very good), and value of simulation as a learning strategy (98.5% responded good or very good).

Among the key learnings identified from the open-ended responses, the importance of a postfall assessment (eg, an assessment of injuries), postfall huddle, and potential interventions that could be introduced to prevent future falls were

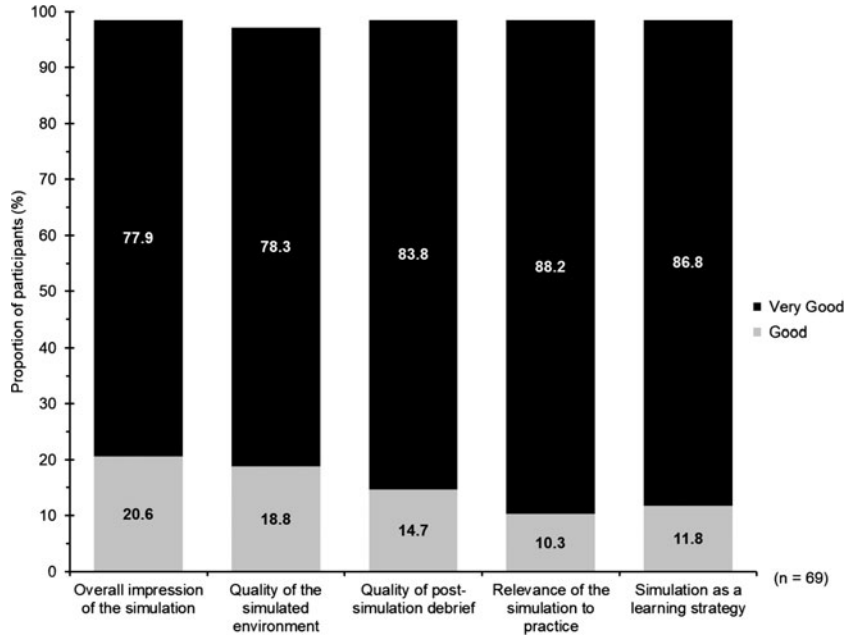

Figure. Percentage of participants who responded "good" and "very good" in each domain on the postsimulation evaluation survey.

the most commonly identified themes. These were reported by 53.7% (29 of 54 responses), 29.6% (16 of 54 responses), and 16.7% (9 of 54 responses) of the participants, respectively.

With respect to the open-ended question pertaining to the application of their learning, 81.6% (40 of 49 responses) indicated that they will apply their knowledge by "us[ing] this simulation as a future reference if someone falls" and "complet[ing] a more detailed assessment post-fall."

Finally, while most participants expressed that the training was sufficient and helpful in its current format, some identified opportunities to improve the reach of this program. For example, many indicated that the simulation training should be extended to all team members on their floor or unit and need to be conducted more frequently.

DISCUSSION

In this evaluation, we assessed a fall simulation training program designed by the Fall Prevention QI Plan Team at Perley Rideau. Our findings indicate that simulation-based training is well received by frontline workers in a nursing home setting and can be conducted as part of a typical shift with minimal disruption to resident care. Furthermore, through this process of designing and implementing our patient simulation, we observed improved interprofessional communication and teamwork among staff members. This also created opportunities to further the leadership and educational skills among experienced nurses within our organization.

Clinically, the results of this study have significant implications. While it is known that frail, older adults residing in nursing homes are at a high risk for falls, postfall nursing assessments, huddles, and preventive interventions are not always operationalized in routine care. As a result, the number and proportion of falls among residents in nursing homes continue to rise. A comprehensive assessment that identifies modifiable risk factors to prevent future falls and guides the selection of appropriate interventions for this population is vital to risk minimization. Indeed, these were the dominant themes found in our evaluation, where more than half of the participants had identified a postfall assessment as one of their key learnings.

The fundamental theories supporting simulation learning were reflected in the participants' responses to their experience, as indicated by their recommendation for more hands-on practice and recognition of the importance of debriefing. Simulations, as a type of experiential learning, offer opportunities to expand the variety of learning modalities that are offered in a clinical environment to enhance the education experience of frontline workers. In this evaluation, we have demonstrated the feasibility of a hybrid simulation in a resource-limited environment. The observations from our evaluation support the predominantly hands-on learning process emphasized in experiential learning theories in nursing.

Furthermore, this approach is well aligned with existing evidence indicating that the provision of feedback (eg, through the postsimulation debrief), repetitive practice, and curriculum integration within a real-world care setting are key features of effective learning. According to the International Nursing Association for Clinical Simulation and Learning, the purpose of the debrief—which is a reflective process immediately following a simulation that is led by a trained facilitator using an evidence-based debriefing model—is to transfer learning from the simulation to future situations.[24] While postfall debriefs or huddles are known to be effective strategies to prevent future falls and fall injuries,[13,14] they are not always performed in clinical settings. Through this simulation training, we created an opportunity to reintroduce and reinforce the importance of postfall huddles and fall risk assessments involving all members of an interprofessional team as part of the process. Not only did the participants in our program find the postsimulation discussion to be of high quality, more than 80% of the participants further expressed that they will apply these skills in the future when caring for a resident who falls.

While we were able to identify variations in practice related to staff's response to a resident fall in a prior audit of our organization, our experience from this simulation demonstrated that quantitative audits do not provide the depth of insight that is required to improve fall prevention or education around fall prevention. Although some participants found it intimidating to be observed by the lead nurse, this approach provided an opportunity for frontline staff to receive more informed and personalized feedback regarding their response to a fall, which will likely yield better retention of knowledge. This also

provided opportunities for the identification of additional staff learning needs and challenges with equipment.

CONCLUSIONS

The use of simulation in health care has increased exponentially as the method has been shown to be of value for patient safety. While they are typically provided in academic settings, our evaluation demonstrate that they can be feasibly designed and implemented in low-resource clinical settings, such as nursing homes. The results from this evaluation suggest simulation-based training for fall prevention was positively received by frontline staff in a nursing home and many found the training to be valuable. Examining the nursing home workers' perspectives of this program has provided insight into how simulation experiences can influence learners' self-perceptions of confidence and their likelihood to apply the knowledge gained in future clinical practice.

REFERENCES

1. Peel NM. Epidemiology of falls in older age. *Can J Aging*. 2011;30(1):7-19. doi:10.1017/S071498081000070X
2. Stinchcombe A, Kuran N, Powell S. Seniors' falls in Canada: second report: key highlights. *Chronic Dis Inj Can*. 2014; 34(2/3):171-174.
3. Canadian Institute for Health Information. *Falls and vehicle collisions top causes of injury hospitalizations for seniors*. Canadian Institute for Health Information website. Published 2019. Accessed January 5, 2021. https://www.cihi.ca/en/falls-and-vehicle-collisions-top-causes-of-injury-hospitalizations-for-seniors
4. Ng R, Lane N, Tanuseputro P, et al. Increasing complexity of new nursing home residents in Ontario, Canada: a serial cross-sectional study. *J Am Geriatr Soc*. 2020;68(6):1293-1300. doi:10.1111/jgs.16394
5. Gryfe CI, Amies A, Ashley MJ. A longitudinal study of falls in an elderly population: I. Incidence and morbidity. *Age Ageing*. 1977;6(4):201-210. doi:10.1093/ageing/6.4.201
6. Tinetti ME. Factors associated with serious injury during falls by ambulatory nursing home residents. *J Am Geriatr Soc*. 1987;35(7):644-648. doi:10.1111/j.1532-5415.1987.tb04341.x
7. Campbell AJ, Borrie MJ, Spears GF. Risk factors for falls in a community-based prospective study of people 70 years and older. *J Gerontol*. 1989;44(4):M112-M117. doi:10.1093/geronj/44.4.m112
8. Tinetti ME, Speechley M, Ginter SF. Risk factors for falls among elderly persons living in the community. *N Engl J Med*. 1988;319(26):1701-1707. doi:10.1056/NEJM198812293192604
9. Aronow WS, Ahn C. Association of postprandial hypotension with incidence of falls, syncope, coronary events, stroke, and total mortality at 29-month follow-up in 499 older nursing home residents. *J Am Geriatr Soc*. 1997;45(9):1051-1053. doi:10.1111/j.1532-5415.1997.tb05965.x
10. Kiely DK, Kiel DP, Burrows AB, Lipsitz LA. Identifying nursing home residents at risk for falling. *J Am Geriatr Soc*. 1998;46(5):551-555. doi:10.1111/j.1532-5415.1998.tb01069.x
11. Health Quality Ontario. Long-term care home residents who fell. Health Quality Ontario website. Accessed January 5, 2021. https://www.hqontario.ca/System-Performance/Long-Term-Care-Home-Performance/Falls
12. Ray WA, Taylor JA, Brown AK, et al. Prevention of fall-related injuries in long-term care: a randomized controlled trial of staff education. *Arch Intern Med*. 2005;165(19): 2293-2298. doi:10.1001/archinte.165.19.2293
13. Grainger L, Amin K, Watkins D. Simulation-based training to teach nurses skills in falls assessment and prevention. *Nurs Older People*. 2019;31(1):36-38. doi:10.7748/nop.2019.e1071
14. Kiegaldie D, Nestel D, Pryor E, et al. Design, delivery and evaluation of a simulation-based workshop for health professional students on falls prevention in acute care settings. *Nurs Open*. 2019;6(3):1150-1162. doi:10.1002/nop2.318
15. Kim J, Park JH, Shin S. Effectiveness of simulation-based nursing education depending on fidelity: a meta-analysis. *BMC Med Educ*. 2016;16:152. doi:10.1186/s12909-016-0672-7
16. Hanshaw SL, Dickerson SS. High fidelity simulation evaluation studies in nursing education: a review of the literature. *Nurse Educ Pract*. 2020;46:102818. doi:10.1016/j.nepr.2020.102818
17. Brown WJ, Tortorella RAW. Hybrid medical simulation—a systematic literature review. *Smart Learn Environ*. 2020; 7(16):1-16. doi:10.1186/s40561-020-00127-6
18. Marken PA, Zimmerman C, Kennedy C, Schremmer R, Smith KV. Human simulators and standardized patients to teach difficult conversations to interprofessional health care teams. *Am J Pharm Educ*. 2010;74(7):120. doi:10.5688/aj7407120
19. Hollenback R, Simpson A, Mueller L. Falls simulation room: do you see what your patient sees? *Nursing*. 2017;47(9):65-67. doi:10.1097/01.NURSE.0000522020.45924.3a
20. Aebersold M, Tschannen D. Simulation in nursing practice: the impact on patient care. *Online J Issues Nurs*. 2013; 18(2):6.
21. Simulation Canada. Home page. Accessed March 9, 2020. https://www.sim-one.ca
22. Eppich W, Cheng A. Promoting Excellence and Reflective Learning in Simulation (PEARLS): development and rationale for a blended approach to health care simulation debriefing. *Simul Healthc*. 2015;10(2):106-115. doi:10.1097/SIH.0000000000000072
23. Fanning RM, Gaba DM. The role of debriefing in simulation-based learning. *Simul Healthc*. 2007;2(2):115-125. doi:10.1097/SIH.0b013e3180315539
24. INACSL Standards Committee. INACSL standards of best practice: Simulation^{SM} participant evaluation. *Clin Simul Nurs*. 2016;12(suppl):S26-S29. doi:10.1016/j.ecns.2016.09.009