Integrating Simulations Into Perioperative Education for Undergraduate Nursing Students

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ABSTRACT

Incorporating high-fidelity simulations into an undergraduate nursing program's perioperative elective course capitalizes on students' active learning. Simulations allow students the opportunity to assess and participate in clinical scenarios, apply standards, and demonstrate correct nursing actions without compromising patient safety. Incorporating a high-risk, low-volume malignant hyperthermia simulation experience into the undergraduate nursing curriculum emphasizes active learning and provides an opportunity for students to experience an uncommon emergency perioperative event. A high-fidelity malignant hyperthermia simulation links a scenario with course content, incorporates didactic information from previous courses, and emphasizes the importance of debriefing. *AORN J* 103 *(February 2016) 212.e1-212.e5.* © *AORN, Inc, 2016. http://dx.doi.org/10.1016/j.aorn.2015.12.017*

Key words: *simulation, malignant hyperthermia, perioperative education, debriefing, QSEN.*

High-fidelity simulations allow nursing faculty members to assess a student nurse's ability to assess, intervene in, and evaluate patient scenarios. Gredler[1] defined simulation as an evolving case study in which the participants undertake specific roles and work through the problems, issues, and challenges that develop during the simulated scenario.

In perioperative nursing practice, malignant hyperthermia (MH) is a high-risk, low-volume anesthetic emergency. Very few student nurses have the opportunity to care for a surgical patient with MH. Therefore, fidelity simulation can be used to allow every student to experience a high-risk, low-volume MH emergency.

BENEFITS OF HIGH-FIDELITY SIMULATION

Simulations have been successfully used in undergraduate nursing education since the 1950s and are increasingly used in many nursing program courses.[2-4] Simulators range from low-technology to high-fidelity mannequins that can closely mimic patient situations. Low-fidelity simulators are basic mannequins that allow students the opportunity to practice basic psychomotor skills.[5] In contrast, high-fidelity simulators are able to replicate a patient's response to changing clinical conditions through computerized technical capabilities.[6] Many students increase knowledge retention when using active learning strategies such as simulation.[7] The incorporation of simulation-based learning into the nursing curriculum provides a consistent patient experience for teaching and an active learning mechanism for a group of students.[8] Simulation exercises can facilitate team training, decision making, communication, and situational awareness to enhance patient safety.[9] A simulated environment allows participants to learn, assimilate information, and even make mistakes without harm to a patient, increasing confidence and competency in nurses.[10]

High-fidelity simulation is the use of predeveloped patient scenarios with computerized mannequins that respond to the

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treatments and interventions of the learner, providing an active learning experience with instant feedback.[4] This type of simulation is a close approximation of the realism encountered with actual patients. The computerized mannequins used in these high-fidelity simulations resemble the human body in appearance and can mimic physical findings: blood pressure, heart and lung sounds, and pulses throughout the body.[11]

An important aspect of nursing education is the incorporation of Quality and Safety Education for Nurses (QSEN) competencies into student learning situations and experiences. These competencies were redefined in 2007 to create a new mind-set for nurses' knowledge, skills, and attitudes in regard to quality and safety for patients in today's complex health care environment.[12] The QSEN competencies applicable to the perioperative simulation of MH include patient-centered care, teamwork and collaboration, safety, quality improvement, and evidence-based practice. By identifying these QSEN competencies, nursing faculty members can successfully plan, implement, and evaluate quality and safety topics in the MH simulation experience.[13]

Another benefit of simulation is that the knowledge of perioperative nurse preceptors can facilitate active learning with perioperative student nurses. The role of the perioperative nurse as mentor and facilitator benefits the student nurse in assimilating the professional role of the nurse.[7]

FINANCIAL CONSIDERATIONS

High-fidelity simulators range in cost from $29,000 to $75,000. These simulators can be used for multiple simulation experiences, and these scenarios may also be beneficial for perioperative staff nurses. Local hospitals can collaborate with college of nursing faculty members in presenting perioperative simulations. The use of actual ORs in non-prime time operating time can enhance the realism of the scenarios.

THEORETICAL FRAMEWORK

The Nursing Education Simulation Framework devised by Jeffries was the framework we followed as we developed the MH simulation. This framework links five concepts: *educational practices, teacher, student, design characteristics of the simulation,* and *outcomes.* Active engagement of students in a simulation with multiple components meets the needs of diverse learner types: tactile, kinesthetic, auditory, and visual.[7]

LaFond and Van Hulle Vincent support the use of the Jeffries simulation framework in directing nursing education. The framework supports positive student outcomes from simulation experiences. The National League of Nursing/Jeffries Simulation Framework (NLN/JSF) supports active learning with feedback and debriefing as an essential component of simulation design.[14] Student nurses engaged in high-fidelity simulations experience active learning.[7]

SIMULATION STRATEGY

The baccalaureate nursing faculty members from the College of Nursing and Health at Wright State University, Dayton, Ohio, developed, implemented, and evaluated an MH simulation experience for the perioperative elective course. This simulation was staged in a mock OR with the perioperative patient undergoing an exploratory laparotomy. A critical component of the simulation was the opportunity for all nursing students to experience the same learning activity. Using the mock OR offered a realistic, hands-on learning environment. The objective criteria used to guide the progression and execution of the MH simulation were

- identification of assessment abnormalities,
- effective participation in an interdisciplinary team,
- application of appropriate infection control standards and safe care, and
- demonstration of correct nursing actions to safely and appropriately execute nursing assessment and intervention responsibility.

Equipment Requirements

To facilitate the MH crisis, the learning resource center set up a mock OR with a high-fidelity simulator. The simulation coordinator nurse, in collaboration with the perioperative course faculty member, created the MH simulation. The MH simulation was loaded into the simulator, and the resource center coordinator acted the part of the anesthesia provider controlling the simulator. The high-fidelity simulator was connected to the monitor with visual and audible tones. The MH scenario progressed, adapting to actions taken by the undergraduate students.

Learning Environment

The simulation in the mock OR was scheduled during regular class hours, using the laboratory learning resource center. Clinical faculty members who hold CNOR certification led the simulation experience. Students assumed assigned perioperative roles in the simulation. These roles included circulating nurse, OR nurses arriving to assist in the crisis, and scrub nurse.

The students performed assessments and intervention skills. The simulation was designed and developed so that students