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Featured Article

Medication Safety Simulation to Assess Student Knowledge and Competence

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KEYWORDS

patient safety;
simulation;
medication
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Abstract

Background: Medication administration is an important part of the nurse's role. Students and new nursing graduates often lack knowledge and competency to safely administer medications. Simulation can facilitate student learning about medication safety.

Purpose: This simulation intervention study tested the differences in knowledge, competency, and perceptions of medication safety between students who did and did not participate in safety enhanced medication administration simulations.

Method: This was a two-group pretest-posttest design. Participants completed the Medication Safety Knowledge Assessment (MSKA) and the Healthcare Professionals Patient Safety Assessment (HPPSA) pretests at the start of the semester. The control group participated in the usual simulations/debriefings; the intervention group participated in one additional medication administration simulation, as well as medication safety enhanced simulations. During the final simulation of the semester, participants' competency in medication administration safety was rated using the Medication Safety Critical Element Checklist (MSCEC). All participants completed the MSKA and HPPSA posttests.

Results: Data for the MSKA were analyzed using a Knowledge Pass/Fail cut score of 21 correct answers or more to pass. The HPPSA scores were analyzed using *t* tests and MSCEC between groups scores were compared. There were statistically significant differences in student knowledge (MSKA) and competency (MSCEC) for students who participated in the medication safety enhanced simulations.

Conclusions/Implications: Medication safety is essential to ensuring patient safety; it is important to ensure that nursing graduates are well-prepared to provide safe care. Outcomes of this study support the evidence that simulation is an effective strategy to improve student learning.

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The seminal Institute of Medicine (IOM) report urged a greater focus on the quality of health care provided in the United States (Kohn, Corrigan, & Donaldson, 2000). Despite this report, less than a decade ago, medical errors were still the eighth leading cause of death in the United

States with at least 1.5 million preventable medication errors costing \$17 billion annually (Chenot & Daniel, 2010; Durham & Alden, 2008). Around this same time, the IOM (2010) published a new report calling for the transformation of nursing education to improve the quality of care in nursing (Benner, Sutphen, Leonard, & Day, 2010). Despite this call for reform, medical errors continue to soar and are now estimated to be the third leading cause of death in the United States (Makary, 2016). Nurse fac-

ulties are faced with the challenge of using best educational practices to incorporate critical quality and safety concepts into the classroom and clinical settings.

students and new graduate nurses have deficiencies in safely administering medications. These performance deficits include error identification (Henneman et al., 2010; Whitehair, Provost, & Hurley, 2014), verifying essential steps of safe medication administration (Elliott & Liu, 2010; Schneidereith, 2014), patient identification (Wolf et al., 2006), and medication calculation for correct dose administration (Wolf et al., 2006; Zahara-Such, 2013). Furthermore, nursing students lack adequate clinical judgment, including problem recognition and reporting of essential clinical data (Sherwood & Barnsteiner, 2012), to safely administer medications. This problem with students' lack of knowledge, skills, and clinical judgment about safe medication administration was the foundation for conducting this study.

The use of clinical simulation is supported by the IOM (Benner et al., 2010; Kohn et al., 2000) as one strategy to improve patient safety and support the transfer of learning to the clinical setting. Simulation is an evidence-based pedagogy that facilitates the learning of important aspects of safety and quality patient care (Henneman et al., 2010; Jeffries et al., 2004; Sears, Goldsworthy, & Goodman, 2010). Simulation affords the opportunity for students to demonstrate clinical judgment and make decisions in a safe environment while witnessing the consequences and evaluating the effectiveness of their actions (Benner, 2001; Benner et al., 2010; Lasater, 2007). Zimmerman and House (2016) suggested that simulation might represent the most useful strategy to decrease medication errors.

Key Points

- Safe medication administration is critical to patient safety.
- Simulation can be an effective strategy to enhance students' knowledge about safe medication practices.
- Knowledge and competence can be improved through a medication safety enhanced simulation-based learning experience.

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Background

Medication administration is a key nursing responsibility directly affecting the quality and safety of patient care. Medication administration includes not only the skill of administering medications but also applying clinical reasoning, utilizing information technologies, and navigating the complexity of the health care system. Evidence (Sulosaari, Kajander, Hupli, Huupponen, & Leino-Kilpi, 2011; Wolf, Hicks, & Serembus, 2006) demonstrates that

Literature Review

Few studies in the nursing education literature explore the use of simulation associated with safe medication administration. Radhakrishnan, Roche, and Cunningham (2007) reported no difference in medication errors between senior baccalaureate nursing students who participated in simulation, in addition to clinical experiences, and those students who did not participate in simulation. However, patient

Table Study Design: Timing of SBLE and Data Collection

Time in Semester	Control Group	Intervention Group
Beginning	HPPSA and MSKA pretest	HPPSA and MSKA pretest
Beginning	Medication skill laboratory (DML debriefing)	Medication skill laboratory (MSE DML debriefing)
Middle	—	Two patient medication administration SBLE (MSE DML debriefing)
End	GI and postop hip SBLE (DML) MSCEC	GI and postop hip SBLE (MSE DML) MSCEC
End	HPPSA and MSKA posttest	HPPSA and MSKA posttest

Note. DML = Debriefing for Meaningful Learning; GI = gastrointestinal; HPPSA = Healthcare Professional Patient Safety Assessment; MSKA = Medication Safety Knowledge Assessment; MSE = medication safety enhanced; MSCEC = Medication Safety Critical Element Competency Checklist; postop = post-operative; SBLE = simulation-based learning experience.

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