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Featured Article

High-Fidelity Patient Simulation to Evaluate Student Nurse Patient Safety Competency

Amy H. Lee, DNP, MSN, RN[a,*,1], Carol Kelley, PhD, RN, AGNP-BC[b], Celeste M. Alfes, DNP, MSN, RN, CNE, CHSE[b], Linda K. Bennington, PhD, RN[a], Mary A. Dolansky, PhD, RN, FAAN[b]

[a]*Old Dominion University School of Nursing Health Sciences Building, Norfolk, VA 23529, USA*
[b]*Case Western Reserve University-Frances Payne Bolton School of Nursing, Cleveland, OH 44106, USA*

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patient safety;
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Abstract

Background: Nurse educators are challenged to find innovative methods to help nursing students develop and remember fundamental skills while ensuring patient safety. Virtual reality (VR) headgear and custom haptic technology combined with game-based learning principles may provide an innovative approach to promoting mastery learning and retention.

Method: This mixed methods pilot study explored the usability of, and user reaction to, a game-based VR system designed to practice urinary catheterization. Time on task and number of procedures completed in one hour were compared to subjects that practiced traditionally, using a task trainer with faculty oversight. Follow-up skill demonstration was compared two weeks post-practice session.

Results: Subjects (n = 20) rated usability of the VR system favorably; they also rated practicing catheter insertion this way as highly engaging and enjoyable. Subjects using the VR system spent more time practicing ($p = .001$) and completed more procedures in one hour than students that practiced traditionally ($p < .001$). Follow-up skill demonstration pass rates between groups were identical at two weeks.

Conclusion: Practicing nursing skills using game-based VR may be an effective way to promote mastery learning and retention.

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Background

In 1999, *To Err is Human: Building a Safer Health System* was published claiming that as many as 98,000 Americans were dying each year from medical error (Institute of Medicine [IOM], 1999). This landmark report provided

[1]Permanent address: 5107 Turnberry Court, Suffolk, VA 23435, USA. Tel.: +1 757 373 9371. ahlee0817@gmail.com.

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* Corresponding author: ahlee@odu.edu (A. H. Lee).

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the impetus for the current patient safety movement. The Robert Wood Johnson Foundation in partnership with the IOM later identified nurses as being uniquely positioned to impact safe patient care. To prepare future nurses for this task, schools of nursing have been charged by the IOM to improve patient safety content in all curricula (IOM, 2010). To assist faculty with this effort, the Quality and Safety Education for Nurses Project translated the IOM quality recommendations into nursing practice competencies to facilitate student nurses to have the knowledge, skills, and attitudes (KSAs) necessary to provide high quality and safe patient care (Cronenwett et al., 2007). The competencies provide a foundation for faculty to integrate contemporary quality and safety concepts into the nursing curriculum. Evaluation of learning is an essential step to ensure competency in these safe patient care tenants throughout the curriculum. Evaluation data can help faculty determine whether the student nurse has developed a basic foundation of patient safety knowledge and skill to allow him/her to enter the profession ready to practice safely (Barnsteiner et al., 2013).

Key points

- High-fidelity patient simulation can provide a realistic patient care situation to evaluate student nurse basic safe patient care competencies.
- There was no statistically significant difference ($p < .05$) between previous health care experience, age, and high-fidelity patient simulation performance with the competencies of introduction, hand hygiene, patient identification, call bell, and personal items within reach or handoff using situation, background, assessment, and recommendations.
- Evaluation of the student's patient safety competency will provide valuable information for faculty and clinical practice facilities.

Patient care in the clinical setting has been identified as essential for the development and practice of safe patient care skills and the most productive method to transfer theory to practice (Benner, Sutphen, Leonard, & Day, 2009). Clinical practice experiences provide the foundation for pre-licensure preparation that allows students to organize, prioritize, and practice safe patient care. Evaluation of student nurse safe patient care ability takes place during clinical practice experiences. In the current health-care environment, there are an increasing number of pre-licensure nursing programs vying for clinical practice settings. Facility based patient safety initiatives have decreased the number of available student nurse placements (Grant, Moss, Epps, & Watts, 2010; National Council of State Boards of Nursing [NCSBN], 2014; Shin, Jin-Hwa, & Jung-Hee, 2015). The result of fewer clinical settings is that faculty need to accept less than optimal clinical placements that may potentially lead to incongruent and unpredictable evaluation of safe patient care skills of student nurses. Lack of an optimal patient clinical settings to evaluate safe patient care experiences leads to a disconnect between what is taught in the classroom and what occurs during clinical practice rotations (Ironside, McNelis, & Ebright, 2014). This disconnect and potential for incongruent student evaluation of skills emphasizes the need to incorporate patient safety content in the classroom throughout the curriculum with reinforcement until graduation (Cronenwett et al., 2007; Jones, 2013).

One means of incorporating patient safety content is through the use of patient care simulations that mimic authentic patient care situations. These simulations can be accomplished with low-fidelity modalities such as case studies, virtual reality, and standardized patients or with high-fidelity modalities using life-like patient care simulators that provide realistic patient care scenarios (International Nursing Association for Clinical Simulation and Learning (INASCL), 2016; Medley & Horne, 2005; Rhodes & Curran, 2005). Regardless of fidelity or modality, patient care simulations have been identified to be an effective method to teach and enhance learning for student nurses. Simulation has been used to teach and reinforce safe patient care content such as medication administration safety, adherence to infection control policies such as hand hygiene, and safe identification of patients including allergies (Adamson, 2015; Gantt & Webb-Corbett, 2010; Henneman, Cunningham, Roche, & Cumin, 2007; Henneman et al., 2010; Ironside, Jeffries, & Martin, 2009; Pauly-O'Neill,& Prion, 2013; Sears, Goldworth, & Goodman, 2010).

Current studies do not support one type of simulation to be superior for use with students. High-fidelity patient simulations (HFPS) are time intensive and costly that may limit their use for some faculty. However, even with these drawbacks, HFPS have increased in popularity with nursing programs as being a realistic, interactive method to better prepare student nurses to care for patients in today's complex health care environment. HFPS are also viewed as an interactive method to support classroom teaching and to potentially replace clinical practice time with live patients (Kirkman, 2013; NCSBN, 2014). Currently, there is little evidence supporting the use of simulation to evaluate student nurse learning following specific curricular patient safety didactic content. The use of patient care simulations to evaluate safe patient care could provide a way to evaluate readiness before entering the clinical practice environment. The purpose of this study was to use HFPS to evaluate the safe patient care competency of entry-level student nurses who have received didactic content on safe patient care in the classroom.

Theoretical Framework

The National League for Nurses (NLN)/Jeffries Simulation Theory (Jeffries, Rogers, & Adamson, 2015; Jeffries &