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Using high fidelity simulation to increase nursing students' clinical postpartum and newborn assessment proficiency: A mixed-methods research study

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ABSTRACT

Objective: The objective of this study was to explore the benefits of using High Fidelity Simulators (HFS) to teach maternal postpartum and newborn assessment skills to student nurses before they interacted with actual hospital patients.
Design: This descriptive, observational study employed a mixed-method design using a Qualtrics online survey instrument.
Setting: The study was set at a Midwestern university.
Participants: The study used a convenience sample of third-year BSN nursing students (n = 132).
Methods: After participating in an HFS experience and completing a maternity clinical rotation, students took an online Qualtrics survey evaluating the benefits and drawbacks of the HFS experience.
Results: Students valued the HFS experience at an average score of 3.82 on a Likert Scale of 1–5. Open-ended questions identified three themes: psychomotor learning leading to skill acquisition, affective learning, and simulation restructuring to provide more time, better instructor preparation, and smaller groups.
Conclusion: This study's data supports the use of HFS to enhance nursing care and education, with special attention given to instructional consistency. Practicing new assessment skills in a non-threatening, safe environment gives students expertise and confidence while promoting the development of critical thinking skills.

1. Introduction

Nursing education pairs didactic instruction and clinical skill development. Today's employers expect nursing graduates entering the workforce to have nursing knowledge, clinical competence, and confidence in their abilities. Nursing students attain clinical competence while working with patients in clinical areas supervised by clinical professors. Often, these professors seek innovative methods to help nursing students' exhibit clinical competence before they enter a new clinical area.

Nursing students may find maternity nursing distinct from other specialties. Students accustomed to providing critical or intensive care for medical/surgical patients find, in contrast, most maternity patients are healthy, young female adults who are alert, oriented, ambulating, and participating in self-care. While previous clinical rotations reinforced the skills of heart, lung, and bowel-sound assessment, postpartum assessments—including palpation of the fundus, assessing milk production, and measuring newborn head circumference—often are new skills for the maternity student. Because patient teaching also is an important component of maternity nursing, students also must be proficient in this skill during this clinical rotation. Many nursing students have reported feeling uncomfortable with providing breast and perineal care as well as postpartum teaching and assessment. In addition, students who lack experience with infants often feel uncomfortable providing newborn assessment and care. Therefore, the aim of the study was to evaluate students' perceptions of practicing assessment skills using High Fidelity Simulators (HFS) before working with postpartum and newborn patients on a hospital maternity unit.

2. Literature Review

The ability to practice clinical skills in a SIM Lab in order to acquire competency aims to prepare nursing students for real world setting (Mills et al., 2015; Sundler et al., 2015). Prioritizing and planning nursing care is essential for effective work performance. Aggar et al. (2018) examined the effectiveness of a time management intervention

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using simulation to improve nursing student preparedness for medication administration in a clinical setting. Year nursing students (n = 180) were divided into two groups (n = 92 intervention, n = 88 comparison group). Time management activities were integrated into a low fidelity simulated environment. A self-administered validated questionnaire measured the student nurses perception of preparedness for medication administration in a clinical setting. The simulation intervention group showed significantly improved ability to clarify unclear instructions (p = 0.019), monitor patients conditions post medication administration (p = 0.032) and assess medication effectiveness (p = 0.034). The authors concluded that a time management intervention using simulation could effectively enhance students' preparedness for and confidence in mediation administration in a clinical siting.

A review of the literature yielded several studies showing that the use of HFS in nursing education is an effective teaching method that can support the development of self-confidence, clinical competence, and critical thinking/reasoning skills as well as promote cognitive and psychomotor results comparable to traditional teaching methods. In their research of high fidelity nursing simulation's impact on student self-confidence and clinical competence, Blum et al. (2010) examined entry-level nursing students' self-confidence scores and the clinical competence ratings given by their faculty. Blum et al.'s (2010) results indicated an overall improvement in student self-confidence and competence from the laboratory to the clinical setting after using HFS to mimic the clinical situation.

According to Evans and Kelly (2004), novice-nursing students often fear entering a patient's room in the clinical area. Fears of harming a patient or being unprepared to answer a patient's or family member's question often are found to cause initial jitters, which can compromise student self-confidence. The use of HFS in a clinical scenario before or in addition to patient contact can help students develop critical thinking and clinical reasoning skills. In their study with 300 third-year undergraduate nursing students, Wolton et al. (2010) found that students perceived HFS as enjoyable, with an appropriate degree of challenge, and congruent with the theoretical concepts studied in the course. Kim and Kim (2015) assessed the effects of adding a one-time simulation experience to non-randomly assigned nursing students (Group A, n = 48; Group B, n = 46). Both groups received didactic information, but only one group had an additional, one-time simulation experience that included clinical reasoning skill development. Kim and Kim's (2015) results indicated that the group receiving the one-time HFS experience scored significantly higher on clinical reasoning skills and related knowledge compared to students in the group that received didactic information alone. These findings show that clinical reasoning development and knowledge acquisition can be supported by HFS use.

In a systematic review of 12 studies using experimental and quasi-experimental design, Cant and Cooper (2009) concluded that using medium and HFS manikins are effective teaching methods that may have an advantage over traditional teaching methods. Additionally, this study's simulation group had higher student satisfaction scores than did its control group.

Findings from an integrated literature review of 16 studies affirmed the effectiveness of simulation as a pedagogical tool in nursing education (Stroup, 2014). These results indicated that simulation promotes cognitive and psychomotor results equivalent to traditional methods.

Kable et al. (2018) reported the results of a cross-national study that evaluated 17 simulation sessions for undergraduate nursing students in three Universities in Australia and the United Kingdom. They rated simulation quality using 27 questions developed from evidence-based quality indicators. The highest quality scores were for provision of learning objectives prior to the simulation session (90%) and debriefing (72%). Student preparation and orientation (67%) and perceived realism and fidelity (67%) scored the lowest compared to other components. The observational study effectively identified areas of strength amongst simulations sessions and identified areas that need improvement.

Table 1
Standardized survey questions.

1. The maternity simulation provided me with a clinical-like situation to assist me in developing my nursing skills
2. The postpartum maternal assessment provided me with a satisfactory opportunity to perform an assessment before having a real patient in the hospital
3. The newborn assessment provided me with a satisfactory opportunity to perform an assessment before having a live patient in the hospital.

Ratings
1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree strongly
5. Strongly agree

3. Methods

3.1. Design

This descriptive observational study was developed over a three-year period at an urban Midwestern university. The study was conducted using a web-based, cross-sectional Qualtrics online survey consisting of seven questions gauging students' response to an HFS experience in postpartum and newborn assessment. Three standardized questions measured student responses on a Likert Scale (Table 1), and four open-ended questions (Table 2) obtained respondents' self-reported conclusions about the experience. Using both quantitative and qualitative approaches in this research allowed a collection of a wide-range of student information that helped provide a thorough picture of their assessment of the HFS experience.

3.2. Setting and Participants

The university has two BSN nursing programs: a 16-month accelerated second-degree (ASD) program, and a traditional four-year program. Following approval from the University's Institutional Review Board, recruitment of third-year maternity nursing students (in either program) willing to participate voluntarily in the survey after completing their maternity clinical rotation at the hospital. The study began with the Winter 2013 term and ended with the Summer 2016 term. During this two-year 1/2 period, 132 students signed the consent and participated in the study. However, for unknown reasons several students chose not to record all their comments. All participants were at least 18 years of age. In fact, the average age of the University's fourth-semester nursing student is 30 years.

All students attended lectures on postpartum and newborn assessments prior to the HFS, which took place on campus at the University's simulation lab (SIM lab). Each clinical group spent a total of 8 h in the lab. Students were expected to perform a postpartum and newborn assessment in the SIM lab after instruction and demonstration by their clinical instructors. Upon completion of the maternity clinical rotation, students were asked to participate in the online survey.

3.3. Survey Instrument

The simulation evaluation survey was created by the primary author with assistance from the university's research office personnel. It included three standardized questions rated on a five-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree) (Table 1),

Table 2
Open-ended survey questions.

1. What did you learn from the postpartum maternal simulation?
2. What did you learn from the newborn simulation?
3. What do you think would improve the simulation session?
4. Would you recommend doing another simulation this semester?