



# The Effect of Simulation on Skill Performance: A Need for Change in Pediatric Nursing Education

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## Key words:

Safety;  
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Medication administration;  
SBAR (situation background, assessment, recommendation);  
Objective Structured Clinical Examination (OSCE);  
Nursing education

**Background:** This study sought to determine if student's performance of safety skills improved following a simulated educational experience.

**Methods:** Further analysis of data from a quasi-experimental design ( $n = 73$ ) was examined to identify if student's skill performance improved following a simulated educational intervention.

**Results:** Students did show an improvement in skill performance, but even after the intervention over half the students did not assess patient identification, over half did not administer medications safely, and students struggled with communicating nursing recommendations.

**Conclusion:** Further research needs to focus on skill performance and assessing students' ability to provide safe nursing care.

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PATIENT SAFETY IS a continuing concern in health care. In 2000, the Institute of Medicine (IOM) Report identified that more individuals died from medical errors in 1 year than from car accidents (IOM, 2000). James (2013) estimated that “approximately 440,000 preventable adverse events contribute to the death of patients each year” from care they received in the hospital (p. 6). Some of these preventable adverse events are medication errors, lack of patient identification, and miscommunication between health care providers. To improve the care of patients, it is imperative that nursing education begin to focus on educating nurses on providing safe care to their patients and preventing these adverse events.

To help identify the changes that should be occurring to nursing education in the area of patient safety, the Robert Wood Johnson Foundation funded the Quality and Safety Education of Nurses (QSEN) (Cronenwett et al., 2007). The Advisory Board for QSEN adopted the recommendations from the IOM to address six key areas: patient-centered care, teamwork and collaboration, evidence-based practice, quality

improvement, safety, and informatics. QSEN has developed working definitions and the required knowledge, skills, and attitudes that a graduating new nurse and a practicing nurse should have related to these areas (Cronenwett et al., 2007). Safety is defined as “minimize risk of harm to patient and providers through both system effectiveness and individual performance” (Cronenwett et al., 2007, p. 128). To improve patient safety and ultimately patient outcomes, midlevel and low level simulation experiences that include QSEN skills can be incorporated into nursing courses allowing for the integration of classroom and clinical teaching. The purpose of this study was to identify if students' skill performance improved after midlevel fidelity simulations and paper/pencil case studies in the areas of patient identification, medication administration, and communicating using SBAR (situation, background, assessment, and recommendation).

## Literature Review

Nursing faculty believes that the patient simulator can be used as a teaching strategy to promote safe patient care and enhance patient outcomes, but there is limited research in the area of patient simulation and students' skill performance. A literature search was conducted to identify evidence related to

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educational interventions that promote students' skill performance in the areas of patient safety. The CINAHL database, PubMed, and Google Scholar were used to search for articles using the search terms: nursing skills or clinical competence, SBAR, patient identification, and drug administration. The initial search returned 131 articles. Of these, eight articles were included in the review as they reported relevant evidence of an educational intervention using simulation to enhance students' skill performance. One article on frequency of medication errors was also included to provide information regarding the frequency of medication errors by nursing students.

Four studies compared the effects of high-fidelity simulation versus low-fidelity simulation on students' skill performance with only half the studies showing a significant difference between the two groups (Ackermann, 2009; Schwartz, Fernandez, Kouyoumjian, Jones, & Compton, 2007; Steadman et al., 2006; Wenk et al., 2009). Ackermann compared the two educational interventions of cardiopulmonary simulation using the human patient simulation (high-fidelity simulation) plus standard American Heart Association (AHA) CPR for adults review versus just the standard AHA education on skill performance in junior level nursing students. Skill performance was measured immediately following the educational experience (acquisition) and 3 months after the educational experience (retention). Ackermann reported a statistically significant increase in acquired skills ( $p = .000$ ) and retention of skills ( $p = .000$ ) for the group who received simulation training in addition to the standard education. Steadman et al. compared problem-based learning to high-fidelity simulation in fourth year medical students and reported a statistically significant difference between the simulation and problem-based learning group in the mean change score (difference between pretest and posttest) ( $p = .04$ ).

Wenk et al. (2009) evaluated medical student's skill performance between a group of students taught with the human patient simulator and a group taught through problem-based group discussion and found no statistically significant difference ( $p > .05$ ). Wenk et al. did have a small sample size ( $N = 32$ ) which may have resulted in not finding statistically significant results. Schwartz et al. (2007) evaluated the effect of simulation training versus case-based learning in fourth year medical students. Schwartz et al. reported no statistically significant difference between the two groups (MANOVA; Hotelling's  $T^2 [3, 98] = .053, p = .164$ ).

The literature supports that nursing students frequently do not assess patient identification prior to medication administration. Gantt and Web-Corbett (2010) and Cazzell and Howe (2012) both identified that at least 25% of the time, students did not assess patient identification prior to medication administration. Gantt and Web-Corbett reviewed evaluation data collected during simulations of senior nursing students. The simulations focused on student competency in the areas of blood administration, tracheostomy suction, and intravenous therapy with patient identification imbedded throughout the simulations. Following the initial results, changes were made to the course and patient safety issues of proper identification

were again reviewed with the senior level students. Following the further education and reemphasize of proper patient identification, 22% of the students continued to omit patient identification ( $n = 102$ ) (Gantt & Web-Corbett, 2010).

The current literature further supports that nursing students frequently commit medication errors by not following the five rights of medication administration. The five rights of medication administration include the right medication, right dose, right time, right route, and right patient. Harding and Petrick (2008) conducted a 3-year retrospective review of 77 medication errors committed by nursing students in a 4-year nursing program, which admits 32 students a year. Of the 77 medication errors, 66% were identified as having violated one of the rights of medication administration. The other 34% of medication errors were error of omission (medication not given). Henneman et al. (2010) found that 100% of senior nursing students ( $N = 50$ ) committed at least one medication error when independently caring for a simulated patient. The most frequent error committed was patient identification (Henneman et al., 2010).

Campbell (2013) conducted a quasi-experimental quality improvement project to identify if students who received four 90-minute high fidelity simulation exercises ( $n = 15$ ) had a higher level of skill performance in the areas of patient identification and medication administration when compared to students who just received the traditional clinical experience ( $n = 12$ ). No significant difference was found between the two groups and no significant increase in performance was found following the simulation experiences (Campbell, 2013).

The literature supports that even though students have been taught and at some point in time have demonstrated safe and effective care, nursing students will still not provide safe and effective care to patients, either real or simulated. Further research is needed to identify whether simulation is an effective teaching strategy for students that will result in students independently providing safe and effective care to a simulated patient. In nursing, simulations that lead to learning include low fidelity simulation (static mannequins, task trainers, and paper/pencil case studies) midlevel fidelity simulation (have some features that mimic reality), and high fidelity simulation (sophisticated, computerized mannequin that mimics a real live patient) (Meakim et al., 2013).

## Methods

This paper focuses on skill performance findings associated with data from a larger study (Bowling, 2011). The complete study included data collected during a nonequivalent control group pretest posttest design comparing two education interventions, midlevel fidelity simulation and paper/pencil case study on student's knowledge, self-confidence, and skill performance. Four instruments were used to collect the data for the larger study: a demographic questionnaire, knowledge test, self-confidence in learning using simulations scale, and mini Objective Structured Clinical Examination (OSCE) to measure skill performance. The two educational

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