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Featured Article

Evaluation of Simulation in Undergraduate Nurse Education: An Integrative Review

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Abstract

Background: Although nearly two decades have passed since the introduction of simulation in nurse education, many nurse educators continue to struggle with how to evaluate the effectiveness of simulations. The aim of this review was to synthesize the research findings regarding evaluation of simulation in undergraduate nurse education.

Methods: One hundred and one articles were reviewed.

Results: Synthesis of research revealed the following five themes: confidence/self-efficacy, satisfaction, anxiety/stress, skills/knowledge, and interdisciplinary experiences. Evidence regarding minimal level of fidelity needed to produce significant learning outcomes was inconclusive. Recommendations and future directions are provided.

Conclusion: More robust educational research in simulation is warranted.

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Introduction

The influential Institute of Medicine (IOM) (2011) Report, *Future of Nursing: Leading Change, Advancing Health,* provides direction for nurse educators to incorporate high-fidelity simulation and promote interdisciplinary learning experiences. Although nearly two decades have passed since the introduction of simulation in nurse education, many nurse educators continue to struggle with how to integrate simulation within the curriculum, maximize its usage, conduct interdisciplinary experiences, assess students, and evaluate the effectiveness of simulation-based learning experiences. Nursing faculty shortages, high workload demand, commitment to learning simulation-based technology, isolation within one's area of expertise or ''silo'' effect, and lack of experience in development of instrumentation and research may be reasons for the meaningful delay of vetted and effective simulation-based learning experiences throughout nursing curricula. Determining the current state of knowledge regarding evaluation of simulation in nursing is necessary for educators to improve research methods, educational efforts and student outcomes.

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Aim

The aim of this review was to evaluate and synthesize the research findings regarding evaluation of simulation in undergraduate nurse education, unveiling what is known and unknown in the topic. Based on this information, recommendations and future directions are presented.

Key Points

- Five themes emerged: confidence/self-efficacy, satisfaction, anxiety/stress, skills/knowledge, and interdisciplinary experiences.
- Evidence regarding minimal level of fidelity was inconclusive.
- We suggest using established instruments and mixed methods approaches to evaluate simulation.

Method

The databases of CINAHL and PubMed were searched for literature within five years of March/April 2012 containing the keywords of ''evaluation'', ''simulation'', and ''nursing'' combined. Search criteria were further limited to peer-reviewed, research articles in English and Chinese yielding 447 results. Abstracts were read for relevance. Virtual simulations were excluded. Only research studies regarding mannequin-based simulations in undergraduate nurse education were included. In total, 101 articles were examined.

Results

The majority of research provided evidence falling within the following five themes: confidence/self-efficacy, satisfaction, anxiety/stress, skills/knowledge, and interdisciplinary experiences. The synthesized data revealed that students indicated satisfaction with simulation, simulation fostered confidence/self-efficacy, simulation lead to skills/knowledge acquisition, and interdisciplinary experiences were a valued approach in teaching. Conflicting information was noted regarding the fidelity level of simulators needed to create meaningful learning experiences.

Confidence/Self-Efficacy

Confidence/Self-Efficacy was a commonly described phenomenon in the literature related to simulation. Twenty-six studies indicated confidence or self-efficacy increased as a result of a learners' simulation experience (see Figure 1). Mould, White, and Gallagher. (2011) used a pretest posttest design to evaluate a series of simulations conducted over a semester with third year Bachelor of Nursing (BN) students (N = 219). ''BN students reported more confidence ($p < 0.001$) and competence post-simulation series ($p < 0.001$)'' (p. 185). ''Males reported more confidence and competence than females'' (Mould et al., p. 185). Schlairet (2011) found simulation increased self-confidence among undergraduate students. However, Schlairet (2011) also noted that senior-level students reported lower scores for self-confidence compared to lower level students. Cardoza and Hood (2012) used a descriptive correlation design to examine senior baccalaureate nursing students' reported self-efficacy or confidence in providing family-centered care using high-fidelity simulation (HFS). Senior students were described to have ''unrealistic self assessments of their clinical knowledge and nursing performance'' prior to simulation performance (p. 142). The authors concluded that students were not able to accurately self-identify their knowledge and transferability of their knowledge to family-centered situations. Conversely, with a control group of 54 and intervention group of 53 students, Brannan et al. (2008) were unable to find a statistically significant effect of whether classroom lecture or use of mannequin-based simulation played a more important role in students' level of cognitive skill and confidence. The majority of research included in this literature review, 25 out of 26 studies, suggested simulation contributed to students' achievement of confidence. This finding is consistent with Cant and Cooper's (2010) literature review. However, Yuan, Williams, and Fang's (2012) systematic review suggested that insufficient evidence existed to support a correlation between simulation and students' achievement of confidence.

Satisfaction

Sixteen studies reported on student satisfaction with simulation (see Figure 1). All of the studies reviewed demonstrated a positive association with simulation and student satisfaction. Students expressed that they ''enjoyed the simulation experience and felt that it facilitated their learning'' (Partin et al., 2011, p. 188). Fountain and Alfred (2009) investigated student satisfaction with high-fidelity simulation (N = 78) and identified that students with learning style preferences for solitary learning and social learning were satisfied with the simulation experience. Schlairet (2011) explored the influence of simulation across an undergraduate curriculum (N = 161) and obtained positive satisfaction scores; however, senior-level students reported the lowest satisfaction scores. Reese et al. (2010) identified that medical and nursing students were satisfied following an interdisciplinary simulation experience. Many studies investigated both concepts of confidence and satisfaction in the same study. It is unknown if social desirability influenced the overall findings of satisfaction reported with use of simulation. The amount of teaching experience of the faculty member and style of facilitation is a potentially influential variable not captured in most research. This is of vital importance because teaching with simulation represents a specialized pedagogy that is very different from