Review Article

Simulation Usage in Nursing Fundamentals: Integrative Literature Review

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Abstract: Simulation is a transformational tool for nurse educators as they strive to develop students who are skilled in critical thinking, communication, and psychomotor skills. Implementation of simulation often begins in fundamental nursing courses and is then threaded through entire programs. These courses offer high levels of laboratory access, which focuses on skill development and clinical preparation. This article reviews current evidence as it relates to simulation application in foundational nursing education. Findings from this study affirm the effectiveness of simulation as an educational tool. It promotes cognitive and psychomotor results equivalent to traditional methods with higher levels of faculty satisfaction and critical thinking development.

Nursing education is being transformed by technological advances in simulation. These active learning options may help to solve an important challenge for nurse educators. Students are expected to be capable of adapting to a fast-paced workplace upon graduation, which requires a learning environment that allows for critical thinking, self-confidence and experiential learning (Blum, Borgland, & Parcells, 2010). Students must be provided with opportunities to connect classroom theory with the experiences of the clinical setting. Simulation is a key link in this process because it allows faculty to create laboratory environments that replicate actual clinical scenarios (Norman, 2012). These scenarios reflect classroom theory content and allow for hands-on application while developing critical thinking skills. Students can practice nursing interventions, learn to

prioritize care, and apply communication concepts within the safety of the simulation laboratory. The outcomes that may result from simulation inclusion in an undergraduate nursing program include diminished anxiety, increased knowledge retention, and development of psychomotor skills before encountering the reality of acute care settings (Billings & Halstead, 2012).

Based on the potential benefit that exists with simulation, many schools are recommending its application throughout the nursing curriculum. Because this is a daunting task to undertake, the foundational level of nursing coursework has become a popular point to initiate this type of change (Kardong-Edgren, Starkweather, & Ward, 2008). These foundational courses provide content on nursing skills, communication strategies, health assessment, and beginning pharmacology. Students at this level are very anxious about interacting with patients clinically, lack critical thinking practice, and are novices in their psychomotor

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skills. The use of simulation at this level has been proven to be beneficial in all of these areas (Dearmon et al., 2013). There are often laboratory hours already programmed into these courses, making this level very appropriate for initiating and testing methods for simulation.

It is imperative to analyze what has been researched related to simulation application in foundational nursing courses. Recently, literature reviews have been completed in related areas. Ross (2012) completed a review of current findings related to the effect of simulation application on psychomotor skill development which uncovered an overall lack of rigorous, quantitative research related to this topic. Shearer (2013) completed an integrative review of simulation and its impact on patient safety. Once again, conclusions were limited by the lack of empirical evidence. This integrative review attempts to fill some of the current gaps identified in these findings. It explores faculty perspectives, application strategies, implementation processes, and the overall effectiveness of simulation usage in foundational nursing courses. Numerous research designs with small sample sizes were included to explore what commonalities exist between the studies.

> **Key Points**
> - Fundamental nursing courses provide important opportunities to apply and evaluate simulation effectiveness.
> - Simulation usage has a positive effect on critical thinking development, faculty satisfaction levels, and student satisfaction levels.
> - Further research is necessary in longitudinal and experimental designs.

Methods

An integrative literature review process was utilized to assess what is currently known and accepted related to simulation application in fundamental nursing courses. Studies were searched for utilizing the databases CINAHL, Health Source: Nursing/Academic Edition, and Medline. The search utilized the phrase: Baccalaureate nursing AND simulation. The inclusion criteria were primary research studies published in peer-reviewed journals since 2003 with findings related to clinical simulation in foundational nursing courses. Research focused on non-nursing students or research included a specialty focus. The purpose of this review was to determine the use of simulation in fundamentals courses. This did not include specialty areas like geriatric or maternal—fetal, even if they occurred in these initial courses in some programs. Additional studies were obtained by reviewing the reference lists of reviewed articles.

Simulation is broadly defined, for the purpose of this research, to include low-fidelity simulation (LFS), medium-fidelity simulation (MFS), high-fidelity simulation (HFS), and standardized patients (SP). Definitions for the simulation levels that were utilized in this research are noted here for the purpose of consistency and are based on the definitions provided by the Simulation Innovation Resource Center of the National League for Nursing (NLN). LFS is defined as a simulation environment that offers minimal realism and is focused on specific skill development (NLN, 2013). LFS can include role playing, case study application, and static manikins. Static manikins are utilized with props added to fit scenarios. MFS is defined as a simulation experience with moderate realism and increased technological application. Manikins are programmable with certain basic assessments. These may include vital signs, pulses, lung sounds, and heart sounds (NLN, 2013). Verbal cues are provided by the instructor and adaptations to assessment findings are manually entered during the simulation (Billings & Halstead, 2012). HFS is defined as simulation experiences that offer high levels of realism and interactivity. Manikins are technologically advanced and can be programmed to mimic scenarios or responses to interventions (NLN, 2013). SPs, as a simulation strategy, involve the use of individuals who are trained to act as a patient in physical appearance and communication skills. The scenarios are repeatable and only change based on the individual student's action (NLN, 2013).

Retrieval and Quality Assessment of Studies

The search and evaluation method produced 15 research articles that are included in this review. The initial computerized search process resulted in 198 articles to review. Of these articles, 138 were excluded based on the title containing exclusionary criteria. The remaining 60 source abstracts were reviewed based on inclusion and exclusion criteria. This resulted in the exclusion of 43 articles owing to the inclusion of specialty practice areas or upper-level course work. The remaining 17 articles were methodologically appraised for quality and inclusion in this review. At this point, three were excluded based on specifics in their research purpose that were outside the scope of this review. The bibliographies of the remaining articles were reviewed which produced one additional source for inclusion. The final result was 15 research articles to be analyzed in this study.

These 15 articles were appraised for research quality based on rigor, design, sample size, and generalizability. A table was developed (Table) that outlined the purpose, methodology, findings, and evaluation of each study. Although each individual study tended to have small sample sizes and singular locations, there was an overall congruency in findings among them. This replication effect strengthened the reliability of the overall conclusions that