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Review Article

High-Fidelity Simulation in Undergraduate Nursing Education: A Review of Simulation Reviews

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undergraduate nursing students;
high-fidelity simulation;
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integrative review;
meta-analysis;
systematic review

Abstract: The purpose of this focused review was to provide an overview of existing high-fidelity simulation reviews in undergraduate nursing education. Over the last 10 years, there has been a substantial increase in the use of high-fidelity simulation in undergraduate nursing education. Six reviewers conducted a systematic literature search on existing reviews of high-fidelity simulation and undergraduate nursing education from January 1, 2009, through June 30, 2015. Using a comprehensive search of literature databases and hand searches, a total of 34 reviews were initially selected for full review with seven reviews included in the final analysis after rereview of the inclusion/exclusion criteria. Findings from simulation research and reviews revealed significant differences in design and assessment methods leading to a wide variety of measurement outcomes and a variety of limitations. Of the seven reviews, five were integrative reviews and two were reviews of the literature. No meta-analysis or systematic reviews met the inclusion criteria. The review suggests a need for methodologically sound research that translates simulation outcomes to future performance and practice. Findings from the review support the multitude of challenges in simulation research including a lack of funding, a lack of simulation training for faculty and staff, and a lack of support for faculty conducting simulation research. Limitations of prior studies include weak designs, mixed samples, and a lack of valid and reliable evaluation tools.

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Over the last 10 years, there has been an increase in attention by the United States and other jurisdictions in developing guidelines or regulations that support simulation as a substitute for traditional clinical time for undergraduate nursing students. According to (2014), 22 Registered Nurse State Boards of Nursing support simulation at some level as a substitute for clinical. The number of clinical hours that can be replaced is variable with most State Boards of Nursing remaining silent or deciding on replacement hours on a case to case basis. A number of states are currently in the process of reviewing regulations to support replacement of clinical hours, which may be a direct response to the recent landmark study by the National Council of State Boards of Nursing (NCSBN; Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries, 2014).

Key Points

- There is a need for rigorous research that translates simulation outcomes to practice.
- Standardization of implementation of high-fidelity simulation is essential.
- Differences in research design and assessment methods lead to limitations of findings.

The 2014 NCSBN study found that up to a 50% substitution of traditional clinical time with high-fidelity simulation (HFS) yielded no statistically significant differences in outcomes from those with other more traditional methods of clinical. Importantly, National Council Licensure Examination pass rates, nursing knowledge assessments, and perceived readiness for practice postgraduation did not differ between prelicensure nursing students who spent their hours in traditional clinical as compared with a 25% or 50% replacement of those hours with HFS. The NCSBN suggests that learning through simulation is dependent on high-quality simulation. Likewise, Cant and Cooper (2009) concluded that the use of simulation can be related to knowledge gains but only when best practice guidelines are utilized.

The International Nursing Association for Clinical Simulation and Learning published nine guidelines for best practice of simulation designed to provide evidenced-based guidelines for the development and integration of simulation (INACSL BOD, 2013, 2015). Further support for best practice of simulation can be found in meta-analyses, systematic, integrative, reviews of the literature, and other types of reviews on the practice of clinical simulation. However, findings of simulation reviews on a variety of outcomes have thus far been inconclusive, and consistent limitations of these studies have included significant differences in design and assessment methods (Cant & Cooper, 2009; Yuan, Williams, & Fang, 2012).

Standard I Terminology in the Standards of Best Practice (Meakim et al., 2013) defines HFS as: ''experiences using full scale computerized patient simulators, virtual reality or standardized patients that are extremely realistic and provide a high level of interactivity and realism for the learner'' (p. S6). For the purposes of this review, the definition of HFS was noted as a simulated learning experience using full-scale computerized human patient simulators. The objective of this appraisal of simulation reviews was to provide a narrative description of existing HFS reviews to assist academic nurse educators in examining simulation topics that are well studied and to identify areas that need further investigation. The results can be used to inform future research topics in simulation utilizing HFS as an effective teaching—learning strategy in the education of undergraduate nursing students.

Methods

Framework/Design

Six reviewers conducted a systematic literature search on existing reviews of HFS and undergraduate nursing education. Integrative, best practice, reviews of the literature, and critical reviews were appraised with the Critical Appraisal Skills Programme (CASP) guidelines (2014). CASP is a 10-question checklist used to evaluate a variety of research studies. The CASP was a good fit because the scale offered a systematic way to evaluate reviews of simulation across six individual reviewers. Although the CASP was designed for a single review, the criterion on the scale was helpful for this review of reviews because each reviewer examined the same critical components. This provided a way to compare the quality of each review.

Research questions were framed using a structured approach that identifies essential elements of a research question. Those elements are; the patient population (P), the intervention (I), the comparator group (C), the outcome or endpoint (O), and the