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Nursing Student Confidence and Self-efficacy in Simulation: Evidence Synthesis Project

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NURSING STUDENT CONFIDENCE AND SELF-EFFICACY IN SIMULATION:
EVIDENCE SYNTHESIS PROJECT

An Evidence-based Practice Capstone Project

Submitted to the Faculty of the

Graduate Program in Nursing

In Partial Fulfillment

of the Requirements for the Degree

Master of Science in Nursing

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Abstract

The use of simulation-based activities is a growing trend in nursing pedagogy and requires evaluation to assess and improve outcomes. This project completed a review of multiple research studies and reviews to evaluate the effects of simulation and simulation methods on students' sense of self-efficacy and confidence. The findings support the use of simulation and found that simulation does increase students' perception of confidence and self-efficacy. The data collected included both qualitative and quantitative data. A few studies lacked generalizability due to small sample size and scenario selection. However, multiple methods were noted to improve the simulation experience and they include high-fidelity simulation, multiple patient scenarios, reflection exercises, debriefings, realism, skills practice, group work, role-play, active learning, and facilitation. Weaknesses identified included stress, potential for rote learning, contempt for artificial patients, differences in self-efficacy of those with a history of clinical experience and those without, and lack of relationship between self-efficacy over time. The research provided insight into the strengths and weaknesses of simulation as a teaching method and provided a vision for potential future research and changes to improve simulation as a teaching method based on their effects on student confidence and self-efficacy.

Keywords: Evidence synthesis, simulation, confidence, self-efficacy, baccalaureate, perceptions, and nursing students

DEDICATION

I want to thank my husband Jason and my children for their support of this project. For my husband, thank you for putting up with my stress and preoccupation with work. For my children, I want to thank for their patience and pray they will learn the value of education.

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CHAPTER I

INTRODUCTION

The quality of patient care is of central concern in the evaluation of healthcare. Quality of patient care is important in the assessment of nonmaleficence and prevention of patient harm. The government plays a role in the oversight of healthcare and works to address access to care and quality of patient care (Tang, Eisenberg, & Meyer, 2004). The government facilitates the evaluation of quality of care by monitoring, reporting, and supporting the advancement of healthcare quality and through efforts to assist research, monitoring the supply of healthcare workers, and working with academic institutions to ensure education on quality patient care (Tang, Eisenberg, & Meyer, 2004).

The Joint Commission (2018) is a national nonprofit accrediting body that evaluates the quality and performance standards of healthcare entities. Furthermore, the commission has set standards and measures to meet in order to gain certification, which reflect quality in patient care. The commission also evaluates institutional performance improvement measures, sentinel events, and safe staffing, and reports them publicly. The Joint Commission National Patient Safety Goals (NPSGs) (Joint Commission Resources, 2017) focus on patient safety concerns such as: patient identification, medication safety, staff communication, alarm safety, prevention of infection, detection of safety risk, and prevention of surgical mistakes. Nurses have a direct impact on the performance and outcomes of these goals due to their unique role in direct patient care. Public reporting may improve oversight and may aid in selection of care facilities for patients, employers, and potential employees.

The Institute of Medicine (IOM, 2004) has identified nurses as critical stakeholders of patient quality and safety. Nurses spend a considerable amount of time with patients. As

severity of illnesses increase and facilities turn out patients to be cared for at home, nursing care and education become pivotal to the impact on patient safety outcomes (IOM, 2004). As participants in patient safety, it is important to have enough nurses for patient care. There is a growing discrepancy between supply and demand for nurses (IOM, 2004). In addition, working conditions and other career options are deterrents for some to pursue nursing and nursing turnover is still of concern do to work conditions and burn out.

Faculty shortages is also a concern as a shortage of nursing faculty contributes to a steady enrollment state despite a high demand for nurses, undergraduate, graduate, and at the doctorate level (Fang, 2013). Yet of greater importance is the availability of clinical sites or sites that afford the opportunity for meaningful hands on experience (Alexander et al., 2015). Education of sufficient competent and qualified nurses to participate in patient care is essential to the maintenance of patient quality and safety. The National Council of State Boards of Nursing (NCSBN) has identified simulations as an effective technique in nursing education (Alexander et al., 2015). To counteract for the clinical based instructors and clinical site shortages, nursing schools are increasing the use of simulation-based training (Cantrell, Meyer, & Mosack 2017). Hayden, Smiley, Alexander, Kardong-Edgren, and Jeffries (2014), found supporting evidence that nursing curricula could effectively replace up to 50 percent of clinical hours with simulation and still meet desired outcomes.

Unfortunately, as lack of meaningful clinical site availability continues to be problem in educating well prepared nurses for the bedside. Although, in a systematic review, Aebersold and Tschannen's (2013) found evidence that supports the benefits of simulation in nursing education and its application in nursing curriculum, more analysis is needed to evaluate the best practices of simulation in undergraduate nursing education. Specifically, high fidelity simulation (HFS),

low and medium fidelity, virtual, standardized patients, role-play, clinical scenarios, and in situ simulations are several available tools for nursing programs to build curricula. While these tools appear to be of value, further review for their effectiveness in nursing pedagogy is needed. One means of evaluating simulation effectiveness is to investigate students' perceived gains in self-confidence and self-efficacy following simulation-based activities, as confidence and self-efficacy are positively associated with competence (Rama & Sarada, 2017).

Self-Efficacy, Confidence, and Simulation

In order to evaluate the effectiveness of simulation in undergraduate nursing education, it is helpful to understand the relationship of self-efficacy and confidence to competence. Self-efficacy is one's belief in their ability to succeed in a particular situation or task (Bandura, 1977). Self-efficacy is also a belief in one's ability to take actions to manage future situations or circumstances (Stump, Husman, & Brem, 2012). By applying Bandura's theory of behavioral change (Bandura, 1977), one can infer that nursing students who have improved self-efficacy have an increased sense of competence in their ability to practice not only in school but also in clinical practice. Students who believe in their abilities apply maximum effort, whereas, students with limited self-efficacy may not take action in order to avoid mistakes (Bandura, 1977). Nurse Educators are challenged with the task of increasing self-efficacy in order to provide competent bedside nurses, who believe in their ability to respond to patient care needs.

Self-confidence is the belief in one's overall capability and is often used interchangeably with self-efficacy. Self-confidence is one of the most influential motivators of behavior and action (Bandura, 1986). Self-confidence is one's judgement about their abilities. The most effective way to develop self-confidence is through mastery or perceived success (Bandura,

1977). Student preparation and skill attainment can improve self-confidence and preparedness for the clinical environment.

Self-efficacy and confidence are means to evaluate simulation methods and future performance. Student's with confidence and increased self-efficacy tend to react to difficult problems as challenges to be solved and display intrinsic motivation, whereas those without, cower from problems and are plagued with concerns of their personal deficiencies (Bandura, 1993). Self-efficacy can be improved by performance accomplishments, observation of others performing tasks, verbal persuasion, and positive physiologic states (Bandura, 1993).

Simulation is a strategy in nursing education that provides an opportunity to practice skills, role-play, and practice putting theory to practice in clinical decisions without posing a risk to patients (National League for Nursing, 2015). Simulation has the potential to observe others, receive verbal persuasion, performs tasks, and cause physiologic reactions that effect student perception of self-efficacy and confidence (Bandura, 1993). Simulation can take many forms including but not limited to low to high fidelity, standardized patients, virtual patients, role-play, and computer-based simulations.

The challenges surrounding the implementation of simulation in nursing education involve the evaluation of the effectiveness of this pedagogical approach. Self-efficacy and confidence are self-reported measures of one's ability to perform and because of such are beneficial to the evaluation of simulation-based activities. Increased self-efficacy and confidence are indicators of one's belief in their ability to perform and reflect potential future clinical actions (Bandura, 1993).

Background and Need

The International Nursing Association for Clinical Simulation and Learning (INACSL) provides clinical practices guideline for simulation and released new standards that include simulation design, outcomes, objectives, facilitation, debriefing, participant evaluation, integrity, inter-professional education, and work on a cohesive glossary of terms (Sittner et al, 2015). Current practice involves the use of patient simulation using manikins, role-play, computer and virtual patients, and low fidelity items for psychomotor skills attainment (Society for Simulation in Healthcare, 2015). The National League for Nurses (NLN) supports the integration of simulation into nursing curriculum and its expansion following evidence that supports its incorporation to improve quality and safety by providing experiential learning and emphasis on safety education prior to care (NLN, 2015; Cronenwett, Sherwood, & Gelmon, 2009). The current best practices involve the application of case scenarios and experiential learning that replicate clinical situations and foster critical thinking and skills attainment.

Simulation has seen an increase in nursing education and research due in large part to its support by the National League for Nurses (2015). Although, literature supporting simulation is evident, there is a great variety of research and further research is needed that synthesizes current findings on the effectiveness in nursing education. Research to evaluate simulation effects in self-efficacy and confidence has focused on numerous singular studies. While it is beneficial to understand how one method, or sequence of simulation improves self-efficacy and confidence, a synthesis of cumulative findings could have a greater impact on education. Questions remain as to the perceived benefits and strengths of specific methods, and ways in which simulation can be maximized to produce the greatest increases in self-efficacy and confidence. Because simulation

effects self-efficacy and confidence, and hence the ability to affect future clinical performance and patient safety, it is beneficial to maximize and scrutinize best practices in nursing simulation.

Problem Statement

There is limited research available that evaluates and synthesizes best practices in undergraduate nursing simulation as evidence by effects on perception of confidence and self-efficacy.

Purpose Statement

The purpose of this evidence-synthesizing project was to review and critically appraise current literature regarding how simulation affects self-efficacy and confidence in nursing students in pre-licensure baccalaureate undergraduate programs. Nursing pedagogy has been adapted to reflect the governmental, regulatory, accrediting bodies, National League for Nurses and Quality and Safety Education for Nurses (QSEN) guidelines (Cronenwett, 2007) that focus on quality and safety. Simulation strategies have increased to provide a safe, experiential learning environment where students can learn to think critically and perform necessary skills to improve patient quality and safety (NLN, 2015). Great strides have been made in simulation and multiple methods and strategies are applied in effort to teach undergraduate nursing students to provide competent care. Despite the growth in nursing education, the effectiveness of simulation on undergraduate nursing student self-efficacy and confidence needs further evaluation. Moreover, few studies have provided a review of multiple strategies or studies on the effects of simulation on undergraduate nursing student self-efficacy and confidence.

Evidence-based Practice Question

What are the effects of simulations compared to no simulations on perception of self-efficacy and confidence in pre-licensure baccalaureate nursing students in the undergraduate setting?

Significance to Nursing Education

This evidence-based practice synthesizing project may provide insight into the effects of simulation on undergraduate nursing student's perception of self-efficacy and confidence. In the short term, this project may provide an awareness of best methods to apply in simulation and those to avoid. In the long term, this project provides an accumulation of methods and strategies in simulation, both positive and negative, which can be applied to improve perceived levels self-efficacy and confidence in undergraduate nursing students. By maximizing the strategies that improve perceptions of self-efficacy and confidence in undergraduate nursing students, nurse educators may better prepare competent nurses who can provide quality patient care.

Definition of Terms

Brief. An activity prior to a simulation where participants receive essential information pertaining to a simulation.

Debrief. An activity that proceeds a simulation and is led by a facilitator that formerly, and collaboratively reflects on a simulation learning activity.

Facilitator. An individual who is involved in the implementation, delivery, and debriefing of a simulation activity.

Feedback. An activity where constructive feedback is provided to the learner.

Fidelity. The degree of realism, or level in which a simulation reflects a real event.

High fidelity. A simulation that reflects a high level of realism, often involves a manikin.

Low fidelity. A simulation that does not require external programming, often involves task trainers.

Medium fidelity. Simulation that demonstrates realism often with mannequins or task trainers that demonstrate a condition without automatic cues.

Realism. The ability to mimic real life or quality of representation of an event, person, thing, or situation.

Simulation. “A technique that creates a situation or environment to allow persons to experience a representation of a real event for the purpose of practice, learning, evaluation, testing, or to gain understanding of systems or human actions” (Lopreiato, 2016).

Chapter Summary

This initial chapter provided an introduction to professional concerns of providing quality patient care and the increased use of simulation in undergraduate nursing education. The background and need explored the history and current trends in healthcare that necessitate the use of simulation in nursing education. A lack of clarity and synthesis of best practices in simulation as evidence by their effects on self-efficacy and confidence was identified as the problem. Providing a review and critical appraisal of current literature regarding how simulation affects self-efficacy and confidence in nursing students in pre-licensure baccalaureate undergraduate programs was identified as the purpose. The significance to nursing education was explained and a definition of key terms provided.

CHAPTER II

METHODS

Quality and safe patient care are national nursing priorities. Educating competent nurses who are able to deliver safe competent care is of importance to the public and nursing as a profession. Simulation is a tool applied in nursing education that has the potential improve competence of nurses at the bedside. In order to assess competency, one can evaluate reported levels of confidence and self-efficacy because they are positively associated with competence (Bandura, 1993). Furthermore, to improve nursing education, it is important to determine which means in simulation are associated with increases or decreases in reported levels of self-efficacy and confidence.

The identified problem is that there is limited research available that evaluates and synthesizes best practices in undergraduate nursing simulation as evidence by effects on perception of confidence and self-efficacy. The purpose of this evidence-synthesizing project was to review and critically appraise current literature regarding how simulation affects self-efficacy and confidence in nursing students in pre-licensure baccalaureate undergraduate programs. The identified PICO question to help guide this appraisal is “What are the effects of simulations compared to no simulations on perception of self-efficacy and confidence in in pre-licensure baccalaureate nursing students in the undergraduate setting?”

Data Collection Procedure

A systematic database search was used to locate evidence relevant to questions of simulation effects on students’ perception of self-efficacy and confidence. Databases searched for relevant articles included EBSCO, CINAHL, PubMed, and Medline Complete. A total of 10,305 records were initially identified (Figure 1). Inclusion and exclusion criteria were applied

to reduce the findings to evidence relevant to this review. Key terms were applied to further reduce the number of pieces of evidence identified as relevant to the topic of investigation.

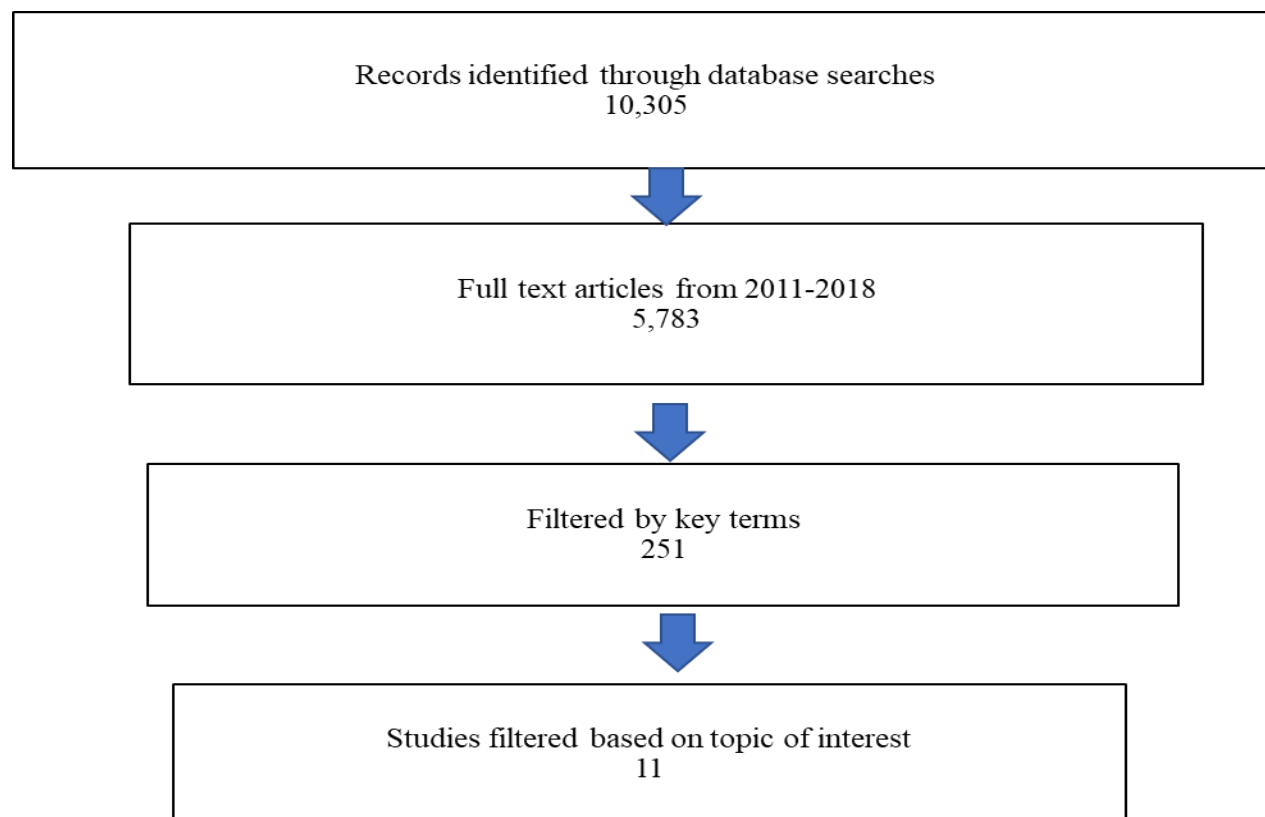


Figure 1. Evidence selection for systematic review

Inclusion and Exclusion Criteria

Inclusion criteria included identification of full text articles, written in the English language from 2011 to 2018 which reduced the number of records to 5,783 records (Figure 1). Subsequently, key terms were applied to the search to further reduce the number of pieces of evidence identified as relevant to the topic of investigation (Figure 1). Specifically, key terms for inclusion included nursing education, simulation, perceptions, self-efficacy, confidence, and

baccalaureate. The pieces of evidence were filtered based on the topic of interest aim of the review.

Articles were excluded if they did not involve the analysis of simulation effects on nursing. Evidence focused on medicine, emergency response personal, and other applied health fields were excluded. Furthermore, articles that did not evaluate simulation or the implied effects on undergraduate nursing students was excluded. Articles that did not focus on baccalaureate nursing students was also excluded.

Data Analysis

The Johns Hopkins Nursing Evidence-Based Practice Model and Guidelines (Dearholt & Dang, 2012) helped guide the critical appraisal of evidence. The evidence was evaluated for level and quality. A quality rating of B was established as the minimum standard for evidence used to answer the evidence-based practice (EBP) question guiding this evidence-synthesizing project. Evidence were evaluated on their methods, significance of their statistical tests, reliability, validity, and bias. Credibility, trustworthiness, and generalizability were also included in the analysis of the identified articles in this review. Tables were created to consolidate the findings. Appendix 1 contains a succinct analysis and research rating based on the Johns Hopkins Nursing Evidence-Based Practice Model and Guidelines (Dearholt & Dang, 2012). Appendix 2 contains an evidence summary that includes a synthesis of the levels of evidence identified to answer the question, what are the effects of simulations compared to no simulations on perception of self-efficacy and confidence in in pre-licensure baccalaureate nursing students in the undergraduate setting?

CHAPTER III

LITERATURE REVIEW AND ANALYSIS

Quality of patient care is of national concern. Nurses are devoted to patient care and spend a great deal of time with patients. As the complexity of care increases and patients and their families become responsible for more care at home, nursing care and nursing education become critical to the impact on patient safety outcomes (IOM, 2004). Education of enough competent and qualified nurses to participate in patient care is indispensable to the maintenance of patient quality and safety. The National Council of State Boards of Nursing (NCSBN) has identified simulations as an effective technique in nursing education (Alexander et al., 2015). In order to improve simulation education, it is beneficial to review best practices in simulation as an educational technique. Bandura's (1993) work on behavior supported the notion that increased self-efficacy and confidence are indicators of one's belief in their ability to perform and reflect potential future clinical actions. Self-efficacy and confidence are self-reported measures of one's ability to carry out skills or care and because of such are beneficial to the evaluation of simulation-based activities.

Due in part by the increased support of simulation by the National League for Nurses (2015), there is a growing body of evidence on simulations. Although there is a great deal of evidence that supports simulation, further research is needed that synthesizes current findings on the effectiveness in nursing education.

While many studies have evaluated simulation effects on student's perception of self-efficacy and confidence, they are smaller in scope. While it is valuable to identify evidence from a singular source of evidence, a synthesis of cumulative findings could have a greater impact on education. The purpose of this evidence-synthesizing project was to review and critically

appraise current literature regarding how simulation affects self-efficacy and confidence in nursing students in pre-licensure baccalaureate undergraduate programs. The goal is to identify an accumulation of methods and strategies in simulation, both positive and negative, which can be applied to improve perceived levels self-efficacy and confidence in undergraduate nursing students and direct future research to improve quality patient care and to answer the question, What are the effects of simulations compared to no simulations on perception of self-efficacy and confidence in in pre-licensure baccalaureate nursing students in the undergraduate setting?

The review of literature will address three areas of research related to the effects of simulation on student's perception of self-efficacy and confidence. The first section looks at more specifically at the effects of simulation on student's perceptions. In the second section there will be review of different design methods of simulation and how they affect student's perceptions. Finally, the last section will evaluate research focused on the sequencing of simulations, and it effects students 'perceptions. The Johns Hopkins Nursing Evidence-Based Practice Model and Guidelines (Dearholt & Dang, 2012) helped guide the critical appraisal of evidence

Effects of Simulation

Struksnes and Engelién (2016) performed a quantitative, descriptive study, that applied a cross-sectional survey that examined the perception of nursing students learning skills pre and post clinical placement. Struksnes and Engelién's (2016) evaluated sponge baths for their patient simulation and clinical placement assessment. The study method included a purposive sample of 187 full and part time undergraduate nursing students. The students participated in two questionnaires, one following a simulation and then a second one proceeding 10-week clinical practicum. The first questionnaire addressed whether the student had any previous clinical

experience and if they were full or part time. The second questionnaire used a seven-part Likert scale questionnaire borrowed from the National League for Nurses (Tosterud, Hedelin, & Hall-Lord, 2013). The scale reviewed student satisfaction with learning and self-confidence from a scale of 1 to 5, from strongly agree to strongly disagree. SPSS statistics program was used to evaluate mean scores, frequencies, percentages, whether students were full time or part time and whether students had any previous clinical experience or not. A *t*-test was conducted to review group differences with a *p* value of $< .05$ considered acceptable.

Struksnes and Engelién (2016) reported that most students found the simulation to be beneficial and a positive experience before and after the clinical experience, yet more declared mastery after clinical experience with a *t*-test of group differences of ($p = .003$). Of note, students noted the greatest benefit from performing the patient role, 85%, and identified that it helped them to understand the needs of the patient. An unusual finding was that students with previous experience in the clinical setting identified more clinical mastery than students without with significant group differential *t*-tests $p = .000$ versus $p = .004$).

Struksnes and Engelién (2016) identified weaknesses in their methodology. Response rates of the students were high, but self-reporting provided no measurable data on skill level. Student experiences between testing can potentially affect the answers on the second questionnaire. The instrument chosen for data collection was translated from Norwegian which can contribute to errors in translation, although reliability was tested using Cronbach's alpha with an acceptable value of Cronbach's $\alpha = .77$. Validity of the tool was preestablished and was obtained from the National League for Nurses (Tosterud, Hedelin, & Hall-Lord, 2013).

Overall, the article was rated at a Level III B. The cross-sectional study is an effective means for description across time. The sample is purposive and not convenience because of the

student's knowledge of bed baths and the desire of the researchers to study simulation training of bed baths. The bias from sampling is lessened because all students who participated in the mandatory education were offered to participate. The only exclusions were the students who did not complete the program. The sample plan was small, but fully explained with rationales. The fact that some students refused to participate and that some did not complete the program could infer some bias but the sample appears to be a representative sample of the nursing student population. Along with limiting bias, the authors made efforts to apply an established tool for their questionnaire and account for acknowledge differences that may affect outcomes.

Potential threats to internal and external validity were identified. Sampling was identified as purposive but can easily be considered convenience and this does suggest some threat to selection bias and selection effects of external validity. Some students did not complete the program and serve as an example of mortality and pose a threat to internal validity and to selection effects of external validity. Maturation is a threat because of the time lapse between training and ability of students to learn new skill in that time. Maturation poses a threat to selection effects and measurement effects of external validity as well as internal validity. The data was collected via student self-reporting, which can pose a threat to internal validity of instrumentation, and to measurement effects of external validity. The authors translated the instrument from English into Norwegian, which can infer a threat to internal validity and to measurement effects of external validity.

Dunn, Osborne, and Link (2014) performed a non-experimental quantitative comparative study that evaluated the influence of simulation on students' sense of self-efficacy with patient communication and physical care. The participants included 26 juniors in a baccalaureate-nursing program in the Midwest who completed their required training on high fidelity

simulation (HFS). The participants were all female aged 19-43; with 20 of the 26 identified as Caucasian. The students participated in high fidelity simulation training twice weekly for eight weeks, which consisted of core nursing skills and critical thinking applying active learning strategies. Students responded to the Nursing Student Self-Efficacy Scale that was previously tested for validity in measures of self-efficacy (Stump, Hussman, & Brem, 2012) before the beginning of the training sessions and after their conclusion.

The Nursing Student Self-Efficacy Scale (NSSSES) tool applied measured 20 items and has two subscales that measure Communication Skills and Psychomotor Skills and was previously substantiated (Dunn, Osborne, & Link, 2014). A five-point Likert scale was applied with 1 being not confident and 5 being completely confident. The Communication skills subscale assessed student confidence in their ability to communicate and the Psychomotor Skill assessed confidence in physical care. Psychomotor Skills was validated with the item-response theory. Cronbach's alpha was applied to assess internal consistency for both scales. Cronbach's alpha was identified as satisfactory at 0.95 for Communication Skills and 0.94 for Psychomotor Skills (Dunn, Osborne, & Link, 2014). Analysis of both scales included a paired *t*-test to evaluate whether mean scores on the posttest was significantly higher in than the mean in the pretest.

Results indicated that nurse efficacy was significantly greater in the posttests in both communication and physical care. Posttest nurse efficacy for communication ($M = 4.44$, $SD = 1.49$) was significantly greater than pretest efficacy ($M = 4.08$, $SD = 0.10$) after HFS training; $t(24) = 3.17$, $p < .01$ (Dunn, Osborne, & Link, 2014). Posttest physical care was significantly greater for physical care ($M = 2.64$, $SD = 0.16$) was significantly greater than pretest efficacy ($M = 1.81$, $SD = 0.16$) after HFS training; $t(24) = 5.01$, $p < .01$ (Dunn, Osborne, & Link, 2014).

Dunn, Osborne, and Link's (2014) study supported their assumption that HFS may be a valuable tool for increasing nursing student confidence and self-efficacy. Dunn, Osborne, and Link (2014) identified that small sample size and the subjective self-reporting were limitations to this study. The researchers also noted that a larger more diverse sample may increase generalizability, as their study was limited to a small homogenous sample.

Dunn, Osborne, and Link's (2014) study is at a Level III B. There was no manipulation of the control, all students received the same training. The authors identified gaps in the literature and were clear in their purpose. The literature review was current and relevant. The process of data collection was clearly presented. Reliability was established and Cronbach's alpha for the two were 0.94 and 0.95. Validity of the tool was previously substantiated, the results were clear, limitations discussed, and conclusion based on findings. Dunn, Osborne, and Link's (2014) research study supports the notion that HFS improves undergraduate baccalaureate nursing student's perception of self-efficacy. Students from their study reported improvement in both physical skills and communication following HFS. The measurement tool was validated, and their data were statically significant.

Several threats to internal and external validity were identified. For example, the sample was one of convenience with only 26 junior nursing students participating in the study. The small convenience sample elicited a threat to internal validity of selection bias and also a threat to external validity of selection effects. In addition, the instrument used to operationalize self-efficacy required self-reporting which can contribute to the threat to internal validity of instrumentation and measurement effects of external validity. Since the NSSSES (Dunn, Osborne, & Link, 2014) was administered before and after students' simulation experience, the

threat to internal validity of testing also may exist which also may contribute to reactive effects of external validity.

Wheeler and McNelis (2014) evaluated the effectiveness of simulation for a home-based visit for community-based education and nursing student perception of the learning from the home-based simulation. The Wheeler and McNelis (2014) applied non-experimental mixed methods approach to gain quantitative and qualitative data for their descriptive study. They used a convenience sample of 144 traditional baccalaureate nursing students, 112 from a large metropolitan program and 32 from a small private institution. Quantitative data were collected via the assessment of three instruments that had students evaluate the teaching methods. The three tools were previously substantiated and came from the National League for Nursing (2018) and include the Student Satisfaction and Self-Confidence Scale (SSSC), the Educational Practice Scale for Simulation (EPSS), and the Simulation Design Scale (SDS). The three instruments applied a Likert scale with 1 being strongly disagree and 5 being strongly agree. Cronbach's alphas for all instruments ranged from 0.86 to 0.96 (Jeffries, 2007). Quantitative data indicated high levels of student satisfaction with learning with a mean of 4.43 (SD=0.53), self-confidence with a mean of 4.23 (SD=0.48), perception of teaching methods, and support of the design with a mean of 4.4 (SD=0.5). Qualitative data collection involved semi structured recorded interviews in a focus group setting with field notes. Qualitative data were reviewed using a modified constant-comparative approach established by Glaser and Strauss (1967) and Lincoln and Guba (1985). The interviews were coded and supported four themes: the simulation was realistic; learning was fun, they had to think outside the box, and that self-selecting roles in the scenarios was beneficial. High points noted in the simulation were the creation of realism, critical thinking, and debriefing. Barriers were not identified but quantitative findings were consistent

and qualitative data verified two themes: being forced to work outside the box and learning was fun.

The authors applied mixed methods in a descriptive study to describe the effects of simulation on undergraduate nursing students in a clinical health. The purpose of the study was clear, gaps in knowledge identified, and literature review was current at the time it was published. The sample was a convenience sample between two schools. The sample between programs was evaluated for differences in variables and nothing of significance was identified but the convenience sample lessens generalizability. Data collection was clear, and the Quantitative instruments were previously established and developed by the National League for Nursing. Reliability was established with Cronbach's alphas all greater than 0.86. Quantitative analysis applied SPSS software to determine internal consistency, reliability, and descriptive statistics such as measures of central tendency and variation. Qualitative analysis applied the standards previously established by Lincoln and Guba (1985) and included a modified constant-comparative approach and based on previous work by Glaser and Strauss (1967) and Lincoln and Guba (1985) on grounded theory. Not all qualitative data was reviewed but it was noted that analysis resulted in 106 codes that were reduced to four themes (Wheeler & McNelis, 2014). The limitations were not discussed but the conclusions were based on findings.

Wheeler and McNelis' (2014) study is at a Level III B. Since this study used mixed methods, two types of critical appraisal were necessary. In terms of the quantitative portion of the study, Wheeler and McNelis (2014) used a convenience sample without the benefit of a power analysis for determination of sample size. Therefore, even though 144 nursing students participated in the study, the threat to internal validity of selection bias and the threat to external validity of selection effects may exist. Since a pretest and posttest were administered, the threat

to internal validity of testing may be present and may suggest reactive effects of external validity. All three instruments used for this study used a Likert scale and therefore provided self-reported data. As a result, the threat to internal validity of instrumentation may be present, as well as measurement effects of external validity. In terms of the qualitative portion of the study, interviews were conducted in a focus group setting by the researchers. Credibility of the qualitative results was indicated by direct quotations which provided evidence for the elicited themes identified. The section of the reported method and analysis of findings of the qualitative portion of the study was brief, yet fittingness was present as the conclusions of the qualitative component of the study were based on the qualitative findings. The presence of auditability and transferability for the qualitative portion of the study was not able to be established based on the brevity of the published report.

Cantrell, Meyer, and Mosack (2017) performed a systematic review of the literature to evaluate the effects of simulation training on students' level of anxiety, stress, and self-efficacy. The review evaluated 17 quantitative and qualitative studies from 2010 to 2015 that investigated the effects high fidelity simulation had on student's levels of anxiety and stress. A 12-step guideline previously established (Kable, Pich, & Maslin-Prothero, 2012) was used as the framework for the review. Two researchers searched the databases and search engines that included: Educational Resources Information Center, Google Scholar, Cumulative Nursing Index, Medline (EBSCO), Medline (ProQuest), PubMed, Cochrane, Consumer Health Complete, Health and Wellness Resources Center, ProQuest Nursing and Allied Health Source. Keywords and Boolean combinations included the terms nursing students, stress, anxiety, self-efficacy, and simulation. In addition, key words systematic reviews and meta-analysis were used in an attempt to find more research, but no results were identified that met the inclusion criteria. Inclusion criteria

included: studies in English, published works between 2010 to 2015, studies in which HFS was an intervention in a nursing program, studies that evaluated stress and or anxiety, and studies that were identified as primary quantitative or qualitative research. Exclusion criteria included exclusion of those not meeting the inclusion criteria and studies not identified as peer reviewed. A total of 364 studies were identified and after review of titles and abstracts to meet inclusion and exclusion criteria 20 studies were identified. Later, three articles were removed because the measurement of stress or anxiety was not related to HFS.

The studies were appraised using the Joanna Briggs Institute Levels of Evidence (JBI, 2014). The authors synthesized the findings by method. The findings were identified and appraisal results were listed clearly in a table that listed the authors, purpose of the study, sample and design, the variables or instruments, the results, the implications and the level of evidence. The review found that students reported higher levels of stress with simulation than with clinical. The students did however; believe that simulations are valuable and stated satisfaction with the method. Findings supported simulation training but identified that stress reducing measures would help to facilitate student learning and increase student self-efficacy.

Cantrell, Meyer, and Mosack's (2017) review was a Level III A. The purpose of the systematic review was clear, and they did indeed review literature related to nursing student stress before, during, and after simulations. The method of literature research was comprehensive, included inclusion criteria, key terms, and the reason for any exclusion. A diagram of the method as well as the table with a comprehensive review of the articles was provided. The findings were provided, directives for further research proposed, and the recommendations were based in the findings. The findings support simulation in nursing

education as beneficial, but their findings indicate that future efforts on relieving nursing student stress in simulations would be beneficial.

Different Methods of Simulation

Several selected studies evaluated the perceptions of students following specific types of simulation. Prince, Winmil, Wing, and Kahoush (2016) performed a mixed methods descriptive study that evaluated the perception of students who participated in multiple-patient simulations. Their study consisted of 52 students in their final laboratory rotation of their medical surgical course that participated in multiple-patient simulations. Anonymous pre and post questionnaires that consisted of three affective and nine self-efficacy questions created by two content experts were used. The debriefing questionnaire contained an open-ended question that asked about suggestions for improving the simulation experience. The findings from their pre-briefing and debriefing questionnaires indicated acceptable reliability (pre-Cronbach's $\alpha = 0.754$; debriefing, Cronbach's $\alpha = 0.871$). A 5-point Likert scale was used to evaluate the difference between the means of the pre-briefing and post briefing responses. The results indicated that students perceived increased confidence, self-efficacy, and motivation following multiple-patient simulations since calculated scores improved in each category. The affective statements focused on motivation and attitudes and included an ability to use what one learned, believing the material was useful to learn, and an ability to use the what was gained in practice. Mean differences between pre-briefing and debriefing questionnaires had a mean difference that ranged from +0.06 to +0.31. Pre-briefing and post briefing self-efficacy mean differences ranged from +0.06 to +0.69. The open-ended questions were only answered by 47 of the 52 students. Qualitative responses were categorized into 4 categories based on frequency of responses. Qualitative findings highlighted a desire for more multiple-patient experiences, more

realistic to hospital setting, helps with critical thinking and prioritization, and a desire to work in small groups and more time to work through the multiple patient simulations (Prince et al., 2016).

The study by Prince, Winmil, Wing, and Kahoush (2016) is at a level III B. Since this study used mixed methods, two types of critical appraisal were necessary. Regarding quantitative design, several threats to internal and external validity were identified. The researchers used a convenience sample of students enrolled in a course and did not perform a power analysis for determination of sample size. As a result, the threat to internal validity of selection bias and the threat to external validity may exist. Also, the threat to internal validity of testing related to the pre and post testing may have weakened the study. Internal validity also may have been weakened by the threat of instrumentation. Specifically, the researchers used content experts to create the questionnaire and did not address why a previously substantiated tool was not used. In terms of the qualitative portion of the study, credibility was supported by direct quotations of examples from categories identified. Fittingness was present as qualitative findings were reported separately and based on the open-ended questions. Audibility and transferability is limited due to the conciseness of the authors' report. The research mentioned the process and indicated that four categories were identified but a table or separate listing of the four categories was not provided. The findings do suggest that multiple patient simulations are positive.

Baptista et al. (2016) performed a randomized control study that looked at the differences in perceived gains in nursing students from medium and high-fidelity simulations. The authors used the Satisfaction with Clinical Experience Simulation Scale (Baptista et al., 2014) and the Gains Perceived with High-fidelity Simulation Scale (Baptista et al., 2016) to assess and compare

differences in medium and high-fidelity simulation. The interventions included training on how to respond to patients in a critical situation applying the concepts of airway, breathing, circulation, and neurologic status, a trainer's guide, and a digitally prepared clinical file for each simulation patient. (Babtista et al., 2016). A power analysis was performed to determine appropriate sample size for each inventory scale. Eighty-five students participated in the study with 36 in the control group, medium fidelity, and 49 in the experimental group, high-fidelity. Sample size was sufficient for the Satisfaction with Clinical Experience Simulation Scale but not met with the Gains Scale. Randomization for placement into the experimental and control groups was obtained through SPSS. The Mann-Whitney U test and the Wilcoxon signed-rank test were used to analyze differences in the groups.

Student satisfaction was high with high in both groups in all dimensions. The average level of satisfaction was at 77.77% (SD= 11.29) in the control group and 90.04% (SD=7.46) in the experimental group. Comparison of the control and experimental group was statistically significant in the realistic dimension ($U= 324.50$, $W= 990.50$, $p <0.001$) and overall satisfaction ($U= 557.50$, $W= 1223.50$, $p <0.001$) (Babtista et al., 2016). Both groups reported simulation to be important to the learning process and expressed gains with 75.55% (SD=10:45) in the control and 82.99% (SD= 9:13) in the experimental group. Comparison of the two groups found recognition/decision making to be the only one statistically significant ($U=626.00$, $W= 1292.00$, $p <0.05$) (Babtista et al., 2016). Interpretation of results indicates gains from both medium and high-fidelity simulation but found consistently greater gains with high fidelity simulation, particularly in realism and overall satisfaction. The study results are useful in that they highlight statistically significant results that encourage the application of high fidelity over medium fidelity simulation particularly in recognition and decision making.

Babstista et al. (2016) study was at a Level I A. The researcher identified what is known, addressed gaps, and clearly identified that they wanted to analyze and compare differences in gains and satisfaction in medium and HFS. The study consisted of a small convenience and voluntary sample prior to randomization. However, sufficient numbers of subjects were met for the Satisfaction Scale but not the Gains Scale which indicates the threat of internal validity of selection bias and threat of external validity of selection effects. The threat of selection effects limits generalizability of study findings. Initially, 102 students agreed to participate in the study. At the conclusion of the study, 85 students remained posing the threat of mortality for the internal validity of the study. The threat to internal validity of instrumentation may be present because of the self-reported nature of the Likert scale instruments used to measure outcome variables for the study.

Franklin, Gubrud-Howe, Sideras, and Lee (2015) conducted a pilot randomized control trial, experimental study that looked at effects of simulation preparation methods on students' perception of self-efficacy and competence and examined the change in competence and self-efficacy. Franklin et al. (2015) applied the methods from a former study (Franklin, Sideras, et al., 2014) to conduct this pilot study. Twenty senior nursing students participated. Preparation methods for a multi-patient simulation included voice-over PowerPoints, expert modeling, and reading assignments. Data was collected using the National League for Nursing Student Satisfaction and Self Confidence Scale (Jeffries & Rizzolo, 2006) pre and post a five-week preparation and simulation (Franklin et al., 2015). Results indicated that voice-over Power Points and expert modeling improved perception of competence and self-efficacy but there was no relationship determined between competence and self-efficacy over time.

Franklin, Gubrud-Howe, Sideras, and Lee 's (2015) builds on previous findings and established tools. Their literature review and support were current and relevant. The demographics and interventions were similar within each group. Data collection measure were described, and statistical significance reviewed. ANOVA results indicated no significant relative change between groups ($F(2, 17) = 2.37, p = 0.124, \eta^2 = 0.218$). Relative change was identified to be higher in the modeling (Cohen's $d = 1.068$) and in the voice over PowerPoint group (Cohen's $d = 1.363$). Although no significant results were found among groups, when the modeling group and the PowerPoint group were compared to the reading group the results were significant, $t(18) = -3.08, p = 0.003$, Cohen's $d = 1.501$. No relationship was found between change in competence and change in self-efficacy. Results from this study support active learning strategies of modeling and voice over PowerPoint over reading to prepare students for clinical simulations. Change in confidence along with self-efficacy was not found to be statistically relevant and no relationship identified. Further work is needed to compare self-efficacy and competence over time.

Franklin, Gubrud-Howe, Sideras, and Lee 's (2015) RCT is a Level I B. The small convenience sample suggests selection bias and poses threats to internal validity and selection effects of external validity. The data was collected via student self-reporting, which can pose a threat to internal validity of instrumentation, and to measurement effects of external validity. Since the NCLS (Jeffries & Rizzola, 2006) was administered before and after students' simulation experience, the threat to internal validity of testing also may exist which also may contribute to reactive effects of external validity.

Lestander, Lehto, and Engstrom (2016) performed a qualitative descriptive research study that evaluated the effects of a Three-step Post-simulation Reflection Model to explore the value of reflections after HFS on student learning. Undergraduate nursing students participated in a high-fidelity simulation and then participated in a Three-step post-simulation reflection model that combined verbal and written reflections. Reflective text completed pre and post group reflection was subjected to qualitative content analysis (Graneheim & Lundamn, 2004) and themes and categories. The reflection model combined with verbal and written findings indicated that ongoing reflection improved student's perception of learning and decreased stress and allowed them to learn from their failures. The students did note increased perceptions of confidence over time, with more reporting they were maturing as a nurse. This study supports the use of student driven debriefings and reflective exercises in addition to standard debriefings in simulation education to improve self-confidence because it encourages active learning and group participation.

The study is at a level of III A. The authors were rigorous in their methods. The Three-step model Post-Stimulation Model was clear, and the detailed reflections were thoroughly analyzed. The content analysis applied the previous qualitative works to establish trustworthiness by Graneheim and Lundman (2004) and enhance credibility. Credibility was further enhanced by the review and analysis of the content for themes and categories by each author. Audibility was addressed as the authors listed each theme, discussed findings, and provided example quotations for each category. The findings were applicable to the study situation, meaningful to the researchers, relevant to the literature findings, and interpretations true to the data findings, fittingness.

Au, Lo, Cheong, Wang, and Van (2016) performed a qualitative exploratory study of first year undergraduates nursing students who were evaluated to assess their perceptions of high fidelity simulation instead of clinical placement activities. The study was implemented in a nursing lab and the demographics of the students were similar. All students were first year nursing students. Open ended questionnaire was provided after students participated in two HFS. Qualitative content analysis was performed. Data collected were reviewed for coding and themes. The themes from the review of findings included appreciation, positive feelings, gaining a suitable atmosphere for learning, adequate emergency preparedness, misunderstanding, contempt, and rote learning (Au, Lo, Cheong, Wang, & Van, 2016). Their findings indicated that simulation was useful for preparing students for real clinical and for developing resourcefulness. There was an overall satisfaction with high fidelity simulation, with over 85% considering high fidelity simulation a relaxing atmosphere to learn verses the clinical environment (Au et al., 2016). Barriers were only that first-year students participated. Other relevant findings noted a small percentage of students that disliked caring for artificial patients and there were concerns for rote learning. Recommendations included continued efforts to engage students and create realism to discourage contempt and rote learning.

Au, Lo, Cheong, Wang, and Van (2016) study is at a Level III A. The literature review was current, and the purpose clearly stated. The process was clearly described. The sample size was purposive and voluntary. Data saturation was not identified but the research findings were reviewed using qualitative content analysis. Three authors reviewed the content to obtain code and a based-on content and themes with a table of data provided, credibility. To ensure trustworthiness the framework by Lincoln and Guba (1985) was applied. Participants were encouraged to be honest to enhance to enhance credibility. Audibility was clear as the authors

very clearly presented their research process. After coding, the themes were reviewed with the students to confirm findings and support confirmability and credibility. The design was fitting to the topic and the findings based on the data provided. The population was limited to novice students, encompassing more experienced nursing students could enhance future data collection and deeper exploration.

Sequencing of Simulation

Ogilvie, Cragg, and Foulds (2011) conducted a qualitative descriptive study that evaluated the perceptions of student outcomes following simulation that focused on a four-part method. Participants received 4 days of high-fidelity simulation that contained the elements of clinical scenarios, realism, facilitation, and debriefing. Outcomes evaluation found that students found simulation to be positive. Study participants highlighted the opportunity to hone assessment skills and take care of declining patients that they would not experience in the clinical setting. They also reported a bridging of the theory-practice gap because they could work through scenarios they would not see in the clinical setting. Students felt honing their skills helped prepare them for the clinical setting and allowed them to focus more on communication because they felt more confidence in their skills performance. Participants also stated that teacher facilitation style was important to their learning and stated a preference for instructors that are comfortable with simulation, allowed for mistakes, and only intervened if patient safety was at risk. Barriers identified by the authors of the study included a small participant group and a concern for the translation of student confidence and efficacy to competence.

Ogilvie, Cragg, and Foulds (2011) study is at a Level III B. The purpose was clear but only included 6 students out of the 10 who participated, with no explanation for their exclusion.

Demographics were considered, and methods of collection were made clear. The research process was clear, and transcripts were evaluated for content and clinical scenarios, realism, facilitation, and debriefing were identified as key elements of positive simulation, audibility. Credibility was enhanced as participants confirmed findings following data analysis. The data are meaningful and support that the identified elements enhanced knowledge development and skill acquisition, fittingness. Students from the group felt the identified elements, as well as chance to hone skills and knowledge in simulations prior to clinical, increased their confidence. Barriers to the study included the limited participation but findings are significant and indicate that simulations prior clinical placement increases student perception of confidence.

Woda, Gruenke, Alt-Gehrman, and Hanen (2016) performed a qualitative descriptive study based on the work of Jeffries (2012) that evaluated the placement of simulation learning modules both before and after hospital-based learning experiences on undergraduate nursing student perception of clinical decision making. The sample consisted of 117 undergraduate junior level nursing students. Students were randomly assigned into one of two groups. One group had 7 weeks of hospital learning experiences prior to simulations learning experiences and the other had 7 weeks of simulation learning experiences followed by hospital learning experiences. The 7-week simulation blocks consisted of three 4-hour HFS and one online simulation. A paper pencil questionnaire was provided after the two blocks and consisted of open ended questions about students perceived clinical decision making that the authors transcribed verbatim. Coding and analysis resulted in the emergence of three themes: pre-experience anxiety, real time decision making, and patient care experiences. The majority reported they preferred the simulation prior to clinical and that it decreased anxiety because simulation affords time for skills practice. Some students did however note that they had

increased confidence and awareness before the simulation experience. The results found no significant differences in clinical decision making between students who had hospital learning experiences first verses those with simulation experiences first. Both group however identified that simulations improved the confidence of their clinical decision making. Both groups also identified that increased patient care experiences, be it simulated or not, increased their confidence and decreased their anxiety with clinical decision making (Woda, Gruenke, Alt-Gehrman, & Hanen, 2016). The findings supported the nursing student confidence in clinical decision making with simulations regardless if they are provided before or after clinical based learning experiences.

Woda, Gruenke, Alt-Gehrman, and Hanen (2016) is at a level III A. The study design was clear and based around a strong established framework (Jeffries, 2012), audibility. A purposive sample was used, and students were randomly assigned to the two blocks. Data saturation was not the determinate of the sample size. Data collection included open ended questions that were transcribed verbatim, which enhances credibility. The findings are applicable to simulation design and research outside this study and method of evaluation is compatible with the research design, fittingness. The study results are presented and relate to the phenomenon of interest. The conclusion and recommendations are based on findings and provide relevant insight for future simulation design and research.

SUMMARY

A comprehensive review of current literature was provided for this evidence synthesis project. Literature was reviewed for their relevance to simulation effects on undergraduate baccalaureate nursing students' perception of self-efficacy and confidence. The evidence was

organized by three emerging themes; effects of simulation, differing methods of simulation, and sequence of simulations.

CHAPTER IV

RESULTS

Safe quality patient care is a national priority. Nurses have a direct impact into quality patient care (IOM, 2004). Quality of care is importance to patients, the nursing profession, and the government. Educating enough qualified and competent nurses is essential to efforts to support quality patient care. Simulations are increasingly being used in nursing education to teach students assessment skills, apply theory, develop clinical decision making, and hone clinical practice. Simulation has been identified as an effective means to teach students in a safe environment prior to clinical practice and can afford opportunities not often provided in hospital-based learning experiences (NLN, 2015).

With increasing application of simulation training in nursing education, it is important to evaluate the effectiveness of this method. Assessment of student perception of self-efficacy and confidence is one means of determining the efficacy of simulation as it is positively associated with competence (Bandura, 1993). While much research has focused on simulation and even some have evaluated simulation effects on student's perception of self-efficacy and confidence, they are smaller in scope. This project aimed to identify multiple sources of evidence that focus on simulation effects on undergraduate nursing student perceptions of confidence and self - efficacy. A synthesis of findings can help to provide a greater impact on the future design, and study of simulations, to improve this educational method and quality of care. The purpose of this evidence-synthesizing project was to review and critically appraise current literature regarding how simulation affects self-efficacy and confidence in nursing students in pre-licensure baccalaureate undergraduate programs. The goal is to identify an accumulation of methods and strategies in simulation, both positive and negative, which can be applied to improve perceived

levels self-efficacy and confidence in undergraduate nursing students and direct future research to improve quality patient care and to answer the question, what are the effects of simulations compared to no simulations on perception of self-efficacy and confidence in pre-licensure baccalaureate nursing students in the undergraduate setting?

Following a methodical literature search on simulation effects on undergraduate nursing student perceptions of self confidence and self-efficacy, 11 pieces of evidence were identified. The evidence was reviewed and critically appraised for its relevance to the evidence-base practice question. The evidence was categorized into three themes: effects of simulation, design methods of simulation, and sequencing of simulation.

Effects of Simulation

The pieces of evidence identified for effects of simulation included two quantitative studies, 1 mixed methods study, and 1 systematic review. All 4 pieces of evidence regarding the effects of simulation were identified as a level III. The quantitative studies and the mixed methods study were evaluated as a quality rating of B and the systematic review as a quality A. All 4 pieces of evidence are relevant and support the predetermined quality rating of B.

The first quantitative study by Struksnes and Engelién (2016) sought to apply a cross sectional design to describe the relationship between students' perception of learning skills following a sponge bath simulation both before and after clinical placement. Findings from the study indicated that most students identified simulation as beneficial both before and after the clinical, the greatest benefit was identified as playing the role of the patient, and students with previous clinical experience expressed more clinical mastery.

The second quantitative study by Dunn, Osborne, and Link (2014) applied a comparative study to evaluate the influence of simulation on students' sense of self-efficacy with

communication and physical care. Nursing students participated in HFS twice weekly for eight weeks and took part in a pre and posttest applying the Nursing Student Self-Efficacy Scale (NSSES) with two subscales that measure Communication Skills and Psychomotor Skills (Dunn, Osborne, & Link, 2014). The finding from this study identify that nursing student perception of self-efficacy was higher in in both communication and physical care following HFS.

The mixed methods study by Wheeler and McNelis (2014) sought to evaluate and describe the perception of nursing students' learning from a home-based simulation. Quantitative findings indicated high levels of student satisfaction with learning, self-confidence, perception of teaching methods, and support of the design. Qualitative findings identified four themes: the simulation was realistic, learning was fun, they had to think outside the box, and self-selecting simulation roles was beneficial. Students further identified that they were forced to think outside the box and that learning was fun.

The systematic review by Cantrell, Meyer, and Mosack (2017) sought to review literature to evaluate the effects of simulation on student's level of anxiety, stress, and self-efficacy. The review consisted of 17 articles that were appraised using the Joanna Briggs Institute Levels of Evidence (JBI, 2014). The review identified that students consistently reported higher levels of stress with simulations than with clinical. The review also found that students identified simulations as valuable and identified satisfaction with the method.

Different Methods of Simulation

Differing methodology was identified as a theme in the literature and consisted of five pieces of evidence. Greater levels of evidence supported different methods of simulation theme with two level I's and three level III's. The quality rating for the differing methods of simulation and consisted of three quality A's and two quality B's. The pieces of evidence were varied in

their approach and consisted of a mixed method study, a randomized control trial, a pilot randomized control trial, a qualitative descriptive, and a qualitative exploratory study.

The mixed methods study by Prince, Winnil, Wing, and Kahoush (2016) applied a mixed method design to evaluate and describe the effects of multiple patient simulations. Students completed a questionnaire that addressed nine self-efficacy questions and three affective questions, and responded to open ended questions. Quantitative comparison of the differences in self-efficacy, specified that students indicated increased confidence, self-efficacy, and motivation following multiple patient simulations. Qualitative data was collected via the open-ended questions. The responses to the open-ended questions were reviewed and coded and categorized into 4 themes; students desired more multiple patient simulations, the simulation was realistic, helps with critical thinking and prioritization, and a desire to work in smaller groups. Multiple patient simulations were determined to be a positive.

The randomized control study by Baptista et al (2016) compared perceived gains and satisfaction between students provided medium fidelity simulation and those provided HFS. Student's reported high satisfaction with both medium and HFS. Both groups expressed gains and found simulations important to the learning process. Recognition and decision making was higher in the HFS group. Comparison and interpretation found consistently greater gains with HFS, particularly in realism, satisfaction, and decision making.

Franklin, Gubrud-Howe, Sideras, and Lee's (2015) pilot randomized control trial evaluated effects of simulation preparation methods on student's perception of self-efficacy and competence and examined the change in competence and self-efficacy over time. Preparation methods for their multi patient simulation included voice-over PowerPoints, expert modeling, and reading assignments. Voice-over PowerPoints and expert modeling improved perceptions of

competence and self-efficacy. No relationship between competence and self-efficacy over time was identified.

The qualitative descriptive study by Lestander, Lehto, and Engstrom (2016) evaluated the effects of a Three-step Post-simulation reflective model that combined written and verbal reflections after HFS. Findings indicated ongoing reflections improved perceptions of learning, decreased stress, allowed them to learn from their failures, increased perception of confidence overtime, and an increase of nurses reporting they felt they were maturing as a nurse. This study supports student driven debriefings, reflective exercises, in addition to debriefings, as the Three-step model increases perceptions of confidence.

The qualitative exploratory by Au, Lo, Cheong, Wang, and Van (2016) identified as a Level III A explored first year nursing students experience with HFS in place of clinical placement activities. Themes identified included positive appreciation of simulation, identification of a suitable atmosphere for learning, adequate emergency preparedness, misunderstanding, and contempt for rote learning. Study findings supported simulation with over 85% of students indicated satisfaction with this method, who considered is a relaxing place to learn, but some noted a contempt for rote learning and disliked artificial patients.

Sequencing of Simulation

Findings from the theme of sequence of simulation identified a qualitative descriptive study at a Level III B and a qualitative descriptive study at a level III A. The qualitative study by Ogilvie, Cragg, and Foulds (2011) was at a Level III B and evaluated the effects of 4 days of HFS in place of hospital clinical time in an adult acute care for junior level nursing students. Following the simulation underwent semi structured interviews where 4 positive elements of the simulation environment were identified: clinical scenarios, realism, facilitation, and debriefing.

Bridging the theory practice gap, assessment and organization skills, safety and communication, teacher approach, and reflection were identified as methods that effected the positive elements of simulation. The positive elements of simulation also enhanced knowledge development, skill acquisition and lead to increased self-confidence. Students identified an improvement in skills and confidence from simulations prior to clinical.

Woda, Gruenke, Alt-Gehrman, and Hanen's (2016) qualitative study was identified as a Level III A and evaluated students perception of clinical decision making following simulations learning modules both before or after hospital-based learning activities. Students completed open ended questionnaires and the results were coded and analyzed with emergence of three themes: pre-experience anxiety, real time decision making, and patient care experiences.

Anxiety was reported to be lessened in the group who had simulations first. No differences in clinical decision making was identified between the group who had simulation before hospital-based experiences verses the those who had them after. Both group identified increased confidence with simulation and identified that all patient experiences increased confidence and lessened anxiety.

Quality

Most of the studies identified were at a level III, nine, and two were at a level I. The evaluation of self-efficacy and confidence requires self-report and frequently use Likert scales, open ended questionnaires or interviews for data collection. The effects of simulation pieces of evidence were all at a level III and the quality ratings were identified as either A or B. The quality was affected by the convenience samples, mortality, self-reporting, pre and post test design. The pieces pf evidence identified under the theme differing methods of simulation had the greatest level of evidence, with two at a level I and three at a level III, with all identified as a

quality A or B. Methodology affords more opportunity to control variables than the assessment of effects, hence the randomized control trials. Quality again was affected by the sample, self-reporting, pre and post test design, mortality, new questionnaires, and brevity of report. Evidence evaluated and categorized under the theme of sequencing of simulation included 2 level III, one at a quality of B and 1 at a quality A. The sequencing pieces of evidence were qualitative, and the quality was affected in one by the small sample and the brevity of report. Support of self-efficacy and confidence was identified more at a level III. Only pieces of evidence identified as a quality A or B were included for this review.

SUMMARY

This chapter reviewed the importance of quality nursing care, nursing education, increased use of simulations, and the need to improve simulations in undergraduate nursing pedagogy. Self-efficacy and self-confidence were identified as a means to evaluate the effectiveness of simulations and this chapter synthesized the findings and critiques of 11 identified pieces of evidence. The majority of the evidence was identified as a level III, 6 out of 11 identified as a quality B and 5 out of 11 identified as a quality A.

CHAPTER V

DISCUSSION AND CONCLUSION

Quality and safety in patient care are of local, national, and professional concern. Nurses serve large roles in the oversight, provision, and maintenance of quality of patient care. Educating enough qualified nurses is important to the assurance of quality patient care. Due to the shortage of clinical sites, and even clinical instructors, simulations are being incorporated into nursing curriculum to meet the learning needs of students. Assessment of this pedagogical approach is important to ensure the effectiveness of this method to improve learning and clinical performance. One identified means to assess simulation effectiveness is perception of self-efficacy and self-confidence, as it is positively associated with competence (Bandura, 1993). The aim of this evidence synthesizing project was to evaluate the evidence for simulation effects on student's perceptions of self-efficacy and self-confidence. The question guiding the search was, what are the effects of simulations compared to no simulations on perception of self-efficacy and confidence in prelicensure baccalaureate nursing students in the undergraduate setting? The purpose was to review and critically appraise current literature regarding how simulation effects undergraduate nursing student self-efficacy and self-confidence in baccalaureate programs.

The search for evidence resulted in 11 pieces of evidence, nine at a level III, and two at a level I. The quality of all the evidence are at the predetermined acceptable level of B. The themes identified included effects, differing methods, and sequencing of simulations. All evidence identified supported the application of simulation and noted increases in either undergraduate nurse self-efficacy and or self-confidence. The findings then answer the question guiding this project, what are the effects of simulation compared to no simulations on perceptions of self-efficacy and confidence in pre-licensure baccalaureate nursing students in the

undergraduate setting? The answer to the question is students with simulation identify increased perceptions of self-efficacy and confidence verses those without.

Discussion of Findings

The findings from this project were categorized into the themes of effects of simulation, differing methods of simulation, and sequencing of simulation to improve clarity. The theme of effects highlighted that students identified simulations as beneficial, both before and after clinical based learning activities, noted role playing had a great positive impact on simulation, and that students with previous clinical experience noted increased clinical mastery. The evidence also supported that students acknowledged increased satisfaction with this design and identified that simulations are realistic, make learning fun, improve outside the box thinking, and self-selecting roles was beneficial. HFS were also identified to improve student perception of self-efficacy in communication and physical care. Of note, students identified increased stress with simulations but identified it as a valuable and expressed satisfaction with the learning method.

Evidence identified under the theme of differing methods of simulations included five pieces of evidence that were identified as level I or III and at the predetermined quality rating of A or B. The evidence indicated that students identified increased perceptions of self-efficacy and confidence following multiple patient simulations and that students desired more multiple patient simulations, simulation was realistic, helped with critical thinking and prioritization, and students preferred the idea of working in smaller groups. One piece of evidence completed a comparison of medium fidelity simulation with HFS found that both student groups reported gains in self-efficacy and confidence, but greater gains were identified in the HFS group. The HFS group identified greater gains in decision making and reported increased satisfaction and

realism. Voice-over PowerPoints and expert modeling were identified as simulation preparation methods that improved perceptions of competency and self-efficacy. An examination of change in competence and self-efficacy found no relationship. A three-step post simulation model that combines written and verbal reflections following HFS was found to improve stress, allow students to learn from failures, increase perception of confidence overtime, and increase student perception of maturing as a nurse. Student led debriefings, reflection exercises, in addition to the standard simulation debriefing improve student perception of confidence. Evidence also found that when HFS was replaced with clinical placement activities, students noted simulations to provide a suitable atmosphere for learning, allowed for emergency preparedness, but contributed to some misunderstanding. Students identified HFS to be a relaxing place to learn but some noted a contempt for rote learning and disliked artificial patients.

Sequencing of simulation included two pieces of evidence that were identified as level III, with one at a level A and one at a level B. Simulations were identified to improve skills and confidence prior to clinical. Four elements of the simulations were identified to improve skills and confidence: clinical scenarios, realism, facilitation, and debriefing. Of note one study found the students identified increased anxiety if they had clinical before simulations but no difference were identified between groups who had clinical verses simulation first. Students exposed to simulation before or after clinical reported increased confidence and that all patient experiences lessened anxiety.

Implications of Findings

The findings support the continued inclusion of simulations as a pedagogical approach. Th findings support that incorporation of the findings from this evidence synthesizing project into simulation development and include: medium fidelity, HFS, multiple patient simulations,

role-play, role selection, student driven debriefings, verbal and written reflections along with debriefings, realism, instructors comfortable with simulations, and preparation with additional methods that may include voice-over PowerPoints and expert role modeling. Additional tools to facilitate simulation in nursing education identified is to address ways to decrease levels of anxiety and to consider more simulations as students note decreased anxiety and increased confidence with all experiences. Considerations can be made to make simulation groups smaller and to allow more student role selection, reflections, and debriefings. Simulation developers and participants should work to apply clinical scenarios and facilitate realism.

The methods identified in this study should help to facilitate the preparation of nurses with increased levels of self-confidence and self-efficacy. Students with improved levels of self-confidence and self-efficacy are more inclined to act and address the needs of the patient. These methods may also be applied to clinical based education, to improve not only skills, but self-confidence and self-efficacy of nurses at the bedside. By addressing the needs of students and staff, hopefully we can take a step further in the achievement of clinical quality.

Further research can look to apply multiple methods from this study to assess increases in perceptions of self-efficacy and self-confidence. One can also evaluate the relationship between self-efficacy and confidence to clinical competence and changes over time. Future investigation can also evaluate the application of these simulation tools to the clinical setting where practice is occurring daily.

Limitations for Consideration

It is important to consider that the evidence from this evidence synthesis project was limited by the evidence-based practice questions and the identified limits and exclusions. The evidence did not include professional groups or students outside of undergraduate nursing. The

search also only included evidence that included full text work from 2011 -2018. A greater body of support may be found with the inclusion of a larger search population. It is also important to consider that the quality of the evidence identified is affected by the nature of the topic, which is to assess students' perceptions, and thus is subject to self-reporting which effects validity. Most of the evidence was also affected by a convenience sample, and pre and post test design.

Identified Gaps in Findings

In this evidence synthesis project, multiple studies and methods were evaluated that look at nursing students' perceptions of self-efficacy and confidence. Many of the studies were small, some lacked generalizability to all clinical scenarios, and there is a pattern of concern around the translation of confidence and of self- efficacy to competence. Weaknesses identified with simulation as a method included stress, potential for rote learning, contempt for artificial patients, differences in self-efficacy of those with a history of clinical experience and those without, and lack of relationship between self-efficacy over time. Overall, the evidence consistently demonstrated increased student perception of confidence and self-efficacy and most of the evidence reviewed highlighted particular methods or tools that facilitated student learning.

CHAPTER SUMMARY

This chapter reviewed the concern for quality of patient care, role of nurses in overseeing that quality, application of simulation in nursing pedagogy, and evaluation of nursing student self-efficacy and confidence to evaluate this pedagogical approach. A discussion of the results of this evidence synthesis project was provided as well as an answer to the evidence-based practice question. The findings and implications to nursing education, practice, and research were discussed. Limitations of the study and gaps in the search and findings were identified.

the need to evaluate this pedagogical approach. The approach and evidence-based practice question of was based on the evaluation of simulations on students reported self-efficacy and self-confidence. A discussion To provide quality nurses, the proper education is needed, and application of simulation was identified as means to address a need in nursing education. The assessment of simulation was important for evaluation of nursing student outcomes and this project was aimed at addressing the effects of simulation on nursing student self-efficacy and confidence.

PROJECT SUMMARY

This project identified a local, state, national, and professional need for quality of care and acknowledged nurses as key players in the assurance of quality. The need to educate enough qualified nurses was identified, and clinical site shortages was identified as barriers to education. Simulations was identified as an acceptable method to teach nurses and self-efficacy and self-confidence were identified as means to assess the effectiveness of this pedagogical method. A systematic search strategy was identified, evidence collected, and filtered based on the identified inclusion and exclusion criteria.

The 11 identified pieces of evidence were analyzed and critically appraised. The analysis identified three themes: effects of simulation, different methods of simulation, and sequencing of simulation. The results were discussed as well as the levels of evidence and quality rating. Nine articles were identified at a level III and two articles identified at a level I. All evidence met the predetermined quality rating of B. Two appendices were created to assess level and quality and one to provide a quality synthesis of findings. A discussion of the results and findings was provided and included an answer to the evidence-based practice question. Simulations improve self-efficacy and self-confidence in baccalaureate nursing students in the undergraduate setting.

Implications to nursing education, research, and practices was included and limitations, and gaps were identified.

This project could be followed by further research that seeks to evaluate the relationship between perceptions of student self-efficacy and confidence to clinical competence. The methods identified from this evidence synthesis project to improve self-efficacy and confidence can be translated to the design of simulations in undergraduate nursing education and even in the clinical setting. Future study could also look at extending the research to include a larger population or even evaluate the perceptions in interprofessional simulations.

References

- Aebbersold, M., & Tschannen, D. (2013). Simulation in nursing practice: The impact on patient care. *The Online Journal of Issues in Nursing*, 18(2), Manuscript 6. doi: 10.3912/OJIN.Vol18No02Man06
- Alexander, M., Durham, C. F., Hooper, J. I., Jeffries, P. R., Goldman, N., Kardong-Edgren, S., . . . Crystal Tillman, C. (2015). NCSBN simulation guidelines for prelicensure nursing programs. *Journal of Nursing Regulation*, 6(3), 39-42.
- Au, M. L., Lo, M. S., Cheong, W., Wang, S. C., & Van, I. K. (2016). Nursing students' perception of high-fidelity simulation activity instead of clinical placement: A qualitative study. *Nursing Education Today*, 19, 16-21. doi.org/10.1016/j.nedt.2016.01.015
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191-215.
- Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist*, 28(2), 117-148.
- Cantrell, M. L., Meyer, S. L., & Mosack, V. (2017). Effects of simulation on nursing student stress: An integrative review. *Journal of Nursing Education*, 56(3), 139-144. doi: 10.3928/01484834-20170222-04
- Cronenwett, L., Sherwood, G., Barnsteiner, J., Disch J, Johnson, J., . . . Warren, J. (2007). Quality and safety education for nurses. *Nursing Outlook*, 55(3), 122-131.
- Dearholt, S. L., & Dang, D. (2012). *Johns Hopkins nursing evidence-based practice: Model and guidelines* (2nd ed.). Indianapolis, IN: Sigma Theta Tau International.

- Dunn, K. E., Osborne, C., & Link, H. J. (2014). High-fidelity simulation and nursing self-efficacy: Does training help the little engines know they can? *Nurse Education Perspectives*. 35(6), 403-404.
- Fang, D. (2013). Special Survey on vacant faculty positions for academic year 2012-2013. Retrieved from American Association of Colleges of Nursing, Washington, DC; 2013 <http://www.aacnnursing.org/Portals/42/News/Surveys-Data/vacancy12.pdf?ver=2017-07-12-143412-957>
- Franklin, A. E., Gubrud-Howe, P., Sideras, S., & Lee, C. S. (2015). Effectiveness of simulation preparation on novice nurse's competence and self-efficacy in multiple patient simulation. *Nursing Education Perspectives* 36 (5), 324-325.
- Franklin, A. E., Sideras, S., Gubrud-Howe, P., & Lee, C. S. (2014). Comparison of expert modeling verses voice-over Power-Point and presimulation readings on novice nurses' competence for providing care to multiple patients. *Journal of Nursing Education*, 53, 615-622.
- Glaser, B., & Strauss, A. (1967). *The discovery of grounded theory*. New York. NY: Aldine.
- Hayden, J. K., Smiley, R. A., Alexander, M., Kardong-Edgren, S., & Jeffries, P. R. (2014). The National Council of State Boards of Nursing national simulation study: A longitudinal, randomized, controlled study replacing clinical hours with simulation in prelicensure nursing education. *Journal of Nursing Regulation*, 5(2), 1-66.
- Institute of Medicine (U.S.). Committee on the Work Environment for Nurses and Patient Safety., & Page, A. (2004). *Keeping patients safe: Transforming the work environment of nurses*. Washington, DC: National Academies Press.

- Jeffries, P. R. (2012). *Simulation in nursing education: From conceptualization to evaluation* (2nd ed.). New York, NY: National League for Nursing.
- Jeffries, P. R. & Rizzolo, M. A. (2006). Designing and implementing models for the innovative use of simulation to teach nursing care of ill adults and children: A national, multi-site, multi-method study [Summary Report]. New York, NY: National League for Nursing.
- Joanna Briggs Institute. (2014). *Levels of evidence and grades of recommendation*. Retrieved from <http://joannabriggs.org/jbi-approach.html#tabbed.nav=Levels-of-Evidence>.
- Kable, K. M., Pich, J., & Maslin-Prothero, S. E. (2012). A structured approach to documenting a search strategy for publication: A 12-step guideline for authors. *Nurse Education Today*, 32, 878-886.
- Lincoln and Guba (1985)- see wheeler
- Lopreiato J O. Healthcare Simulation Dictionary. Rockville, MD: Agency for Healthcare Research and Quality; October 2016. AHRQ Publication No. 16(17)-0043.
- National League for Nursing (NLN). (2015). *A vision for teaching with simulation* [NLN Visions Series]. Retrieved from [http://www.nln.org/docs/default-source/about/nln-vision-series-\(position-statements\)/vision-statement-a-vision-for-teaching-with-simulation.pdf?sfvrsn=2](http://www.nln.org/docs/default-source/about/nln-vision-series-(position-statements)/vision-statement-a-vision-for-teaching-with-simulation.pdf?sfvrsn=2)
- Prince, W. L., Winmill, D., & Kahoush, A. (2016). Nursing student's perceptions of a multiple-patient simulation experience. *Nursing Education Perspectives* 37(6), 331-332.
- Rama, L. & Sarada, S. (2017). Role of self-esteem and self-efficacy on competence - A conceptual framework. *IOSR Journal of Humanities And Social Science*. 22(2), 33-39.

- Sittner, B.J., Aebbersold, M.L., Paige, J.B., Graham, L.L.M., Schram Parsons, A., Decker, S.I., & , L. (2015). INACSL Standards of best practice for simulation: Past, present, and future. *Nursing Education Perspectives*, 36(5), 294 – 298.
- Society for Simulation in Healthcare (2015). *About simulation*. Retrieved from [http://www.ssih.org/ About-Simulation](http://www.ssih.org/About-Simulation)
- Struksnes, S., & Engelién, R. I. (2016). Nursing students' conception of clinical skills training before and after their first clinical placement: A quantitative, evaluative study. *Nurse Education in Practice*. 16(1), 125-132. doi: 10.1016/j.nepr.2015.10.009
- Stump, G. S., Husman, J., & Brem, S. K. (2012). The nursing student self-efficacy scale: development using item response theory. *Nursing Research*, 61(3), 149–58. doi: 10.1097/NNR.0b013e318253a750.
- Tang, N., Eisenberg, J. M., & Meyer, G. S. (2004). The roles of government in improving health care. *Joint Commission on Quality and Safety* 30(1), 47-55.
- The Joint Commission (2018). About the joint commission. Retrieved from [https://www jointcommission.org/about_us/about_the_joint_commission_main.aspx](https://www.jointcommission.org/about_us/about_the_joint_commission_main.aspx)
- Tosterud, R., Hedelin, B., & Hall-Lord, M L. (2013). Nursing students' perceptions of high- and low-fidelity simulation used as learning methods. *Nurse Education in Practice* 13(4), 262-270.
- Wheeler, C. A., & McNelis, A. M. (2014). Nursing students' perception of a community-based home visit experienced by a role-play simulation. *Nurse Education Perspectives*. 35(4), 259-261. doi: 10.5480/12-932.1

Woda, A. A., Gruenke, T., Alt-Gehrman, P., & Hansen, J. (2016). Nursing student perceptions regarding simulation experience sequencing. *Journal of Nursing Education*. 55(9), 528-532.

Appendix A

Evidence Summary

#	Author and date	Type of evidence	Sample and setting	Findings supporting EBPO	Limitations	Level of Evidence	Quality of Evidence
1	Struksnes, S., & Engelién, R. I. (2016)	Non-Experimental Study	187 first year nursing students Simulation lab at a Norwegian university college.	Students found the simulation exercise beneficial both before and after the internships. 85% of students identified that the role of patient was useful and 79% identified the role of nurse in simulation as valuable. There were no significant differences in part time and full-time students in regard to the conceptions of the simulation.	Purposive sample infer some selection bias. Not all students completed the program and represent mortality and a threat to internal validity. Maturation poses a risk to selection effects and self-reporting pose a threat to instrumentat ion. Measurement effects are of concern due to translation from English to Norwegian.	III	B
2	Dunn, Osborne, & Link. (2014)	Non-Experimental Study	26 junior level baccalaureate nursing students at a Midwest nursing program	Nursing student self-efficacy in patient communication was identified to be significantly greater following HFS. Nursing student self-efficacy in	Small convenience sample represents potential selection bias and poses a threat to internal validity and external validity of selection	III	B

				physical care was identified to be significantly greater in physical care following HFS.	effects. Pre and post test design pose a threat to internal validity of testing and may contribute to reactive effects of external validity.		
3	Wheeler, C. A., & McNelis, A. M. (2014).	Non-experimental, mixed methods study	144 nursing students, 32 at a private college and 112 at a large city university	Role play increases self-confidence. Simulation was identified to increase self-confidence and perceptions of active learning, collaborative, diverse, and high expectations of learning. Objectives, ongoing support, problem solving, feedback, and reflective exercises increased the fidelity of the simulation. Fidelity, realism, and debriefing supported the increased perceptions of self-confidence, as well as simulation in nursing education.	Convenience sample represents potential selection bias and poses a threat to internal validity and external validity of selection effects. Pre and post testing design pose a threat to internal validity of testing and may contribute to reactive effects of external validity. Data collected included self-report which poses a threat to instrumentation. The presence of audibility	III	B

					and transferability could not be established do to the brevity of the report.		
4	Cantrell, Meyer, and Mosack (2017)	Systematic Review	The review evaluated 17 quantitative and qualitative studies from 2010-2015 that investigated the effects high fidelity simulation had on student's levels of anxiety and stress	The review found that students reported higher levels of stress with simulation than with clinical. The students did however; believe that simulations are valuable and stated satisfaction with the method. Findings support simulation training but identified that stress reducing measures would help to facilitate student learning and increase student self-efficacy.	The literature search was limited to full text articles from 2010-2015 and only contained studies that measured stress and or anxiety related to HFS. The studies also included both undergraduate and graduate students.	III	A
5	Prince, Winnil, Wing, and Kahoush (2016)	Descriptive qualitative	52 Nursing students in their final lab for Med/Surg	The results indicated that students perceived increased confidence, self-efficacy, and motivation following multiple-patient simulations sense calculated scores	Convenience sample represents potential selection bias and poses a threat to internal validity and external validity of selection effects.	III	B

				<p>improved in each category. The qualitative responses highlighted a desire for more multiple-patient experiences and a desire to work in small groups.</p>	<p>Pre and posttest design pose a threat to internal validity of testing and may contribute to reactive effects of external validity.</p> <p>Threat to instrumentat ion due to content experts created a new questionnair e.</p> <p>Audibility and transferabilit y were not established do to brevity of report.</p>		
6	Babstista et al. (2016)	RCT	85 Nursing Students in the 4 th year of their bachelor's degree	<p>Interp retation of results indicates gains from both medium and high-fidelity simulation but found consistently greater gains with high fidelity simulation, particularly in realism and overall satisfaction. The study results are useful in that they highlight statistically significant</p>	<p>Sufficient sample was not provided for Gains scale which represents potential selection bias and poses a threat to internal validity and external validity of selection effects.</p> <p>Threat to selection effects can limit generalizabil ity.</p>	I	A

				results that encourage the application of high fidelity over medium fidelity simulation particularly in recognition and decision making.	Mortality posed a threat to internal validity. Data collected included self-report which poses a threat to instrumentat ion.		
7	Franklin, Gubrud-Howe, Sideras, and Lee (2015)	Pilot RCT	20 senior prelicensure nursing students	Role modeling and Voice over PowerPoint prior to simulations was found to significantly increase nursing student self-efficacy	Convenienc e sample represents potential selection bias and poses a threat to internal validity and external validity of selection effects. Pre and posttest design pose a threat to internal validity and external validity of selection effects. Data collected included self-report which poses a threat to instrumentat ion.	I	B
8	Lestander, Lehto, and Engstrom (2016)	Qualitative Descriptive Study	51 Nursing students in the third year of a three-year bachelor	This study supports the use of student driven debriefings and	Lacks some generalizabil ity. Comparison with other	III	A

			program- 16 included in results	reflective exercises in addition to standard debriefings in simulation education to improve self-confidence because it encourages active learning and group participation.	debriefing methods would be helpful.		
9	Au, Lo, Cheong, Wang, and Van (2016)	Qualitative	80 first year nursing students	Their findings indicated that simulation was useful for preparing students for real clinical and for developing resourcefulness . There was an overall satisfaction with high fidelity simulation, with over 85% considering high fidelity simulation a relaxing atmosphere to learn.	The population was limited to novice nursing students.	III	A
10	Ogilvie, Cragg, and Foulds (2011)	Qualitative Descriptive	6 nursing Students. Community college in Eastern Ontario	The data support that the identified elements enhanced knowledge development and skill acquisition. Students from the group felt the identified elements, as well as chance to hone skills and knowledge in simulations prior to clinical,	Limited participation , only 6 of the 10 included in the study due to participation .	III	B

				increased their confidence.			
11	Woda, Gruenke, Alt-Gehrman, and Hanen (2016)	Qualitative Descriptive	117 nursing students in a junior level med/surg course.	Both groups however identified that simulations improved the confidence of their clinical decision making. Both groups identified that increased patient care experiences, be it simulated or not, increased their confidence and decreased their anxiety with clinical decision making	Data was collected only at one school and the group was rather homogeneous which limits generalizability. A purposive Sample was applied. Data was not identified at the determinate of sample size.	III	A

Appendix B

Synthesis and Support

Level (Category)	# Sources	Quality Rating	Synthesis of findings that addresses the EB PQ
<p><u>LEVEL I</u></p> <ul style="list-style-type: none"> • Experimental Study • Randomized controlled trial (RCT) Systematic Review of RCTs with or without meta-analysis 	2	1A 1B	Students expressed gains in medium and HFS and found the method facilitates learning. Students expressed increased decision making and satisfaction following HFS. Voice-over PowerPoints and expert role modeling in preparation for simulations improved perceptions of competence and self-efficacy.
<p><u>LEVEL II</u></p> <ul style="list-style-type: none"> • Quasi-experimental studies • Systematic review of a combination of RCTs and quasi-experimental studies, or quasi-experimental studies only, with or without meta-analysis 			
<p><u>LEVEL III</u></p> <ul style="list-style-type: none"> • Non-experimental study • Systematic review of a combination of RCTs, quasi-experimental, and non-experimental studies only, with or without meta-analysis • Qualitative study or systematic review of qualitative studies with or without meta-analysis 	9	4A 5B	Simulation has been identified as a technique that improves undergraduate baccalaureate nursing students self-reporting of self-efficacy and confidence. Multiple patient simulations, HFS, medium fidelity, role-playing, role selection, reflection exercises, debriefings, and realism increased perception of self-efficacy and confidence following simulations.
<p><u>LEVEL IV</u></p> <ul style="list-style-type: none"> • Opinion of respected authorities and/or reports of nationally recognized expert committee based on scientific evidence. 			
<p><u>LEVEL V</u></p> <ul style="list-style-type: none"> • Evidence obtained from literature reviews, quality improvement, program evaluation, financial evaluation, or case reports • Opinion of nationally recognized expert(s) based on experiential evidence 			

Recommendations Based on Evidence Synthesis

The findings support the use of simulations in undergraduate nursing education and answer the evidence-based practice question. Simulations improve self-efficacy and competence versus students who do not receive simulation training in baccalaureate nursing students in the undergraduate setting. The recommendation from this project support the increased application of this method in education and future research to improve this pedagogical method.