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Implementing High-Fidelity Simulation to Meet Undergraduate Clinical Requirements

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IMPLEMENTING HIGH-FIDELITY SIMULATION TO MEET UNDERGRADUATE
CLINICAL REQUIREMENTS

By

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A doctoral project submitted in partial fulfillment
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Abstract

Increased demand for clinical experiences, lack of clinical sites, and shortages of qualified nursing faculty are reasons undergraduate nursing programs are seeking to utilize simulation to meet student learning needs. High-fidelity simulation (HFS) gives students the opportunity to develop technical skills, enhance critical thinking skills, and apply theoretical concepts to clinical presentations in a controlled, safe environment. There is mounting interest in replacing traditional clinical hours with simulated practice experiences, particularly in specialty nursing areas like obstetrics. Despite literature supporting HFS and the positive effects of its use in undergraduate nursing education, faculty remain unfamiliar with the process of integrating simulation into undergraduate nursing curriculums effectively.

Guided by the National League for Nursing (NLN) Jeffries Simulation Theory (2016), this Doctor of Nursing practice (DNP) project aimed to create a maternal-newborn HFS to replace traditional clinical hours and resolve maternal-newborn clinical barriers for undergraduate nursing students at a rural, associate degree nursing program. The eight-hour, four station HFS was systematically created to fill gaps in clinical experiences in the existing maternal-newborn course at the college. The project introduced HFS to the maternal-newborn didactic and clinical faculty through an education session and participation in the created HFS. The project utilized pre- and post-simulation open-ended surveys to measure changes in knowledge, perception, and likelihood to adopt before and after training. Results of the project demonstrated a significant improvement in faculty knowledge after the training as well improvement in perceptions and an identified increase in likelihood to adopt HFS as part of the maternal-newborn curriculum. As undergraduate nursing programs move to integrate more

simulation into existing curriculum, it is important to examine faculty perceptions and intentions toward simulation to understand and more effectively implement it as a viable replacement to traditional clinical experiences for students.

Keywords: high-fidelity simulation, obstetrical clinical, undergraduate nursing clinical competencies, maternity nursing, obstetrical nursing, clinical education, *NLN Jeffries Simulation Theory*

Dedication

“The bond that links your family is not one of blood, but of respect and joy in each other’s lives”-Richard Bach

This project is dedicated to my amazing husband, Jeff and our children Alec, Allyson, Samantha, Andrew, and Josh. Without their love, support, encouragement, and patience, completion of this project would never have taken place. My family is my heart and the reason of strive to be better every day.

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Chapter 1

Introduction

High-fidelity simulation (HFS), when compared to other types of teaching methods in nursing education, produces positive educational outcomes (Adamson, 2015). Simulation based learning has been utilized in nursing education for over 20 years to improve clinical skill performance and positively impact student confidence and competence (Au, Lo, Cheong, & Van, 2016). Simulation-based pedagogical advances provide nursing educators with innovative teaching and learning strategies to bridge theory and practice gaps (Bland & Tobbell, 2016). Nursing educators can use simulation to engage students to practice and implement learned nursing skills, work as members of the health care team, and promote the use of safe, high-level communication and documentation (Alconero-Camarero, Gaudron-Romero, Sarabia-Cobo, & Martinez-Arce, 2016). The success of a simulation program in nursing education depends on the quality of the training provided to the faculty and that that faculty are formally trained in theory-based simulation methods (Hayden, Smiley, Alexander, Kardong-Edgren & Jeffries, 2014). Nurse educators in traditional clinical settings and simulation use the same educational theories to support and engage student learning (Thomas et al., 2015). In 2014, The National Council of State Boards of Nursing (NCSBN) National Simulation Study found substantial evidence to support the practice of substituting high-quality simulation experiences for up to half of required traditional clinical hours to produce comparable educational outcomes to traditional clinical alone (Hayden et al., 2014). High-fidelity simulations utilize mannequins capable of realistic physiological responses to students' actions and are used in conjunction with computer software and live standardized patients to create as realistic an environment as possible (Hallin,

Backstrom, Haggstrom, & Kristiansen, 2016; O'Donnell, Mann, & Martin, 2014). Students are asked to buy-in to the simulation as if it were a traditional clinical experience and perform a combination of skills in the context of the environment of the simulation created by faculty. A review of the students' responses and interventions is conducted post-simulation in the form of a structured debriefing (Curl, Smith, Chisholm, McGee, & Das, 2016). The debriefing occurs in a supportive, safe environment where both faculty and peers give the students feedback regarding simulation performance. High-fidelity simulation, used as a clinic tool, facilitates student preparedness for possible future clinical situations, meets desired student outcomes and clinical competencies, and allows for error, repetition, practice, and questions without risk of harm to actual patients (Curl et al., 2016; Gaberson, Oermann, Shellenbarger, 2015). Lastly, HFS offers several advantages for students, as both participants and observers.

Maternal-newborn nursing care requires a unique skill set and highly specialized practice experience (O'Donnell et al., 2014). With a shortage of maternal-newborn clinical sites HFS may be one solution to this challenge. High-fidelity simulation provides nursing students with maternal/newborn experiences that facilitate the use of the critical thinking skills needed to determine fetal and maternal well-being. Also, HFS offers the opportunity for students to recognize complications through the review of care and medication indications, outcomes and objectives of obstetrical care, and practicing professional roles during what could otherwise be high-stress experiences during a live delivery (Drake, 2016; Hayden et al., 2014). Obstetrical simulation allows students to learn to recognize clinical signs of progressing labor, indicators for delivery, identification of maternal/fetal risks and trends, and the application of appropriate interventions for high-risk situations, such as a postpartum hemorrhage or shoulder dystocia

(Kim, Ko, & Lee, 2012). In addition, HFS offers a venue for nursing students to manage life-like clinical events in a safe environment without risking the condition of mom or baby. The simulation environment enables students to be active and engage in intellectual curiosities that promote strong critical thinking skills that aid in the delivery of safe and effective care in complex, obstetrical settings (Bland & Tobbell, 2016). Practice and successful implementation of maternal/newborn nursing skills during a simulation can have a positive impact on student performances and may increase students' confidence in clinical settings (Gray & Cavner, 2017). High-fidelity simulation makes the unfamiliar familiar, improving team dynamics and clinical competencies providing students the experience and confidence to act quicker and more effectively and may result in improved patient outcomes (O'Donnell et al., 2014). National organizations such as the National League of Nursing (NLN) provide standards for nursing education and endorse simulation as a proven method to prepare students for a complex health care environment where they must think critically, act quickly, and communicate effectively with health team members to prioritize safe, effective patient care actions in a nonthreatening, controlled setting (Gaberson et al., 2015; Pinar et al., 2015). The goal of nursing educators is to produce professional nurses that, after graduation, effectively and professionally address the health problems and issues of the diverse patient populations they serve. Thus, maternal-newborn HFS would be of benefit to nursing programs experiencing a shortage of faculty and maternal-newborn clinical sites.

Problem Statement

The use of clinical simulation comes at a time when nurse educators face numerous challenges that impact clinical teaching. In 2012, the NLN reported the most recent data

indicates that Associate Degree Nursing (ADN) students comprise two-thirds of all pre-licensure registered nurse (RN) enrollees in the United States, and approximately one of every five pre-licensure ADN programs is in a rural area (Kaufman, 2013). In many rural areas, where clinical resources are overused or scarce, schools are limited in the number of students they can place in a setting at one time to ensure an adequate clinical experience. Obstetrical clinical experiences for some ADN nursing students in some rural areas are a challenge for nursing faculty to coordinate due to clinical faculty shortages and too few clinical sites (Curl et al., 2016). The unpredictable progress of labor, varying patient expectations and demands, and obstetrical emergencies can prevent students from participating in direct care of mom and baby (Gaberson et al., 2015; Hall, 2015). Even when clinical sites are available for obstetrical nursing students, students are limited to observational experiences rather than hands-on patient care resulting in the student following the nurse and watching laboring patients progress and deliver (Gaberson et al., 2015; Kim et al., 2012). Because student perception is positively associated with confidence levels, students in these situations can be left unsatisfied with the traditional obstetrical clinical experience if not given an opportunity to use the knowledge and skills learned in class (Gore & Thompson, 2016). Educators should be innovative to expose students to skills application and decision-making opportunities in the specialty nursing areas including mental health, pediatrics, and maternal/newborn health. Of the specialties, obstetrical nursing practice settings can be particularly difficult to ensure quality experiences for students (Kim et al., 2012).

Providing maternal newborn faculty with appropriate training on the use of HFS may prove useful as the shortage of clinical sites and faculty continues. Promoting the teaching skills of adjunct clinical nurse faculty promotes student satisfaction and improved attainment in

clinical competencies (Crocetti, 2014). Obstetrical clinical faculty should have access to all learning opportunities, such as HFS, to ensure nursing students learn necessary skills. Additionally, nursing faculty should have adequate training for the development of appropriate clinical scenarios and best practice in implementation of obstetrical simulation. Faculty development in best practices in obstetrical simulation is a significant factor to consider when substituting simulation hours for traditional clinical experiences. High fidelity simulation is best facilitated by an adequate number of nursing faculty that are appropriately trained and have developed expertise in the pedagogy of simulation (Kim, Park, & O'Rourke, 2017).

Current data supports the relationship between effective faculty simulation training and better learning outcomes (Jeffries, 2005; Kim et al., 2017; Rizzolo et al., 2015). Further, simulation should be used thoughtfully to augment learning and is useful for providing low occurrence high acuity clinical experiences in traditional clinical practice settings (Jeffries, 2016). Therefore, the creation of HFS scenarios that include a wide variety of obstetrical experiences, such as assessment of fetal/maternal well-being, labor progression, identification of the clinical signs of impending delivery, and identification and treatment of certain obstetrical problems, can help to guide future discussions regarding state boards of nursing clinical definitions and requirements (Kim et al., 2012).

Purpose Statement

The purpose of this project is to educate maternal-newborn nursing faculty at an ADN nursing program to meet obstetrical clinical requirements for a growing student population by creating and implementing a high-fidelity obstetrical simulation that can be used as replacement for traditional obstetrical clinical student experiences. The goal is to improve faculty

understanding for meaningful obstetrical experiences through simulation as well as reduce the negative educational impact on clinical site shortages for an ADN program in Northeastern Ohio.

Chapter II

Review of the Literature

Using the terms nursing simulation as a starting point, an internet search was conducted using several search engines, including Google Scholar, Medline, Pub Med, the Cumulative Index of Nursing and Allied Health Literature (CINAHL), and Cochrane databases to gather pertinent evidenced-based research data for the project. These terms were searched to identify gaps and needs pertaining to obstetrical simulation and its use as a replacement tool for traditional clinical experiences. Research articles and systematic reviews for the use of HFS as a replacement or adjunct to specialty nursing clinical experiences, specifically maternal/newborn nursing clinical, were identified using various combinations of the following key words: high-fidelity simulation, obstetrical clinical, undergraduate nursing clinical competencies, maternity nursing, obstetrical nursing, clinical education, simulation in associate degree nursing programs.

The search produced limited resources addressing maternal-newborn simulation as an adjunct to replace traditional student clinical experiences, although, there is strong documentation to support the use of simulation in nursing education dating back to more than a decade. Inclusion criteria for the project limited the search to publications from January 2012 through June 2017. Articles that addressed the following topics were chosen by the following criteria: (1) the use of high-fidelity simulation as a strategy to improve student competencies and confidence; (2) documentation of the use of high-fidelity simulation as a replacement for traditional obstetrical clinical experiences; (3) faculty awareness of simulation training; (4) undergraduate nursing students completing specialty nursing, specifically maternal/newborn clinical requirements using HFS; and (5) were published in English.

Faculty and Student Perceptions of Simulation

Consistent themes found in the literature, pertaining to the use of HFS in undergraduate nursing education, identified simulation as a means to fill the gap between theory and practice, as a method of student learning to improve clinical competence, and confidence by allowing learners to practice and acquire knowledge in a safe environment that closely matches reality (Al-Ghareeb & Cooper, 2016; Pinar et al., 2015). In addition, students can explore exercise critical thinking and develop psychomotor skills in the safety of a nursing lab using life-like high-fidelity manikins and/or standardized patients. Simulation in undergraduate nursing education, specifically maternal newborn nursing, results in increased clinical satisfaction and competency for students (Gray & Cavner, 2017; Kim et al., 2012). Integration of HFS provides students with hands-on experience during an obstetrical emergency that may not be available in a traditional clinical setting. Simulation can provide students the opportunity to improve clinical skills performance, increase self-confidence, and experience to apply to real-life situations (Curl et al., 2016; Gray & Cavner, 2017; Jeffries, 2016). Nursing faculty can utilize the processes used in this project to develop and promote positive curriculum changes for maternal newborn nursing and look to replace a portion of traditional clinical hours with HFS.

According to Alconero-Camarero et al., (2016), clinical simulation allows both students and faculty the ability to perform their clinical practice in a safe environment that facilitates the standardization of interventions and promotes the integration of knowledge into clinical practice. Through a researcher-developed survey created from components of existing literature, the authors exposed students to a HFS in a critical care course focused on acute coronary syndrome and its treatment. The researcher-developed survey used by the authors demonstrated content

validity and satisfactory consistency (alpha 0.857). Students were surveyed regarding the simulations' usefulness and contribution to clinical satisfaction and competency. The study concluded that participants reported high satisfaction (95%) and felt the scenario was realistic (98.7%) (Alconero-Camarero et al., 2016). The clinical simulation improved clinical knowledge and competency. While self-perception is not always an accurate measure of competence, student perception and satisfaction can be an important contributing factor towards the development of simulation and clinical learning environments to satisfy possible needs and expectations of students (Au et al., 2016).

Simulation as Replacement for Traditional Clinical

Au et al. (2016) completed a qualitative study to determine undergraduate nursing students' perception of HFS when used as part of their traditional clinical education. This qualitative study used open-ended questions to poll students and nursing clinical faculty to determine their perceptions of utilizing HFS instead of traditional clinical placement noting advantages, disadvantages, gains, losses, and satisfaction levels. Of the faculty polled, 78 percent felt that HFS enhanced learning outcomes, while providing safe patient care and improved student critical thinking skills (Au et al., 2016). Over 70 percent of the participants reported positive feelings toward the use of HFS. The study suggests that HFS activities, when used as a replacement for traditional clinical experiences, improved health assessment abilities, and communication skills. Additionally, the use of simulation as a teaching method is appreciated by nursing faculty. The implementation of HFS contributed to the resourceful abilities of students not previously seen in actual traditional clinical experiences.

A study conducted by Curl et al. (2016) found empirical evidence that combining, and even replacing, traditional clinical experiences with high-fidelity simulation resulted in significantly higher scores on pre-graduation standardized Health Education Systems Incorporated (HESI) exit exams than traditional clinical experiences alone. This quasi-experimental project used HFS in lieu of 50 percent of clinical experience in four clinical specialty areas: obstetrics, pediatrics, mental health, and critical care. In the study, three associate degree nursing programs collaborated to identify barriers to student specialty clinical sites. Researchers compared the attainment of knowledge and skills between students participating in HFS along with traditional clinical experiences and with students participating exclusively in traditional clinical experiences. Knowledge and skills were measured with student HESI exit clinical specialty exams. Prior to the implementation of the study, researchers noted that the two study groups (HFS/clinical group and traditional clinical alone group) had no significant differences in mean prior standardized HESI medical/surgical test scores ($p=0.38$). At the end of the study, there was a significant difference between the groups. Mean scores were higher in the students who had half of their clinical experience using HFS activities. Students in both groups successfully accomplished all clinical objectives (Curl et al., 2016).

During traditional clinical experiences, students may have little or no experience in dealing with deteriorating patients and therefore, do not have the opportunity to practice learned skills (Hallin et al., 2016). Hallin et al. (2016) conducted a quasi-experimental study to evaluate the use of HFS as a tool to improve students' integration of theory and practice. The HFS scenarios elicited the students' recognition of changes in patient condition. The authors used videotaped student simulations, student grades, and questionnaires to evaluate student

performance. Lasater's Clinical Judgement Rubric (LCJR) was used to rate the students' performance during the simulation with a reliability rating of 0.864; which was considered sufficient for the study (Hallin, 2016; Lasater, 2007). The study concluded that HFS could be used as a clinical evaluation tool to evaluate nursing students in clinical. In addition, nursing students' performance in HFS could be used to evaluate clinical judgement and student achievement during complex clinical situations and therefore and assist students to identify practice gaps. Last, nursing students can act within a specific practice environment and observe the consequences of their actions (Hallin et al., 2016).

Hall (2015) states, "high-fidelity simulation is widely used to enhance the realism of virtual clinical situations in a nonthreatening environment" (Hall, 2015, p. 124). Hall's retrospective, comparative quantitative study examined the effectiveness of adding HFS to traditional hospital-based clinical experiences to improve clinical outcomes for senior maternity nursing students. Specifically, the study aim was to determine whether students who received HFS in addition to traditional clinical experiences achieved greater learning, elevated critical-thinking skills, and higher Assessment Technologies Institute (ATI) standardized test scores post experience. The assumption was as students become more competent and skilled, they gain confidence and are more motivated (Hall, 2015). The comparison was between two groups of students, HFS students and non-simulation, traditional students. The study revealed a significant difference between the simulation students and the non-simulation students on content scores given post experience. Simulation students (n=147) and the non-simulation students (n=132) completed a timed, proctored exam, 60 multiple-choice questions. The simulation group scored significantly higher (90.5 % met the set benchmark of a Level 2 on the exam) than the non-

simulation group (61.4 % met the benchmark). The author concluded that HFS can provide students with opportunities to engage in hands-on application of theoretical knowledge that supports transfer to practical skills while also improving critical thinking (Hall, 2015).

Kim et al. (2012) used a quasi-experimental study to examine the effects of simulation-based education on the communication and clinical competence of nursing students in maternity nursing practicum. Comparison of two groups, a non-simulation control group and a simulation-added group, was conducted measuring two specific areas, communication and clinical competence. To measure communication between the groups, the researchers administered pre/post communication assessments to both. Homogeneity pre-simulation for both the non-simulation and simulation groups ranged from 3.69 +/- 0.61 and 3.53 +/- 0.54 respectively and was not significant. The HFS group had three simulation sessions that included orientation to the simulation, obstetrical assessment, obstetrical interventions, normal delivery, and high-risk delivery with a shoulder dystocia. Communication skills were measured using a tool developed by Yoo (2001) and clinical competence was evaluated using a tool from Yang and Park (2004). Communication scores improved significantly more for the HFS group versus the non-simulation, traditional clinical group (0.58 simulation, 0.09 non-simulation, $t=2.39$, $p=0.020$). The clinical competence score of the simulation group increased 0.63 points and the non-simulation group after attending only traditional clinical increased 0.15 points, indicating a significant difference between the two groups ($p=0.009$, $t=2.71$) (Kim et al., 2012). The study suggests that simulation is not only as effective as traditional clinical, but also has a positive impact on maternity nursing students' communication and clinical skills and can improve clinical performance.

Simulation Training for Faculty Use and Development

One of the fundamental aims of undergraduate nursing education is to enable students to be able to transfer their knowledge to future practice (Terzioglu et al., 2016). The use of different instructional environments improves the development of students' psychomotor skills (Terzioglu et al., 2016). Undergraduate nursing education programs with limited resources and staff are forced to teach psychomotor skills mainly in the clinical practice environment. In obstetrical clinical settings, maternal or newborn emergencies are not predictable or guaranteed resulting in student experiences being limited to observation or terminated completely. In addition, patient privacy issues can interrupt student attempts to implement learned skills. Terzioglu, et al., 2016, studied the effects of instructional environments on student psychomotor and communication skills. Simulation scenarios included specific obstetrical care areas including Leopold's maneuvers and teaching breastfeeding techniques. Researcher-prepared questionnaires, psychomotor checklists, skills checklists, and communication checklists as well as Spielberg's State and Trait Anxiety Inventory were administered to participants attending traditional clinical, nursing skills lab only, and standardized patient simulation. Students participating in traditional clinical and simulation demonstrated improved psychomotor skills with median scores of 81.5 and 88.6 ($p=0.001$) respectively (Terzioglu et al., 2016). Students reported improved comfort levels and that the simulation experience helped to gain confidence. The study results show that the use of different instructional environments can improve students' psychomotor and communication skills to better prepare them for the obstetrical practice environment (Terzioglu et al., 2016). These methods can be applied to faculty as well as they are introduced to integrating HFS into obstetrical nursing courses to improve skills and gain understanding.

Improving maternal and newborn care for students is a priority. Practical HFS training for undergraduate nurses can improve patient safety and prevent complications (Al-Ghareeb & Cooper, 2016). Because nursing education takes place in settings of complex and ever-changing patient health care needs and demands, curricula need to be responsive and foster new ways to support student clinical skill development.

Needs Assessment and Description of the Project

Hospital consolidations, decreases the number of nurses willing to serve as preceptors, and increases student-to-faculty ratios. As a result, there is a significant reduced availability for student specialty (obstetric, pediatric, mental health, critical care) traditional clinical experiences (Richardson & Claman, 2014). High-fidelity simulation and its uses in undergraduate clinical nursing education have been studied for almost two decades (Doolen et al., 2016). The need for this project was identified through a strengths, weaknesses, opportunities, and threats (SWOT) analysis of undergraduate, pre-licensure nursing programs affected by the decline in available obstetrical clinical sites to effectively complete clinical requirements in a rural setting in Northeastern Ohio (Foundation of Nursing Studies, 2015). Through evaluation of demographic data available from public sources, college organizational data in the form of retrospective record reviews from the Ohio Board of Nursing (OBN), and interviews with maternal-newborn faculty and staff at the college, the needs analysis was achieved. The purpose of the project is to create a high fidelity obstetrical simulation that can be implemented by maternal-newborn clinical instructors as a solution to the concerns over the current shortage of maternal-newborn traditional clinical sites available for an undergraduate nursing program in Northeastern Ohio (OBN, 2015).

For the purpose of this project, open-ended pre-/post surveys were administered to relevant faculty to generate a discussion regarding current perceptions and knowledge pertaining to obstetrical simulation and the likelihood that these faculty members would adopt a HFS simulation into their curriculum. Considerations while creating and implementing the project include size of the student population affected by the problem, identification of key stakeholders at the college, organizational assessment outlining needs, project team selection, cost-benefit analysis, and a clear definition the scope of the project.

Population Identification

A needs assessment was completed to gather information required to develop a plan for the simulation project. A review was conducted to evaluate the number of currently enrolled nursing students, available resources, physical layout of the school, and assessment of current faculty and staff available for the nursing program. According to the current program catalog, students enrolled in the first year of the program are considered “level one” students and then advance to “level two” in the second year through graduation. Current enrollment records report 39 level one students and 31 level two students. Level two students will complete mental health, critical care, maternal-newborn, pediatric, and leadership nursing in the second year of the nursing program. Traditional clinical hours are assigned to each nursing class. The maternal-newborn nursing class is three credits and has 48 traditional clinical hours associated with it.

The nursing department at the college is comprised of the Director of Nursing (DON), three full time instructors, a part-time Simulation Coordinator, ten adjunct faculty members, and three administrative staff members. Current barriers and student satisfaction ratings regarding clinical experiences were discussed with the DON. Additional topics were clinical site

availability, clinical strengths/challenges, faculty concerns, and staffing ratios. It was agreed that traditional obstetrical clinical experiences were the most challenging to schedule, staff, and elicit acceptable student feedback and competencies regarding skills and experience. Moreover, the DON shared that the faculty voiced the need for additional specialty simulations, specifically obstetrics, to facilitate student learning and to meet course goals.

Through the review of demographic data and public reports, a broader needs assessment revealed that a gap exists at regional levels for quality obstetrical clinical sites for students to obtain the required number of traditional clinical hours. The OBN reported in November 2016, a new regulation stating that undergraduate nursing education programs may use HFS as substitute for traditional clinical experiences in the specialty nursing area including maternal/newborn nursing. The Board noted that under new rules, educational programs could decide to replace 50% of their pediatric or obstetrical clinical hours.

Identification of the Project Sponsor and Key Stakeholders

Vested individuals of the project include both internal and external key stakeholders. Internal stakeholders include the College President, the DON, faculty, staff, and students. Individual internal organizational stakeholders are staff collaborating with the student include the Campus President, the DON, the Simulation Coordinator, lead faculty for the maternal-newborn nursing class as well as two other clinical instructors. External stakeholders for the project include the OBN, equipment suppliers, current and potential clinical sites, and the people in the community where nursing students engage in traditional clinical experiences. External stakeholders include the nursing students as participants in the simulation, regulatory agencies as

enforcers of acceptable standards and educational practices, and traditional clinical site facilitators as advocates for patient care

The project setting is a corporately owned technical college located in Northeastern Ohio. The college has six associate business and health-related degree programs with a total of 178 students currently enrolled. The college has been part of the community since 1886 adding the current nursing program in 2010. In 2015, the college was one of only five colleges in the state of Ohio to receive a 100% first-time pass rate on the NCLEX exam (OBN, 2015). The simulation program at the college was started in 2015 and employs a part-time simulation coordinator. The college offers alternative scheduling with classes available at night and on weekends and draws mostly working adult students to its registered nurse program.

Assessment of Available Resources

Analysis of available resources at the college was conducted early on during the development and planning phases of the project. The cost of implementing this project is minimal as the school has acquired the necessary equipment for high-fidelity obstetrical simulation including a Noelle birthing torso, an iSimulate fetal heart rate monitor program and iPad simulator, electronic health record (EHR) Tutor electronic health record simulator, and several simulation student and instructor texts. The nursing laboratory at the college will be used for training sessions. Faculty will participate in two training and practice sessions totaling four hours each. Faculty positions are salaried, and the training and practice sessions are worked into their normal work schedule, so there are no expenses for faculty training.

Team Selection and Formation

Team formation and selection for the project completion included the Doctor of Nursing Practice (DNP) student, the DON, lead faculty for the maternal/newborn course and the Simulation Coordinator at the college. Team member roles are as follows:

- The DNP student served as project manager, responsibilities included development, implementation, and evaluation of project as well as documentation of the created obstetrical simulation.
- The DON was the project facilitator assisting with timelines and providing materials for project implementation and arranging faculty schedules to allow for education and simulation practice
- The Simulation Coordinator at the college served as a mentor and as a support to the DNP student who assisted with orientation to the nursing laboratory and simulation materials available, networking with faculty members, and assisting with the development of the obstetrical simulation

Project Mission, Goals, and Objective Statements

Project Mission

The mission of this evidenced-based practice project was to illustrate the use HFS as a replacement for eight hours of traditional obstetrical nursing clinical experience while still achieving course objectives and meeting educational standards. The project seeks to evaluate the effectiveness of a high-fidelity obstetrical design and training for relevant faculty by measuring changes in faculty knowledge, perceptions, and intention to adopt simulation before and after training.

Project Goal

By providing sequence and structure for a guided eight-hour high-fidelity obstetrical simulation, the nursing faculty and staff at the college will be able to implement the use of the simulation to replace eight of the required forty-eight hours of obstetrical clinical hours for their second level nursing students. After demonstration of implementation guidelines and tools, the goal of this project is to increase current applicable faculty's knowledge and comfort in executing an obstetrical HFS that will allow students to engage in learning activities that include evaluation of maternal and fetal well-being in the early and late stages of delivery with and without complications.

Project Objective Statements

Objective one. Create an eight-hour, four station obstetrical simulation that meets the needs of second-level maternal-newborn nursing students at a rural ADN nursing program in Ohio

Objective two. Organize and implement training sessions for participating faculty. These sessions will include a one-hour session to explain simulation as a learning tool, its uses as a replacement for traditional clinicals, and *The NLN Jeffries Simulation Theory*, 2016. After the first session, the faculty will complete a high fidelity obstetrical simulation created from the maternal-newborn course objectives as participants/learners. The HFS will be divided into two four-hour sessions. All sessions to be held on the campus of the ADN nursing program in Ohio.

Objective three. Evaluate the effectiveness of the high-fidelity training sessions using Kirkpatrick's Four-Level Training Evaluation Model to measure successful implementation.

Objective four: Assess maternal-newborn clinical faculties' intentions to adopt HFS into their maternal/newborn nursing course.

Nursing as a profession requires both practice experts and educators to expand the scientific basis for patients' care and the education for future nurses (Drake, Langford, & Young, 2016). Doctoral education in nursing is designed to prepare nurses for the highest level of leadership in practice and scientific inquiry (AACN, 2006). Educators can respond to this mandate by creating simulation-based, life-like clinical scenarios to facilitate learning for nursing students in a controlled and safe learning environment. Researchers have found that HFS and structured debriefing can improve clinical skill building, critical thinking abilities, and National Council Licensure Examination (NCLEX) performance for students (Drake, 2016). The primary objective of the project is to create, demonstrate, and implement a multi-station obstetrical high-fidelity simulation to relevant faculty used to replace eight hours of current traditional clinical requirements for level two students participating in the maternal-newborn course.

Chapter III

Theoretical Underpinnings

Theoretical Framework

The development and refinement of theory is a vital aspect of the advancement of any discipline (Jeffries, 2016). The use of evidenced-based practice (EBP) models can support an organized approach to initiate a change, prevent incomplete or incorrect implementation, improve the use of resources, and facilitate appropriate evaluation of outcomes (Schaffer, Sandau, & Diedrick, 2012). The NLN Jeffries Simulation Theory and the use of the five variables of simulation will serve as a framework of change for the project. According to the NLN Jeffries Simulation Theory, there are aspects of the simulation design that are considered in the simulation preparation process. Aspects of the theory include specific learning objectives that guide simulation activities and scenarios with appropriate content and complexity levels, elements of physical and conceptual fidelity, participant and observer roles, and briefing and debriefing strategies. A created simulation should include resources such as time, equipment, staff, and allocated resources (Jeffries, 2016).

Existing NLN Jeffries Simulation Theory framework variables for simulation include active learning, feedback, participant/facilitator interaction, collaboration, defined outcomes, diverse learning, and a set of sequenced-activities (Adamson, 2015; Jeffries, 2016). Achieving high-quality simulation experiences in maternal-newborn nursing course requires clear learning objectives that articulate with the curriculum and student objectives. Learner objectives are a construct in the Jeffries theory and need to be goal directed. Sufficient high-quality simulation-based learning resources include well-prepared nursing faculty and staff and formal debriefing to

facilitate student learning (Forber, DiGiacomo, Davidson, Carter, & Jackson, 2015). A simulation must have context. Contextual factors, such as circumstances and setting, affect every aspect of the simulation and are an important starting point in the design and evaluation of a simulation. Context includes simulation background, design, educational strategies, facilitator/participant attributes, and desired outcomes for the participants, facilitators, and organization (Jeffries, 2016). The process of caring for a woman in active labor and during delivery is multifaceted. For the project, Gasper and Dillon's (2012) text *Clinical Simulations for Nursing Education: Instructors Edition*, will be used to create the context for the four simulation stations. The text provides evidenced-based learning outcomes, physical and conceptual guidelines for the simulation, practice guidelines, and evaluation and outcome criteria.

Various components of the simulation experience appeal to and are effective for individuals with diverse learning preferences (Jeffries, 2016). Students in today's ADN nursing classrooms represent a wide array of diversity in learning needs and expectations (Popkess & Frey, 2016). Nursing faculty must continually think creatively as they develop active learning strategies and environments to teach students to successfully transition into an ever-changing and increasingly diverse healthcare climate. Many learner-associated factors have an impact on the simulation experience and can be influenced by the facilitator, educational practices, and simulation design characteristics, but are largely under the control of the learners. The NLN Jeffries Simulation framework recognizes the dynamic interaction between facilitator and learner and the role overlap that exists between the two. If educators in the nursing program continue to teach in the same way that they have always approached the classroom and student learning, there will be very little value and progress achieved (Popkess & Frey, 2016). When faculty are

engaged, prepared, and adequate resources are available for the design and delivery of high-quality simulation, critical thinking skills, clinical reasoning, and student knowledge are enhanced through active learning, immediate feedback, student/faculty interaction, and collaboration (Hayden et al., 2014; Jeffries, 2016).

Simulation design characteristics for the current NLN Jeffries Simulation Framework (2016), include defined objectives, appropriate fidelity, problem solving, student support, and debriefing. Student learning styles need to be considered and all domains explored. This includes tactile, auditory, kinesthetic, and visual components in the simulation. Clear obstetrical scenario goals were outlined in the project simulation creation and correlate with the existing maternal/newborn syllabi at the college. Fidelity should include multiple dimensions of realism (Jeffries, 2016). The project simulation will use a birthing manikin and simulation software that closely replicate real-life labor and delivery situations including a fetal monitor and interactive software that allows the manikin to answer questions when asked by the learners. In this theoretically based simulation project is designed to meet learners' needs, promote learner engagement, and allow maternal newborn nursing students to actively apply theoretical learning and skills to a simulated clinical environment. The created obstetrical simulation will be thoughtfully used to augment learning and will allow the participants opportunity to directly use a fetal monitor, participate actively in a delivery using a birthing manikin, perform newborn care, and complete assessments immediately post-delivery. In addition, learners will administer medications, document care actions, and critically think through the interventions to recognize and prevent postpartum hemorrhage, a low-occurrence high-acuity event that nursing students may not experience in their program of study. The four simulation scenarios of the obstetrical

simulation are designed to be implemented one at a time with each stage of labor highlighted. Learner focus, and transitions are deliberate and planned to build the learners' confidence and participation is supported by promoting a positive experience. Active, diverse learning that allows the participant to use tactile, auditory, kinesthetic, and visual domains and problem solving are key variables in the Jeffries theory. Contributions of simulation learners are complex and include age, gender, readiness to learn, personal goals, preparedness, tolerance for ambiguity, self-confidence, learning style, cognitive load, and level of anxiety (Adamson, 2015; Jeffries, 2016). Learner variables will be presented during the training session to promote diverse teaching methods through a maternal-newborn HFS for future use at the college. The role of the facilitator must also be considered in the simulation design. Variables that the facilitator must consider include role assignment, orientation, and group size. The project simulation will utilize small groups of no more than four, a facilitator, the simulation coordinator and assistant, with appropriate orientation to equipment and surroundings as well as patient information. Simulation performance outcome measures need to provide not only individual participant performance but need to expand to include longer-term educational outcomes as well as impact indicators for simulation (Jeffries, 2016). Debriefing for a simulated experience should be learner-center with the facilitator allowing learners to do most of the talking. Variables to consider for the facilitator of a simulation include personality, nursing experience, attitude, roles, attributes, values, self-awareness, and teaching ability (Jeffries, 2016).

Facilitators need to be self-aware and help reduce obstacles for learners that may threaten their ability to learn (Jeffries, 2016; Parker & Myrick, 2012). Engaging faculty throughout the maternal-newborn HFS as learners is part of the necessary training program. Faculty need to

embrace a learner-centered approach to planning simulation integration into the maternal-newborn curriculum. Faculty experiencing the simulation first-hand may experience “buy in” as they immerse themselves in the simulation activity. Faculty members will participate in an environment that is dynamic, with active learning and interprofessional collaboration occurring constantly. A diverse learning environment of inclusivity is created between the facilitator and the learners through simulation with the active exchange of ideas and feedback guided by high learning expectations and outlined task completion that are aligned with nursing curricula. The simulation created for the project was based on current college maternal/newborn course objectives and clinical requirements (see Appendix C). Through two four-hour training sessions, faculty will be introduced to maternal-newborn HFS and its use as a replacement for traditional clinical time. During the first session, a PowerPoint presentation will serve as the teaching method to discuss simulation (see Appendix F). Faculty will then be pre-briefed for the project simulations, oriented to the simulation lab and to equipment, and familiarized with simulation learning objectives and goals, just as the simulation would be implemented with students so that faculty can experience the simulation through a learner’s eyes. The second session will actively engage faculty participants in four simulation stations created for the project. Lastly, faculty will experience debriefing. Pre- and post-surveys will be administered to qualitatively compare faculty perceptions and intention to adopt simulation to current curriculum.

Chapter IV

Project Plan

Setting

The project was implemented at a rural, Northeastern Ohio ADN nursing program to relevant faculty using existing equipment in the nursing department and nursing lab.

Population of Interest

The NCSBN (2014) study and several systematic reviews of simulation support that simulation outcomes are dependent on colleges using best practice guidelines, including faculty simulation training (Adamson, 2015; Doolen et. al., 2016; Jeffries, 2016). The population of interest for the project included several members of the college faculty including the DON, Simulation Coordinator, the simulation lab assistant, lead Obstetrical instructor, the Clinical Coordinator, two obstetrical clinical instructors, and obstetrical teaching assistant.

The purpose of this project was to address the challenges of ADN nursing program faculty to meet maternal-newborn clinical requirements for a growing student population by creating and implementing a HFS for use as a replacement for traditional obstetrical clinical student experiences. The goal is to improve faculty understanding for meaningful maternal-newborn experiences through HFS as well as to reduce the negative educational impact on clinical site shortages for an ADN program in Northeastern Ohio.

Activities

The project simulation will utilize a Noelle-Gaumard high fidelity simulator, an iSimulate fetal monitor, as well as an electronic documenting program. A multi-station approach with four scenarios was created to demonstrate and implement an obstetrical simulation to replace eight

hours of traditional clinical hours for an ADN program to alleviate the impact on clinical site shortages. The scenarios include assessment of fetal and maternal well-being, normal labor progression and resolution, newborn assessment, and postpartum hemorrhage. Each scenario will include five phases: scenario description, debriefing design, actions, debriefing, and evaluation utilizing *The NLN Jeffries Simulation Theory* (Jeffries, 2016). Development of the simulation was based on current maternal-newborn clinical objectives outlined in course syllabi with the added goal to give appropriate nursing faculty the opportunity to experience simulation as learners for training purposes. This DNP project aimed to develop faculty knowledge of maternal- newborn HFS and last, to organize school resources to support obstetrical high-fidelity simulation.

It is important to evaluate simulation and facilitators to ensure that program and course outcomes are supported. The purpose of the obstetrical simulation was to provide instruction to faculty and once adopted, to students, regarding appropriate care interventions to manage a laboring patient and care of the newborn on an obstetrical unit. The simulation scenarios used for the project were purposefully designed to focus on defined clinical domains and incorporate critical thinking skills, level of competency, and achievement of maternal-newborn course outcomes.

Measures & Instruments

Guidelines and quality measures for simulation have been published by both the International Nursing Association for Clinical Simulation (INACSL) and the Society for Simulation in Healthcare (SSH). The INACSL Standards of Best Practice: Simulation (2016) and the NLN Jeffries Simulation Theory (2016) were the foundation of the project. The INACSL

standards are designed to advance the science of simulation, utilize best practices, and provide evidence-based guidelines for implementation and training in undergraduate and graduate educational settings (INACSL Standards Committee, 2016). Gore and Thompson (2016) outlined the National Council of State Boards of Nursing (NCSBN) national study conducted to evaluate the amount and types of simulation that result in better outcomes for students. The NCSBN concluded that by incorporating the INACSL Standards of Best Practice: Simulation that up to 50% of traditional clinical experiences could be replaced with simulation across all pre-licensure clinical courses (Gore & Thompson, 2016; Hayden et al., 2014). The project will utilize an evidenced-based simulation experience based on these standards. Standardized simulation design provides a framework for developing effective simulation-based experiences (INACSL Standards Committee, 2016). Criteria set by the INACSL guidelines ensure that the simulation includes:

- a needs assessment to provide foundational evidence of a need for a well-designed simulation-based experience
- measurable outcomes, structured format based on the purpose, theory, and modality for the simulation-based experience
- provides context for the experience
- uses the appropriate level of fidelity to create the required perception of realism
- uses a facilitative approach that is participant-centered and driven by objectives
- provides a pre-briefing
- evaluates the participants, facilitators, the experience, and the facility

- provides preparation materials and resources to promote participants ability to meet objectives
- is pilot tested before full implementation (INACSL Standards Committee, 2016)

During the implementation and completion of the project, faculty members will experience the entire simulation-based experience to ensure that it accomplishes its intended purpose, provides opportunity for students to achieve objectives, and that the simulation will be effective when implemented into the program. It is important to evaluate simulation and facilitators for their ability to support program outcomes and organizational goals (Jeffries, 2016). Through evaluation of the faculty perspectives and experiences, the project sought to drive the continuous quality improvement of simulation-based education.

For this project, a pretest/post-test design will be measure the effects of training for a maternal-newborn HFS as a possible replacement for traditional clinical on relevant faculty's knowledge, perception, and intention to use such a simulation. All didactic and clinical faculty members of a Northeastern Ohio ADN nursing program were invited to participate. Pre- and post-training surveys consisted of three open-ended questions to gain anecdotal information and start discussion among faculty members regarding the use of simulation at the college to facilitate its use as an effective adjunct to traditional obstetrical clinical and alleviate resource shortages (see appendix B). The project provided insight into faculty knowledge, perceptions, and intention to adopt an obstetrical simulation in their curricula.

Timeline

The timeline was developed from careful analysis of the steps and sequences needed to complete the development, implementation, and faculty training of a maternal-newborn HFS to a

rural ADN program in Northeastern Ohio. For the project, the following milestones were developed: (1) build a relationship with key stakeholders, (2) attend a kickoff meeting to describe the project to key participants and collect pre-simulation data, (3) implement communication plan for status and milestone reports, (4) complete project through faculty training program and simulation, (5) collect post-simulation data and interpret results in terms of project goals, and (6) disseminate results through the communication plan and complete requirements of the project for graduation (see table 4.1).

Table 4.1. Project Timeline

Project Milestone	Date of Completion
Institutional Review Board Approval	October 2017
Project Kickoff	November 2017
Pre-simulation Survey	November 2017
Communication Plan	December 2017
Implement Project	December 2017
Post-simulation Survey	January 2018
Complete Project	February 2018

Resources and Supports

Achieving high-quality HFS experiences requires clear learning objectives, to articulate with the curriculum, and sufficient high-quality simulation resources (Forber et al., 2015). The school has acquired the necessary equipment for HFS including a Noelle birthing torso, an iSimulate fetal heart rate monitor program and iPad simulator, EHR Tutor electronic health

record simulator, and several simulation student and instructor texts. The nursing laboratory at the college was used for the faculty training session. The staff conference room, computer lab, nursing library, and two nursing classrooms were available for meetings, project work, survey administration, and project discussions. The simulation coordinator supported the project and there was an assistant available to assist with equipment and available texts.

Risks and Threats

Despite an increasing number of nursing schools utilizing simulation as part of curriculum requirements, data regarding the effectiveness of training options for faculty is limited (Kim et al., 2017). Barriers such as the cost and time intensive nature of training for simulation, particularly specialty simulation like that need for maternal-newborn nursing courses prohibit many schools from participating in simulation as part of their clinical requirements (Forber et al., 2015). Using a simulation-based learning environment has great potential for promoting competence and in-depth knowledge of substantive topics relevant to practice (Doody & Condon, 2013). This component of nursing education can lack critical leadership and guidance leading to student and instructor pushback and dissatisfaction with the process. Therefore, the DNP student provided the leadership necessary to educate and promote faculty learning outcomes and added value of the maternal-newborn HFS project to curriculum goals.

Evaluation Plan

Planning the evaluation of a project should occur early in the development and should closely link to the goals and interventions (Bemker & Schreiner, 2016). The evaluation plan for this project's high-fidelity obstetrical simulation was based Kirkpatrick's Four-Level Training Evaluation Model to measure successful implementation. Kirkpatrick and Kirkpatrick (2016)

described a four-level evaluation model for training and education projects noting that effectiveness of an education program might be measured in terms of reaction and/or satisfaction (level 1), learning or knowledge gain (level 2), behavior change (level 3), and organizational results (level 4). The project aim will be to progress appropriate nursing faculty to Level 2 on Kirkpatrick & Kirkpatrick's scale as evidenced by pre- and post-simulation/training session survey results. The project question, source of data, and the level of evaluation are provided in Table 4.2.

Table 4.2. Project Evaluation Plan

Project Goal	Effective implementation of an obstetrical high-fidelity simulation as a replacement for traditional clinical
Desired Outcome	Improve faculty's foundational knowledge of simulation as well as improve perceptions and intention to adopt
Key Success Indicators	<p>Objective One: Simulation is created using evidenced-based criteria and theory</p> <p>Objective Two: Training session is implemented with appropriate faculty attending and participating in the simulation</p> <p>Objective Three: Development of simulation and training provides and effective alternative</p>

	<p>to traditional clinical as evidenced as positive feedback in post-survey responses</p> <p>Faculty reports increase in knowledge and intent to use simulation in the future</p>
Data Collection Plan	<p>College needs assessment based on clinical resources/simulation resources</p> <p>Faculty pre/post simulation surveys</p>
Implementation/Analysis Plan	<p>Time needed for implementation and data analysis=5 months</p>

Chapter V

Summary of Implementation Results

Initiation of the Project

Institutional Review Board (IRB) approval from both the institution planned for the project setting and the University of Nevada, Las Vegas (UNLV) was obtained. After reviewing current organizational resources, a plan for implementing a one-hour simulation education session for participating faculty as well as the planning for the simulation was created with the nursing program simulation coordinator. Faculty participants for the project were recruited from the total population of second level nursing maternal/newborn faculty in an ADN program in Northeast Ohio. The recruitment letter was distributed to faculty participants with an inter-office email. Email addresses of potential faculty participants were provided by the DON of the college. Email recruitment letters were distributed during the first two weeks of the project. The next step in project initiation was to meet with faculty to present the educational in-service that explained the project, answered questions, and to obtain consent from faculty for their participation. The in-service was held on campus at a monthly faculty meeting in which a one-hour timeframe was allotted for project explanation and discussion. Included in the project in-service were discussions regarding the project theme, simulation, participant time requirements, scheduling, and the overall timeline of the project.

Completion of the Project

All participating faculty were present for all DNP project sessions. Project goals were met as follows:

- **Objective one.** An eight-hour, four station maternal-newborn simulation designed to meet the needs of second-level maternal-newborn nursing students at college was created and rehearsed in adjunct with the college simulation coordinator, and then implemented with the participating faculty through two four-hour simulation sessions (see Appendix D).
- **Objective two.** A training session for participating faculty was held by the DNP student in a meeting room at the college. This session lasted approximately one-hour to introduce simulation as a learning tool, explain its uses as a replacement for traditional clinicals, and the *NLN Jeffries Simulation Theory* (Jeffries, 2016) using a PowerPoint presentation. Prior to the first session, the faculty completed a pre-simulation, open-ended question survey (see Appendix B). Next the high fidelity obstetrical simulation created from the maternal-newborn course objectives was implemented in the nursing laboratory at the college with faculty as participants/learners. The maternal-newborn HFS session was divided into two four-hour sessions for scheduling purposes. All sessions were held on the campus of the ADN nursing program in Ohio, one per week for three weeks. Post-simulation open-ended question surveys were completed on the last day.
- **Objective three.** Evaluation the effectiveness of the high-fidelity training sessions using Kirkpatrick's Four-Level Training Evaluation Model was used to measure successful implementation of the DNP project.
- **Objective four:** Data collected and analyzed was used to assess maternal-newborn clinical faculties' intentions to adopt HFS into their maternal/newborn nursing course

Threats and Barriers

Specific threats and barriers were identified as the project was initiated and included faculty participant engagement and project monitoring. Historically, simulation at the institution has not been utilized formally in the maternal/newborn nursing course and was not a part of the participants' current teaching/learning strategies. While all faculty involved in the maternal/newborn course at the school utilize the same course objectives and syllabi (see appendix C), there are variations in course implementation related to classroom and clinical experiences. There were concerns voiced by faculty related to their ability to participate in the simulation effectively and performance anxieties. Strategies to overcome this obstacle included reassuring faculty that the participation was voluntary, and that the simulation environment would be one that supports active, diverse learning. Faculty were further informed that simulation is low-risk, is supportive of participants, and that activities in the lab would not be recorded or evaluated. Another barrier to this project included the challenge of communication of participating faculty members with the DNP student. The DNP student as well as all faculty participants worked varied schedules; this was also identified as a barrier. Strategies used to overcome this obstacle included regular email and text updates regarding scheduling and participant expectations. Participants' honesty was encouraged when answering pre and post-simulation surveys. The DNP student was also available by telephone, text, or email communication to faculty participants at any time during the implementation phase should questions or concerns arise.

Project Monitoring

Project monitoring included the DNP student attending monthly faculty meetings to answer questions and provide discuss regarding participation in the project. Consenting faculty participants were invited to participate in four parts of the project: first, a meeting in which the project was explained in detail, consents were signed, and pre-simulation surveys were completed, second, a one-hour simulation education session that included 1) a PowerPoint explaining the *NLN Jeffries Simulation Theory* and 2) the process to create simulation as replacement for traditional obstetrical clinical hours and lastly, participating faculty were asked to attend two four-hour maternal-newborn HFS sessions as learners finishing the last session with completion of the open-ended post-simulation surveys. A list of participating faculty was created and a sign-in sheet used to document participation.

Data Collection

Data collection included consent forms, pre-/post simulation surveys, and session sign-in sheets. A total of ten consent forms were collected and coded with a number. The pre- and -post surveys were coded to match the corresponding faculty participant consent form numbers. Completed survey questions were entered on to a spreadsheet for data analysis. Surveys were confidential with only a number to identify participants for data analysis. All ten-invited faculty completed consents, attended and participated in all obstetrical simulation sessions, and completed pre- and post-simulation surveys for the project.

Data Analysis

An analysis of the data was conducted to demonstrate project outcomes. The first part of the data analysis plan included a meeting with the DON to complete a needs assessment for the maternal/newborn course at the college. The DON indicated that current issues with traditional

clinical at the school included an inadequate number of clinical sites within a commutable distance, a finite number of obstetrical clinical faculty, high student-instructor ratios on the clinical unit (10:1), and limited patient census numbers due to the two clinical sites utilized by the course only holding eight and ten couplet rooms respectively. Also, the DON noted, student satisfaction with traditional obstetrical experiences was poor in past years because of these continued clinical issues. An eight-hour obstetrical simulation was created by the DNP student based on current maternal/newborn course learning objectives (see Appendix C). Creation of the obstetrical simulation met objective one of the DNP project. Pre-simulation surveys were completed and collected from participating faculty and entered on to an Excel spreadsheet. Simulation training sessions were scheduled and took place over a two-month period. Post-simulation data was collected in the form of the same survey administered prior to the simulation training for comparison. The surveys were composed of three open-ended questions assessing the participating faculty's familiarity and likelihood to utilize simulation to meet current maternal/newborn course objectives (see Appendix B). The Kirkpatrick Four Levels of Training model was used to evaluate Level one faculty satisfaction with the maternal newborn HFS training. Qualitative analysis was used to compare pre- and post-simulation results.

Project Results

Two groups of five faculty members participated in four obstetrical scenarios led by the simulation coordinator and the DNP student. Post-scenario debriefings were completed immediately after the simulations with both groups. At the end of the second simulation day, all participants were asked to complete post-simulation surveys. All ten faculty participants completed surveys after the last training session.

Kirkpatrick's Four Levels of Training Evaluation (2016) was used to determine the impact of obstetrical simulation education on the faculty's attitudes towards future implementation of obstetrical HFS as a possible replacement for traditional clinical hours for the college's maternal/newborn course. Kirkpatrick and Kirkpatrick's model (2016) describes a four-level evaluation model to measure training effectiveness. Initial comments collected through the pre-simulation survey completed by faculty identified that 70 percent of faculty members were not comfortable utilizing simulation to meet current obstetrical curriculum/clinical requirements. The post-simulation surveys addressed Kirkpatrick and Kirkpatrick's levels one (Learners' views on the learning experience) and two (modification of attitudes and perceptions), according to the Kirkpatrick model, indicating that faculty are more likely post-obstetrical simulation training to utilize the pedagogy in the maternal/newborn course at the college in the future. Level two indicates the degree to which participants acquire the intended knowledge, skills, attitude, confidence and commitment to a specific topic based on their participation in training (Kirkpatrick & Kirkpatrick, 2016).

Themes of comfort and course utilization for ten faculty participants answers were identified through quantitative analysis of the data with faculty responses compared pre- and post-simulation training. Post-intervention faculty reported an increase in familiarity and comfort with simulation and its use in the maternal/newborn course (n=90%). Faculty participants also indicated that they would be more likely to utilize simulation in the course in the future after the training (n=80%).

Potential for Sustainability

The use of high fidelity obstetrical simulation prepares undergraduate nursing students for real-world, hands-on practice and is an effective teaching strategy when used as replacement to traditional obstetrical clinical experiences. Nurse educators must have high-quality education and training on the appropriate use of simulation as a teaching-learning methodology to meet maternal/newborn course objectives and student learning outcomes. High fidelity obstetrical simulation is a learning strategy that strives to reproduce a variety of maternal-newborn clinical practice situation to prepare students for actual clinical practice (Ferguson, Howell, & Parsons, 2014). Planning for the use of clinical simulation and having expert nursing educators and staff to plan and implement obstetrical simulations are extremely important to successfully integrate simulation into any undergraduate maternal-newborn nursing course.

Dissemination of the Results

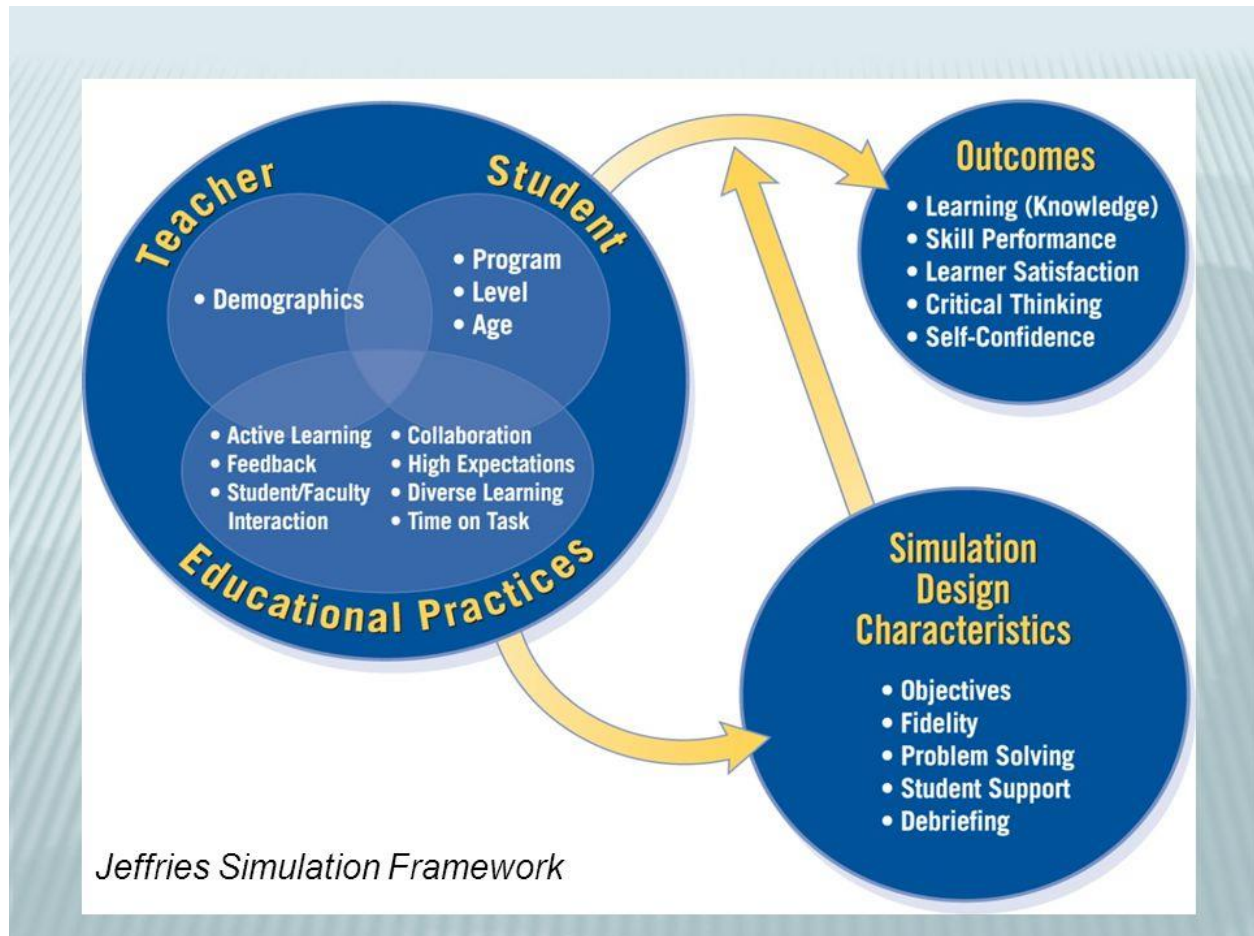
Dissemination of the project is planned to report results to the stakeholders, academic community, and other professionals in similar nursing education settings. Facilitating quality obstetrical clinical experiences continues to be a challenge for some undergraduate nursing programs, especially in rural settings. The successful results of this project will heighten awareness of the use of high fidelity simulation as a valuable tool to replace traditional clinical experiences to meet maternal/newborn course objectives. The DNP student as project manager, will share project findings with key stakeholders through a PowerPoint presentation at the college. Project faculty participants and institutional leaders at the college will be invited to attend the post-project presentation. The presentation will include a detailed summary of the project, the results with recommendations for the college, the process used to create the obstetrical simulation including the actual scenarios, and sustainability. Additionally, this DNP

project will be a resource to the academic community through publication in the university's database. Lastly, to disseminate the project on a larger scale, the manuscript may be presented to the appropriate peer-reviewed journals for possible publication in the future.

In a time of expanding technology, nursing shortages, and rapidly changing health care climates, the need for highly qualified maternal-newborn registered nurses to care for a diverse, complex population has dramatically increased. Lack of qualified nursing faculty and an adequate supply of clinical sites are two top reasons qualified nursing candidates are turned away from pre-licensure nursing programs (NLN, 2014). Simulation-based learning is one solution to this challenge. High-fidelity obstetrical simulation gives students the opportunity to develop technical skills, enhance critical thinking skills, and apply theoretical concepts to clinical presentations in a controlled, safe environment. There is mounting interest in replacing traditional clinical hours with simulated practice experiences, particularly in specialty nursing areas like obstetrics. Simulation used in this way cannot be just another technology or curriculum add-on, but a purposeful, scientific theory-based pedagogy with clear, measurable objectives and deliberate learner outcomes (Cook, 2015). Clinical faculty should utilize all available technologies and learning opportunities for their students. High fidelity simulation, when used as a tool to meet desired student learning outcomes and obstetrical clinical competencies, ensures that students are better prepared to enter complex care environments where they can make decisions, act quickly, and communicate effectively with patients, families, and other health team members. Nursing education programs need to adequately train faculty for the development of appropriate high-fidelity scenarios, effective implementation of simulations, and appropriate

evaluation of student/faculty experiences to further develop future use as an evidenced-based, scientific pedagogy in nursing education.

Appendix A: NLN Jeffries Simulation Theory Framework



Jeffries, P.R. (2016). *The NLN Jeffries Simulation Theory*. Washington, DC: National League for Nursing.

Appendix B: Pre-/Post Simulation Faculty Survey

Simulation Question	Faculty Answer
1. How do you feel simulation supports the obstetrical curriculum at the college?	
2. Can you identify obstetrical curriculum or clinical needs that simulation can address?	
3. How do you feel about your ability to integrate or utilize simulation in adjunct to current obstetrical curriculum requirements?	

Appendix C: Institution Maternal/Newborn Course Syllabus

Course Syllabus

**NUR 207
MATERNITY NURSING**

Fall Semester-9/6/2016-12/23/2016

Credits: 3

Course Length: 16 weeks

(32 lecture hours, zero lab hours, and 48 clinical hours-schedule TBA)

Days: Monday 6p-8p

Room: 205

Text:

Perry, S., Hockenberry, M., Lowdermilk, D., & Wilson, D. (2014). *Maternal child nursing care* (5th ed.). St. Louis, MO: Elsevier Mosby.

This syllabus is subject to change in order to meet the needs of all students and consequently, to assist the school in producing employable graduates.

Revised: October 2016

PREREQUISITES: NUR103, HGD101

COURSE DESCRIPTION:

This course in maternal and child nursing will provide the nursing student with a basic understanding of the study of nursing through the discussion of the OVCT nursing philosophy and core concepts of person, health, nursing, nursing process, environment, teaching and learning, and professionalism as they relate to nursing care of the childbearing family. This course prepares the student with the knowledge of basic client needs and provides opportunity to apply the knowledge and skills required to administer nursing care to a variety of persons in a variety of environments. The nursing process provides the basic organizational framework for determining the client's needs and providing the appropriate nursing care. In addition to health promotion and maintenance, and a safe effective care environment, the course content includes the discussion of alterations in health across the lifespan including content in male and female reproduction, human growth and

development from conception through adulthood, family dynamics, and psychosocial and physiological aspects of the family.

COURSE OBJECTIVES: Upon completion of this course, the student will be able to:

·Describe the scope of maternity nursing
·Examine contemporary, socio-political, and ethical issues affecting the care of women and infants
·Analyze financial, cultural, and communication barriers that affect the care of women and infants
·Discuss how community health status and home care fits into the maternity continuum of care
·Analyze conditions and factors that increase health risks for women across the lifespan, including life stage, culture, substance abuse, eating disorders, medical/health conditions, pregnancy and intimate partner violence
·Summarize the significant changes in growth and development of the embryo and fetus
Conceptualize common nursing assessments, diagnosis, interventions, methods of evaluation, and education needs in providing care for the pregnant women
·Identify signs of developing complications during labor and birth and incorporate evidence-based nursing interventions
·Describe components of a systemic postpartum assessment and recognize signs of potential complications
·Discuss normal findings in the normal newborn and describe how to perform a physical assessment including gestational age
·Applies the role of the registered nurse in the application of the nursing process through assessment, nursing diagnosis, planning, implementation, and evaluation of safe and effective patient care for clients
· Differentiate the medical, surgical, and safe and effective nursing management of culturally diverse patients with maternity needs
· Describe nursing responsibilities appropriate in providing antepartum through postpartum care.
Maintains accountability for personal and professional conduct within the student role of registered nursing in caring for individuals with maternity needs

Appendix D: Obstetrical Simulation Documents

Simulation Objectives

- | | |
|--|--|
| 1. Provide psychosocial support | Participant builds caring and supportive relationship with the laboring woman and her family |
| 2. Collect obstetrical history | Identifies factors that contribute to maternal-fetal physiological status and possible complications |
| 3. Assess the maternal-fetal unit | Monitors the maternal-fetal status by managing fetal monitoring equipment and notifying other care |
| 4. Provides for maternal comfort | Attentive to maternal comfort measures, such as positioning, hydration, nutrition, and medications |
| 5. Prepares for delivery | Assess labor progress accurately, supports the patient, prepares delivery environment in a timely manner and determines that all necessary resources are available and organized |
| 6. Provides neonatal care | Provides competent newborn care, including immediate interventions, assignment of APGAR scores, administration of routine medications, and proper identification |
| 7. Supports postpartum maternal recovery | Assesses the newly delivered mother accurately, reports abnormal findings as necessary, maintains uterine contractility by proper fundal massage, promotes patient and family comfort, shares appropriate information, and provides opportunity for family bonding with the infant |
| 8. Describe excessive vaginal bleeding | Recall descriptive terms for postpartum bleeding |
| 9. Manage a postpartum hemorrhage | Maintain a calm and supportive environment with difficult patient experiencing a postpartum |

10. Documents events

hemorrhage, perform appropriate intervention and describe the physiologic response
Uses appropriate terminology to document events accurately, completely, and in a timely manner

Evaluation Criteria of Outcomes

The Participant:

Facilitator Comments:

Provides psychosocial support

Assesses the maternal-fetal unit

Provides for maternal comfort

Prepares for delivery properly

Provides appropriate neonatal care

Supports postpartum maternal recovery

Recognizes complications

Documents events appropriately

Simulation Prerequisites:

Normal maternal-fetal physiology, assessment, and care

Possible postpartum complications

Medication Administration

IV therapy

Simulation Setting:

Labor/Delivery patient room

Environment and Simulator:

Melissa Hanson is a 31-year old G5T3P1A0L4 at 39 weeks. Patient is 5ft 6 inches and 120 pounds. English is her primary language. She has no significant medical history or surgical history. The patient is Rh negative, group beta strep negative. She enters labor and delivery accompanied by her husband. She is experiencing painful 3-4-minute contractions lasting 45-60 seconds. She has attended CBE classes and is using breathing and relaxation techniques effectively and she is committed to natural childbirth. Prenatal records indicate no problems and all labs are normal. Membranes have been ruptured for approximately 2 hours and she is leaking clear fluid. The fetal baseline is 140, external variability is average, and there are no decelerations. The initial vaginal exam indicates that the cervix is 4-5 cm and 80% effaced, the baby is vertex presentation at +1 station.

Labor Latent-N/A
 Active-labor progresses normally, and fetal heart tones remain within normal limits (baseline 140-150s; accelerations; average variability, no decels) for 20 hours with augmentation with pitocin
 Transition-Patient copes well through with breathing and relaxation techniques
 FHT remain WNL (140-150s, + accels, average variability, early decels)
 Second Stage-Patient pushes effectively and crowns after pushing for 25 minutes
 Heart tones WNL throughout (baseline 140s, + accels, average variability, early decels)

Delivery The physician arrives as the vertex crowns and delivery is spontaneous, without episiotomy, second degree tear. Minor peri urethral abrasions are noted. The baby is laid on the maternal abdomen for drying and suctioning. The physician assists father to cut the cord. The baby cries and pinks up with minimal stimulation and is moved to the warmer for assessment

Newborn The normal female infant is vigorous and crying. He as good tone and is actively moving. He weighs 9 lbs. 10 oz. Family bonding is facilitated with kangaroo care. Newborn medications are administered before his is admitted to the nursery. Apgars are 8/9.

Mom Estimated blood loss is 500 ml. Baseline vitals post-delivery include BP range from 120/80-128/92, P70, RR12-14. She is to receive 20 units of Pitocin post-delivery @ 125 ml/hr until the bag is finished. 1 hour goes by, her vital signs-BP 130/90, P88, RR 14. She has not voided since delivery. The uterus becomes boggy and is 2 fingers above the umbilicus to the left.

Station One – Active Labor

Time: 2 hours
Setting: Nursing Laboratory
Participants: Facilitator
 Sim lab assistant as husband/significant other

Roles: Primary nurse, Secondary nurse, Unlicensed assistive personnel (UAP)

Observers

Equipment: Patient ID band with name and birthdate

Allergy bracelet-aspirin

Oxygen, Suction

20 G. IV catheter, IV tubing, IVAC pump, IV solution: 1000 ml Lactated Ringers

Clean gloves

Stethoscope, automatic BP cuff, pulse oximeter

Linens including sheets, Chux pads, towels, wash clothes, patient gown

Fetal monitor and IPAD

Noelle birthing manikin

Computer on Wheels for documentation purposes

Medications: Simulated Pitocin in 500 ml bag

Learning Outcomes:

Cognitive:

The student will be able to:

1. Identify factors in a patient's past obstetrical history that increase the risk for complication during and after delivery
2. Correctly interpret the signs of progressing labor correlating the signs and symptoms with correct pathophysiology
3. Identify the appropriate nursing interventions for the patient in labor

Psychomotor:

The student will be able to:

1. Perform appropriate assessment for a patient in labor.
2. Initiate appropriate interventions for a patient in labor.
3. Work collaboratively as part of the healthcare team in the care of a laboring patient

Affective:

The student will be able to:

1. Reflect thoughtfully upon the performance of self and other in a simulated obstetrical situation
2. Discuss feelings related to working as a member of the care team
3. Identify factors that worked well during the scenario
4. Identify factors that need improvement during the scenario

Communication:

The student will be able to:

1. Communicate effectively with healthcare team members in a simulated laboring patient scenario
2. Communicate effectively with the patient and family in a simulated laboring patient scenario

3. Use Directed Communication when delegating tasks
4. Employ Closed-Loop Communication to acknowledge communication from others

Safety:

The student will be able to:

1. Demonstrate a safe environment with attention to hazards to health care providers, visitors, and the patient. Includes body mechanics and equipment issues

Pharmacology:

The student will be able to:

1. Identify the medications used to induce and augment labor.

Station Two - Delivery

Time: 2 hours

Setting: Nursing Laboratory

Participants: Facilitator

Sim lab assistant as husband/significant other

Roles: Primary nurse, Secondary nurse, Unlicensed assistive personnel (UAP)

Observers

Equipment: Patient ID band with name and birthdate

Allergy bracelet-aspirin

Oxygen, Suction

20 G. IV catheter, IV tubing, IVAC pump, IV solution: 1000 ml Lactated Ringers

Clean gloves

Stethoscope, automatic BP cuff, pulse oximeter

Linens including sheets, Chux pads, towels, wash clothes, patient gown

Fetal monitor and IPAD

Noelle birthing manikin

Computer on Wheels for documentation purposes

Medications: Simulated Pitocin in 500 ml bag

Learning Outcomes:

Cognitive:

The student will be able to:

1. Identify factors in a patient's past obstetrical history that increase the risk for complication during and after delivery
2. Correctly interpret the signs of progressing labor correlating the signs and symptoms with correct pathophysiology
3. Identify the appropriate nursing interventions for the patient in labor

Psychomotor:

The student will be able to:

1. Perform appropriate assessment for a delivering patient.
2. Initiate appropriate interventions for a delivering patient.
3. Work collaboratively as part of the healthcare team in the care of a delivering patient

Affective:

The student will be able to:

1. Reflect thoughtfully upon the performance of self and other in a simulated obstetrical situation
2. Discuss feelings related to working as a member of the care team
3. Identify factors that worked well during the scenario
4. Identify factors that need improvement during the scenario

Communication:

The student will be able to:

1. Communicate effectively with healthcare team members in a simulated delivering patient scenario
2. Communicate effectively with the patient and family in a simulated delivering patient scenario
3. Use Directed Communication when delegating tasks
4. Employ Closed-Loop Communication to acknowledge communication from others

Safety:

The student will be able to:

1. Demonstrate a safe environment with attention to hazards to health care providers, visitors, and the patient. Includes body mechanics and equipment issues

Pharmacology:

The student will be able to:

1. Identify the medications used to cause uterine contraction immediately post-delivery.

Station Three – Immediate Newborn Assessment

Time: 2 hours

Setting: Nursing Laboratory

Participants: Facilitator

Sim lab assistant as husband/significant other

Roles: Primary nurse, Secondary nurse, Recording nurse

Observers

Equipment: Patient ID band with name and birthdate

Newborn ID bands: one for wrist and one for the leg

Clean gloves

Baby stethoscope, automatic BP cuff, pulse oximeter, thermometer

Linens including baby blankets, hat

Sim baby

Oxygen delivery device

Computer on Wheels for documentation purposes

Medications: erythromycin eye ointment, aquamephyton 1 mg/0.5 ml

Learning Outcomes:

Cognitive:

The student will be able to:

1. Determine essential assessments for the newborn with no respiratory effort upon delivery in a timely manner
2. Engage in purposeful, efficient information sharing and plan of care information and evaluation when necessary
3. Identify the appropriate nursing interventions the newborn

Psychomotor:

The student will be able to:

1. Perform timely and efficient newborn nursing interventions including: dry, stimulate, and correctly positioning the newborn, assign APGAR score, manage thermoregulation, and administer newborn medications
2. Guide and support newborn's family through the experience with communication and learning strategies specific to learning readiness, culture, age, and educational level. Provide family explanation of use of oxygen, thermoregulation needs of the newborn, and medications
3. Work collaboratively as part of the healthcare team in the care of a newborn

Affective:

The student will be able to:

1. Reflect thoughtfully upon the performance of self and other in a simulated obstetrical situation
2. Discuss feelings related to working as a member of the care team
3. Identify factors that worked well during the scenario
4. Identify factors that need improvement during the scenario

Communication:

The student will be able to:

1. Communicate effectively with healthcare team members in the simulated care of the newborn scenario
2. Communicate effectively with the patient and family in the simulated care of the newborn scenario
3. Use Directed Communication when delegating tasks
4. Employ Closed-Loop Communication to acknowledge communication from others

Safety:

The student will be able to:

1. Demonstrate a safe environment with attention to hazards to health care providers, visitors, and the patient, includes body mechanics and equipment issues

Pharmacology:

The student will be able to:

1. Identify the medications used to care for the newborn immediately post-delivery.

Station Four – Postpartum Hemorrhage

Time: 2 hours

Setting: Nursing Laboratory

Participants: Facilitator

Sim lab assistant as husband/significant other

Roles: Primary nurse, Secondary nurse, Unlicensed assistive personnel (UAP)

Observers

Equipment: Patient ID band with name and birthdate

Allergy bracelet-aspirin

Oxygen, Suction

20 G. IV catheter, IV tubing, IVAC pump, IV solution: 1000 ml Lactated Ringers

Clean gloves

Stethoscope, automatic BP cuff, pulse oximeter

Linens including sheets, Chux pads, towels, wash clothes, patient gown

Fetal monitor and IPAD

Noelle birthing manikin

Computer on Wheels for documentation purposes

Medications: Simulated Pitocin in 500 ml bag, Hemabate, Methergine

Peripads

Lochia with clots: artificial blood and red Jello

Telephone

Learning Outcomes:

Cognitive:

The student will be able to:

1. Identify factors in a patient's past obstetrical history that increase the risk for postpartum hemorrhage (PPH)
2. Identify factors in a patient's recent labor and delivery history that increase risk for PPH
3. Correctly interpret the signs and symptoms of PPH
4. Correlate symptoms to the pathophysiology of PPH
5. Identify the appropriate nursing interventions for the patient with PPH

Psychomotor:

The student will be able to:

1. Perform appropriate assessment for a patient with PPH
2. Initiate appropriate interventions for a patient with PPH
3. Work collaboratively as part of the healthcare team in the care of a patient with PPH
4. Correctly set up and administer medications as ordered

Affective:

The student will be able to:

1. Reflect thoughtfully upon the performance of self and other in a simulated obstetrical situation
2. Discuss feelings related to working as a member of the care team
3. Identify factors that worked well during the scenario
4. Identify factors that need improvement during the scenario

Communication:

The student will be able to:

1. Communicate effectively with healthcare team members in a simulated obstetrical emergency scenario
2. Communicate effectively with the patient and family in a simulated obstetrical emergency scenario
3. Use Directed Communication when delegating tasks
4. Employ Closed-Loop Communication to acknowledge communication from others

Safety:

The student will be able to:

1. Demonstrate a safe environment with attention to hazards to health care providers, visitors, and the patient. Includes body mechanics and equipment issues

Pharmacology:

The student will be able to:

1. Identify the medications used to treat PPH.

Appendix E: Faculty Training PowerPoint

Implementing High-Fidelity Obstetrical Simulation

Tammy McCoy, MSN
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Objectives

- › The participants will be able to:
 - Review the state of Nursing Science in Simulation
 - Describe the components of the NLN Jeffries Simulation Theory
 - Identify ADN obstetrical clinical experience barriers
 - Identify challenges educators face in regards to developing competencies using simulation as a tool for teaching.

Introduction

- › Simulation can take many forms
- › Simulation provides a rich learning opportunity for students
- › Students integrate theory with practice while making real-time clinical decisions
- › Environment poses no risk to patients

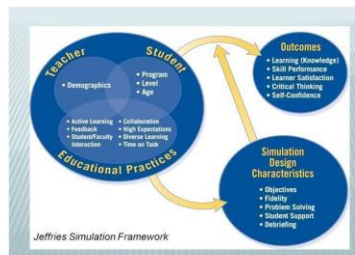
NCSBN Findings

- › The NCSBN National Simulation Study
- › Up to 50 percent of traditional clinical experiences can be substituted with quality simulation

Need for Simulation

- › 2/3 of undergraduate programs are ADN programs
- › Clinical/Faculty shortages
- › Emphasis is on creating contextual learning environments that replicate crucial obstetrical practice situations
- › Use of technology
- › Diverse learning strategies

NLN Jeffries Simulation Theory



Simulation Design

- Features found to be important in designing a quality simulation:
 - Objectives/Information
 - Fidelity
 - Problem-Solving
 - Student Support
 - Reflection

Fidelity: Realism

- Simulations need to:
 - Mimic reality
 - Feel authentic
 - Include elements of physical and conceptual fidelity (equipment, moulage, and appropriate facilities)

Participant

- Participant attributes affect the simulation learning experience
- Attributes include age, gender, level of anxiety, self-confidence, preparedness, & role assignment

Facilitator and Educational Strategies

- Dynamic interaction between the facilitator and participant
- Facilitator attributes include skill, educational techniques, and preparation
- The facilitator responds to participant needs in simulation by adjusting educational strategies, cues, & debriefing

The Simulation Experience

- This is characterized by an environment that is experiential, interactive, collaborative, and learner-centered
- Uses tactile, auditory, kinesthetic, & visual learning
- Buying-in, suspending disbelief promotes engagement and psychological fidelity

Aims of Simulation

- Can simulation effectively replace traditional clinical experiences in the undergraduate prelicensure curriculum?
 - How much?
 - What courses?
 - Generalizable results

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