HOW DOES OBSTETRIC SIMULATION IMPACT UNDERGRADUATE PRELICENSURE BSN STUDENTS' CLINICAL JUDGMENT RELATED TO USING AND UNDERSTANDING FETAL MONITORING?

by

Brandy Clayton

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

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APPROVED BY:

RuthAnne Kuiper Ph.D., RN, ANEF, Committee Chair

Martha Baker Ph.D., RN, CNE, ACNS-BC, Committee Member

Tracey Turner EdD, EdS, MSN, RNC-OB, Committee Member

ABSTRACT

Obstetric simulation can impact undergraduate prelicensure Bachelor of Science in nursing (BSN) students' clinical judgment related to using and understanding fetal monitoring. The purpose of this study aimed to determine if a relationship exists between a student's obstetrical simulation practice and increased knowledge gained for fetal monitoring interpretation. Simulation practice provides a tangible way to test knowledge and competency, but is there an effect on student learning with the knowledge and understanding of fetal monitoring, and can simulation practice create that knowledge? A purposive sample of 24 undergraduate prelicensure BSN nursing students, within their obstetrical course, with the intent to determine if a significant relationship exists between the students' perceived self-efficacy of clinical reasoning with fetal monitoring pre- and post-simulation practice. A one-group pre-survey and post-simulation survey design study, collected by pre-and post-survey questions and with self-reflection journaling, did determine the relationship between students' perceived knowledge and understanding of fetal monitoring compared to knowledge and understanding acquired with simulation practice with the use of paired sample *t* tests, dependent *t* test, and ANOVA. Statistical results noted that the p values was < .001. Structured journaling questions will use coding that will capture the clinical reasoning and judgment during and after the simulation. The results concluded that simulation within the curriculum will significantly impact students' knowledge and understanding of fetal monitoring. Future research is needed on this topic as there are few articles on this, they are outdated, and to reflect how simulation can increase knowledge and understanding of fetal monitoring.

Keywords: Simulation, fetal monitoring, external fetal monitoring, Bachelor of Science, prelicensure nursing, clinical reasoning, clinical judgment

Dedication

This dissertation is dedicated to my children Tasha and Thaddeus, my rocks. You guys are the reason why. You were the blessings in my life that continuously made me who I am today. I love you and thank you for your support. Follow your dreams and always remember that you can be and do anything you set your mind to. To my grandson, Amaru, I love you to infinity and beyond.

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Table of Contents

List of Tables

List of Figures

List of Abbreviations

Bachelor of Science in Nursing (BSN)

External Fetal Monitoring (EFM)

Fetal Heart Rate (FHR)

Fetal Heart Rate Monitoring (FHRM)

Fetal Monitoring (FM)

Licensed Practical Nurse (LPN)

National Council of Licensure Exam- Practical Nurses (NCLEX-PN)

National Council of Licensure Exam-Reregistered Nurse (NCLEX-RN)

Registered Nurse (RN)

High Fidelity Simulation (HFS)

CHAPTER ONE: INTRODUCTION

Overview

This chapter sought to determine if a relationship existed between a student's simulation practice and their knowledge and understanding of the obstetrical interpretation of fetal monitoring. This study also aimed to determine if simulation practice for the students transfers knowledge and judgment of fetal monitoring to the clinical setting. Finally, the study also sought to determine if continued use of simulation increases knowledge and understanding of clinical reasoning around fetal monitoring over time. This study used the pre- and post-simulation surveys in conjunction with a self-journaling de-brief to determine if students learning, knowledge, and understanding of fetal monitoring strip interpretation were increased and their clinical reasoning and judgment. This study used a prolapsed cord simulation, in which the fetal heart rate decreases, to determine if students can recognize and appropriately interpret the fetal heart rate.

Background

Nursing instructors are vital resources as students learn the practice of nursing. Nursing school provides the foundation for practice, sets the tone for learning, and provides the initial interaction with professional nursing arenas. The students must combine didactic theory with patient care in the clinical setting. This transition is difficult for some students, as the students must demonstrate the relationships between didactic theory and clinical practice, and most students cannot effectively put classroom instruction into hands-on practice (Collier, 2018). Students may even be afraid to touch patients in the clinical setting. Students want to understand what the clinical environment will be like before going to authentic practice sites. Students want to go into a patient room, feel comfortable, and not fear the unknown. Crew & Minor (2018) note that simulation can allow a protected and safe environment that allows students to practice without being humiliated or

ashamed of making errors. There must be a neutral approach where students can tie classroom instruction with clinical practice. Delaney (2006) notes that students need a variety of teaching methods to retain the course information successfully and that various methods should be implanted and modified if the objectives are not being met. Birkhead et al. (2012) note that the challenge with students learning maternal health is the lack of preparation.

Fetal Monitoring

Fetal monitoring has evolved over the last few decades and developed in the 1970s, and the use of recorded tracings is more accurate than fetoscope auscultation (Kinnick, V.L., 1989). In the past, nurses performed fetal auscultation with a fetoscope. Now, nurses place transducers over the fetus to visualize and hear heartbeats. Some internal monitors, such as Phillips©, monitor fetal heart rate. External fetal monitoring (EFM) will interpret fetal heart recordings with a device that will enable a nurse to physically see a paper-traced recording of this information (Simpson et al., 2014).

Fetal monitoring has become prevalent with most deliveries in the United States (Menihan & Kopel, 2019). Nursing for Women's Health (2015) relate the rationale for assessing a pregnant mother's uterine activity and fetal heart rate and the nurse's reaction to being clinically sound and competent to monitor and perform interventions. Fetal monitoring enables a nurse to monitor the uterus and fetus (Cohen & Friedman, 2011). Simpson et al. (2014) relay that the obstetrical nurse's primary role is to monitor the mother and fetus; in which obstetric assessments include the mother's vital signs, contractions, and the fetus, including the fetal baseline, accelerations, and decelerations.

Students have a small amount of exposure to reading fetal monitoring strips and lack the ability to interpret the reading and are not able to relate interventions if needed. Nursing for Women's Health (2015) convey that nurses have to acquire competence for fetal monitoring and that fetal heart monitoring entails skill, knowledge, validation, and clinical judgment. "When

obstetric nurses are required to interpret findings from cardiac monitoring, adequate education and competence validation processes should be developed" (Simpson et al. 2014, p 414). Competency must be established when learning to read fetal monitoring (Eganhouse, 1991).

Fetal Monitoring Instruction within Nursing Programs

Fetal monitoring in a maternal-child health course is a fundamental instruction block, with little emphasis on reading or interpreting fetal monitoring strip outputs. Nursing students must take a maternal-child health course with required clinical practice hours. Kinnick, V.G. (1989) notes that maternal health courses are limited in hours, and the students do not gain knowledge in this skilled area of fetal monitoring. Showalter (2016) affirms that maternal child curriculum and clinical are often short and inadequate for learning. Therefore, fetal monitoring may not be adequately retained since students may not have the opportunity to practice the skill or apply the knowledge and understanding. Romaguera & Zimmerman (2010) convey that new graduates often have trouble reading fetal monitoring and providing the correct interpretation. Graduated students can be hired into labor and delivery or postpartum units. These graduated nurses must read and interpret these strip outputs and provide the correct intervention as needed.

The National Council of Licensure Exam-Registered Nurses (NCLEX- RN) test could reference maternal-child and newborn information; therefore, knowing and understanding maternal/newborn care is imperative. Students in a clinical setting should have a foundational knowledge of fetal monitoring strip reading and adequately perform abnormal fetal heart monitoring if needed. The researchers' motivation for this study is to increase a student's knowledge and understanding of fetal monitoring within a maternal-child course. Students often perform clinical in the maternal unit without knowledge or understanding of general information or

when problems arise. The researcher sought to show how simulation can effectively increase the knowledge and understanding of fetal heart rate monitoring within the maternal-child course.

Nursing students learn some of the foundational knowledge and understanding regarding fetal monitoring in their nursing programs. Showalter (2016) declares that maternal child curriculum and clinical are often short and inadequate for learning. Therefore, fetal monitoring may not be adequately retained since students may not have the opportunity to practice the skill or apply the knowledge and understanding. Students can explain what a normal baseline is, what a deceleration is, and possibly identify a contraction on a fetal strip, but the student's objective is to understand and comprehend what decelerations and accelerations are and their relationship with fetal heart rate and contractions. Faculty can instruct students on the general knowledge behind it. Still, due to lack of repetition, students may not be able to recognize why a fetal heart rate may vary.

Kinnick, V.G. (1989) articulates that maternity courses in nursing programs do not emphasize enough fetal monitoring interpretation and that maternal health courses are limited in hours, and the students do not gain knowledge in this skilled area of fetal monitoring. Only 30% of schools focused on fetal monitoring and students were instructed only through a few hours of didactic instruction. Fetal monitoring in a maternal-child health course is a fundamental instruction block, with little emphasis on reading or interpreting fetal monitoring strip outputs. MacKinnon et al. (2017) relay, “nurse educators experience difficulties providing undergraduate students with maternal-child learning experiences for various reasons. Simulation has the potential to complement learning in clinical and classroom settings” (para 1).

Simulation practice can provide that reality and decrease stress for a student. Showalter (2016) relates that simulations before starting clinical will help alleviate stress and the unfamiliarity

of the maternal-child health course. Lee et al. (2018) affirm that a clinical setting can artificially be created using simulation to learn fetal heart rate monitoring. Masters (2014) notes that simulation can achieve meeting the course objectives. Students want to learn skills authentically, and the role simulation practice provides students with training close to the authentic situation with hands-on in a laboratory. This artificial clinical setting allows similarities to a patient room and scenario, decreasing anxiety in the authentic clinical environment. Simulation practice enables students to gain insight into patient care without the fear of causing harm, making an error, watching their fellow students, and receiving faculty feedback. Simulation practice provides a pre-clinical setting where students can practice skills, assessments, interventions, and procedures and learn their actions' positive and negative consequences. Simulation can allow students to get comfortable and learn without fear of making errors. Simulation practice can provide pre-clinical experience for students and give them knowledge and practice before arriving at a maternity patient's room.

Students are expected to learn and grow from semester to semester and course to course. Students are evaluated on their skills with tests, skill check-off, assignments, and passing the NCLEX- RN examination. Simulation practice is one pedagogy that faculty can use to promote student outcomes. Lee et al. (2018) show that simulations have been programmed to increase the knowledge and understanding of nursing students. Cowperthwait (2020) reported that simulation usage has increased over the years. With the revolution of simulation practice, students actively engage with learning in a practical setting like an actual clinical rotation. These pedagogies are important as they determine student learning and the upward progression necessary to become clinical experts.

Amerjee et al. (2018) state that students need clinical practice before performing maternal-child clinical. Birkhead et al. (2012) state that students do not feel adequately prepared for

maternal-child health clinical. Park & Lee (2015) affirm that simulation can effectively produce knowledge in prelicensure BSN students with maternal-child content. Simulation can provide the foundational framework for students to identify and recognize normal versus abnormal fetal heart monitoring and react accordingly. Simulation practice can assist students with applying the fundamentals of fetal monitoring, including interpretation, knowledge, and understanding. Jeffries et al. (2009) relate that simulation can effectively teach prelicensure BSN students to interpret maternal-child course information.

Learning Theories and Frameworks that Support Fetal Monitoring Simulation

The researchers' motivation for this study was to increase a student's knowledge and understanding of fetal monitoring within a maternal-child course. Students often perform clinical in the maternal unit without knowledge or understanding of general information or when problems arise. The researcher sought to show simulation can effectively increase the knowledge and understanding of fetal heart rate monitoring within the maternal-child course. Several theories will assist with answering the research questions.

Pamela Jeffries Simulation Framework (Ravert & McAfooes, 2012) will guide the development of the simulation situation, Benner's Novice to Expert Theory (Murray et al., 2019) will support the novice level of interaction, and Bloom's Taxonomy (Bruuckere, 2017) will serve as a resource for the vocabulary of the learning objectives. The pedagogies developed with these theories can assist faculty with meeting objectives and ensure student knowledge and understanding are achieved. Bandura's Social Learning Theory will support the study design and aims to discover the impacts of student learning and how simulation can increase knowledge and understanding of fetal monitoring interpretation. Pamela Jeffries Simulation Framework (Ravert & McAfooes, 2012), Benner's Novice to Expert Theory (Benner, 1984), and Bloom's Taxonomy (Bruuckere, 2017) are

vital components for nursing faculty to construct curricula and ensure that the didactic and clinical pedagogies actively engage student learning. The theory underpinning the study design aims includes Bandura's Social Learning Theory (Bandura, 1989) as it related to student behaviorism learning. This conceptual model will guide faculty in developing program curricula to meet course objectives. Rothgeb (2021) affirms that students need appropriate outcomes to feel relaxed in a program. Students learn through various pedagogical methods. Linton et al. (2019) note that students want quality education when applying for schools and will not apply to a school with low student satisfaction with instruction. Student satisfaction in prelicensure BSN programs is elevated when faculty develop rapport, are present, instruct in various ways, and use different methods (Cobb, 2011). Lee et al. (2018) relate that students are apt to learn when they feel valued and that their instructors value their learning. Klein et al. (2006) determined that student satisfaction with learning occurs when faculty develop learning outcomes related to achievable learning and promote learning. This study sought to gain insight into whether simulation will increase a student's understanding of fetal heart rate interpretation.

Lasater & Nielson (2009) convey that old-style didactic course learning is ineffective today. Faculty must ensure they teach with different pedagogies conducive to all learning styles and promote learning in multiple settings. Dabeny et al. (2019) also convey that faculty must be effective with teaching methods for students to grasp content. Boyer et al. (2015) support that critical thinking, clinical reasoning, and the beginnings of clinical judgment must occur in nursing school.

Kennedy et al. (2020) relate that simulation could effectively replace clinical; however, having clinical with simulation is even more effective. Simulation allows instructors to provide all students with education in a reliable setting. Simulation practice can increase the student's

knowledge and understanding of fetal monitoring as simulation practice promotes competency growth within the learning environment (Larew et al., 2006). Simulation practice can prepare students in an environment that simulates the desired outcome. The ability to successfully use simulation practice within the student's curriculum enhances skills. Mackinnon et al. (2015) note:

> Despite this importance, educators in many countries have acknowledged difficulties providing nursing students with maternal-child hospital learning experiences due to declining birth rates, women's changing expectations about childbirth (i.e., birth as an intimate experience), increased outpatient and community management of early childhood health conditions, and increased competition for clinical placements. (para 2).

Situation to Self

The researchers' motivation for this study was to increase a student's knowledge and understanding of fetal monitoring within a maternal-child course. Students often perform clinical in the maternal unit without knowledge or understanding of general information or when problems arise. The researcher sought to show simulation can effectively increase the knowledge and understanding of fetal heart rate monitoring within the maternal-child course.

Problem Statement

The overall arching problem is that, while maternal-health courses are lectured; students often feel unprepared for clinical and unable to interpret fetal monitoring and understand maternal-health outcomes and objectives. Simulation is an effective way to instruct and deliver knowledge and understanding within a nursing program curriculum. Students can obtain knowledge and understanding of fetal monitoring by incorporating simulation. This study sought to determine if there are literature reviews that supports how simulation increases student learning and how it will increase a student's knowledge and understanding. This study also sought to find literature that

supports nursing programs and the incorporation of simulation as students can retain information and practice skills before the clinical setting. There is supportive research on various maternal health subjects. Kinnick (1990) concludes that students had the basic knowledge and understanding of fetal monitoring when properly instructed in maternal-child health, particularly fetal monitoring. Kinnick, V.G. (1989) reflects that programs taught the maternal-child content but did not emphasize fetal monitoring, and students are inadequately taught to think critically concerning fetal monitoring. Mahley et al. (1999) note that teaching fetal monitoring to prelicensure BSN students can be quite challenging due to class lecture time and the short time to understand fetal monitoring.

Research is needed to determine if a relationship exists between a student's simulation practice and their knowledge and understanding of the obstetrical interpretation of fetal monitoring. There is a huge gap between simulation and the interpretation of fetal monitoring. Research is also needed to determine if simulation practice for the students transfers knowledge and judgment of fetal monitoring to the clinical setting. This study notes the gap of obstetric simulation and the practice impact on undergraduate prelicensure BSN students' clinical reasoning and judgment related to fetal monitoring. The problem is that more research is needed to determine if students can effectively relate knowledge and understanding from simulation practice with fetal monitoring interpretation and apply it in authentic clinical situations.

Purpose Statement

The purpose and intent of this one-group pre- and -post- simulation survey quantitative and qualitative design study, collected by pre-and post-simulation survey questions in conjunction with structured journaling questions, was to determine the relationship between prelicensure BSN students' perceived knowledge and understanding of fetal monitoring compared to knowledge and understanding acquired with simulation practice. This design was used to determine the relationship

between student's knowledge and understanding (dependent variable) with simulation usage (independent variable), as groups were not randomly selected. These methods were used to determine if the phenomena of a student's knowledge and understanding can be improved based on simulation practice and fetal monitoring interpretation. This study sought to determine if a significant relationship exists between the students' perceived self-efficacy of clinical reasoning with fetal monitoring pre- and post-simulation practice and if the incorporation of simulation within the curriculum will significantly impact students' knowledge and understanding of fetal monitoring. A purposive sample of 24 undergraduate prelicensure BSN nursing students, within their obstetrical course, using simulation assisted instruction, sought to determine if simulation is an effective way of teaching and learning method for student knowledge and understanding of fetal monitoring. Hemman & Fought (2010) note that the phenomena of nursing interest nursing, people, their surroundings, and their overall well-being. This study linked the phenomena of nursing, their surroundings, and their relation to simulation, learning, and fetal monitoring.

Significance of the Study

The significance of this study is to relate that simulation can impact prelicensure BSN students' knowledge on fetal monitoring knowledge and understanding. Simulation will aid in the learning of fetal monitoring and bridge this gap between didactic and clinical. The significance of this study will relate current literature to the use of simulation in prelicensure BSN student learning but also address the gap that there are limited studies on simulation and fetal monitoring in general, but also in the prelicensure BSN student population. Simulation is an effective way to include the theories of learning, such as Bandura's Social Learning, Benner's Novice to Expert, Pamela Jeffries Simulation Framework, and Bloom's Taxonomy.

A variety of learning methods should be incorporate into a program's outline to ensure students get the most out of their learning. Traditional ways of learning include course lectures and then students attending clinical experiences. Historically clinical practice within a nursing program served as the only way students would gain hands-on patient care experience. Programs need to focus on NCLEX-RN basic learning foundation and student learning that promotes critical thinking, clinical reasoning, and higher learning. Petges & Sabio (2020) also confer that programs must assess learning needs to prepare the students to pass the NCLEX-RN licensure.

This study showed that simulation within a nursing program could effectively increase the knowledge and understanding of fetal monitoring. Education within nursing programs is vital and ongoing. While educators can provide didactic instruction, the clinical aspect also must be achieved as this is where students show knowledge, understanding, and comprehension. Linton et al. (2019) assure students want a quality nursing program that exceeds teaching standards. Special emphasis must be placed on learning and knowing how students learn. Faculty must develop a good, quality, pre-planned way to deliver course material. Masters (2014) affirmed that simulation must be coordinated into the course schedule and not be scheduled at the last minute.

This study delivered a variety of literature results that relate the positive effect of simulation on student learning. Malarvizhi et al. (2017) annotate that simulation provides valuable feedback to the students concerning their current learning state. Schoening et al. (2006) affirm that simulation can effectively teach students and tie in the needed patient role as appropriate and that instructors can use simulation to teach about patient scenarios. Rentschler et al. (2007) relay that simulation can accurately reflect competency before clinical and show faculty where knowledge gaps exist. Therefore, allowing instructors to find alternate ways to instruct so students can retain the information. The use of simulation is an interactive tool for students to actively be engaged, as

instructors determine if mastery and transition to the nurse role have been achieved (Nyhan & Howlin, 2021; Reed, 2015). Students may not feel adequately prepared for maternal-child clinical practice (Birkhead et al., 2012), and faculty have trouble instructing fetal monitoring and maternal-child health practice (MacKinnon et al., (2017).

The foundational knowledge of fetal monitoring can be presented, but actively demonstrating knowledge and understanding of the fetal strip outputs for interpretation and interventions can be problematic for students. Simulation practice can assist faculty with meeting course objectives. Zhu et al. (2020) relay that simulation closes the gap between didactic and clinical knowledge deficits and that simulation is imperative and extremely beneficial to students and their knowledge and understanding. Cunningham (2010) stated that simulation is the accepted way to train students without using a real patient and affirmed that this is the closest a student can get to patient care without using a patient.

The use of simulation practice will effectively allow students to enhance and increase their knowledge and understanding of fetal monitoring. Barra & Singh Hernandez (2019) note that hands-on is the key to learning, and simulation provides that repetition for skill mastery. Simulation practice can provide faculty with a competency assessment of student knowledge and understanding of fetal monitoring. Simulation practice can effectively offer students and faculty ways to close fetal monitoring knowledge gaps. Simulation practice can bridge the multiple gaps in learning difficulties that students may encounter. Crews & Minor (2018) relate that most prelicensure BSN students do not get much education with maternal-child and note that simulation can effectively provide that needed education and that much-needed research can demonstrate that simulation can help students master the knowledge and understanding of maternal-child content.

Showalter (2016) conducted a study with prelicensure BSN students to determine how maternal-child health simulations could assist with the concentration of their maternal-child course information. The study consisted of two groups who both had lectures first. The first group went to clinical, and the second group had a simulation before clinical. The first group learned how to read fetal monitoring and perform assessments in the clinical setting. The second group used a simulator to learn how to read fetal monitoring and perform assessments. The study concluded that the first group (48%) felt knowledgeable about fetal monitoring after the clinical. The second group felt 80% competent and knowledgeable about fetal monitoring.

This study showed that an abundance of literature supports student learning and knowledge retention with simulation. Very little research has been conducted on simulation and the retention of fetal heart monitoring within student programs. Mahley et al. (1999) conducted a study that showed that the interpretation of fetal monitoring is difficult for students noted a positive relationship between student learning and simulation. Students within their current prelicensure BSN program reported increased comfort with caring for patients and an increased critical thinking approach after simulation (Cardoza & Hood, 2012). Reid et al. (2020) concluded that simulation is a method to determine a student's knowledge and understanding but is also an effective way to validate knowledge after a simulation. In summary, students gain confidence post-simulation compared to pre-simulation and show improved clinical reasoning (Akalin & Sahin, 2020a).

Research Questions

This study aimed to determine if a relationship exists between a student's obstetrical simulation practice and increased knowledge gained for fetal monitoring interpretation. This study also sought to determine the relationship between a student's knowledge and understanding of fetal monitoring after simulation practice would transfer to the clinical setting and the gain over time.

This study examined the following research questions:

RQ1: What was the prelicensure students' BSN perceived knowledge and understanding before and after obstetric simulation practice? (Quantitative and Qualitative)

RQ2: How did obstetric simulation practices increase undergraduate prelicensure BSN students' clinical reasoning and judgment using fetal monitoring? (Qualitative)

RQ3: What impact did the repeated obstetric simulation practice have on prelicensure BSN student knowledge and understanding of their clinical reasoning and judgment of fetal monitoring by the end of their obstetric course?

Definition of Terms

The following list signifies conceptual definitions as it related to this study:

1. Student- prelicensure BSN student enrolled in their OB course
2. Pre-survey and post-simulation survey- data collection tool created by researcher reflecting a Likert Scale for data comparison.
3. Journal-data collection tool created by the researcher reflecting a coding mechanism for data comparison.

The following list represents conceptual definitions for this study as it related to Fetal monitoring interpretation on a fetal strip:

1. Fetal baseline-
    - The average fetal heart rate is over ten minutes. Must have at least two minutes of continuous baseline rate during the assessment period (10 min), measured in increments of five-10 beats per minute, assessed exclusive of accelerations, decelerations, and contractions (Simpson et al., 2014)

- Bradycardia-Baseline FHR <110 bpm persisting over ten minutes or more (Simpson et al., 2014)
- Tachycardia-Baseline FHR >160 bpm persisting over ten minutes or more (Simpson et al., 2014)

2. Baseline Variability- Defined as fluctuations in the fetal heart rate baseline that are irregular in amplitude and frequency. (Simpson et al., 2014)
    - Absent- no variability (Simpson et al., 2014)
    - Minimal- less than five bpm fluctuations (Simpson et al., 2014)
    - Moderate-five-25 bpm fluctuations (Simpson et al., 2014)
    - Marked greater than 25 bpm fluctuations (Simpson et al., 2014)
    - Accelerations- A visually apparent increase in the FHR from the most recently calculated baseline. The increase must last ≥15 bpm and last ≥15 sec from the onset to return (Simpson et al., 2014).
    - Decelerations- Visually apparent decrease in the fetal heart rate from the noted baseline. The decrease in FHR is calculated from the onset to the nadir of deceleration ≥30 bpm (Simpson et al., 2014).
    - Early deceleration-symmetrical, gradual decrease and return of FHR are most often noted with the uterine contraction regarding head compression. The nadir of the deceleration occurs simultaneously at the peak of the contraction and coincident with the beginning, peak, and ending of the contraction correspondingly (Simpson et al., 2014).
    - Late deceleration-symmetrical, gradual decrease and return of FHR associated with a uterine contraction in response to poor placenta perfusion. This

deceleration is delayed in timing, with the nadir of the deceleration occurring after the peak of the contraction. (Simpson et al., 2014).

- Variable deceleration- abrupt decrease in FHR, relatable to cord compression concerning the uterine contractions but can occur at any time (Simpson et al., 2014).

3. Contractions – the uterine muscle force that initiates a fully dilated cervix and delivery of the fetus (Simpson et al., 2014).

4. Knowledge and understanding will be measured using pre-and post-simulation surveys

5. Clinical reasoning and judgment will be elicited with structured journaling questions.

6. Simulation equipment includes a pregnant mannequin and a fetal monitoring machine in operable order.

7. Small group indicates five to six students.

8. Knowledge and understanding of fetal monitoring are the results of simulation practice.

9. Critical thinking refers to using knowledge beyond the foundational knowledge (Zuriguel Perez, 2015) and is assumed within the clinical reasoning process (Kuiper, 2002).

10. Clinical reasoning refers to using clinical knowledge to make a clinical rationale for a patient (Kuiper et al., 2009).

11. Clinical judgment refers to the knowledge required to make sound decisions regarding care or interventions (Sommers, 2018).

12. Simulation refers to using a mannequin that can perform and interact as a human would, allowing nurses the opportunity to perform interventions as a learning tool. (Sofer, 2018).

13. Simulation practice refers to using simulation to enhance knowledge and understanding of fetal monitoring. (Jeffries et al., 2015).

Summary

This study sought to determine if a significant relationship exists between the students' perceived self-efficacy of clinical reasoning with fetal monitoring pre- and post-simulation practice and if the incorporation of simulation within the curriculum will significantly impact students' knowledge and understanding of fetal monitoring. The purpose and intent of this one-group pre- and -post-simulation survey quantitative and qualitative design study, collected by pre-and post-simulation survey questions in conjunction with structured journaling questions, was to determine the relationship between prelicensure BSN students' perceived knowledge and understanding of fetal monitoring compared to knowledge and understanding acquired with simulation practice. This design was used to determine the relationship between student's knowledge and understanding (dependent variable) with simulation usage (independent variable), as groups were not randomly selected. These methods were used to determine if the phenomena of a student's knowledge and understanding can be improved based on simulation practice and fetal monitoring interpretation. Students must have instruction that meets course and program objectives.

Nursing school provides a foundation of knowledge and skill. Instructors must ensure that knowledge and understanding are retained, and competency is mastered via multiple pedagogies. Simulation practice can provide a tangible way to test knowledge and competency, but is there an effect on student learning with the knowledge and understanding of fetal monitoring, and can simulation practice create that knowledge? Obstetric simulation can positively impact undergraduate prelicensure BSN students' clinical judgment related to using and understanding fetal monitoring. The aim for this study, was to determine if a relationship exists between a student's obstetrical simulation practice and increased knowledge gained for fetal monitoring interpretation. A one-group pre- and -post- survey design study, collected by pre-and post-survey

questions, determined the relationship between students' perceived knowledge and understanding of fetal monitoring compared to knowledge and understanding acquired with simulation practice. Structured journaling questions elicited clinical reasoning and judgments used in simulation and subsequent clinical practice. A purposive sample of 24 undergraduate prelicensure BSN nursing students, within their obstetrical course, with the intent did determine if a significant relationship exists between the students' perceived self-efficacy of clinical reasoning with fetal monitoring pre- and post-simulation practice. Incorporating simulation within the curriculum will significantly impact students' knowledge and understanding of fetal monitoring. The use of simulation did assist with instruction in effective teaching and learning fetal monitoring, skill knowledge, and understanding.

Pamela Jeffries Simulation Framework, Benner's Novice to Expert Theory, and Bloom's Taxonomy serve as a resource for pedagogies that can assist faculty with meeting those objectives, all while using these resources to ensure student knowledge and understanding are achieved. Over time, the determination of knowledge, understanding, clinical reasoning, and competency is needed to evaluate students in all educational settings. Faculty must prioritize different student learning methods and meet the intent of that variance. Faculty must continue reevaluating their pedagogical methods to ensure students understand and use clinical reasoning and judgment.

Simulation practice can provide an effective way to ensure that students get experiences with fetal monitoring to gain the competency needed to practice. Understanding how simulation practice assists students with learning fetal monitoring will aid in developing pedagogies that can be used in the future. Simulation practice can provide faculty with a competency assessment of student knowledge and understanding of fetal monitoring. Simulation practice can effectively offer students and faculty ways to close fetal monitoring knowledge gaps. Riley-Baker et al. (2020) relates that

simulation can assist with learning fetal monitoring within the prelicensure BSN program. Simulation practice can bridge the gaps in learning difficulties that students may encounter.

CHAPTER TWO: LITERATURE REVIEW

This chapter connected the guided literature review of this study's aim, purpose, and pivotal theories. This chapter demonstrate the learning theories and how it related to student learning. This chapter will focus on the literature review regarding student learning with simulation concerning fetal monitoring interpretation. This chapter associated multiple studies about student learning with simulation, but very few articulated the relationship between fetal monitoring and simulation. This chapter will also regard Bloom's Taxonomy relating the three domains, as all the domains are used regarding the students learning and with simulation, developed courtesy of Patricia Jeffries Simulation Theory. This will also discuss students as novices regarding Benner's Novice to Expert Theory. According to Nursing Theories (n.d.), Jeffries Simulation Framework and Benner's Novice to Expert Theory are highly referenced theories and frameworks appropriate for student learning. This study also utilizes Bandura's Social learning theory as a theoretical framework for student learning of fetal monitoring after using simulation.

Overview

This chapter focused on the literature review of the theories applied to nursing concerning undergraduate student knowledge and understating of fetal heart rate monitoring using simulation. This chapter also noted the gaps in the literature as they relate to the lack of understanding of fetal monitoring interpretation understanding and how simulation can play a role in the gained knowledge. This area of instruction is important as new graduate nurses often seek employment in labor and delivery units but also having the background knowledge of fetal monitoring as it pertains to clinicals and didactic assignments.

Theoretical Framework

This study used several organizing frameworks and Bandura's Social Learning Theory. The earlier frameworks and theories, Pamela Jeffries Simulation Model, Bloom's Taxonomy, and Benner's Novice to Expert Theory, focus on learning methods within a nursing program. In addition, this study used Bandura's Social Learning Theory based on the co-factors of behaviorism, constructivism, and situated cognition. These learning paradigms demonstrate that knowledge and understanding of fetal monitoring, with simulation, students can gain that expertise.

Faculty typically use these learning paradigms to adjust and monitor student competency, knowledge, and understanding and make pedagogy adjustments. Simulation is one of those pedagogies that fills the gap to improve knowledge and understanding when an authentic scenario is needed for learning (Au et al., 2016). It allows a safe space for students to learn, enhance skills, and make mistakes. The use of Pamela Jeffries Simulation Framework, Bloom's Taxonomy, and Patricia Benner's Novice to Expert Theory will guide faculty in developing the program curriculum to meet course objectives. These theories represent a nursing theory and model for competency, knowledge, and understanding. These theories should assist faculty in developing simulations that reference course objectives, knowledge, critical thinking skills, clinical reasoning, mastery of skills, and clinical judgment for competency. In conjunction with Bloom's Taxonomy, Benner's Novice to Expert Theory is necessary to define student learning. Using Benner's Theory should allow faculty to note student competency and adjust pedagogies. Using Bloom's taxonomy, students' progress from a novice when specific knowledge and understanding competencies are met.

Thompson (1998) conducted a study that reflected students' needs for learning. This study noted that they lack confidence, are not ready to learn actively, and have a program that allows them to think critically. This study concluded that faculty must develop a program where the course

objectives are academically appropriate for student learning. Students' learning methods that allow student progression with the use of simulation, can assist with the foundation of nursing and other learning aspects. Delaram et al. (2017) relate that tests and quizzes are ineffective in evaluating if learning was achieved and that the most effective way to evaluate learning is to provide activities that promote critical thinking and clinical reasoning as a test of foundational knowledge. Doody & Condon (2013) note that traditional teaching and learning methods are effective with alternate styles, such as simulation. The clinical setting is suitable for student learning, and faculty must prepare and foster students with that training before attending clinical (Moscaritolo, 2009). Levett-Jones et al. (2009) deliver that students feel a sense of safety and unity when instructed. Critical thinking and clinical reasoning within the clinical practice setting must be introduced in nursing school (Boyer et al., 2015; Kuiper et al., 2009). MacKinnon et al. (2017) note that:

> Nurse educators have identified several advantages for learners using simulation, including providing a safe environment to improve nursing competence, allowing learners to become more comfortable with receiving feedback about their clinical performance, providing consistent and comparable experiences for all students, and learning a mix of technical and non-technical skills such as communication, teamwork, and delegation. (para 6).

Moscaritolo (2009) relate that a nursing instructor's focus is to provide and promote student learning, so the student evolves into a professional nurse. The use of simulation practice assists faculty with ensuring that students obtain clinical thinking and reasoning abilities and can learn and reinforce new skills and apply learned knowledge (Mackinnon et al., 2015). Cardoza & Hood (2012) relate that simulation allows faculty and nursing students to implement class learning into hands-on learning. Malarvizhi et al. (2017) affirm that simulation allows clinical practice with needed and necessary feedback.

Pamela Jeffries Simulation Framework

The Pamela Jeffries Framework was relevant for this study as the framework set the standard for simulation and how simulations should be performed and conducted. LaFond et al. (2013) note that Jeffries's Framework for simulation provides a model to promote successful student learning. Jeffries Simulation Framework and its relevance to simulation has been the model that has demonstrated positive student learning results and increased knowledge and understanding. Faculty should use this framework during course learning as this will assist students in mastering content and begin to relate didactic information to clinical practice.

Cowperthwait (2020) notes that Pamela Jeffries's Simulation Framework has phenomenally impacted nursing education and confirms that these components are imperative for student learning success. Morrow (2018) relates that the simulation model supports an articulating nursing phenomenon. Pamela Jeffries Simulation Framework is based on student learning with the assistance of simulation practice and the impact of several key components. These components include faculty involvement, the coordination of the simulation, the outcomes, student involvement, and the overall simulation strategy (Jeffries et al., 2015). These components must be present for a simulation to affect student learning. Faculty must ensure the simulation is conducive, concise, and worthy. The simulation practice must meet course objectives, students must have the initiative to learn, and the outcomes must meet the learning objectives.

Pamela Jeffries Model was a relevant framework for this study as she set the standard for simulation and how simulations should be performed and conducted. The simulation development tool design from the Jeffries Simulation Framework is a reliable tool that assists simulators with developing simulations and used by many educators. Ravert & McAfooes (2012) relate that with Jeffries Simulation Framework, the facilitator and participants will reach outcomes in conjunction

with the appropriate design. This tool must allow faculty to create simulations to meet course and program objectives and outcomes. Morrow (2018) confer that Jeffries Framework establishes a diagram that focuses on conceptual underpinnings and endorses wisdom in the students. This wisdom is correlated with Benner's Theory to take novice student nurses and promote their learning and development during clinical experiences. Lavoie et al. (2018) confer that most studies on simulation reference Jeffries Framework to train and determine competence.

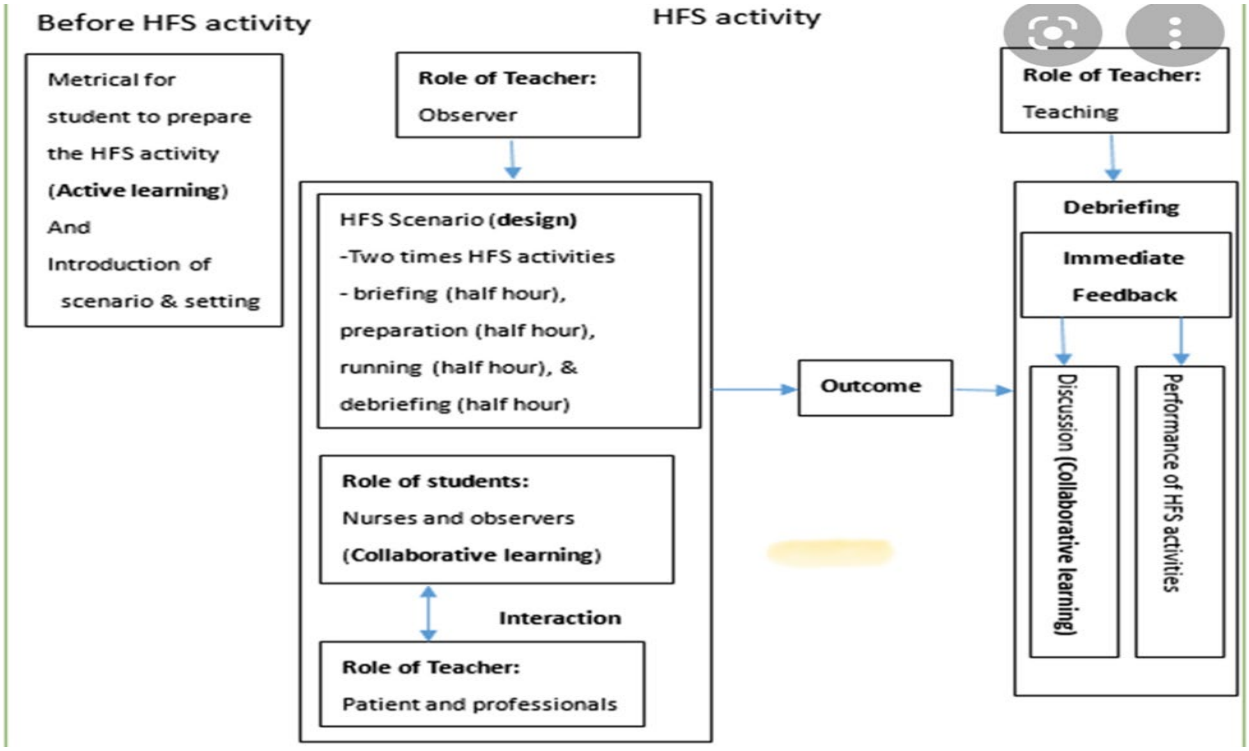
The Jeffries Simulation Framework was useful in this study to determine how faculty can effectively create a simulation that will meet the students' needed learning outcomes or objectives. This tool will allow the facilitator to develop a simulation that will meet the intent of determining how obstetric simulation practices increase undergraduate prelicensure BSN students' critical thinking and clinical reasoning using fetal monitoring. Au et al. (2016) reflects on Jeffries's Simulation Framework to implement knowledge and understanding in prelicensure BSN students. This model will guide instructors to effectively implement a simulation and the before and after simulation expectations and respective outcomes. Ravert & McAfooes (2012) exhibit how Bloom's Taxonomy is referenced and will assist in developing the learning outcomes and objectives for this study (Figure 2). Jeffries is the model to use as it will ensure competency is being achieved (Labrague et al., 2019). The fetal monitoring simulation used in this study, used the processes and concepts displayed in the Jeffries Simulation Model (Figure 1) and the simulation plan in Appendix C.

Lubbers & Rossman (2016) used the Jeffries Simulation Framework and performed a one-group pretest-posttest survey design study to determine if simulation could assist clinical learning despite short clinical time in local facilities. This study used 54 prelicensure BSN students and a pre-test and a post-simulation test survey tool with a confidence level of $p < 0.001$. The results were

that students' confidence levels dramatically increased and were highly satisfied with the simulation and their learning. Bowden et al. (2022) relay that Jeffries Simulation Model is a significant framework for showing nursing students a different way to learn. This article was a mixed method and the debriefs used noted were where the nurses learned the most valuable information from the simulation. Tanner (2006) note that the Clinical Judgment Model is a widely used tool for debriefing after simulation activities.

Figure 1

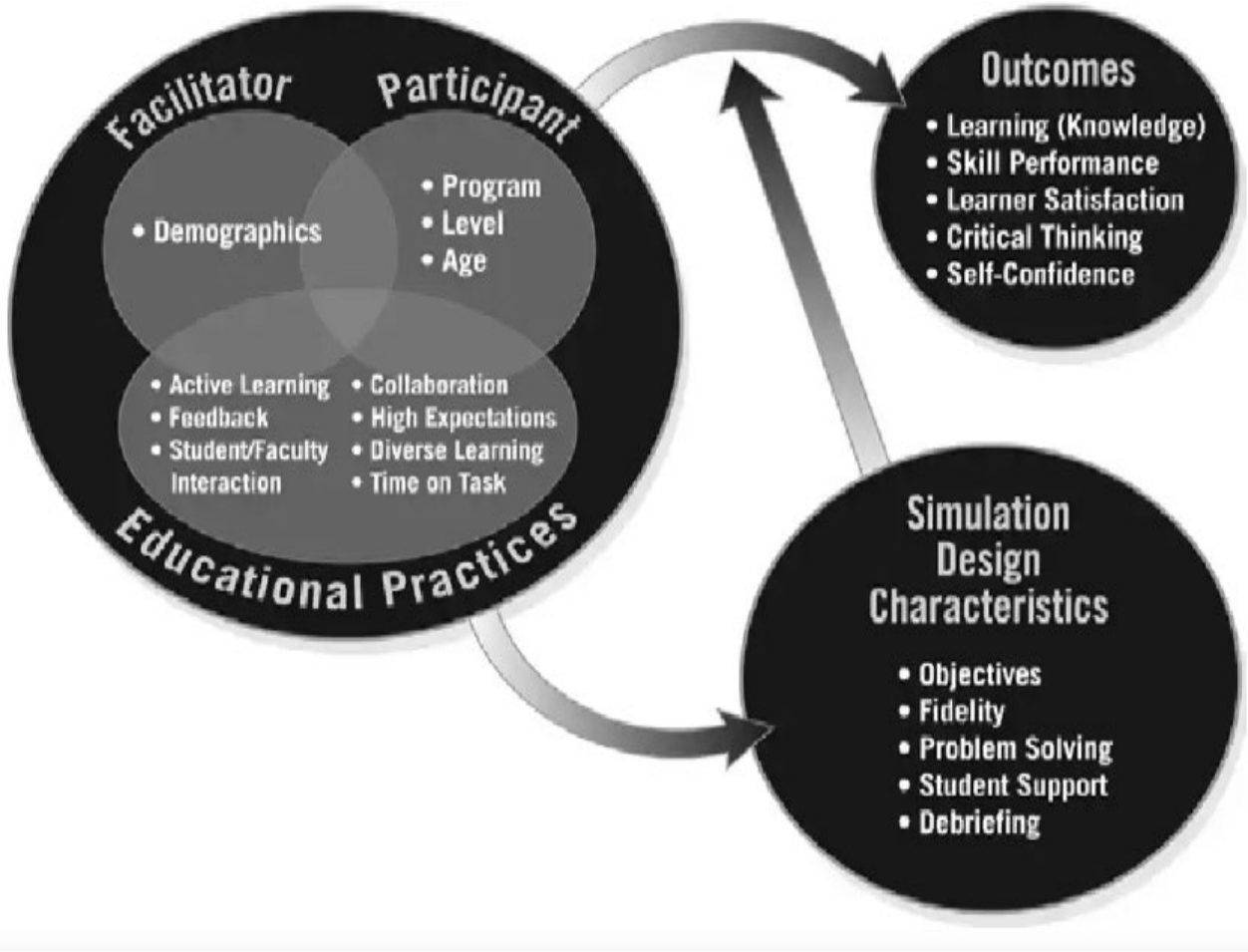
Jeffries Simulation Framework: HFS



Note. This model guides instructors to effectively implement a simulation and the before and after simulation expectations and respective outcomes. Retrieved from "Nursing students' perception of high-fidelity simulation activity instead of clinical placement: A qualitative study," by Au, M. L., Lo, M. S., Cheong, W., Wang, S. C., & Van, I. K., 2016, Nurse Education Today, 39, p. 16-21

Figure 2

Jeffries Simulation Framework



Note. This model represents the use of the Jeffries Simulation Framework that the facilitator and participants will reach outcomes in conjunction with the appropriate design. Retrieved from "State of the nursing science summary: A review of the NLN/Jeffries simulation framework" by Ravert, P., & McAfooes, J., 2012, Clinical Simulation in Nursing, 8(8), p. e410-e411.

Bloom's Taxonomy

Bloom's Taxonomy served as the reference guide for faculty to progress students learning within a curriculum. Bloom's Taxonomy is a system of three domains (cognitive, psychomotor, and affective) to verify student learning and if they have mastered the content being taught (Billings &

Halstead, 2020). This study referenced all three domains, as all the domains are used concerning the students learning and with the use of simulation. Bloom's taxonomy defined the specific outcomes achieved with simulation practice and subsequent clinical experiences.

According to Billings and Halstead (2020), the cognitive domain focus is on learning through knowledge. Bloom's Taxonomy focus is on the cognitive domain areas that enhance six concentrations: remembering, understanding, applying, analyzing, evaluating, and creating, and each domain must be mastered or achieved before moving to the next (Keating & Deboor, 2018). This domain is where critical thinking begins as the students learn the foundation and move to more advanced thinking.

The simulation will respectively capture all these areas of concentration. Keating & Deboor (2018) note that the psychomotor domain is affected using simulation as this domain requires sensory prompts to move on during simulation. This domain will be important as the students react to their simulator scenario and provide appropriate interventions. This domain also references how students perform with patients in the clinical setting.

Keating & Deboor (2018) note that the affective domain relates to emotion or personal feeling. This domain is used during the simulation debrief. This domain is important as it allows the students to reflect on their feelings, concerns, and emotions. This domain will allow personal reflection and growth from the simulation.

Bloom's Taxonomy is a reference tool that faculty must use as it assists with defining course objectives that allow for higher cognition to facilitate critical thinking and increased knowledge (Adams, 2015). With Bloom's Taxonomy, faculty can ensure that course outcomes and program objectives are met and mastered. Nursing education programs use Bloom's Taxonomy to make course and program objectives for student learning.

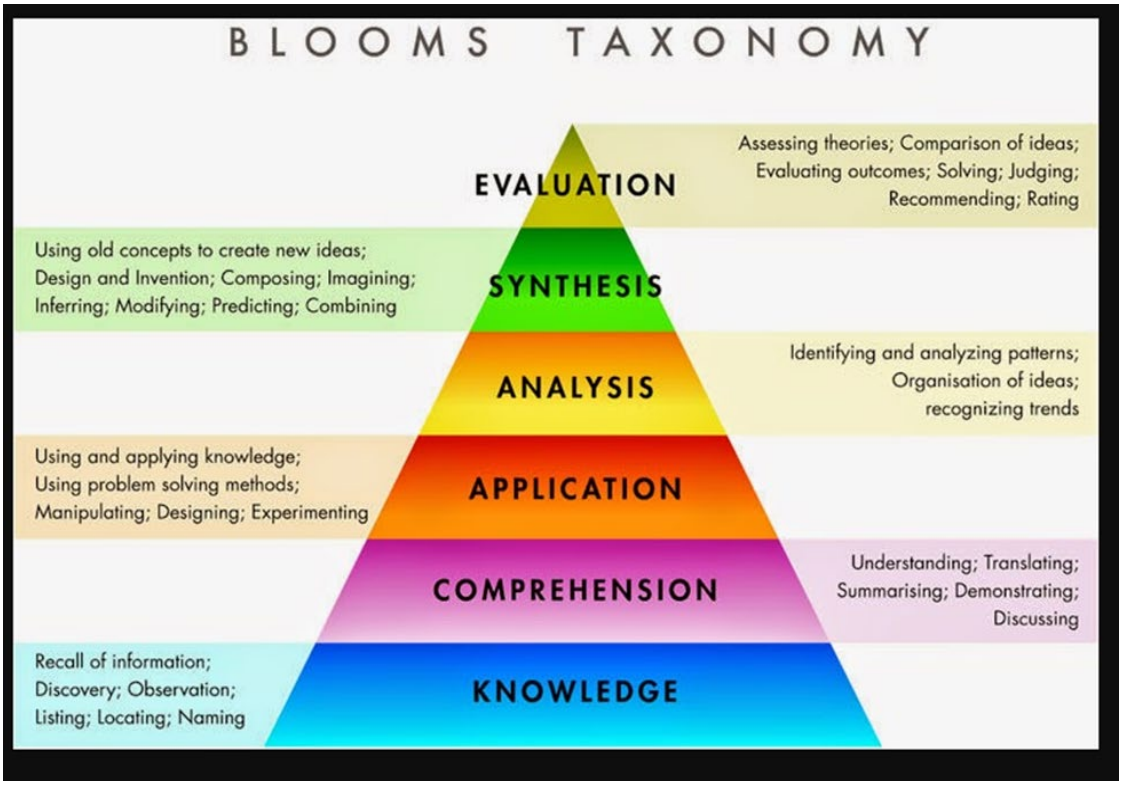
Bloom’s Taxonomy verb usage and examples, from the lowest domain to the highest, include recall, identify, demonstrate, differentiate, and formulate (Su & Osisek, 2011). These verbs must be used when developing simulation objectives to meet the intent. The verbs start as basic and foundational as novice students and nurses initially are. The verbs then progress, become more intense, and relate to complex thinking and evaluation. The progression from one domain to another is indicative of mastery. The use of the verbs will assist faculty in developing correct objectives and outcomes to ensure student knowledge and understanding.

Bloom’s Taxonomy was the reference guide for faculty to progress students learning within a curriculum. Su & Osisek (2011) relate that Bloom's Taxonomy is a vital tool that allow faculty to incorporate learning objectives related to the learning domain of the students. This article demonstrates that, while faculty instruct differently, Bloom's taxonomy enables continuity of learning. While different instruction ways vary, the verbs for learning stay the same, and a lesson plan can be created equally. The progression from one domain to another is indicative of mastery. The use of the verbs assists faculty in developing correct objectives and outcomes to ensure student knowledge and understanding. Using verbs in the taxonomy will assist with skill mastery to move students' critical thinking and reasoning from one level to the next. Students start in the knowledge domain, where foundational information is gained. Once some knowledge is retained, they can slowly progress into the comprehension domain. This domain is challenging for some students as they try to master the foundation knowledge in clinical practice. Simulation should enable the student to apply the knowledge and comprehension domains and a little of the third domain, analysis. Bloom's Taxonomy was used in this study to make the necessary course learning outcomes and objectives and determine if student knowledge and understanding regarding fetal monitoring were achieved post-simulation. This study's three domains (cognitive, psychomotor, and

affective) are equally important. Bruuckere (2017) exhibits how Bloom's Taxonomy is referenced and will assist in developing the learning outcomes and objectives for this study (Figure 3).

Figure 3

Blooms Taxonomy



Note. This model serves how Bloom's Taxonomy is referenced and will assist with developing the learning outcomes and objectives for this study—retrieved from "A longer piece on the taxonomy of Bloom," by Bruuckere, P., 2017.

Measurable Learning Objectives

With Bloom's Taxonomy, measurable student learning outcome was with reference the cognitive learning domain. Barkley & Major (2016) note that outcomes measure what faculty hope to accomplish with student learning should be developed before the learning exercise and followed

up with the learning outcome. Measurable objectives for simulation practice would include, by the end of the simulation practice; the student should be able to:

1. Interpret and analyze a fetal monitoring strip regarding fetal heart baseline and contractions.
2. Identify normal fetal heart rate rhythms.
3. Recognize abnormal heart rate rhythms.
4. Identify and recognize fetal heart rate accelerations.
5. Distinguish between the three types of decelerations.
6. Identify proper intrauterine resuscitation measures for the mother and fetus as needed.
7. Recognize and prepare the patient for Cesarean delivery as needed.

Barkley & Major (2016) note that faculty must ensure that measuring an objective is an activity or intervention that students can realistically complete and convey that the evaluation of these objectives needs to be passed or failed, with no questionable in between and emphasis that that faculty should avoid using words like know or understand, as these are in the gray area of interstation. The above-noted objectives are achievable for the student simulation and are labeled as observed/not observed (Appendix A). Gore (2017) affirms that course objectives must be identified and met with simulation, or the simulation is deemed ineffective. Li et al. (2022) notes that simulation within a nursing program will effectively meet course learning objectives. Rothgeb (2021) conveys that objectives allow students to understand their learning expectations. Li et al. (2014) relates that 58% percent of students are learners using all senses. Therefore, teachers must be mindful of the various styles when preparing students for learning and note that instructors must be cautious of all learning styles, meet the course learning objectives, and seek academic excellence.

Benner's Novice to Expert Theory.

Benner's theory was relevant to students with no prior knowledge and the need to develop foundational ways to solve or understand continually. Most faculty understand that nursing students are novice learners, and their experience is related to learning. For this study, Benner's Theory related to novice nurse learning as a reminder that Bloom's cognitive domain verb usage is important.

Benner's Novice to Expert Theory serve as a reminder that students are at the lowest level of knowledge and skill. The novice student nurse is still learning, growing, and different from their cohorts. Students must be reminded that they still have much to learn, and that graduation does not indicate expert knowledge (Benner, 2022). Novices initially use a step-by-step process of thinking when taking care of patients (Lasater & Nielsen, 2009). Carlson et al. (1989) also remind us that faculty must understand that students are novices and clinical is a growth progression and that Benner's theory also aids that learning is a continual progression, as novice nurses are also learning not to take a blood pressure during a contraction, a learned skill that a novice must learn.

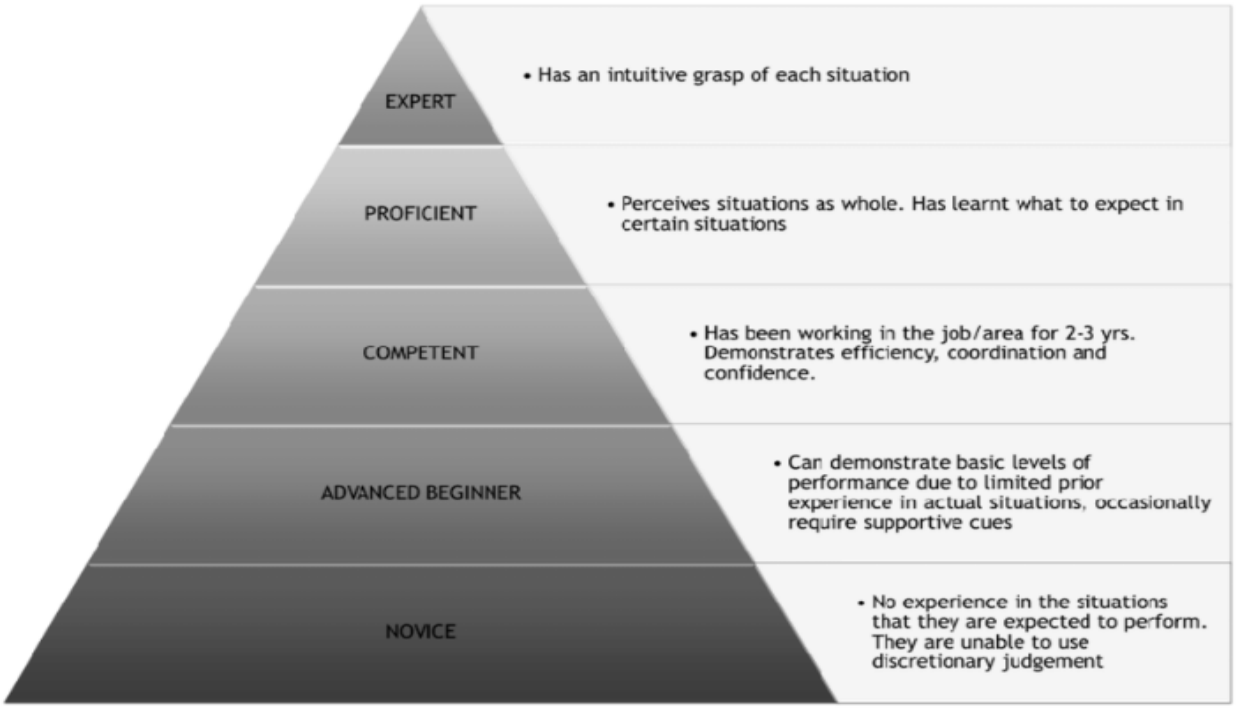
Patricia Benner's Novice to Expert Nursing Theory represents learning from a student novice to an experienced nurse regarding the development and enhancement of nursing knowledge, skill, clinical competence, and comprehension of patient care through learning and training (Ozdemir, 2019). This theory is relevant to students without prior knowledge and must continually seek foundational ways to solve or understand. Benner's Novice to Expert theory is crucial for student nurses and faculty to determine where competency lies (Benner, 1989). This theory should allow faculty to meet the needs of students, as all student's learning needs are not the same. Benner's theory will enable programs to provide faculty with resources and adequate curriculum development (Thomas & Kellgren, 2017). While this theory applies more to the registered nurse, it

plays a part in the understanding that all students learn and develop at different rates and that all students learn differently. “Benner, in a recent analysis of clinical nursing, argues that the progression from novice to expert consists of a series of steps of skill acquisitions” (Holden & Klingner, 1988, para 2).

Benner's Novice to Expert Theory serves as a reminder that students are at the lowest level of knowledge and skill. Novice student nurses are still learning and growing at different paces from their cohorts. Students must be reminded that they still have much to learn from clinical practice and that graduation does not indicate expert knowledge. Benner’s Novice to Expert Theory was used in this study to assist with the learning competency of prelicensure BSN students. Their foundational learning level is a novice, and they need to recall that the experience at this level is lacking. Murray et al. (2019) depict Benner’s Theory (Figure 4).

Figure 4

Benner's Novice to Expert Theory



Note. This model serves as a representation of Benner's Novice to Expert Theory progression. Retrieved from: Benner's model and Duchscherer's theory: Providing the framework for understanding new graduate nurses' transition to practice" by Murray, M., Sundin, D., & Cope, V., 2019, *Nurse* Education in Practice, 34, p. 199-203.

Benner also specifies that the novice student lacks the skills to think critically and that the need to understand the foundations will be the primary learning factor (Benner, 2022). Benner also related that faculty are enriching the practice apprenticeship during a time of limited clinical placements: integrating classroom, online, and practice teaching. The article further states that the need to have experienced faculty or staff will assist them in learning the foundation and developing an enriched critical thinking curriculum is the key. Further, this article conveys that simulation can

assist faculty in accomplishing that goal. This article notes that students should be allowed to fail without repercussion, as this is a learning aspect to help them gain knowledge and understanding.

Social Learning Theory

Aliakbari et al. (2015) annotated that faculty need theoretical frameworks and models to succeed with student teaching and learning. Lasater & Nielsen (2009) note that traditional instruction methods are ineffective and that clinical programs must increase the critical thinking behind patient care. The education environment is constantly changing and frequently challenging; therefore, instilling critical thinking and clinical reasoning is necessary. Students learn in a multitude of ways. Different methods must be incorporated into a program's outline to ensure students get the most out of their learning. The traditional ways of learning, including course lectures and students attending clinical experiences, are ineffective for today's educational needs. Doody (2013) notes that traditional teaching and learning methods are effective with alternate styles, such as simulation.

Hall (2015) conducted a retrospective study to determine the relation between simulation and junior prelicensure BSN students using Bandura's Social Cognitive Theory to guide and concluded that prelicensure BSN students who receive didactic training in conjunction with simulation enhanced their skills, knowledge, and competence. The Social Learning Theory supported the premise of this study and was used for this proposal. This theory refers to how simulation practice relates to student learning and differentiates that students learn in various ways, at different levels of comprehension, and how feedback can be crucial to understanding. Lavoie et al. (2018) relate that most simulation studies do not specify a theory related to student simulation learning, and a theoretical framework is needed. Only 40% reference a learning theory out of 182 studies. This theory refers to how group learning is positive, group behavior is mimicked, and group

simulation practice engrains information when recall allows. This theory guided the assumptions and limitations of this project as it also interconnected the framework of Behaviorism, Constructivism, and Situated Cognition**.**

Social Learning Theory and Behaviorism

The Social Learning Theory implies that learning is recalled from others who have demonstrated skill, and knowledge is gained through observation of others. The theory relates students to learn by the model of behavior (Lyons & Berge, 2012). Billings & Halstead (2020) convey that this theory is central as it concentrates on how students interact and their performance in learning. Bethards (2014) notes the Social Learning Theory allows students to learn from one another by observing a particular environmental context and grasp concepts as they observe. Simulation practice allows students to observe and watch other students implement interventions and decide to follow and model that method. This theory allows the student to learn and recall the methods learned when needed. Lavoie et al. (2018) note that only 6% of reports use this learning theory in 182 studies. Grealish & Ranse (2009) note that the Social Learning Theory will suffice prelicensure BSN student learning when participation needs exist. The participation allowance allows the students to choose whether to emulate the behavior.

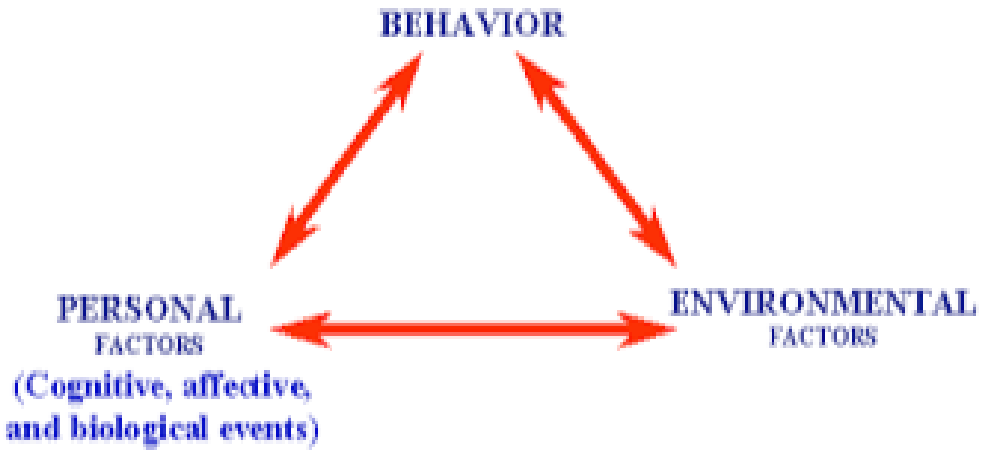
Behaviorism asserts that students learn through learned behavior and feedback (O'Shea, 2021). The learning paradigm that includes behaviorism shows that novice students act like sponges and retain and learn as much information as possible (Walters, 2021). Behaviorism activities describe concepts and abilities adapted to a situation and are the most straightforward form to evaluate student learning and feed into the Social Learning Theory (Handwerker, 2012).

Simulation practice will allow students to observe, perform, and watch other students implement interventions. The feedback from the other students or the faculty is where the theory is

operationalized as the student learns and recalls from feedback. Handwerker (2012) notes Behaviorism connects program learning and outcomes and that Benner's Novice to Expert Theory relies heavily on this learning paradigm; Bandura (1989) annotate how Behaviorism relates to prelicensure BSN student learning (Figure 5).

Figure 5

Social Learning Theory



Note. This prelicensure model relates to the Social Learning Theory and will enable students to grasp concepts related to prelicensure BSN student learning. Retrieved from "Social cognitive theory, Six theories of child development," by Bandura, 1989, Annals of child development. Vol. 6.

Social Learning Theory and Constructivism

Constructivism is defined as student learning with relation to an implied to a task and is student-dependent (O'Shea, 2021). Lainema (2009) constructivism has gained appreciation regarding simulation. Walters (2021) convey constructivism describes learning where the senses respond to concepts and learn from others. Simulation practice allows students to observe, perform,

and watch other students implement tasks. The repetition of a task demonstration is where the learning takes place. This practice allows students to learn and recall from executing tasks or experiences (Keating & Deboor, 2018).

Keating & Deboor (2018) also note that hearing, seeing, touching, and smelling allow learning through recall. Handwerker (2012) note that constructivism is a deep critical thinking avenue. Asal & Kratoville (2013) note this strategy allows students to problem-solve independently. This theory will allow students to make decisions based on their experience and interactions with the simulation. Pedagogies that promote constructivism are as important as simulation, and clinical practice helps students learn using their five senses and construct knowledge from experiences. Lavoie et al. (2018) note that only 2% of reports use this learning theory out of 182 studies. Monteiro & Sibbald (2020) note simulation in conjunction with the Constructivist Theory will create lasting impressions as the students relate their experiences.

Social Learning Theory and Situated Cognition

Situated cognition is how student relate and learn in a group environment (Jenlink & Austin, 2013). Situated cognition refers to student learning and simulation practice. Burke & Mancuso (2012) convey this theory promotes critical thinking through environmental exposure and student interactions to drive the learning process. The process described here is related to Bandura's Social Learning Theory. Walters (2021) notes that this theory passively allows students to build upon current knowledge. Simulation practice will enable students to observe and watch other students within a group when situational implemented tasks or interventions occur. Situated cognition allows the group structure to occur and learn from their group peers. This theory enables the student to learn and recall the methods and skills when the situation presents itself. This theory is the foundation for the survey used in this study. Lavoie et al. (2018) note that only 6% reported this

learning theory out of 182 studies. Onda (2012) notes high-fidelity simulation can extract knowledge from a novice student and instill more knowledge simultaneously.

Related Literature

This section will reflect and display the current literature on simulation, its effects on nursing students learning, and how simulation can increase their knowledge and understanding of fetal monitoring. This section demonstrated competency obtained with simulation and in conjunction with maternal health scenarios. While the literature is abundant on how simulation can increase a student's learning, little is known about how simulation affects learning on fetal monitoring.

Gathering Method

The gathering of literature was performed through the Liberty University library database. The search was also conducted through CINAHL, PubMed, and EBSCO host platforms. Keywords used to search for relevant research were simulation, practice, knowledge, understanding, fetal monitoring, nursing students, students, prelicensure, BSN, Undergraduate, clinical reasoning, clinical judgment, maternal child, maternal-child health, clinical instruction, Benner's Novice to Expert Theory, Jeffries Simulation Framework, Bloom's Taxonomy, and multiple learning theories. Publication dates ranged from 1989 to 2021. Those studies older than five years were included if they were deemed primary sources relating to the relationship between student learning and fetal monitoring knowledge and interpretation.

Simulation Evolution

The use of simulators started in the 1950s to the 1960s, and by the 1980s, simulators were a critical way to instruct nursing students. This significant advancement has served many nursing students with the means to provide care, enhance skills, and apply didactic to the clinical setting.

Cobbett & Snelgrove-Clarke (2016) conclude that students appreciate simulations as the students have enhanced learning with the simulations. The advancement of technology has created mannequins that can talk, hemorrhage, deliver babies, allow the placement of chest tubes, and have seizures. According to Harder (2009), it will enable faculty to teach students various diagnoses, interventions, and skills. Simulation assists nursing students in developing their clinical skills (Feingold et al., 2004). Kirkpatrick et al. (2018) relate that students want simulation as they stimulate learning. prelicensure BSN programs have evolved from strictly didactic to online and hybrid programs. Most programs typically take two years to complete and require either a Licensed Practical Nurse (LPN) or Associate of Science in Nursing (ADN) degree or two years of prerequisites before acceptance (Academia Labs, n.d.). Students follow a program's curriculum, perform clinical hours, sit for the NCLEX-RN, and become registered nurses. Academia Labs also notes that in traditional programs, students will complete clinical practice, clinical laboratory, simulation, and didactic classes to meet course and program objectives.

Simulation for Teaching and Learning in Nursing Programs

Simulation can provide a variety of positive pedagogies regarding student learning. Cobb (2011) relate that students are happier with prelicensure BSN programs when instructors use various instructional methods. McIvor et al. (2017) stated that simulation practice enhances Bloom's Taxonomy progress. Simulation allows students to demonstrate competency, relate the content learned, absorb new knowledge, correct mistakes, and safely make mistakes. Lee et al. (2019) stated that simulation practice provides students with a safe space for learning. Simulation effectively should allow healthcare professionals to train without worrying about endless mistakes (Fancher et al., 2015).

Lee et al. (2019) note that simulations have been programmed to increase the knowledge and understanding of nursing students. Simulation increases critical analysis and reflection (Hutchinson & Janiszewski-Goodin, 2013). Thomas & Mackey (2012) relay that simulation promotes self-confidence and allows students a safe environment to make mistakes. School programs should have simulation embedded in the curriculum. Cunningham (2010) determined that simulation is needed for nursing programs, even in Practical Nurse Programs. Reflection can assist in developing new knowledge as it allows one to have time to process the information it provides self-awareness and insight (Asselin, 2011). Reflection also serves novice nurses as journaling provides a way to reflect on specific questions for learning (Kuiper, 2002). Simonelli & Paskausky (2012) note simulation can effectively improve clinical competency and demonstrates a positive relationship between simulation and clinical. Al Khasawneh et al. (2021) note simulation has evolved into teaching curriculums. Herron et al. (2019) also conclude that simulation enhances learning compared to other learning styles. Wang et al. (2013) relate that technology is the future learning method for students, with simulation counting as technology.

Jeffries Simulation Framework concepts must be implemented for a successful student learning outcome, and student empowerment and feeling like a nurse come from simulation, whether in the classroom or clinical. Bailey & Emory (2022) note that students' self-assurance significantly increased using simulation and indicated that they increased their knowledge, understanding, and confidence after the simulation practice of 26 students with a 0.91 confidence level of increased knowledge and understanding. Chan & Burns (2021) note while students have learned the foundation for nursing, they cannot think critically and lack the clinical reasoning behind a nursing situation. that nursing students have a detrimental lack of knowledge and understanding and the need for a clinical area where they can make mistakes and learn is

imperative. Clinical simulation effectively increases students' knowledge and understanding of patient care and interventions (Meyer, 2011). With simulation, students can demonstrate competency and increase their critical thinking skills, clinical reasoning, and judgments. Thomas & Mackey (2012) note that:

> Simulation refers to student learning experiences using a technologically advanced, computerized manikin. Computerization allows for dynamic manikin verbal responses and physical changes that instructors can purposefully control based on student actions, inactions, and reactions. Verbal and physical changes in the manikin in response to student interventions allow for active decision-making. Therefore, high-fidelity scenarios can mimic clinical situations. This teaching method will enable students to test their decision-making and interventions in a safe patient environment. The opportunity to encounter clinical problems, make judgments, and experience outcomes will better prepare new graduates for transition into the workforce. (para 2).

Simulation can provide the clinical aspect of patients and great feedback to students (Tanner, 2006). Simulation promotes clinical competence and confidence before clinical. Simulation in the nursing program is a great tool when students first learn how to interact with patients, perform skills for the first time, and provide a safe place to learn to correct behaviors. Simulation is imperative for student learning (Harder, 2009). Disler et al. (2013) affirm simulation should be part of every semester in a nursing program as students feel more comfortable every time they perform simulation. Hutchinson & Janiszewski-Goodin (2013) annotate that simulation increases the critical thinking aspect of student thinking. Simulation can provide a way to help and assist students with interventions that require much practice, like intravenous starts, intramuscular injections, catheter placement, and assessments. It also allows students to learn as authentically as

possible outside clinical units. Simulations also offer the tools to enhance clinical reasoning and provide the competency learned safely. Thomas & Mackey (2012) relate that students can be challenged in the simulation setting, preparing them for complex patient settings and allowing them to excel at clinical practice. Schlairet (2011) concluded simulation reflected increased confidence in instructor teaching. Lee et al. (2019) note that simulation can significantly increase knowledge and understanding, improving recall of information over didactic learning.

Fero et al. (2015) relate that simulations are necessary for students to think critically and improve a student's knowledge, skill, and confidence. Herron et al. (2019) convey video simulation can increase students' clinical learning compared to case studies and note both learning styles were conducive; the results comparing video simulation were far more educational than using case studies for student learning within a prelicensure BSN program. Ashley & Stamp (2014) found that simulation assists with the clinical skills students need to prepare for clinical and effective problem-solving. This finding demonstrates that with simulation, a patient's history and care plan assist with the proper diagnosis assessment and provide appropriate interventions based on the given factors. Guimond et al. (2019) conveyed that with simulation, there were increased communication and nursing skills among students. Zhu et al. (2020) studied replacing clinical time with simulation can effectively meet the demand for clinical learning. This study used a qualitative approach to prelicensure BSN students and showed that simulation could increase learning measure outcomes and effectively meet course objectives. Ashley & Stamp (2014) note that simulation improves student communication skills with their given team and allows them to speak out safely and note that simulation assists the students in thinking critically and the skills needed for learning.

Competency can be demonstrated in many ways, and simulation is one of the most effective ways to do so. Studies have also proven to increase competency after simulation. Cardoza & Hood

(2012) note that simulation has become an important aspect of teaching within nursing programs and can establish the needed competency assessment for student learning and feel more comfortable with caring for patients and an increased critical thinking and clinical reasoning approach after simulation. Alanzi et al. (2017) related the purpose of simulation to the prelicensure BSN programs curriculum, demonstrating that a significant need for prelicensure BSN programs to have an established simulation role in the curriculum is vital. Edwards et al. (2018) note that simulations can be an effective way for nursing students to learn and evolve skills. Simulation can increase the knowledge and understanding of patient care and states that simulation practice can provide a realistic way to give students the environment the students need for growth. Gharibi et al. (2020) concluded with simulation, prelicensure BSN students could effectively increase student knowledge and understanding and confirm that just a few weeks of simulation an hour can effectively demonstrate and acknowledge the increase in buoyancy.

Simulation is an effective way to determine a student's knowledge and understanding, but it is also an effective way to validate knowledge after a simulation. Reid et al. (2020) relayed that within a program, of study where undergraduate nursing students were taught a didactic course, there was a clinical performed. Doody (2013) attests simulation enhances knowledge and understanding of student learning and that using traditional learning methods combined with simulation will increase the learning deficit within prelicensure BSN programs. Simulation allows students to tie the didactic portion to clinical before clinical starting. The simulation also positively increases the trust and rapport with faculty (Hutchinson & Janiszewski-Goodin, 2013).

Disler et al. (2013) relay that a small group of students in a simulation setting will benefit from simulation as it promotes thinking, relating to patients, making them feel like nurses, and increasing knowledge. Cardoza & Hood (2012) also convey students better understood didactic

lessons after a simulation, allowing them to understand the concept being lectured. Students could recall information better when simulations were performed.

Simulation for Teaching and Learning in Women's Health

Very few and limited studies have been conducted on fetal monitoring. Very few studies have been conducted regarding students and fetal monitoring interpretation. Even fewer have been conducted on simulation, student, and fetal monitoring. Programs teach fetal monitoring courses, but as research has indicated, fetal monitoring instruction is limited. Kinnick (1990) concludes students had the basic knowledge and understanding of fetal monitoring when properly instructed in maternal-child health, particularly fetal monitoring. Kinnick, V.G. (1989) reflects that programs taught the maternal-child content but did not emphasize fetal monitoring, and students are inadequately taught to think critically concerning fetal monitoring. Mahley et al. (1999) note that teaching fetal monitoring to prelicensure BSN students can be quite challenging due to class lecture time and the short time to understand fetal monitoring. Birkhead et al. (2012) note students can feel comfortable using simulations to prepare them for clinical. There is extensive knowledge behind fetal monitoring, and the student may lack interest in the topic.

Some studies have been confuted on the lack of confidence between students and fetal monitoring. Birkhead et al. (2012) relay students do not feel properly prepared for clinical in the maternal-child health unit and have few opportunities to experience maternal-child practice in the clinical setting. Kipnis (2011) reflects that labor education within the prelicensure BSN program is imperative. Rose & Eller (2014) also state knowledge and understanding are initiated with simulation. Simulation was an effective way to train and maintain competence and improve patient care and practice within the educational learning arenas of nursing and physicians.

Simulation can assist with the learning of assessments, vitals, diagnosis, interventions, and fetal monitoring. Students need to link the pedagogy of simulation and fetal monitoring to student learning and provide a way for students to learn the clinical setting and patient care progressively and confidently how to read fetal monitoring strips, emphasizing progression from the novice level and using higher levels of Bloom's taxonomy. Simulation allows students to decrease fear and anxiety related to patient care and the initial uncomfortable feelings with the clinical setting (Thomas & Mackey, 2012). Hodge et al. (2008) note simulation can be incorporated into the curriculum for students to learn, relate, convey, and describe normal versus abnormal maternal-child situations and neonates. Akalin & Sahin (2020a) conclude simulation is an effective way to improve learning with students. Yeom & Kim (2016) confirm simulation can effectively increase student knowledge in the clinical setting, increasing their knowledge and understanding of fetal monitoring and that simulation effectively increases knowledge and understanding of the skills needed for fetal monitoring interpretation. Schlairet (2011) concluded simulation reflected increased instructor and student rapport confidence. Sittner et al. (2013) note simulation can effectively enhance the prelicensure BSN level knowledge and competence and focus on the maternal-child aspect from didactic to clinical and demonstrated that simulation would effectively reflect that students should use simulation to gain the concepts needed from didactic in the clinical arena.

Simulation can increase healthcare personnel's knowledge and understanding of skills (Fancher et al., 2015). Simulation can allow competency with other maternal-fetal complications experienced by healthcare employees and physicians. Van der Hout-van der Jagt et al. (2011) performed a study on six experts that determined simulation can provide a realistic response to a patient scenario and that their study represented that simulation provides the practice that

physicians need to be prepared for a patient situation and provides an avenue to refresh on skills that have not been routinely performed. Rose & Eller (2014) studied obstetrical residents and physicians who use the simulation for training and education, and that simulation is proven effective in training, educating, and ensuring competency. Malarvizhi et al. (2017) concluded that simulation could effectively increase student learning of neonatal resuscitation and noted that the students started with no knowledge (44%) and competency with the subject, with a significant difference (98%) after the simulation. Kinnick, V.L. (1989) studied if faculty could determine what students could relate to fetal monitoring in the classroom and clinical setting and noted that the need was that students needed a two-hour didactic lecture on fetal monitoring before performing a hands-on portion and that more class time is needed to adequately teach students this special skill. Abraham & Kusheleva (2019) performed a simulator study to diagnose pre-eclampsia within resident physicians with varying education levels and noted that all residents showed familiarity with the diagnosis and management of pre-eclampsia and before the simulation that the residents were not self-confident in eclampsia and that after the simulation the residents were confident with interventions for eclampsia.

Meyer (2011) relates using a pediatric simulator increased nursing students' competency and understanding and that with the use of the Jeffries Simulation model as the mode for the simulation development, students will benefit from simulation of even 12 hours compared to those students who received no simulation time and the simulation group increased knowledge and understanding, and the non-simulation group did not. This confirmed that students' use of simulation can assist with the learning of obstetrical maternal-fetal complications. Scerbo et al. (2008) conducted a study that represented and acknowledged the critical thinking of undergraduate students and their knowledge of normal versus abnormal maternal-fetal heart rate and noted that

students could perceive fetal heart rate rhythm and decelerations. As a result, the study perceived reading the strips as troublesome, and practice is needed before performing the skill.

A simulation can provide the students with an alternate way to learn and understand the material before attending clinical. Simonelli & Paskausky (2012) convey simulation in a maternal-child course effectively ensures students retain and relate the information to a patient and noted that prelicensure BSN students would have the experience and competence to react to high-risk and normal births. Akalin & Sahin (2020a) conducted an integrative review that concluded that simulation practice effectively determines knowledge and understanding of maternal assessment in nursing students but also that student confidence and clinical reasoning are increased with simulation as well as simulation practice decreases anxiety and fear students may initially have when performing patient care.

Germain et al. (2018) note nursing students felt significantly confident post-simulation to care for postpartum mothers and confirm that simulation enhanced these skills and knowledge before caring for postpartum couplets and that simulations are relevant to student maternal-child learning. Craft-Blacksheare & Frencher (2018) used simulation to demonstrate competence in newborn and postpartum assessment and relate that within the prelicensure BSN level, students demonstrate an assessment of mom and baby before attending clinical with the use of simulation; this leading and resulting in simulation helped them feel more comfortable taking care of mom and baby, with increased confidence in performing assessments on both. Mert Karadas & Terzioglu (2019) relay simulation effectively educates prelicensure BSN students on a postpartum hemorrhage as BSN nurses, via the post-simulation questionnaire, conveyed that simulation was effective with education and training for postpartum hemorrhage with a $p= 0.001$. Akalin & Sahin (2020b) note simulation is an effective way to teach students about pre-eclampsia. After their

study, the prelicensure BSN students and the simulation increased their knowledge and understanding of pre-eclampsia with a value between $p<0.001$ and $p<0.05$. Mahley et al. (1999) conducted a study that showed that the interpretation of fetal monitoring is difficult for students and that the development of a tool by the faculty will assist the students with learning, and that the use of an external fetal monitoring card is a reference tool that can successfully assist students with recalling external fetal monitoring information and assist students in a simulation setting. Developing a memory tool will assist and guide the process enabling the students to recall fetal monitoring information.

Shorten & Ruppel (2017) concluded simulation was an effective means to teach maternal-child health and annotated that simulation demonstrated a positive effect of the learning of maternal-newborn learning and conveyed that simulation allowed the prelicensure BSN students to gain knowledge and confidence while learning the physiological aspect of nursing. This concluded that simulation does prepare students for the obstetrical complications that arise in clinical. Barra & Singh Hernandez (2019) conducted a study on practical nurses that demonstrated simulation was an effective way to master maternal child skills and that the use of simulation after didactic course teaching and used a pregnant mannequin to demonstrate skills. After the didactic, the students were presented with a scenario and effectively performed appropriate interventions. Knight et al. (2015) convey that simulation scenarios assisted prelicensure BSN students with fetal demises and that students were educated on fetal demises and how to communicate to patients concerning fetal demises and conclude that students convey that the simulations prepared them to care for these patients adequately. Cobbett & Snelgrove-Clarke (2016) relate that virtual simulations can be an effective way for students to demonstrate clinical readiness for maternal-child health clinical

information and that face-to-face simulations are the most feasible option, less stress is endured face-to-face, and students prefer face-to-face simulations.

Gaps in the Literature

Several gaps were identified in the literature. The literature was extensive in retrospect on simulation within nursing programs and its positive effects. Wittenberg et al. (2021) note prelicensure BSN programs focus on community health and mental health simulations, therefore lacking maternal-child simulations. This finding confirmed that simulations are a needed method of instruction; the need is also to use simulations for all courses. First, very few studies explored the relationship between fetal monitoring and simulation for prelicensure BSN students, and few relate the knowledge gained from simulation practice with fetal monitoring. Only a few studies note simulation practice and the positive or negative impact on knowledge and understanding of fetal monitoring in nursing programs and are older than 20 years. Craft-Blacksheare & Frencher (2018) note simulation can be used to interpret newborn assessment competency. Yang et al. (2019) note simulation is an effective way to learn how to assist moms with breastfeeding. Studies show simulation is relevant to breastfeeding. Schoening & Rutter (2006) note simulation can assist with learning how to perform interventions on a pre-term mother. Beal et al. (2012) note simulation can prepare students for maternal-child clinical.

MacKinnon et al. (2017) note having "systematic reviews of simulation are available, but no systematic reviews of qualitative evidence related to maternal-child simulation-based learning (SBL) for undergraduate nursing students and educators have been located." (para 1). The students reflected that simulation assisted with developing maternal-child skills, interventions, increased communication, and critical thinking within the study and convey that simulation must be intertwined within the prelicensure BSN maternal child health course.

Wittenberg et al. (2021) confirm the gap in maternal-child simulations and the imperative need for them within their study. Multiple articles also note that simulation effectively trains newly graduated nurses assigned to a maternal-child unit. Ehmke et al. (2021) note simulations assist graduated prelicensure BSN nurses in becoming familiar with scenarios they will experience on a maternal unit, providing them the resource to advance from novice to proficient.

This paper related studies that focused on graduated nurses in maternal units, and the relation to studies of a variety of medical issues such as fetal demises, neonatal resuscitation, pre-term labor, pre-eclampsia, breastfeeding, newborn assessment, and hemorrhage; this paper also discussed that more research is needed and to be performed on fetal heart monitoring interpretation. Crew & Minor (2018) note much-needed research is needed to demonstrate the simulations can effectively help the student master the knowledge and understanding of the maternal-child area. MacKinnon et al. (2017) note multiple gaps in the literature regarding maternal health simulations in the prelicensure BSN program.

Summary

Students learn in a variety of ways. Faculty should tailor the learning objectives but at the same time meet the learning styles as each student learns differently. Faculty must ensure the traditional way of instruction, lecture, and a hands-on approach, such as simulation or case studies. This process will ensure that the students can effectively apply the didactic to critical thinking and clinical reasoning to a patient scenario. This study used several theoretical framework theories. These theories included learning methods within a nursing program, such as Pamela Jeffries Simulation Framework, Bloom's Taxonomy, and Benner's Novice to Expert Theory. In addition, this study used Social Learning Theory and the supporting co-factors of behaviorism, constructivism, and situated cognition.

Cobb (2011) relates students are at an advantage when instructors use various methods to instruct. The literature regarding simulation for students learning clinical skills showed that this is an effective way for students to learn foundations, apply critical thinking, and learn how to perform interventions before the clinical setting. The literature revealed that simulation efficiently increases communication, skills, competence, and understanding. The literature regarding simulation for student learning fetal monitoring overall showed that simulation could assist students with learning how to appropriately gain knowledge and understanding of how to interpret fetal monitoring. However, more literature regarding fetal monitoring interpretation in prelicensure BSN students is needed.

Students must also be prepared for clinical. Students are often nervous and anxious upon entering the clinical setting, as they are often unprepared for it. Faculty can assist students with clinical preparation by providing realistic simulation scenarios that portray a patient experience. Students using simulation have an advantage of what to expect on the first days of clinical. Simulation allows students to practice assessments and interventions without the fear and the unknown of what to expect at clinical.

Schoening & Rutter (2006) note simulation is an effective and creative way for students to learn by bringing in the reality of a patient and note that the mannequin transition from severely ill to cured will portray how well they performed and reacted to the simulation. Curing their patient depends on their knowledge and critical thinking skills. Beal et al. (2012) relate simulation is needed for the students to feel comfortable in the clinical setting and that the clinical setting is where the student learns how to put it together. Simulation can assist with critical thinking before clinical. Birkhead et al. (2012) note the students feel inadequately prepared for maternal-child health clinical situations; limited opportunities in this setting and clinical experience are needed to

understand maternal-child health. MacKinnon et al. (2017) note maternal child health simulation teaching must be incorporated into the course curriculum, the simulation must be realistic, and debriefing must be conducted.

Literature reviews also relate that students also benefit from this method of debriefing. Debriefing can increase knowledge and understanding of important interventions, skills, and tasks. The use of debriefing plays an important role in student learning and the various ways students learn. Tanner (2006) note the Clinical Judgment Model is a widely used tool for debriefing after simulation activities. Beal et al. (2012) also convey maternal child simulation must occur as this will prepare students for clinical and learning.

Pamela Jeffries Simulation Framework, Bloom's Taxonomy, and Benner's Novice to Expert Theory are the recognized frameworks for the study, in addition to behavioral learning theories such as the Social Learning Theory. The theory and frameworks did increase knowledge and understanding of fetal monitoring as students use simulation to gain that expertise.

Faculty typically must use these frameworks to adjust and monitor student competency, knowledge, and understanding and make pedagogy adjustments. Simulation is one of those pedagogies that fills the gap to improve knowledge and understanding when an authentic scenario is needed for learning (Au et al., 2016). It allows a safe space for students to learn, enhance skills, and make mistakes. Little is known about how simulation practice relates to increased knowledge and understanding of fetal monitoring. More research is needed on the relationship between students' simulation practice and fetal monitoring.

CHAPTER THREE: METHODS

This chapter will describe the research design, sample, setting, recruitment plan, participant consent, and measurement method for this study. This study aims to determine if a relationship existed between a student's obstetric simulation practice and their knowledge and understanding of the obstetrical interpretation of fetal monitoring. Also, this study seeks to determine the relationship between a student's knowledge of fetal monitoring after practicing during a simulation scenario and its use in the clinical setting over time. A one-group pretest-posttest survey design will be used to evaluate the methods used in this study.

Overview

This study will use a one-group pre- and -post- simulation survey design to examine a relationship of 24 prelicensure BSN students and if simulation provided the needed knowledge and competency to interpret fetal heart monitoring. Maternal-child health is taught in prelicensure BSN programs, but little emphasis is on fetal monitoring. Often, maternal child courses are short, vague, and not a lot of instruction is being conducted and students do not know to interpret fetal monitoring. This study will determine if simulation can assist with the interpretation of fetal monitoring within the prelicensure BSN student population.

Research Design

A one-group pre- and post- simulation survey design with structured journaling responses determined the relationship between students' perceived knowledge and understanding of fetal monitoring before and after simulation practice. A one-group pre- and post-simulation survey design was used for the quantitative study portion when groups are not randomly assigned, there is no given control over the results, and a control group is not needed (Thomas, 2022). The qualitative portion referenced the student’s journaling responses for coding. Both designs were used to

determine the relationship between student's knowledge and understanding (dependent variable) with simulation usage (independent variable), as groups were not randomly selected. Hemman & Fought (2010) note that the phenomena of nursing interest nursing, people, their surroundings, and their overall well-being. This study linked the phenomena of nursing, their surroundings, and their relation to simulation, learning, and fetal monitoring.

These methods were used to determine if the phenomena of a student's knowledge and understanding can be improved based on simulation practice and fetal monitoring interpretation. These methods were noted to be the best methods to gather the data needed to answer the research questions. The mixed methodology of quantitative and qualitative data collection, assisted in answering if simulation will effectively increase knowledge and understanding of fetal monitoring in prelicensure BSN.

Table 1

One-group Presurvey-Postsurvey Design Notation - Projected

Simulation Group	Pre-Survey	Simulation	Post-Survey	Structured Journaling	Structured Journaling Post clinical #1	Structured Journaling Post clinical #2 Post-Survey
R	O_1	X	O_2	O_3	O_4	O_5

Note. This table depicted the groups, simulation practice, the pre-and post-surveys, and journal self-reflection within the study. The column on the far left shows the experimental groups of randomly placed students for simulation practice. The pre-simulation survey column will have the results of the pre-simulation fetal monitoring knowledge. The next column depicts the information after the

simulation. The far-right columns depict the post-clinical survey of fetal monitoring knowledge after the simulation and structured journaling submissions. It is adapted from Howell (n.d.).

The student's knowledge, understanding, clinical reasoning, and judgment were evaluated with structured journaling and a pre-post-learning survey. Using simulation on the dependent variables, showed that the students gained knowledge and understanding after simulation. This study used simulation as the independent variable, and this variable remained the same. The dependent variable for this study represented students' knowledge and understanding.

Quantitative Measures

Quantitative measures included pre-and post-simulation surveys and questionnaires. This is shown in Figure 7. The data were subject to the results reviewed for the commonality of the self-evaluation competency score of one to four from the pre-and post-simulation surveys and reflection journals. Comparative scales were used to determine a comparison, as this type assists with determining the demand. There were reliable methods, as the results were validated and deemed reliable for this project. The commonality of the self-evaluation score of one to four was the comparative scale. This method was the most reliable and valid way to assess the score. The results will not be manipulated, edited, or altered.

Results reflected a decrease from the pre-simulation survey self-reflected competency number to a lower post-simulation self-reflected numerical value, going from a three or four to a one or two. The increase in the self-reflection numerical value demonstrated an increase in knowledge and understanding of fetal monitoring.

The data collection noted the differences in self-reflected numerical competency of the:

1. Pre-simulation survey differences between groups
2. Post-simulation survey differences between groups

Qualitative Measures

The second method sought the commonality of the answers within the journaling/debriefing. This is shown in Figure 8. The results were not manipulated, edited, or altered. The qualitative measures included post-simulation de-briefing and structured journaling, including the simulation knowledge gained and taken into the clinical setting. The Social Learning Theory (behavioral, environmental, and cognitive factors) determined the codes. The common themes under these codes for reflective journaling are:

1. observations of knowledge work
2. observations of thinking strategies
3. judgments of self-improvement
4. judgments of self-competence
5. judgments of resources
6. judgments about social interactions
7. self-reactions
8. self-correction strategies

(Kuiper, 2004, p 6)

Research Questions

This study examined the following research questions:

RQ1: What was the prelicensure BSN students' perceived knowledge and understanding before and after obstetric simulation practice? (Quantitative)

RQ2: How did obstetric simulation practices increase undergraduate prelicensure BSN students' clinical reasoning and judgment using fetal monitoring? (Quantitative and Qualitative)

RQ3: What impact did the repeated obstetric simulation practice have on the prelicensure BSN student knowledge and understanding of their clinical reasoning and judgment of fetal monitoring by the end of their obstetric course? (Qualitative)

Hypotheses

The predicted hypothesis is that simulation positively affects a prelicensure BSN student's level of knowledge.

$H_0$1: There is a relationship between prelicensure BSN students' perceived knowledge and understanding before and after obstetric simulation practice.

$H_0$2. There is no relationship between prelicensure BSN students' perceived knowledge and understanding before and after obstetric simulation practice.

These hypothesis questions are not in relation to the qualitative portion of this study, only the quantitative data collection, a mixed method study.

Assumptions

For this study, the following assumptions could be made:

1. Simulation practice will increase a prelicensure BSN student's knowledge and understanding of fetal monitoring. This assumption will occur after simulation practices have occurred. (Ashley & Stamp, 2014)
2. Simulation practice will increase prelicensure BSN students' clinical reasoning with fetal monitoring interpretation. This assumption will occur after simulation practices. (Hutchinson & Janiszewski-Goodin, 2013)
3. Simulation practice will increase prelicensure BSN students' knowledge and understanding of their clinical reasoning of fetal monitoring over time with repeated simulation practice. This assumption will occur after simulation practices. (Hodge et al., 2008)

4. Simulation will improve the knowledge and understanding of those prelicensure BSN students with prior knowledge of fetal monitoring. This assumption will occur after simulation practices.
5. Small group simulations of four to six effectively enhance a prelicensure BSN student's clinical judgment of fetal heart rate monitoring. (Disler, 2013).
6. Small group simulations of four to six effectively enhance prelicensure BSN students' knowledge and understanding of fetal heart rate monitoring. (Disler, 2013).

Setting

This study was conducted in a university simulation laboratory and classroom where fetal monitoring was taught (Figure 6). Within their obstetrical course, a purposive sample of 24 undergraduate prelicensure BSN nursing students used simulation-assisted instruction in effective teaching and learning fetal monitoring, skill knowledge, and understanding. The faculty were present in the simulation room with the students. The simulation occurred in a clinical simulation laboratory equipped with a high-fidelity simulator called Nolle, manufactured by Gaumard Scientific, USA. The operator area with control panels was contained within the simulation room. It closely resembled a labor and delivery room, including a labor and delivery simulator, patient fetal monitor, and necessary supplies for patient care.

The University's maternal course is a four-credit hour course with clinical. Currently, the University setting does not relate any simulation to student learning, and the maternal course uses an online instruction method. Competence is acknowledged by fetal strips on a worksheet to verify competence. The simulation included a scenario on a patient where the initial fetal heart rate is normal and progressively has variable, early, and late decelerations with contractions. During the simulation, students should have recognized the six components of fetal monitoring: what a normal

fetal baseline is, what accelerations are, the three varying decelerations, and what contractions are noted to resemble.

The students were in four groups and randomly assigned roles ranging from charge nurse, primary nurse, and support nurse. The fetal monitoring simulation was repeated once per group. Small group learning allowed students to engage in the simulation and perform various roles. The small student groups also enable the faculty to use the Jeffries Simulation Framework for instruction. Students were also exposed to pedagogies incorporating this study's theories and models. These frameworks and theories included the Social Learning Theory (working with others) and co-factors of behaviorism (observing the change in activity and responses), constructivism (knowledge gained from experience), and situated cognition (thinking observed during the simulation).

Faculty observed students and wrote down simulation key points such as times, interventions, flow, delegation, and clarification of patient questions. The purpose and intent of this one-group pre- and post-simulation survey design study, collected by pre-and post-simulation survey questions in conjunction with structured journaling questions, determined the relationship between students' perceived knowledge and understanding of fetal monitoring compared to knowledge and understanding acquired with simulation practice. Faculty ensured that roles were assigned to include primary nurse, charge nurse, and support nurses so all students could actively participate in the simulation.

Figure 6

Simulation Lab Picture

Note: This picture represents the simulation lab utilized for this study located at a university in the Pacific Northwest of Washington.

Participants

The participants were students enrolled in an obstetric course in a prelicensure BSN program in Washington State. Students enrolled in the obstetrical course, and participation in the simulation was voluntary. Students were given the option to participate in the project data collection. Informed consent was completed before data collection (Appendix F). All participants were greater than 18 years of age. No one was excluded based on race, ethnicity, or gender. The purposive sample was comprised of 24 students recruited from a prelicensure BSN program and obstetrical course. This purposive sample reflected the random group assignments regarding obstetrical course enrollment. Twenty-four prelicensure BSN nursing students (n=24) from a

university of 1500 students, located in the Pacific Northwest of Washington, currently enrolled in their maternal child health were part of this study. Twenty-four pre-and post-surveys were collected on the simulation day. Twenty-two females and two males were part of this study, The effect size was extremely large, based on Cohen's d, with an alpha level of 0.05. Cronbach's alpha for this study reflected .682. This result demonstrates as a valid internal instrument of measure.

Those with prior knowledge and understanding of fetal monitoring were not excluded. During the obstetric course, the students were exposed to a fundamental fetal monitoring block of instruction that defines normal fetal baseline, acceleration, decelerations, and maternal contractions. Students were introduced to the concepts associated with normal and high-risk deliveries**.** The students were divided randomly into four simulation groups, conducted once per group, with randomly assigned roles that ranged from charge nurse, primary nurse, and support nurse. Before the obstetrics simulation day, the students were exposed to the didactic portion of the concepts in learning the day before the simulation.

Sociodemographic Variables

The sociodemographic variables characteristic of the sample included age, maternal child health interest, and previous knowledge or experience with fetal monitoring. Other sociodemographic factors included current enrollment in an obstetrical course within a prelicensure BSN program, gender, and age over 18.

The following list represents the inclusion criteria for this study:

1. Sociodemographic factors include:
    - current enrollment in an obstetrical course within a prelicensure BSN program
    - prior knowledge or experience in fetal monitoring allowed

- any gender, male or female,
- a student over the age of over 18
- no specific ethnicity, race, income, or marital status
- no contraindication with a previous pregnancy

2. The student must be enrolled in an obstetrical course within an undergraduate nursing program.

Procedures

Procedures included the simulation, debriefing, structured journaling, and pre-and post-simulation survey questions predicated on the Jeffries Framework in conjunction with the Simulation Effectiveness tool. Leighton et al. (2015) assisted with the development template of the pre-and post-survey questions. Pre- and post-simulation questions provided the researcher with data to determine if the simulation practice had been effective and defined the quality of the debriefing activity. Two copies were provided on the same color paper to represent pre-and post-survey simulation completion.

Before the simulation, the students received a 60-minute course on fetal monitoring. This instruction included the need for students' post-simulation to recognize the six components of fetal monitoring: what a normal fetal baseline is, what accelerations are, the three varying decelerations, and what a contraction is noted to resemble. The students conducted the simulation and were then expected to note the six components within the simulations. Once the simulation was completed, the students performed a debrief using the self-reflective journal prompts. After the debrief, the students were expected to complete the post-simulation survey. Students then completed the self-reflected journals over the next few clinical rotations and conducted a post-simulation survey once the clinical course was completed. Full study procedure process can be found in Appendix D.

Student confidentiality and anonymity were provided by allowing students to complete the pre-and post-simulation surveys and placing them in a box. The structured journaling enabled the researcher to measure student perception of clinical reasoning, judgment, knowledge, and understanding gained during the fetal monitoring simulation and guide the post-simulation debrief. Lazarus (2017) relates that structured journaling allows a safe environment for students to reflect, articulate, and convey how they feel. Hodges (1996) also promotes structured journaling for feedback regarding learning. Epp (2008) reflects that structured journaling is important for student learning, and faculty should use this method for student learning reflection. Self-reflection assisted the student with the needed self-awareness for gained knowledge (Asselin, 2011). Self-reflection can guide students in interpreting new information, allowing time for processing and internalization (Asselin, 2011). Pai (2016) convey that the Simulation Learning Effectiveness Scale is reliable and effective in determining simulation learning effectiveness. Leighton et al. (2015) is the sample tool for pre-and post-simulation survey questions. The Simulation Learning Tool also guided the structured journaling questions post-simulation debrief.

Students were informed of the pre-learning experiences in the lecture before the start of the simulation to ensure ample prep time was allowed. The students were exposed to the didactic portion of the concepts in learning before the clinical simulation. During the obstetric course, the students were exposed to a fundamental fetal monitoring block of instruction that defines normal fetal baseline, acceleration, decelerations, and maternal contractions. There were no special recruitment incentives for participation. If students refused to participate, there were no consequences for their grades in the course or standing in the program.

Recruitment Strategy

Before the obstetrics simulation day, students were notified and informed of the need for participants. Students enrolled in the obstetrical course were physically asked by the researcher, with faculty present, if they would like to volunteer to participate in the study. If students volunteered, a consent form was distributed, collected, and verified that a valid signature was present.

Institutional Review Board

Institutional review board approval was obtained before data collection (Appendix E). Participants consented before the study and data collection. Participants were instructed that participation was voluntary and would not affect student grades. The results were anonymous. Pre- and post-simulation survey, journals, and debrief had no identifiable information relating to the students. Participants were always protected from harm.

Student Groups

The students were randomly assigned into four simulation groups with roles ranging from charge nurse, primary nurse, and support nurse. The fetal monitoring simulation was repeated once per group. Small group learning permitted students to engage in the simulation and perform various roles. The small student groups also enabled the faculty to use the Jeffries Simulation Framework for instruction. Students were exposed to pedagogies incorporating this study's theories and models. These frameworks and theories included the Social Learning Theory (working with others) and co-factors of behaviorism (observing the change in activity and responses), constructivism (knowledge gained from experience), and situated cognition (thinking observed during the simulation).

The students were guided to work together, regardless of role, to ensure the needs and interventions of the patient were met and that the students provided quality patient care. Students

were expected to demonstrate knowledge and understanding of normal fetal heart rate, accelerations, the variance of decelerations, maternal contractions, react, and perform the correct interventions for abnormalities.

Simulation Scenario

The simulation was divided into three sections: the demographic/patient history, the simulator events, and the student response/behaviors (Appendix C). The following section consisted of the initial demographic/patient history read by the simulator coordinator. This process was the handoff to the patient scenario so that students understood their simulation scenario. The next section consisted of the simulator events, which represented the patient's decompensation and the need for interventions. The last section displayed the student's responses and behaviors. This section represented how the students respond to their patients and interventions. Student distractors will be present. The distractors included events, new information, or actions that needed intervention. Student behaviors were observed to determine whether the clinical objective was met and whether communication and teamwork were present. Students' roles were assigned to include primary nurses, charge nurses, and support nurses so that all students would get the chance to participate in the simulation actively.

Simulation Scenario Introduction

The simulation scenario consisted of a pregnant female (simulator) actively laboring that initially had a normal fetal monitoring strip and evolved to complications with contractions, fetal heart rate, and decelerations. Students had their baseline fetal monitoring class in the classroom setting and should have been able to demonstrate their knowledge and understanding of normal and abnormal fetal heart rates, with any corresponding accelerations, decelerations, and maternal contractions and reacted accordingly.

The simulation scenario used consisted of cord prolapse. This scenario allowed the students to progress from normal fetal heart rate monitoring with accelerations to interpreting the three variances of decelerations and contractions. Cord prolapse is when the umbilical cord falls outside the uterus before the presenting part of the baby, usually because of a rupture of membranes and an unengaged fetal head. A cord prolapse caused fetal heart decelerations due to cord compression, and a cord prolapse is considered an emergency. A cord prolapse takes skill to recognize and is an effective scenario for students.

The students were given the situation and background of the patient and then proceeded to deliver patient care. The patient's status and vital signs were changed based on students' actions or inactions by the facilitator/instructor. The simulation for each group ran for about thirty minutes and was completed on the newborn's safe delivery. The facilitator guided and assisted with the simulation's progression to the students to help maintain the flow of the simulation. This method included and was not limited to guiding responses to answers on maternal and fetal assessments in response to team actions and can include vital signs, interventions, FHR patterns, and assessment.

Actual Simulation Scenario Description

The faculty guided, instructed, and promoted the simulation flow (Appendix C). They provided the clinical context to the person in the nurse's role. This information was exchanged using a verbal shift handoff at the shift change. Appendix C displays the simulation scenario that was used in this study.

Debrief

Tanner (2006) notes that debriefing is needed for simulation activities. Reed (2015) conveys that debriefing is where the actual learning occurs. Reed (2015) notes three types of debriefing: journaling, discussion, and both, and that choosing one will benefit student learning but offer and

interject all of them for a better learning outcome. Debriefing was used after simulation as it allowed students to determine their knowledge and experience of fetal monitoring interpretation before and after simulation within a group setting. This process also permitted students to vocalize the gains learned or the negatives in a group setting. Debriefing consisted of and included the nursing student group participants. During this process, no identifiable information was used. The debrief was not recorded as the students wrote the answers following the self-reflective journaling prompts. The structured journaling captured the cognitive processes during the simulation and allowed the students to voice comments, concerns, questions, fears, and experiences encountered.

The Researcher's Role

The researcher's role was referenced as the human instrument; the only purpose was to observe behaviors, note results, and conduct the study. The researcher had no relationship with the students, was free from bias, and held no gain for this study. The researcher had no obligation except to conduct practical research. The researcher sought to determine how to utilize simulation in the student area to gain knowledge and understanding of fetal monitoring.

Data Collection

Data triangulation is the mix of verifying results and assisting with the validity and accuracy of the study (Naeem, 2019). The data triangulation literature review shows that this study uses the consistency of answers with the debrief and journals and the compilation of the pre-and post-simulation surveys using the data analysis tools. While the debrief was recorded only via the students' written responses, Jentoft & Olsen (2019) note to take the debrief slow and not hurry as it could cause errors.

Data collection occurred by gathering the anonymous results of all pre-and post-surveys/ questionnaires and journaling questions after completing the simulation. The data analysis for the

qualitative portion of the study consisted of structured journaling to elicit student perceptions of clinical reasoning and judgment. The obtained data were subjected to the results reviewed for the commonality of the self-evaluation competency score of one to four from the pre-and post-simulation surveys and coding from the reflection journals.

Instrumentation

Pre-and Post-Survey

Pai (2016) conveys that the Simulation Learning Effectiveness Scale is reliable and effective in determining simulation learning effectiveness. Leighton et al.'s (2015) template-assisted with developing the pre-and post-simulation survey question template. This method was chosen as it allowed students to determine their knowledge and experience of fetal monitoring interpretation before and after simulation. The students were able to use a number that respectively shows their knowledge before the simulation and after simulation and allows them the opportunity to determine if simulation did assist with their learning of fetal monitoring. It also allowed them to post clinical, determine if simulation carried into their learning of clinical. This numerical scale referenced totally agree, agree, disagree, and totally disagree. The surveys were collected before and after the simulation and remained anonymous. The scores ranged from one to four from the pre-and post-simulation surveys. The obtained data were subjected to the results reviewed for the commonality of the self-evaluation competency and reflection journals. The lowest number 1 represents totally agree, 2 represents agree, and 3 represents disagree, 4 indicates totally disagree. The logistics needed were pen and paper. This data collection method answered these research questions:

RQ1: What was the prelicensure BSN students' perceived knowledge and understanding before and after obstetric simulation practice? (Quantitative)

RQ2: How did obstetric simulation practices increase undergraduate prelicensure BSN students' clinical reasoning and judgment using fetal monitoring? (Quantitative and Qualitative)

RQ3: What impact did the repeated obstetric simulation practice have on prelicensure BSN student knowledge and understanding of their clinical reasoning and judgment of fetal monitoring by the end of their obstetric course? (Qualitative)

The students were guided to work together, regardless of role, to ensure the needs and interventions of the patient are met and that the students provide quality patient care. Students were expected to demonstrate knowledge and understanding of normal fetal heart rate, accelerations, decelerations, and maternal contractions, react, and perform the correct interventions for abnormalities. Faculty and researcher ensured that during the simulation, students could recognize the six components of fetal monitoring: what a normal fetal baseline is, what accelerations are, the three varying decelerations, and what a contraction is noted to resemble. Two methods of measure used were: pre- and post-knowledge questionnaires and self-reflective journaling.

Pre- and post-knowledge questionnaires (Figure 7) referenced below provided a measure of participants' knowledge and understanding of fetal monitoring. Students were asked to complete the pre-survey as a hard copy before beginning the high-fidelity simulated obstetrics experience (Bailey & Emory, 2022). The surveys were collected in a box. Students were asked to complete the post-survey hard copy after completing the high-fidelity simulated obstetrics experience. Students were also asked to conduct an anonymous post-survey at the end of their clinical course.

Leighton et al.'s (2015) Likert scale template example (Appendix B) assisted with the format development for the pre-and post-simulation survey questions. The Likert scale indicated, concerning knowledge and understanding, as 1- agreeing, 2- representing somewhat agree, 3- representing somewhat disagree, and 4- representing disagree. This template served as a simple way

to gather the self-reflection data. Reliability for the template is accurate with the use of Likert, but the lack of validity for the version of the study can exist as the survey was created based off the simulation learning objectives and the research questions. No permission was needed to use Likert template as researcher made own tool.

Figure 7

Pre/Post Survey Tool

Survey Question		**Pre-Evaluation Self-Assessment**	**Post-Evaluation Self-Assessment**
Pre-Brief		1- agree, 2-somewhat agree, 3-somewhat disagree, 4- disagree	1- agree, 2-somewhat agree, 3-somewhat disagree, 4- disagree
	Pre-Simulation scenario brief assisted with my learning		
	Pre-Simulation brief assisted with my knowledge and confidence		
	Pre-simulation brief assisted with the learning of fetal monitoring		
Scenario		1- agree, 2-somewhat agree, 3-somewhat disagree, 4- disagree	1- agree, 2-somewhat agree, 3-somewhat disagree, 4- disagree
Ability	I am more confident in my nursing ability		
Ability	I felt empowered as a nurse		
Opportunity	I was afforded the opportunity to use and implement decision making		
Opportunity	I was afforded the opportunity to provide care and interventions		
Ability	I feel more comfortable caring for patients		

Knowledge and understanding	The simulation provided me a safe space to learn and gain knowledge and understanding		
Knowledge and understanding	Helped me relate fetal monitoring interpretation to patient care		
Knowledge and understanding	Helped gain an understanding and increase knowledge of fetal monitoring		
Debrief		1- agree, 2-somewhat agree, 3-somewhat disagree, 4- disagree	1- agree, 2-somewhat agree, 3-somewhat disagree, 4- disagree
	Debriefing allowed a safe space for learning		
	Debrief allowed me to learn from my mistakes		
	Debrief allowed me to gain knowledge and understanding regarding fetal monitoring		

Note. This figure represents the survey tool for student self-knowledge and understanding fetal monitoring concepts pre- and post-simulation. The lowest number, 1, represents agree, and the highest number represents disagree.

Structured Journaling

Self-reflective structured journaling was used as a data collection avenue, thus aiding in evaluating student clinical reasoning and judgment using fetal monitoring before and after simulation practice. This method was chosen to verify the survey findings and allowed students to relate their knowledge and experience of fetal monitoring interpretation before and after simulation. It also allowed the students to recall facts and determine if the information was gained. A debrief

was completed immediately after the simulation concluded. Debrief consisted of and included the nursing student group participants. The debrief allowed the students to voice comments, concerns, questions, fears, and experiences encountered. The debrief was consistent with the journaling questions. Kuiper (2002) reflects that self-reflection journaling provides a way for novice nurses to reflect and enhance knowledge and understating.

The obtained data were subjected to the results reviewed for the commonality of the self-evaluation competency and reflection journals. The logistics needed are pen and paper. The survey and structured journaling answered the following research questions:

RQ1: What was the prelicensure BSN students' perceived knowledge and understanding before and after obstetric simulation practice? (Quantitative)

RQ2: How did obstetric simulation practices increase undergraduate prelicensure BSN students' clinical reasoning and judgment using fetal monitoring? (Quantitative and Qualitative)

RQ3: What impact did the repeated obstetric simulation practice have on prelicensure BSN student knowledge and understanding of their clinical reasoning and judgment of fetal monitoring by the end of their obstetric course? (Qualitative)

This method was chosen as it allowed students to determine their knowledge and experience of fetal monitoring interpretation before and after simulation within a group setting. This process allowed students to vocalize the gains learned or the negatives in a group. The obtained data were subject to the results reviewed for the commonality of the debrief responses. No identifiable information was used. The logistics needed are pen and paper. The debriefing structured journaling prompts are referenced below (Figure 8).

Figure 8

Reflective Journal Questions for Debriefing

Thinking
1. When performing the simulation, I had difficulty….I think I solved them by…
2. When I think about my performance in clinical today, I feel…
3. When I think about the fetal monitoring skills I performed today, I feel…
4. As I look back, I could have spent:
a. More time on…
b. Less time on…
5. When I think about my feelings during the clinical setting, I will describe them as…, and I handled them by…
Environment
1. When I prepared to carry out the nursing activities in the simulation with my team…
2. When I work with others or need help in the clinical area I…
Behavior and Reactions
1. My nurse preceptor helped me through fetal monitoring skills by…
2. Do you feel simulation is an effective factor for learning fetal monitoring?
3. My impression of my performance in clinical this week was that I …
Additional Comments
1. Other comments about my clinical
2. Other comments about my clinical experience, preceptor, or hands-on skills with fetal monitoring performed this week are…

Note. This figure represents reflective journal questions for debriefing tools for student self-knowledge and understanding of fetal monitoring concepts pre- and post-simulation. The students will write their perceptions.

Data Analysis

The goal of this study sought to determine the relationship between student's knowledge and understanding (dependent variable) with simulation usage (independent variable); a quasi-experiment does not require a random selection of groups (Creswell, 2018). This study aimed to determine if there is a manipulation of an independent variable of simulation to the dependent variable of student knowledge and understanding. Using simulation on the dependent variables did show that the students did gain knowledge and understanding after simulation. The simulation as the manipulation characteristic did remain the same as the independent variable was manipulated before measuring the dependent variable.

Data collection occurred by gathering the anonymous results of all pre-and post-simulation surveys/ questionnaires and journaling questions after completing the simulation of 24 prelicensure BSN students currently enrolled in their maternal child health course. The data analysis for structured journaling quantified the qualitative responses to the questions to elicit student perceptions. There were two ways the results were validated and deemed reliable for this project. The first comparison compared scores of one to four from the pre-and post-simulation surveys, comparison of the scenario pre- and post-results divided into three subsections: ability, opportunity, knowledge, and understanding as this data assisted with the research questions and testing of the hypothesis and null hypothesis. The second comparison was with the words coded from the journaling debrief questions.

Quantitative Analysis

The variable type determines the descriptive statistics for sample demographic characteristics, and inferential statistics will infer something about the population based on the sample characteristics (Salkind, 2014). This method used the comparison of scores, from one to four, from the pre-and post-simulation surveys, comparison of the scenario pre- and post-results divided into three subsections: ability, opportunity, knowledge, and understanding as this data assisted with the research questions and testing of the hypothesis and null hypothesis. Non-parametric tests were used to compare the scores of the pre-and post-simulation surveys. This method was the most reliable and valid way to assess the score.

The data were subject to non-parametric and parametric tests to check for score commonality of the self-evaluation competencies on the pre-and post-simulation surveys and reflection journals. Results, as expected, reflected a decrease from the pre-test survey self-reflected competency number to a lower post-simulation survey self-reflected numerical value. The number should have decreased from three or four to one or two. The increased self-reflection responses on the Likert scale demonstrate an increased fetal monitoring knowledge and understanding. The results were not manipulated, edited, or altered. The data collection noted the differences in self-reflected numerical competency of the:

1. Pre-simulation survey differences between groups
2. Post-simulation survey differences between groups

The analysis included paired samples *t*-test to show differences within a group pre-simulation survey to post-simulation test survey, a dependent *t*-test to show differences between the subjects and the scenario three subsections: ability, opportunity, knowledge and understanding as this data assisted with the research questions and testing of the hypothesis and null hypothesis, and

Analysis of Variance (ANOVA) used for differences between subjects within the group or variance between subjects when more than two means exist (Salkind, 2014). All tests were conducted with an alpha level of 0.05. According to Raosoft (n.d.), the power of a sample size of 24 will have an error rate of 10-12%. The obtained data were reviewed for the commonality of the self-evaluation competency score of one to four from the pre-and post-surveys and reflection journals. The results were not manipulated, edited, or altered. The data collection noted the differences in self-reflected numerical competency of the:

1. Paired sample *t*-tests tested differences pre- and post-survey within the group. The paired sample *t*-test did determine if the mean between two sets of observations was zero (Salkind, 2014). The paired *t*-test required a variance equality test, and the Kolmogorov- Smirnov test was used for assumption testing. This analysis used *p values* < 0.5 for significance of sub-survey section questions of nursing ability, opportunity, and knowledge and understanding of range pre-and post-survey. The effect size was based on Cohen's and use an alpha level of 0.05. This method answered $\mathbf{H_0 1}$. There was a relationship between students' perceived knowledge and understanding before and after obstetric simulation practice.
2. Dependent t-tests showed differences between the subjects of the scenario subcategories of three subsections: ability, opportunity, knowledge, and understanding. This data assisted with the research questions and testing of the hypothesis and null hypothesis and the dependent *t*-test compared the means of the dependent groups to reflect if there is evidence that the population means are significantly different from the results (Salkind, 2014). The dependent *t*-test required an equality test, and the Kolmogorov-Smirnov test was used. This analysis

used *p values* < 0.5 for significance of sub-survey section questions of nursing ability, opportunity, and knowledge and understanding of range pre-and post-survey. The effect size was based on Cohen's and use an alpha level of 0.05. This method answered **$H_0$1**. There is a relationship between students' perceived knowledge and understanding before and after obstetric simulation practice.

3. ANOVA was used for differences between subjects within or between subjects (Salkind, 2014). ANOVA allowed multiple subjects' responses and the ability to determine if the responses of all subjects were equal (Salkind, 2014). The ANOVA test required a variance equality test, and the Kolmogorov-Smirnov test was used. This analysis used a *p-value* < 0.5, and effect size was used with a Partial eta squared. This method answered **$H_0$2**. There is no relationship between students' perceived knowledge and understanding before and after obstetric simulation practice.

Qualitative Analysis

Qualitative analysis for this study was word quantification, analysis, and encoding from the reflective journaling, using the WordStat program in the QDA Miner 4.1.38. This was the second comparison method within this study and utilized the words coded from the journaling debrief questions. This program allowed an effective way for text mining and content analysis of the data to organize, code, and analyze the reflective journaling data into categories aligned with the social cognitive theory (Provalis Research, n.d.). The analysis searched for common themes in self-reflective journaling. The codes applied to the reflective journals are determined from the Social Cognitive Theory (behavior, cognitive and environmental factors).

The common themes from these codes refer to:

1. observations of knowledge work
2. observations of thinking strategies
3. judgments of self-improvement
4. judgments of self-competence
5. judgments of resources
6. judgments about social interactions
7. self-reactions
8. self-correction strategies

(Kuiper, 2004, p 6)

This qualitative method answered the **RQ2**: How did obstetric simulation practices increase undergraduate prelicensure BSN students' clinical reasoning and judgment using fetal monitoring? and **RQ3**: What impact did the repeated obstetric simulation practice have on prelicensure BSN student knowledge and understanding of their clinical reasoning and judgment of fetal monitoring by the end of their obstetric course?

Trustworthiness

This section will discuss trustworthiness and addresses credibility, dependability, transferability, and confirmability. This section will discuss the sections with the plan to decrease or increase trustworthiness. The journaling and pre-and post-simulation surveys were compiled. Reliability and validity were validated on the trustworthiness of the student's responses. No manipulation of answers, persuasion of answers, or change in response was performed. The common numerical values, themes, and perceptions were evaluated to determine whether knowledge and understanding increased after stimulation.

Credibility

There are some threats to internal validity—the dishonesty of student responses. Students were asked questions, and their validity of honest answers provided the framework for the study. The dishonesty of the questions could reflect their perceived initial knowledge of the information. The use of data triangulation could pose and be a viable option for data collection. The Likert survey template was created by the researcher and could pose validity issues.

Dependability and Confirmability

Simulation practice may not increase students' knowledge and understanding of fetal monitoring. This method determined dependability and confirmability as more research will be needed to determine if the routine simulation is effective over one-time simulation for knowledge gained and learned. The simulation was the same script, and the pre-education before the simulation is hoped to increase the student's knowledge and understanding of fetal monitoring.

Transferability

Transferability did not pose a problem for this study as no other method or aspect of qualitative research should be considered; there is no possibility as no other context applies to another.

Ethical Considerations

The project aimed to gain insight into the effectiveness of simulation in student learning and retention of fetal heart monitoring. Ethical considerations were at a minimum. Participants were consented before the study and data collection (Appendix F). Participants were instructed that participation was voluntary, they could withdraw at any time, and not participating would not affect student grades. The results were anonymous. Pre- and post-simulation survey journals and debriefs contained no identifiable information about the students. Participants were always protected from

harm. The university was protected from harm. Institutional review board approval was obtained before data collection (Appendix E). Permission letters were approved prior to the study with the IRB process approval. No student relation existed to researcher and posed no threat. No compensation was offered nor received for this study. Information will be kept in a locked box and the key in a secure area, only with the researcher. No names are associated with the paper data. Data will be stored on a password protected computer. No names are associated with the computer data.

Summary

This chapter discussed the research design, sample, setting, recruitment plan, participant consent, and measurement method for this study. This study aimed to determine if a relationship exists between a student's simulation practice and their knowledge and understanding of the obstetrical interpretation of fetal monitoring. Also, this study sought to determine the relationship between a student's knowledge of fetal monitoring after practicing during a simulation scenario and its use in the clinical setting over time. A one-group pre- and post-simulation survey design was used to evaluate the methods used in this study.

CHAPTER FOUR: FINDINGS

Overview

The results of this mixed method qualitative and qualitative design study assessed whether simulation could assist student learning and increase knowledge gained with fetal monitoring interpretation. The independent variable was simulation, and the dependent variables were knowledge and understanding of fetal monitoring. This chapter notes how the data was sought, the method used for the data collection, and the study's results. This chapter also evaluated and reviewed the research questions and the relation of these questions to the hypothesis. Data analysis for this study focused on qualitative and quantitative methods using pre- and post-simulation surveys and self-reflected journals.

Quantitative

This section reveals how the data was sought, the method used for the quantitative data collection, and the study's results. This section also evaluated and reviewed the research questions and the relation of these questions to the hypothesis. Data analysis for this quantitative section focused on using and gathering the anonymous results of all pre-and post-simulation survey's after completing the simulation and clinical rotations. This quantitative method collection consisted of survey items administered before and after simulation and two clinical rotations.

Research Questions

This study used mixed-method data collection to determine the following:

RQ1: What was the prelicensure BSN students' perceived knowledge and understanding before and after simulation practice? (Quantitative measure)

RQ2: How did obstetric simulation practices increase undergraduate prelicensure BSN students' critical thinking and clinical reasoning using fetal monitoring? (Quantitative and Qualitative measures)

RQ3: What impact did the repeated obstetric simulation practice have on prelicensure BSN student knowledge and understanding of their clinical reasoning and judgment of fetal monitoring by the end of their obstetric course? (Qualitative measure)

Null Hypotheses

$H_0$1. There is a relationship between prelicensure BSN students' perceived knowledge and understanding before and after obstetric simulation practice.

$H_0$2. There is no relationship between prelicensure BSN students' perceived knowledge and understanding before and after obstetric simulation practice.

Descriptive Statistics

Descriptive statistics data screening for this study included the IBM SPSS System for the quantitative portion, and the coding system used was the QDA Miner 4.1.38 for the qualitative portion. SPSS determined the independent variable data (using simulations) and the dependent variables (knowledge and understanding of fetal monitoring). The pre- and post-survey data used the simulation scenario data to interpret results. Qualitative data focused on the commonality and frequency of keywords. Table 2 reflects the study's groups, simulation practice, pre-and post-surveys, and journal self-reflection. The column on the far left shows the experimental groups of randomly placed students for simulation practice. The pre-simulation survey column will have the results of the pre-simulation of fetal monitoring knowledge. The next column depicts the simulation that occurs. The far-right columns depict the post-simulation survey of fetal monitoring knowledge after the simulation and structured journaling submissions.

Table 2

One-group Pre-simulation -Post-simulation Design Notation: Actual

Simulation Group	Pre-Survey	Simulation	Post-Survey	Structured Journaling	Post-Clinical Structured Journaling #1	Post-Clinical Structured Journaling #2 and Post survey
R	O_1	X	O_2	O_3	O_4	O_5

Twenty-four prelicensure BSN nursing students (n=24) from a university of 1500 students, located in the Pacific Northwest of Washington, in their maternal child health course were part of this study. Twenty-four pre-and post-simulation surveys were collected on the simulation day. Twenty-two females and two males were part of this study, with 100% aged 20-23. Tables 3 and 4 provide descriptive statistics about gender and age for this study.

Table 3

Descriptive Statistics: Gender

Gender	*Frequency*	*Percent*
Female	22	0.92
Male	2	0.08
TOTAL	24	100.0

Table 4

Descriptive Statistics: Age

Age	*Frequency*	*Percent*
20-23	24	100.0
TOTAL	24	100.0

Results

Concerning the research questions and testing the null hypotheses, descriptive statistics data screening for this study included the IBM SPSS System for the quantitative portion. The analysis used three different tests to seek the research questions and determine if the hypothesis should be rejected or fail to reject. The data collection noted the differences in self-reflected numerical competency of the pre-simulation survey group differences and post-simulation survey differences between groups. The statistical test results are provided regarding the impact simulation has on prelicensure BSN students' knowledge and understanding of fetal monitoring using the survey scenario subsections of ability, opportunity, knowledge, and understanding self-evaluation scores of one to four on the comparative scale. One indicated totally agree, and four represented totally disagree. Pre-brief and debrief surveys were separated, and data analysis was performed. Scenario survey data was conducted separately. The scenario questions were broken into three subsections: ability, opportunity, knowledge and understanding as this data assisted with the research questions and testing of the hypothesis and null hypothesis.

The paired sample *t*-tests tested the differences between pre-and post-simulation survey results within the group. The paired sample *t*-test determined if the mean between the two observation sets is zero and similar in response. A dependent *t*-test was needed to ensure that no significant results were between the scenario subcategories of three subsections: ability, opportunity, knowledge and understanding as this data assisted with the research questions and testing of the hypothesis and null hypothesis. The dependent *t*-test compared the means of the dependent groups to reflect if there was evidence that the population means were not significantly different with the results. An ANOVA was used for differences between subjects to determine variance (Salkind, 2014). An ANOVA allowed for multiple subjects' responses and the ability to determine if the responses of all subjects were equal.

Hypothesis

$H_0$1. There is a relationship between prelicensure BSN students' perceived knowledge and understanding before and after obstetric simulation practice.

The paired sample *t*-tests were used to test differences within the group and determine if the mean between the two observations was zero or similar. The pre-and post-scenario questions were broken into three subsections: ability, opportunity, knowledge, and understanding. The dependent *t*-test also compared the means of the dependent groups to reflect if there was evidence that the population means were not significantly different with the results.

Data Screening

Before the paired *t*-test and dependent *t*-test were conducted, SPSS (Version 28) was used, and data was placed in the database. Using the surveys, the variable data was separated and corresponded by assigning student responses as a number from one to 24 to represent the number of turned-in surveys (n=24). The student response data was compiled using the scenario pre-and post-

simulation survey questions into subcategories of ability, opportunity, knowledge, and understanding. The data were then subjected to a paired *t*-test and a dependent *t*-test.

Assumption Testing

The paired *t*-test requires a variance equality test, and the Kolmogorov- Smirnov test was used. This analysis resulted in *p values* < 0.5 for sub-survey section questions of nursing ability, opportunity, and knowledge and understanding of range pre-and post-simulation survey significance of $p < .001$. The dependent *t*-test required an equality test, and the Kolmogorov-Smirnov test was used. This analysis resulted in *p values* < 0.5 for sub-survey section questions of nursing ability, opportunity, and knowledge and understanding of range pre-and post-simulation survey significance of $p < .001$. This data was considered normal, and it was decided to proceed with the paired *t*-test and dependent *t*-test. This information is depicted in Table 5.

Table 5

Kolmogorov- Smirnov Test for Hypothesis

	Kolmogorov- Smirnov		
Nursing Ability	Statistic	*df*	Sig
Pre-survey	.208	1	.001
Post-survey	.292	1	<.001

	Kolmogorov- Smirnov		
Opportunity	Statistic	*df*	Sig
Pre-survey	1.97	1	<.001
Post-survey	.292	1	<.001

	Kolmogorov- Smirnov		
Knowledge and Understanding	Statistic	*df*	Sig
Pre-survey	.300	1	<.001
Post-survey	.474	1	<.001

Inferential Testing

Paired *t*-test Results

Paired *t*-test was used to test the $H_0$1 hypothesis, and the results showed a relationship between students' perceived knowledge and understanding before and after obstetric simulation practice. The difference revealed that students' results from pre-and post-simulation survey in the scenario questions were broken into three subsections: nursing ability, opportunity, knowledge, and understanding and compared the difference that the students' results decreased post-simulation survey as expected, reflecting that simulation does increase student ability with fetal monitoring. Therefore, a reject the null $H_0$2 hypothesis was warranted; showing relation at the H01 hypothesis, at the 95% confidence level where, Nursing ability: t(24) = 14.22, p = < .001 (two-tailed), the effect size was extremely large based on Cohen's d = 3.82 with an alpha level of 0.05, Opportunity: t(24) = 18.132, p = < .001 (two-tailed), the effect size was extremely large, based on *Cohen's d* = 2.56 with an alpha level of 0.05, and knowledge and understanding: t(24) = 19.00, p = < .001 (two-tailed), the effect size was extremely large, based on Cohen's d = 4.06 with an alpha level of 0.05. This information is depicted in Table 6.

Table 6

Paired t-tests

Nursing Ability	*Sig*	*t*	*df*	*Sig 2 tailed*
Pre-survey	< .001	15.21	23	< .001
Post-survey	< .001	14.22	23	< .001
Opportunity	***Sig***	***t***	***df***	***Sig 2 tailed***
Pre-survey	< .001	9.23	23	< .001
Post-survey	< .001	18.13	23	< .001
Knowledge and Understanding	***Sig***	***t***	***df***	***Sig 2 tailed***
Pre-survey	< .001	12.91	23	< .001
Post-survey	< .001	19.00	23	< .001

Dependent *t*-tests Results

Dependent *t*-tests were used in this study to show differences between groups. The dependent *t*-test was used to compare the means of the dependent groups to reflect and ensure that the means were not significantly different; therefore, a reject the null $H_0$2 hypothesis was warranted; showing relation at the $H_0$1 hypothesis; at the 95% confidence level where, Nursing ability: t(24) = 5.70, p = < .001 (two-tailed), the effect size was largely based on Cohen's d = .634 with an alpha level of 0.05, Opportunity: t(24) = 3.66, p = < .001 (two-tailed), the effect size was extremely large, based on Cohen's d =2.87 with an alpha level of 0.05, and Knowledge and

understanding: t(24) = 3.82, p = < .001 (two-tailed), the effect size was extremely large, based on Cohen's d = .315 with an alpha level of 0.05. This information is depicted in Table 7.

Table 7

Dependent t-test

Nursing Ability	Sig	t	*df*	Sig 2 tailed
Pre-survey/ Post-survey	< .001	5.70	23	< .001
Opportunity	**Sig**	**t**	***df***	**Sig 2 tailed**
Pre-survey/ Post-survey	< .001	3.66	23	.001
Knowledge and Understanding	**Sig**	**t**	***df***	**Sig 2 tailed**
Pre-survey/ Post-survey	< .001	3.82	23	< .001

Null Hypothesis

$H_0$2. There is no relationship between prelicensure BSN students' perceived knowledge and understanding before and after obstetric simulation practice.

An ANOVA test was used to determine if a relationship did not exist regarding simulation and prelicensure BSN nursing students' use of simulation and fetal monitoring interpretation. The pre-and post-scenario questions were broken into three subsections: ability, opportunity, knowledge, and understanding. ANOVA was used for differences between subjects within or between subjects (Salkind, 2014). ANOVA allowed for multiple subjects' responses and the ability to determine if the responses of all subjects were equal. ANOVA was conducted to test null

hypothesis $H_0$2. The frequency of student responses was equal regarding simulation and the subjects of ability, opportunity, knowledge, and understanding.

Data Screening

Before the ANOVA test, SPSS (Version 28) was used, and data was placed in the database. Using the surveys, the variable data was separated and corresponded by assigning student responses as a number from one to 24 to represent the number of turned-in surveys (n=24). The data was cleaned, and no errors were found. The student response data was compiled using the scenario pre- and post-survey questions into subcategories of ability, opportunity, knowledge, and understanding. Data was then obtained by using an ANOVA test method.

Assumption Testing

The ANOVA test requires a variance equality test, and the Kolmogorov-Smirnov test was used. This analysis resulted in a *p-value* < 0.5 for sub-survey section questions of nursing ability, opportunity, and knowledge and understanding of range pre-and post-simulation survey significance of $p < .001$. This data was considered normal, and it was decided to proceed with the ANOVA. This information is depicted in Table 8.

Table 8

Kolmogorov- Smirnov Test for Null Hypothesis

	Kolmogorov- Smirnov		
Nursing Ability	Statistic	*df*	Sig
Pre-survey	.208	1	.001
Post-survey	.292	1	<.001
	Kolmogorov- Smirnov		
Opportunity	Statistic	*df*	Sig
Pre-survey	1.97	1	<.001
Post-survey	.292	1	<.001
	Kolmogorov- Smirnov		
Knowledge and Understanding	Statistic	*df*	Sig
Pre-survey	.300	1	<.001
Post-survey	.474	1	<.001

Inferential Testing

ANOVA Test Results

An ANOVA test was used to test the $H_0 2$ hypothesis. Results showed a relationship between students' perceived knowledge and understanding before and after obstetric simulation practice. The difference revealed that students' results from pre-and post-simulation survey in the scenario

questions were broken into three subsections: ability, opportunity, knowledge, and understanding. The student's results decreased post-simulation survey as expected, reflecting that simulation does increase students of fetal monitoring after performing; therefore, a failure to reject the null $H_0 2$ hypothesis was warranted; at the 95% confidence level where Nursing ability: F (1, 22) = 4.30, p= .009, with a Partial eta squared of $\eta 2$ = .351, making the effect size very large. Opportunity: F (1,22) = 4.30, p= .420, with a Partial eta squared of $\eta 2$ = .234, making the effect size very large. Knowledge and understanding: F=1,22) =4.30, p= .219 with a Partial eta squared of $\eta 2$ = .117, making the effect size large. This information is depicted in Table 9. The ANOVA test requires a variance equality test, and the Kolmogorov-Smirnov test was used. This analysis resulted in a *p-value* < 0.5.

Table 9

ANOVA Results

Nursing Ability		*SS*	*F*	*Sig*	*df*	*MS*
Pre-survey/ Post-survey	Regression	24.663	8.063	.010[b]	1	24.663
	Residual	67.296			22	3.060

Opportunity		*SS*	*F*	*Sig*	*df*	*MS*
Pre-survey/ Post-survey	Regression	2.654	.677	.420[b]	1	2.654
	Residual	86.304			22	3.923

Knowledge and Understanding		*SS*	*F*	*Sig*	*df*	*MS*
Pre-survey/ Post-survey	Regression	5.240	1.599	.219[b]	1	5.240
	Residual	72.093			22	3.277

The figure below represents the pre- and post-simulation pre-brief and debrief questions. These questions were not included in the data collection but depict that pre- and debrief scores noticeably decrease from two to one in both aspects, which verified that simulations do increase competency, critical thinking, and comfort of taking care of patients (Figure 9)

Figure 9

Pre- and Post-Simulation Pre-Brief/Debrief results

Pre-Brief / Pre-Scenario Survey n=24	Likert Scale			
Category	1	2	3	4
Learning	20/83 %	4/17%	0	0
Knowledge/Comprehension	5/20%	19/80%	0	0
Fetal Monitoring	5/20%	19/80%	0	0

Pre-Brief/ Post- Scenario Survey n=24	Likert Scale			
Category	1	2	3	4
Learning	23/96%	1/4%	0	0
Knowledge/Comprehension	23/9%	1/6%	0	0
Fetal Monitoring	23/96%	1/6%	0	0

De-Brief/ Pre-Scenario Survey n=24	Likert Scale			
Category	1	2	3	4
Learning	19/80%	5/20%	0	0
Knowledge/Comprehension	19/80%	4/17%	0	0
Fetal Monitoring	19/80%	5/20%	0	0

De-Brief/ Post- Scenario Survey n=24	Likert Scale			
Category	1	2	3	4
Learning	24/100%	0	0	0
Knowledge/Comprehension	24/100%	0	0	0
Fetal Monitoring	24/100%	0	0	0

The figure below represents the pre- and post-simulation survey questions the students turned in after clinical. The sample size was too small and had a lot of room for error, but one can discuss that the scores ranged from of one's. (Figure 10).

Figure 10

Post Clinical Pre-Brief/Debrief Survey Results

Pre-Brief / Post -Clinical Survey n=5	Likert Scale			
Category	1	2	3	4
Learning	5/100 %	0	0	0
Knowledge/Comprehension	5/100%	0	0	0
Fetal Monitoring	5/100%	0	0	0

De-Brief/ Post- Clinical Survey n=5	Likert Scale			
Category	1	2	3	4
Learning	5/100 %	0	0	0
Knowledge/Comprehension	5/100%	0	0	0
Fetal Monitoring	5/100%	0	0	0

Overview

The results of this mixed method qualitative and qualitative design study assessed whether simulation could assist student learning and increase knowledge gained with fetal monitoring interpretation. The independent variable was simulation, and the dependent variables were knowledge and understanding of fetal monitoring. This chapter will reveal how the data was sought, the method used for the qualitative data collection, and the study's results. This section also evaluated and reviewed the research questions and the relation of these questions to the hypothesis. Data analysis for this qualitative section focused on qualitative methods using self-reflected journals and the coding of the student responses. Data collection occurred by gathering the anonymous results of all pre-and post-simulation surveys and self-journal questions after completing the simulation and clinical rotation. This method of collection consisted narrative themes exposed within reflective journals.

Qualitative Data

This section reveals how the data was sought and the method used for the qualitative data collection, and the study's results. This section also evaluated and reviewed the research questions and the relation of those questions. Data analysis for this qualitative section focused on the journal entries and the elicit student perceptions. The analysis used for the qualitative data consisted of evaluating the structured journals with content analysis using a word count and theme identification to elicit student thinking and perceptions. The words and phrases were subjected to assertional, connotative, and script analyses.

Research Questions

This study used mixed-method data collection to determine the following:

RQ1: What was the prelicensure BSN students' perceived knowledge and understanding before and after simulation practice? (Quantitative measure)

RQ2: How did obstetric simulation practices increase undergraduate prelicensure BSN students' critical thinking and clinical reasoning using fetal monitoring? (Quantitative and Qualitative measures)

RQ3: What impact did the repeated obstetric simulation practice have on prelicensure BSN student knowledge and understanding of their clinical reasoning and judgment of fetal monitoring by the end of their obstetric course? (Qualitative measure)

Participants

Twenty-four prelicensure BSN nursing students (n=24) from a university of 1500 students, located in the Pacific Northwest of Washington, currently enrolled in their maternal child health course were part of this study. Twenty-four pre-and post-simulation surveys were collected on the simulation day. Twenty-two females and two males were part of this study, with 100% aged 20-23. Tables 3 and 4 provide descriptive statistics about gender and age for this study.

The student responses were referenced a number one to twenty-four, for confidentiality. Using the journals responses, the variable data was separated and corresponded by assigning student responses as a number from one to 24 to represent the number of turned-in surveys (n=24). The subsequent surveys after clinical were labeled one to five.

Results

The study used the pre-determined coding system based on Bandura's concepts for social cognitive learning from the self-reflection journals. The QDA Miner 4.1.38 program was used to count words within the statements. The journals were collected three times, once after the simulation and two more times post-clinical after the simulation. Qualitative analysis for this study

used word quantification, analysis, and encoding from reflective journaling. This method was proven effective in organizing, coding, and analyzing the reflective journaling words and statements into categories aligned with social cognitive concepts. Table 10 reflects the number of journals collected or returned post-simulation and post-clinical.

Table 10

Journals Collected/Returned

	Post-Simulation	*Post-Clinical #1*	*Post-Clinical #2*
Subjects	24	5	5

The results section addressed the researchers' questions through the narratives. The common themes were identified through word analysis dictionaries and coded as:

1. observations of knowledge work
2. observations of thinking strategies
3. judgments of self-improvement
4. judgments of self-competence
5. judgments of resources
6. judgments about social interactions
7. self-reactions
8. self-correction strategies

(Kuiper, 2004, p 6)

Assertional Analysis

The assertional analysis identified the relationships between concepts, connectives and operators in the phrases and shows the epistemology for the analyzed content (Kuipers et al.,1988). The first step is to count the verbs and categorize them into past, present, and future tenses. This analysis referenced journals responses from post-simulation journals and the two post-clinical journals. The word count is depicted in Tables 11 and 12.

Theme Development

The total verb usage for the post-simulation portions of this study noted 187 verbs for the journals, with 53% reflecting past tense, 45% reflecting present tense, and 1% reflecting future tense. Table 11 reflects the assertional analysis coding for the post-stimulation journals. This data analysis reveals very little difference between the thinking recalled from long-term memory, and short-term memory induced by the journal prompts. It is important to note that the post-simulation and post-clinical journals resulted in the same frequency percentage, between 45-55%, with low use of future verbs of 1%. This data trend showed the students did recall past experiences and knowledge and applied them to the present scenario. They were focused on the present situation and could apply the simulation to future situations, albeit to a minor degree.

Table 11

Coding Results Post Simulation Journals

Categories	Frequency	frequency (f)%	% of total
Past	99	.53	53%
Present	85	.45	45%
Future	3	.01	1%
Total	187		

The total verb usage for the post-clinical portions of this study noted 48 verbs for the post-clinical journals, with 52% reflecting past tense and 50% reflecting present tense. Table 12 reflects the assertional analysis coding for the post-clinical journals.

Table 12

Coding Results Post Clinical Journals

Categories	Frequency	frequency (f)%	% of total
Present	25	.52	52%
Past	23	.50	50%
Total	48		

This data trend showed that the students did recall past experiences and knowledge and applied them to the present clinical experience. They were focused on the present situation but did not speculate about future situations.

The assertional analysis also included categorizing the statements for meaning. The four categories representing the assertions include:

- Causal (indicating relationships of cause and effect)
- Comparative (indicating relationships of comparison or contrast)
- Connotative (indicating statements of existence or meaning)
- Indicative (indicating statements of significance)

This analysis showed how the subjects think about the referents or nouns in the statements. While these areas were compared as post-simulation and post-clinical, there is some variance between the areas. Causal and comparative are higher-order thinking. Indicative and connotative statements are lower-order thinking. This study sample showed that post-simulation, there were more indicative and connotative statements, which confirmed students' novice thinking and the need for Bloom's Taxonomy objectives to be at the knowledge and comprehension live. This finding showed a greater number of statements for meaning and significance. Lesser statements for cause and effect and comparison showed no experiences to draw upon in this group, and there is minimal higher-order thinking from this experience. This data is expected as students are not thinking at this level yet. This comparison is depicted in Figure 11.

Figure 11

Assertional Data Analysis

	Post-Simulation Journal	Post-Clinical Journal
	Frequency	Frequency
Causal	8/9.4%	2/8.70%
Comparative	3/3.5%	5/21.70%
Indicative	50/58.80%	15/65.20%
Connotative	24/28.20%	1/4.30%
	Journal words 1447	Journal words 427

Causal statements demonstrate the cause and effect of relationships; comparative statements compare the relationships; connotative statements demonstrate the reality or importance, and indicative statements demonstrate the impact. Figure 12 shows some of the example statements students referenced regarding causal, comparative, connotative, and indicative.

Figure 12

Example of Assertional Phrase Analysis

Type of Assertion	Text
Causal	"Confidence improved because of simulation"
Causal	"Ask for guidance from my nurse"
Causal	"Simulation helped relate fetal monitoring"
Comparative	"Felt better with interventions after simulation"
Comparative	"Simulation helped me better understand fetal monitoring"
Comparative	"Simulation increased my fetal monitoring skills"
Connotative	"I asked clarification from others and seek guidance"
Connotative	"Realistic understanding of fetal monitoring"
Connotative	"Team was helpful and clear communication"
Indicative	"Simulation allowed me to feel confident with my interventions"
Indicative	"Increased my critical thinking more"
Indicative	"Gained confidence with fetal monitoring"

In summary, assertional analysis of the data revealed that this sample wrote primarily about situations of existence and meaning in their most present circumstances. 45% percent of the verbs were stated in the present tense, showing current state information processing (Ericsson & Simon, 1993). The past tense was also frequently used as it related to the past tense verb, indicating thought processes linked to past experiences. Future tense verbs were least used, indicating very little planning ahead or forward reasoning. An analysis of the assertional statements revealed that indicative statements or meaning were by far the most common method of cognitive expression for both journaling episodes. The low level of causal statements for both groups may reflect a lack of experience connecting with this clinical situation as a novice.

Connotative Analysis

The researcher followed the content analysis process by dividing the content into coding categories and reading the journal transcripts for general meaning. The first step in the procedure was preprocessing the data by transcribing the journal entries word for word. The results section addressed the researchers' questions through the themes. Coding of several journal statements was shared with the students regarding their feelings about the simulation and how the simulation increased their knowledge and understanding of fetal monitoring interpretation. Connotative analysis for this study related to the referring phrases or noun themes. This analysis portion separated the post-simulation journals and the two post-clinical surveys. A complete listing of these statement categories is listed in Tables 13 and 14.

Theme Development

The total noun usage for the post-simulation portions of this study noted 632 words for the post-simulation journals, with a variance in category response and a variance in frequency. Table 13 reflects the connotative analysis coding for the post-stimulation journals. The nouns are divided into

the universe of objects describing the ontology of the studied domain (Kuiper et al., 1988). The recurrent themes deduced from the nouns in the content of the narratives could be divided into the three main concepts of Bandura's social cognitive concepts. In the metacognitive category, nouns were coded as pronouns referring to the self or pronoun (1%), cognitive supports (3%), knowledge referents (6%) and thinking strategies (20%). The behavioral category included nouns referring to activities (8%), communication (9%), efficacy (6%), and reactions (20%). The environmental category nouns included nouns referring to the environment (7%), personnel (9%), situation (6%) and time (5%). The total use of metacognitive nouns was 30%, behavioral nouns 43%, and environmental nouns 27%.

Table 13

Connotative: Coding Results Post Simulation Journals

Categories	Frequency	frequency (f)%	% of total
Reaction	127	.20	20%
Thinking	125	.20	20%
Personnel	58	.09	9%
Communication	57	.09	9%
Activities	48	.08	8%
Environment	44	.07	7%
Knowledge	43	.06	6%
Efficacy	40	.06	6%
Situation	37	.06	6%
Time	30	.05	5%
Support	20	.03	3%
Pronoun	3	.005	1%
Total	632		

The coding of several statements was shared in the post-clinical journals by the students regarding their feelings about simulation and how the simulation increased their knowledge and understanding of fetal monitoring interpretation. The total noun usage for the post-clinical portions of this study noted 181 nouns for the post-simulation journals, with a variance in category response and frequency. A complete listing of these statement categories is listed in Table 14. Within the

metacognitive category, nouns were coded as pronouns referring to the self or pronoun (0.0%), cognitive supports (1%), knowledge referents (6%) and thinking strategies (15%). The behavioral category included nouns referring to activities (7%), communication (12%), efficacy (8%), and reactions (17%). The environmental category nouns included nouns referring to the environment (10%), personnel (9%), situation (9%) and time (5%). The total use of metacognitive nouns was 22%, behavioral nouns 44%, and environmental nouns 33%.

Table 14

Connotative: Coding Results Post Clinical Journals

Categories	Frequency	frequency (f)%	% of total
Reaction	31	.17	17%
Thinking	27	.15	15%
Communication	22	.12	12%
Environment	19	.10	10%
Personnel	17	.09	9%
Situation	16	.09	9%
Efficacy	14	.08	8%
Activities	13	.07	7%
Knowledge	11	.06	6%
Time	9	.05	5%
Support	2	.01	1%
Pronoun	0	0	0%
Total	181		

Table 15 compares the post-simulation and post-clinical nouns in the metacognitive, behavioral, and environmental categories. The data indicates that the behavioral and environmental categories are similar, with the metacognitive nouns showing the greatest difference.

Table 15

Comparison of Noun Categories Post-Simulation and Post-Clinical Comparison

Categories	Metacognitive	Behavioral	Environmental
Post-Simulation	30%	43%	27%
Post-Clinical	22%	44%	33%

In summary, the referring phrase analysis revealed the major metacognitive noun referents used in clinical situations as personnel, environment, knowledge, communication, reactions, and thinking strategies. They are relatively the same with post-simulation and post-clinical journaling. The major metacognitive nouns referents used post-simulation and post-clinical were knowledge at 6% and thinking at 20%. The major behavioral noun referents used during clinical experiences were communication at 9 and 12% and reactions at 17 and 20%. The primary environmental noun referents used post-simulation, and post-clinical were personnel at 9%. There were very few differences between the post-simulation and post-clinical journal data. The data revealed that the student's post-simulation and post-clinical had the same reactions. The data showed that the students felt the same after simulation and after clinical, therefore showing that simulation can effectively increase knowledge and understanding even in the clinical setting after using simulation. These trends show that simulation can effectively increase a student’s knowledge and understanding of fetal monitoring.

Script Analysis

The results section addressed the researchers' questions through the themes. The scripts' analysis delivered the themes that answered the following research questions: **RQ2**: How did obstetric simulation practices increase undergraduate prelicensure BSN students' critical thinking and clinical reasoning using fetal monitoring? (Qualitative measure) and **RQ3:** What impact did the repeated obstetric simulation practice have on prelicensure BSN student knowledge and understanding of their clinical reasoning and judgment of fetal monitoring by the end of their obstetric course? (Qualitative measure).

Theme Development

As the students noted in their journals, the frequency of the words indicated a shared relationship and experience from using pre-and post-simulation related to knowledge and understanding of fetal monitoring. The top word categories were common denominators for all journals with just a degree of fluctuation. The common themes with the words in context amongst both the post-simulation and post-clinical journal entries were related to:

1. Reactions
2. Thinking strategies
3. Personnel in the environment
4. Communication with others
5. Environment circumstances

Analysis of this data confirmed that these themes are relatable, and students were able to effectively, with the use of simulation, able to react to their scenario and provide interventions to the patient, critically think and focus on their environment, use effective communication, and use their resources appropriately.

Research Question Responses

Regarding **RQ2**: How did obstetric simulation practices increase undergraduate prelicensure BSN students' critical thinking and clinical reasoning using fetal monitoring? The themes related to this question reveal that the simulation promoted the following.

1. The simulation increased their knowledge of the patient situation with an effective reaction due to the knowledge learned with reading fetal monitoring and simulation.
2. The simulation allowed the students to increase their critical thinking with fetal monitoring reading.
3. The simulation allowed the students to think in the present and make appropriate decisions regarding care concerning fetal monitoring.
4. The simulation allowed the students to not focus on the past and their lack of knowledge of not understanding fetal monitoring.
5. The simulation allowed them to ask questions to other students if they did not understand how to interpret so they could increase their critical thinking.
6. The simulation effectively increased the students feeling comfortable with communication with the student and preceptor.
7. The simulation provided a safe learning environment to increase their knowledge and understanding of fetal monitoring.

Analysis of this data confirmed that these themes are relatable, and students were able to effectively, with the use of simulation, able to react to their scenario and provide interventions for the patient, critically think in the present and past, but also focus on their environment, use effective communication, and use their resources appropriately.

Regarding **RQ3:** What impact did the repeated obstetric simulation practice have on prelicensure BSN student knowledge and understanding of their clinical reasoning and judgment of fetal monitoring by the end of their obstetric course? The themes related to this question reveal that the simulation promoted the following.

1. Apply knowledge gained during the simulation of fetal monitoring to their clinical setting.
2. The simulation provided the ability to increase their critical thinking of fetal monitoring in the clinical setting.
3. The simulation allowed the opportunity to think for the present.
4. The simulation allowed the students to not focus on the past and not have a critical thinking background.
5. The simulation provided the ability to comfortably use the assistance of their preceptor if they needed help or had a question that related to the patient
6. The simulation effectively increased communication
7. The simulation provided a safe space or environment for learning.

Analysis of this data confirmed that these themes are relatable, and students were able to effectively, with the use of simulation, able to react to their scenario and provide interventions to the patient, critically think in the present and past, but also focus on their environment, use effective communication, and use their resources appropriately.

Comparing Quantitative and Qualitative Findings

The relationship between the surveys and the journals indicated that the students need simulation to learn and increase knowledge and understanding. The data also conveyed that students need the simulation to interpret and have knowledge and understanding of fetal monitoring

effectively. The relationship between the surveys and the journals indicates that simulation did affect learning in general and provided an effective way to understand fetal monitoring concepts. They could visually see the changes on the monitor and effectively interpret the reading to provide needed interventions.

Quantitative data results showed that simulation will effectively assist students with the knowledge and understanding of fetal monitoring. The quantitative data showed that simulation does give them the ability to be confident, an opportunity to think critically, and the knowledge and understanding to interpret fetal monitoring. Qualitative data results showed that students feel that simulation assists them with increasing communication, knowledge, reactions, thinking, and being comfortable asking for help from others post-simulation in the clinical setting. Students feel simulation assisted them with the knowledge and understanding of fetal monitoring in the simulation setting and post-clinical.

This mixed method data showed that the students need simulation for learning and to gain knowledge and understanding of fetal monitoring. Comparing the results of the two types of analysis supported the findings of increased knowledge, expression of reactions, and the ability to use simulation to enhance thinking and understanding. The advantage of a mixed method approach in this study allowed the quantitative and qualitative data to show a correlation between student thinking that simulation can effectively increase their knowledge and understanding of learning needs. The mixed method approach also demonstrated that simulation can be used within a course to teach some nursing interventions and relate them to learning. This method lastly showed that students could use the simulation to increase their knowledge and understanding in their maternal child course and relate the simulation to their learning of fetal monitoring.

Theory Usage

Conceptual Models for Study Interventions

Pamela Jeffries Simulation Model, Bloom's Taxonomy, and Patricia Benner's Novice to Expert Theory guided faculty in developing program curricula to meet course objectives. These theories represent a nursing theory and model for competency, knowledge, and understanding. Theories assisted faculty in developing simulations that referenced course objectives, knowledge, critical thinking skills, clinical reasoning, mastery of skills, and clinical judgment for competency. These theories also served as the foundation for this study, including the simulation, script for the simulation, simulation objectives, pre-and post-simulation survey, and post-simulation and post-clinical journals.

Theoretical Frameworks

Four theories underpinned this study and were used for this proposal. They included the Social Learning Theory, Behaviorism Theory, Constructivism Theory, and Situation Cognition Theories. These theories referenced how simulation practice relate to student learning and differentiate that students learn in various ways, at different levels of comprehension, and how feedback can be crucial to understanding. These theories referenced how group learning is positive, group behavior is mimicked, and group simulation practice engrains information when the need to recall allows. These theories guided the assumptions and limitations of the study. These theories served as the foundation for this study, including the simulation, script for the simulation, simulation objectives, and post-simulation debrief.

Summary

This section described the data collection approach, the collection method, and the collection results. The descriptive statistics were described using different inferential tests to

determine the rejection or failure to reject the hypothesis. There was a significant difference between the pre-and post-simulation survey about the three subsections: ability, opportunity, knowledge, and understanding, and the student's results decreased post-survey as expected, reflecting that simulation does increase students' abilities with fetal monitoring.

CHAPTER FIVE: CONCLUSIONS

Overview

This chapter discusses the discussion, limitations, and implications for future practice. It will also discuss the research questions concerning the hypothesis. Simulation is an effective way to increase a prelicensure BSN student's knowledge and allow them a safe space to think critically, demonstrate skill, and perform patient care before entering the clinical setting. The use of simulation will provide a positive avenue for students to learn skills, such as fetal monitoring, where programs may be neglecting some skills that students are exposed to in clinical practice. This chapter correlated the data compiled, the data analyzed, its relation to the current literature, gaps in the literature, and the future implications.

Summary of Findings

This study examined the following research questions:

RQ1: What was the prelicensure BSN students' perceived knowledge and understanding before and after simulation practice? (Quantitative measure)

RQ2: How did obstetric simulation practices increase undergraduate prelicensure BSN students' critical thinking and clinical reasoning using fetal monitoring? (Quantitative and Qualitative measures)

RQ3: What impact did the repeated obstetric simulation practice have on prelicensure BSN student knowledge and understanding of their clinical reasoning and judgment of fetal monitoring by the end of their obstetric course? (Qualitative measure)

This study concluded was there a significant relationship that exists between the students' perceived self-efficacy of clinical reasoning with fetal monitoring pre- and post-simulation practice and that the incorporation of simulation within the curriculum will significantly impact students'

knowledge and understanding of fetal monitoring. Simulation is an effective strategy that can reinforce students' knowledge, understanding, and comprehension. Linton et al. (2019) assure students want a quality nursing program that exceeds teaching standards. Special emphasis must be placed on learning and knowing how students learn. This study used simulation to effectively answer the three research questions and with the means of qualitative and quantitative data that all three were proven true. The dependent *t*-test was used to test $H_0 1$ hypothesis and compare the means of the dependent groups to reflect and ensure that the means were not significantly different; therefore, reject of the null hypothesis $H_0 2$ was warranted. Paired *t*-test was used to test the $H_0 1$ hypothesis, and the results showed a relationship between students' perceived knowledge and understanding before and after obstetric simulation practice, therefore a reject the null hypothesis $H_0 2$ was warranted. An ANOVA test was performed and determined that simulation does have an impact on student perceived knowledge and understanding of fetal monitoring. Coding themes noted for RQ2 and RQ3 resulted that common themes were noted with the frequency and occurrence, indicating a shared relationship and experience from using pre-and post-simulation. This process confirmed and established the relationship between knowledge and understanding of fetal monitoring with simulation learning. The top seven themes were common denominators for all journals with just a degree of fluctuation. The common themes amongst post-simulation and post-clinical journal entries were reaction, thinking, present, past, personnel, communication, and environment. Analysis of this data confirmed that these themes are relatable, and students were able to effectively, with the use of simulation, react to the scenario and provide interventions for the patient, critically think in the present and past, but also focus on their environment, use effective communication, and use their resources appropriately.

Discussion

The purpose and intent of this one-group pretest-posttest quantitative and qualitative design study, collected by pre-and post-simulation survey questions in conjunction with structured journaling questions, determined the relationship between students' perceived knowledge and understanding of fetal monitoring compared to knowledge and understanding acquired with simulation practice. This design was used to determine the relationship between student's knowledge and understanding (dependent variable) with simulation usage (independent variable), as groups were not randomly selected. These methods were used to determine if the phenomena of a student's knowledge and understanding can be improved based on simulation practice and fetal monitoring interpretation.

$H_0$1: There is a relationship between students' perceived knowledge and understanding before and after obstetric simulation practice. The dependent *t*-test was used to test $H_0$1 hypothesis and compare the means of the dependent groups to reflect and ensure that the means were not significantly different; therefore, a reject the null $H_0$2 hypothesis was warranted; showing relation at the H01 hypothesis the null hypothesis was warranted. Paired *t*-test was used to test the $H_0$1 hypothesis, and the results showed a relationship between students' perceived knowledge and understanding before and after obstetric simulation practice, therefore a reject the null $H_0$2 hypothesis was warranted; showing relation at the H01 hypothesis This result compares heavily with the founded literature review in Chapter 2. While little research has been performed on fetal monitoring, vast studies were conducted on maternal and neonatal topics supporting simulation. Simulation was founded that it will assist with learning maternal newborn topics in a variety of learners, to include prelicensure BSN students.

H_02. There is no relationship between students' perceived knowledge and understanding before and after obstetric simulation practice. The student's results decreased post-simulation survey as expected, reflecting that simulation does increase students of fetal monitoring after performing; therefore, a failure to reject the null hypothesis was warranted. An ANOVA test was performed and determined that simulation does have an impact on student perceived knowledge and understanding of fetal monitoring. This result is inconsistent with the literature review in Chapter 2. While little research has been performed on fetal monitoring, vast studies were conducted on maternal and neonatal topics and simulation can assist with learning. Simulation was founded that it will assist with learning maternal newborn topics in a variety of learners, to include prelicensure BSN students.

Regarding the themes noted for **RQ2**: How did obstetric simulation practices increase undergraduate prelicensure BSN students' critical thinking and clinical reasoning using fetal monitoring? And **RQ3:** What impact did the repeated obstetric simulation practice have on prelicensure BSN student knowledge and understanding of their clinical reasoning and judgment of fetal monitoring by the end of their obstetric course? The students wrote in their journals that established the frequency and occurrence of the themes, indicating a shared relationship and experience from using pre-and post-simulation. This process confirmed and established the relationship between knowledge and understanding of fetal monitoring with simulation learning. The top seven themes were common denominators for all journals with just a degree of fluctuation. The common themes amongst post-simulation and post-clinical journal entries were reaction, thinking, present, past, personnel, communication, and environment. Analysis of this data confirmed that these themes are relatable, and students were able to effectively, with the use of simulation, react to the scenario and provide interventions for the patient, critically think in the

present and past, but also focus on their environment, use effective communication, and use their resources appropriately.

Frameworks and Theories

Using simulation based on the Jeffries framework can enhance a nursing program's curricula and be a learning resource for students. Simulation should be a safe learning area. Using Benner's levels of competence for the activities and Bloom's taxonomy for the learning objectives guided the development of simulation scenarios and student objectives. This study aimed to determine whether a student's simulation practice increased their knowledge and understanding of the obstetrical interpretation of fetal monitoring. Also, this study sought to determine the relationship between a student's knowledge of fetal monitoring after using simulation for practice. Finally, this study aimed to determine if continued usage of simulation practice increased knowledge of clinical reasoning changed over time.

Pamela Jeffries Simulation Framework, Bloom's Taxonomy, and Benner's Novice to Expert Theory were the frameworks for the study interventions, in addition to behavioral learning theories such as the Social Learning Theory. The theories and frameworks guided the strategies to increase knowledge and understanding of fetal monitoring as students used simulation to gain that expertise. According to Nursing Theories (n.d.), Jeffries Simulation Framework and Benner's Novice to Expert Theory are highly referenced theories and frameworks appropriate for student learning.

Using the Jeffries Simulation Framework, this study effectively correlated all three framework aspects within the simulation. The educational practice aspect used active learning from the pre-lecture review, facilitator feedback during the simulation, and continuous student/faculty learning throughout the simulation. The simulation effectively met all aspects from the outcomes aspect as related to the learning knowledge, skill perfection, learner satisfaction, novice-level

critical thinking, and gained self-confidence. The post-simulation survey and journals captured this data. Benner's Novice to Expert Theory displayed the novice level as the simulation incorporated the objectives that the students met.

This study also used Bandura's Social Cognitive Theory as a theoretical framework for student reflection on the simulation practice. This study linked the phenomena of nursing practice, the environment, behaviors and thinking strategies during the simulation to learn fetal monitoring. This theory tied in with how simulation positively affects all aspects of students' learning. Bandura's Social Cognitive Theory confirmed that prelicensure BSN students that obtained didactic training with simulation enriched their competence, skill, and knowledge and achieved higher levels of thinking. This theory related that simulation practice connected prelicensure BSN student knowledge and understanding and that positive faculty feedback is important. Bandura's theory also confirmed that students could learn in groups and that observing and watching each other perform allowed them to enhance skills, think, and retain information.

Faculty typically must use these frameworks to adjust and monitor student competency, knowledge, and understanding and make pedagogy adjustments. Simulation is one of those pedagogies that fills the gap to improve knowledge and understanding when an authentic scenario is needed for learning (Au et al., 2016). Birkhead et al. (2012) relay that prelicensure BSN students do not feel properly prepared for clinical in the maternal-child health unit and have few opportunities to experience maternal-child practice in the clinical setting. Simulations allow a safe space for students to learn, enhance skills, and make mistakes.

Students must also be prepared for clinical practice. Students are often nervous and anxious upon entering the clinical setting, as they are often unprepared for it. Faculty can assist students with clinical preparation by providing realistic simulation scenarios that portray a patient

experience. Students using simulation have an advantage of what to expect on the first days of clinical. Simulation allows students to practice assessments and interventions without the fear and the unknown of what to expect.

Shorten & Ruppel (2017) concluded that simulation was an effective means to teach maternal-child health and annotated that simulation demonstrated a positive effect of the learning of maternal-newborn learning and conveyed that simulation allowed the prelicensure BSN students to gain knowledge and confidence while learning the physiological aspect of nursing.

Quantitative

Hypotheses

This study examined the following hypothesis and null hypothesis:

$H_0$1. There is a relationship between students' perceived knowledge and understanding before and after obstetric simulation practice. The data conveyed a positive relationship between prelicensure BSN students' perceived knowledge and understanding before and after obstetric simulation practice in this study. It was determined that there is a statistically significant difference in a prelicensure BSN student's knowledge and understanding of fetal monitoring with simulation. Simulation for this study effectively increased the knowledge and understanding of fetal monitoring by reading and interpreting different variables, decelerations, baseline, contractions, and accelerations. The prelicensure BSN students left the simulation feeling safe to ask questions, increased their confidence, felt comfortable taking care of the patient, and had an idea of what patient care resembled.

While the literature had a plethora of data to support simulation and how it promotes prelicensure BSN student learning, it lacks information about fetal monitoring simulations. The data collected in this study showed that simulation indeed assists the learning of fetal monitoring, and

students improve their reading of fetal monitoring strips with simulation. This study showed significant differences in knowledge and understanding after using simulated fetal monitoring. Simonelli & Paskausky (2012) convey that simulation in a maternal-child course effectively ensures students retain and relate the information to a patient and noted that prelicensure BSN students would have the experience and competence to react to high-risk and normal births.

While the literature review regarding simulation for students learning clinical skills showed that this is an effective way for students to learn foundations, apply critical thinking, and learn how to perform interventions before clinical practice it also showed that simulation efficiently increases communication, skills, competence, and understanding. The literature regarding simulation for student learning fetal monitoring overall showed that simulation could assist students with learning how to appropriately gain knowledge and understanding of how to interpret fetal monitoring. However, more literature regarding fetal monitoring interpretation in prelicensure BSN students is needed.

$H_0$2. There is no relationship between prelicensure BSN students' perceived knowledge and understanding before and after obstetric simulation practice. The methods used in this study showed a relationship between prelicensure BSN students' perceived knowledge and understanding before and after obstetric simulation practice. It was determined that there is a statistically significant relationship that simulation does positively affect a prelicensure BSN student's level of knowledge and understanding of fetal monitoring interpretation. This null $H_0$2 hypothesis was determined by the data to be rejected and untrue.

The data conveyed a positive relationship between prelicensure BSN students' perceived knowledge and understanding before and after obstetric simulation practice in this study. It was determined that there is a statistically significant difference in a prelicensure BSN student's

knowledge and understanding of fetal monitoring with simulation. Simulation for this study effectively increased the knowledge and understanding of fetal monitoring by reading and interpreting different variables, decelerations, baseline, contractions, and accelerations. The prelicensure BSN students left the simulation feeling safe to ask questions, increased their confidence, felt comfortable taking care of the patient, and had an idea of what patient care resembled.

Qualitative

Research Questions

This study examined the following research questions:

RQ2: How did obstetric simulation practices increase undergraduate prelicensure BSN students' critical thinking and clinical reasoning using fetal monitoring? And **RQ3:** What impact did the repeated obstetric simulation practice have on prelicensure BSN student knowledge and understanding of their clinical reasoning and judgment of fetal monitoring by the end of their obstetric course? The students wrote in their journals that established the frequency and occurrence of the themes, indicating a shared relationship and experience from using pre-and post-simulation. This process established the relationship between knowledge and understanding of fetal monitoring and that simulation can help with that relation.

The top seven themes were common denominators for all journals with just a degree of fluctuation. The common themes amongst post-simulation and post-clinical journal entries were reaction, thinking, present, past, personnel, communication, and environment. Analysis of this data confirmed that these themes are relatable, and students were able to effectively, with the use of simulation, react to the scenario and provide interventions for the patient, critically think in the

present and past, but also focus on their environment, use effective communication, and use their resources appropriately.

Alanzi et al. (2017) related the purpose of simulation for prelicensure BSN programs curricula, demonstrating a significant need for prelicensure BSN programs to have an established simulation experience. Edwards et al. (2018) note that simulations can be an effective way for nursing students to learn and evolve skills. Simulation can provide the clinical aspect of patients and great feedback to students (Tanner, 2006).

Implications

This study demonstrated that simulation effectively improved prelicensure BSN students' knowledge and interpretation of fetal monitoring. Using simulation increased their ability to interpret the information on a fetal monitoring readout. This purpose of this study did show that simulation within a nursing program could effectively increase the knowledge and understanding of fetal monitoring. The overall arching problem was, while maternal-health courses are lectured; students often felt unprepared for clinical and unable to interpret fetal monitoring and understand maternal-health outcomes and objectives. Simulation was proven an effective way to instruct and deliver knowledge and understanding within a nursing program curriculum. Students will obtain knowledge and understanding of fetal monitoring by incorporating simulation. This study sought to determine if there was literature review that supports how simulation increases student learning and how it will increase a student’s knowledge and understanding. This study also sought to find literature that supports nursing programs and the incorporation of simulation as students can retain information and practice skills before the clinical setting. The problem is that more research is needed to determine if students can effectively relate knowledge and understanding from simulation practice with fetal monitoring interpretation and apply it in authentic clinical situations.

Quantitative

Data from the pre-simulation and post-simulation surveys appropriately validated that prelicensure BSN students benefit from simulation. Students related in their debriefing that they desired to include simulation as a means of learning. The strength of this study includes that simulation that simulation effectively improved prelicensure BSN students' knowledge and interpretation of fetal monitoring and students desire simulation as a means of learning. It also showed that students will benefit from simulation when the dedicated and secured time for it is embedded within the program, preferably before, during, and after clinical rotations, as they can learn in all aspects of nursing education.

The quantitative data showed that prelicensure BSN students want to have simulation as means of learning and that it does positively enhance their learning but also their learning of fetal monitoring. Students do benefit from simulation when dedicated and secured time is embedded within the program, preferably before, during, and after clinical rotations, as they can learn in all aspects. Students need to have simulation embedded in the curriculum. Programs should secure funding for simulators, a dedicated simulation area or room, and necessary equipment related to simulations. Simulations should reflect appropriate patient scenarios and correlate to their current learning, the course taught, and appropriate learning objectives. Competency can be demonstrated in many ways, and simulation is one of the most effective methods.

Qualitative

Data demonstrated that prelicensure BSN students reference past and present when using simulation as a tool for learning. This study demonstrated that prelicensure BSN students need to have simulation embedded in the curriculum and that programs should secure funding for simulators, a dedicated simulation area or room, and necessary equipment related to simulations.

This study also resulted that simulations should reflect appropriate patient scenarios and correlate them to their current learning, the current course taught, and appropriate learning objectives. The main stakeholders for this study were the students, simulator, instructors, and finances to pay for simulation needs.

The qualitative data results showed that student use simulation as a way to think about the present and past, which positively relates to the framework theories and the way students learn. They are not focused on the future and past or present thinking is normal for student learning. Simulation provided the students an alternate way to learn and understand the material before attending clinical. Kipnis (2011) reflects that labor education within the prelicensure BSN program is imperative. Rose & Eller (2014) also state that knowledge and understanding are initiated with simulation. The simulation is an effective way to train and maintain competence and improve patient care and practice within the educational learning arenas of nursing and physicians.

Cardoza & Hood (2012) note that simulation has become an important aspect of teaching within nursing programs and can establish the needed competency assessment for student learning and feel more comfortable caring for patients. In nursing programs, simulation is a great tool when students first learn how to interact with patients, perform skills for the first time, and provide a safe place to learn to correct behaviors. Some authors deem simulation imperative for student learning (Harder, 2009). Disler et al. (2013) relates that simulation should be part of every semester in a nursing program as students feel more comfortable every time they perform simulation.

While this paper noted several studies focus on graduated nurses in maternal units, numerous studies also focused on maternal medical issues such as fetal demises, neonatal resuscitation, pre-term labor, pre-eclampsia, breastfeeding, newborn assessment, and hemorrhage. More research is needed and to be performed on fetal heart monitoring interpretation. Crew &

Minor (2018) note that much-needed research is needed to demonstrate the simulations can effectively help the student master the knowledge and understanding of the maternal-child area.

Limitations

The following limitations are existent in this study, for both the quantitative and qualitative aspects. The quantitative limitations were that students were not randomized into the clinical course. The students were randomly placed in a training simulation group without regard to prior knowledge, understanding, age, or gender. Another limitation was that the students were randomly placed into four simulation groups, with a 24-student sample size, with simulations conducted six times. The sample size was small and could have been larger. A qualitative limitation was that students were minimized to only traditional prelicensure BSN students currently enrolled in an obstetrical course with any previous obstetric experience accepted, allowing LPN to BSN students an opportunity for the study. Delimitations that were encountered were only including prelicensure BSN students, only in the ages of 20-23, and a small sample size. This population could be expanded to include the LPN to BSN program students for a bigger population sample size.

Recommendations for Further Research

Multiple recommendations for future research are discussed considering this study's findings, limitations, and delimitations. This section references recommendations for further or future research from both the quantitative and qualitative study aspects. The literature was extensive in retrospect on simulation within nursing programs and its positive effects. There were multiple studies about student learning with simulation, but very few articulated the relationship between fetal monitoring and simulation. Some studies have been confuted on the lack of confidence between students and fetal monitoring. More research is needed on the relationship between students' simulation practice and fetal monitoring.

The recommendations for future or further study should study how simulation can increase knowledge and understanding of fetal monitoring, as little is known about how simulation practice relates to increased knowledge and understanding of fetal monitoring. Further research is needed to investigate and provide updated data on determining if simulation practice can increase a student's knowledge of fetal monitoring. More research is needed to have current data as the current research is outdated. More research should be performed to ensure that students are instructed on EFM and faculty are given ample time to instruct on this important subject. Additional studies can be conducted with a larger sample size and follow up within six months to ensure that knowledge is still gained and retained.

Several gaps were identified in the literature. MacKinnon et al. (2017) note that "systematic reviews of simulation are available, but no systematic reviews of qualitative evidence related to maternal-child simulation-based learning (SBL) for undergraduate nursing students and educators have been located." (para 1). MacKinnon et al. (2017) also relay that the students reflected that simulation assisted with developing maternal-child skills, interventions, increased communication, and critical thinking within the study and convey that simulation must be intertwined within the prelicensure BSN maternal child health course.

Wittenberg et al. (2021) confirm the gap in maternal-child simulations and the imperative need for them within their study. Ehmke et al. (2021) note that simulations assist graduated prelicensure BSN nurses in becoming familiar with scenarios they will experience on a maternal unit, providing them the resource to advance from novice to proficient.

Summary

This chapter reflected on the strengths of simulation and how it can appropriately assist in the learning process of prelicensure BSN students within their program. Simulation can assist

students with their critical thinking skills, provide interventions, and make them comfortable with patient care. Programs should have simulation embedded within their program and have dedicated simulation time within the curriculum. Programs should have secured funding for simulators. While the research is vast on simulation and maternal child health topics, the research is lacking on how simulation can effectively contribute to the learning, knowledge, and understanding of fetal monitoring with prelicensure BSN students. Programs must have embedded simulations to allow students to feel confident and comfortable and increase their ability. Future research is needed to provide more information on this topic as there is no relevant and current data on this.

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APPENDIX A: ASSESSMENT TOOL FOR FACULTY SIMULATION LEARNING

Student Behavioral Response	Observed	Not Observed	Notes
The nurse reassures patient			
The nurse reassesses maternal and fetal status.			
The nurse calls for additional help, a provider, or rapid response.			
SBAR is used to inform others of the situation when they arrive.			
The provider clearly demonstrates a leadership role.			
The provider speaks to the patient and support person or delegates someone to inform and answer questions.			
All team members use closed-loop communication and provide mutual support.			
All team members call out critical patient information.			
The team considers etiology and notes it's a cord prolapse			
Provider or nurse informs everyone of prolapsed cord.			
The provider calls for additional help or rapid response.			
The provider speaks to the patient to inform and answer questions.			
Roles assigned as appropriate			
The provider decides, or the nurse notes the need for emergent cesarean section			
The team initiates appropriate clinical response per any protocols, checklists, or cognitive aid.			
The provider clearly demonstrates a leadership role.			

Student Behavioral Response	Observed	Not Observed	Notes
All team members use closed-loop communication and provide mutual support.			
The team performs time out			
The nurse calls for debrief			
The nurse noted fetal baseline decrease and decelerations			
The nurse noted a rupture of membranes			
Nurse demonstrated proper intrauterine resuscitation measures			
******Nurse identified and analyzed normal fetal monitoring baseline, noting variance of the three decelerations, noting acceleration, and contractions.** ****			

******Faculty during the simulation must ensure that students recognize the six components of a fetal monitoring heart rate: what a normal fetal baseline is, what accelerations are, the three varying decelerations, and what contractions are noted to resemble.*****

APPENDIX B: LIKERT QUESTIONS

Simulation Effectiveness Tool - Modified (SET-M)

After completing a simulated clinical experience, please respond to the following statements by circling your response.

PREBRIEFING:	Strongly Agree	Somewhat Agree	Do Not Agree
Prebriefing increased my confidence	3	2	1
Prebriefing was beneficial to my learning.	3	2	1
SCENARIO:			
I am better prepared to respond to changes in my patient's condition.	3	2	1
I developed a better understanding of the pathophysiology.	3	2	1
I am more confident of my nursing assessment skills.	3	2	1
I felt empowered to make clinical decisions.	3	2	1
I developed a better understanding of medications. (Leave blank if no medications in scenario)	3	2	1
I had the opportunity to practice my clinical decision making skills.	3	2	1
I am more confident in my ability to prioritize care and interventions	3	2	1
I am more confident in communicating with my patient.	3	2	1
I am more confident in my ability to teach patients about their illness and interventions.	3	2	1
I am more confident in my ability to report information to health care team.	3	2	1
I am more confident in providing interventions that foster patient safety.	3	2	1
I am more confident in using evidence-based practice to provide nursing care.	3	2	1
DEBRIEFING:			
Debriefing contributed to my learning.	3	2	1
Debriefing allowed me to verbalize my feelings before focusing on the scenario	3	2	1
Debriefing was valuable in helping me improve my clinical judgment.	3	2	1
Debriefing provided opportunities to self-reflect on my performance during simulation.	3	2	1
Debriefing was a constructive evaluation of the simulation.	3	2	1
What else would you like to say about today's simulated clinical experience?			

APPENDIX C: FETAL MONITORING SIMULATION

Fetal Monitoring Simulation

"Stephanie Smith, a 27-year-old G3P2, is at 39 weeks gestation. She is dilated 6 cm with intact membranes and has irregular, painful contractions. Vital signs assessed 15 minutes ago: pulse 71, blood pressure 117/75, respirations 20, and temperature 37.1 Celsius. Fetal heart rate is 135 beats per minute, with moderate variability, positive accelerations, and no decelerations. Her husband is not present at this time. She has 4/10 pain and continues to breathe through her contractions but has not requested any medication for pain control."

As the student finishes the report, the patient call bell rings, and the nurse answers the call. The patient states that she urinated all in her bed and needs changing. The nurse states they will be right there. The nurse enters the room, introduces themselves to the patient, and begins the assessment.

Distractor	Student behavior	Simulator events
Distractor #1 1. The patient volunteers information to the assessing nurse: "I am so sorry; I just urinated all over myself and need help changing my bed." As the patient begins to change her gown and the nurse makes the bed, she complains of excruciating contraction pain. The patient then has a puddle of fluid all over her bed.		
2. What do you do? In response to the patient assessment, what actions will the team make? The facilitator may provide answers to the team as needed to help maintain the simulation flow.		
	Student response/behaviors (no particular order) 1. The nurse questions the fluid released 2. The nurse notes a. fetal heart rate b. any accelerations c. variable, early, late deceleration	

	d. contractions 3. The nurse notes vital signs 4. The nurse determines when to call the team and assigns the appropriate team/role	
		Simulator events 1. The facilitator may provide answers to the team as needed to help maintain the simulation flow. 2. Vital signs: BP 122/79 mmHg, pulse 85 bpm 3. Apparent signs of ruptured membranes, no vaginal bleeding. 4. FHR 140 bpm, with moderate variability, no decelerations, accelerations present, and contractions noted on the monitor.
Distractors 1. The patient is complaining of pain 2. The patient is crying for her spouse 3. That patient is anxious 4. The patient is distraught 5. The patient is grabbing for her phone 6. The patient is hysterically asking when the baby will be delivered.		
	Student response/behaviors (no particular order) 1. The nurse reassures patient 2. The nurse reassesses maternal and fetal status. a. fetal heart rate b. any accelerations c. variable, early, late deceleration d. contractions 3. The nurse notes the patient's vitals	

	4. The nurse determines when to call the team and assigns the appropriate team/role	
		Simulator events 1. The facilitator may provide answers to the team as needed to help maintain the simulation flow. 2. Vital signs: BP 92/65 mmHg, pulse 105 bpm, respiratory rate 20 bpm, temperature 37.6 C, O2 saturation 97% on room air. 3. FHR, which had been 140 bpm, began to fall to 110 bpm. 4. A early and variable deceleration occurs. No accelerations are present, and contractions are noted. 5. Continued fetal deceleration should continue while the team attempts various measures to address it.
	Student response/behavior (no particular order) 1. The nurse calls for additional help, a provider, or a rapid response. 2. (SBAR) is used to inform others of the situation when they arrive. 3. Additional help is called and identified. 4. The nurse delegates roles to extra personnel 5. The nurse notes interventions. 6. The nurse reassures patient 7. The nurse reassesses maternal and fetal status a. fetal heart rate b. any accelerations c. variable, early, late deceleration	

	d. contractions 8. The nurse notes the patient's vital signs 9. The nurse determines when to call the team and assigns the appropriate team/role 10. All team members use closed-loop communication and provide mutual support to one another. 11. All team members call out critical patient information. 12. The team considers etiology for deceleration and performs appropriate diagnostic measures (e.g., vaginal exam). And possibly identifies cord prolapse.	
Distractor 1. When the nurse or provider performs the vaginal exam, the fascinator will note that the patient is complete and the fetus is at 0 station; a pulsating umbilical cord is felt.		**Simulator events** 1. The facilitator may provide answers to the team as needed to help maintain the simulation flow. 2. Vital signs: BP 92/70 mmHg, pulse 108 bpm, respiratory rate 16 bpm, O2 saturation 97% on room air 3. FHR 90 bpm, late decelerations, no acceleration, and contractions noted. 4. The umbilical cord prolapse should continue while the team attempts various measures to address and it is noted that a cesarean section is emergently needed. 5. Simultaneously, the presenting part is digitally held off the umbilical cord. 6. Continued fetal decelerations should continue while the team attempts various measures to address them.

		7. **The simulation can end** after a definitive plan for patient care is implemented (for example, transition to OR [operating room]). 8. The presenting part is digitally held off the umbilical cord. 9. No further opportunities for teamwork and communication are apparent.
	Student response/behavior (no particular order) 1. The nurse calls for cesarean section/ emergent delivery (if able to recognize this early) 2. (SBAR) is used to inform others of the situation when they arrive PRN 3. The nurse seeks additional help, calls, and identifies PRN 4. The nurse delegates roles to extra personnel PRN 5. The nurse reassures patient 6. The nurse reassesses maternal and fetal status. 7. The nurse notes the patient's vitals 8. The nurse notes interventions. 9. All team members use closed-loop communication and provide mutual support to one another. 10. All team members call out critical patient information. 11. The team considers the etiology for deceleration and performs appropriate diagnostic measures (e.g., vaginal exam, ultrasound, need for the OR, terbutaline).	

	12. The team identifies cord prolapse.	
Distractors 1. The patient is continually asking what is happening. 2. The patient is asking where her spouse is. 3. The patient shows agitation with many people coming into the room. 4. The patient gets hysterical and cries when the team suggests movement to the OR for a cesarean section. "Is the baby going to be all right? We don't want to have to do a cesarean section. We want a natural birth, and my husband isn't even here. Can we wait, please?"		**Simulator events** 1. The facilitator may provide answers to the team as needed to help maintain the simulation flow. 2. Vital signs: BP 90/72 mmHg, pulse 114 bpm, respiratory rate 20 bpm, O2 saturation 97% on room air 3. FHR 90 bpm, deceleration continues 4. The umbilical cord prolapse should continue while the team attempts various measures to address and it is noted that a cesarean section is emergently needed. 5. Simultaneously, the presenting part is digitally held off the umbilical cord. 6. **The simulation can end** after a definitive plan for patient care is implemented (for example, transition to OR [operating room]). 7. The presenting part is digitally held off the umbilical cord. 8. No further opportunities for teamwork and communication are apparent.
	Student response/behavior (no particular order) 1. The prolapsed cord is identified 2. The team initiates clinical response for the Caesarean section 3. The nurse reassures patient 4. The nurse reassesses maternal and fetal status. 5. The nurse notes the patient's vitals	

	6. The nurse determines when to call the team and assigns the appropriate team/role 7. All team members use closed-loop communication and provide mutual support to one another. 8. The patient's time outperformed 9. The delivery of an infant 10. The nurse calls for a debrief.	
		**End when** 1. Prolapse cord is identified, OR move is called, and nurse calls for debrief

Note. This table depicts the simulation scenario for student practice**.**

******Nurse identified and analyzed normal fetal monitoring baseline, noting variance of the three decelerations, noting acceleration, and contractions.** ****

******Faculty during the simulation must ensure that students are able to recognize the six components of a fetal monitoring heart rate: what a normal fetal baseline is, accelerations are, the three varying decelerations, and what a contractions is noted to resemble.*****

APPENDIX D: DATA COLLECTION PROCESS

Day of Simulation

Informed consent to participate in study, signed, and returned

Give overview of simulation

Give overview of survey and journals

Have student complete pre-survey questionnaire (Figure 7)

Give overview brief on fetal monitoring definitions (page 26-27)

Perform simulation (Appendix C)

Perform debrief (Figure 8)

Perform post-survey questionnaire and journal (Figure 7 & 8)

*Post clinical survey and journals returned at the end of course (Figure 7 & 8)

Data Collection

Quantitative Method

Focus on survey areas: Nursing Ability, Opportunity, Knowledge and Understanding

Use SPSS system

Number each student as 1, 2, 3, 4 etc. in SPSS

Label fields as

Nursing Ability pre

Nursing Ability post

Opportunity pre

Opportunity post

Knowledge and understanding pre

Knowledge and Understanding post

Compare Ability as pre and post simulations comparison, compare opportunity as pre and post survey comparison, compare knowledge and understanding comparison.

Input Likert numbers in respective field

Run independent *t* test, dependent *t* test, and ANOVA for h Nursing Ability pre / Nursing Ability post, Opportunity pre /Opportunity post, and Knowledge and understanding pre / Knowledge and Understanding post

Run Cronbach's for validity and Cohen's d for sample size

*Repeat same process for post clinical survey's

Qualitative Method

Use Miners 14 coding system

Include all journal responses word for word in system with relation to post simulation entries

Conduct analysis for assertional, connotative, and script themes.

Note common themes for each, note word counts for each.

*Repeat process for post clinical entries

APPENDIX E: IRB APPLICATION

Date: 10-8-2022

IRB #: IRB-FY22-23-292
Title: HOW DOES OBSTETRIC SIMULATION IMPACT UNDERGRADUATE PRE-LICENSURE BSN STUDENTS' CLINICAL JUDGMENT RELATED TO USING AND UNDERSTANDING FETAL MONITORING? Creation Date: 9-14-2022 End Date:
Status: Approved
Principal Investigator: Brandy Clayton
Review Board: Research Ethics
Office Sponsor:

Study History

Submission Type Initial	Review Type Exempt	Decision Exempt

Key Study Contacts

Member Brandy Clayton	Role Principal Investigator	Contact [redacted]
Member Brandy Clayton	Role Primary Contact	Contact [redacted]
Member RuthAnne Kuiper	Role Co-Principal Investigator	Contact [redacted]

Initial Submission

IRB Overview

Application for the Use of Human Research Participants

Before proceeding to the IRB application, please review and acknowledge the below information:

Administrative Withdrawal Notice

This section describes the IRB's administrative withdrawal policy. Please review this section carefully.

Your study may be administratively withdrawn if any of the following conditions are met:

- Inactive for greater than 60 days and less than 10% of the app has been completed
- Duplicate submissions
- Upon request of the PI (or faculty sponsor for student submissions)
- Inactive for 90 days or more (does not apply to conditional approvals, the IRB will contact PI prior to withdrawal)

*required

✓ I have read and understand the above information.

Study Submission & Certification

This section describes how to submit and certify your application. Please review this section carefully. Failure to understand this process may cause delays.

Submission

- Once you click complete submission, all study personnel will need to certify the submission before it is sent to the IRB for review.
- Instructions for submitting and certifying an application are available in the IRB's Cayuse How-tos document.

Certification

- Your study has not been successfully submitted to the IRB office until it has been certified by all study personnel.
- If you do not receive a “submission received by the IRB office” email, your study has not been received.
- Please check your junk folder before contacting the IRB.

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*required

✓ I have read and understand the above information.

Moving through the Cayuse Stages

In Cayuse, your IRB submission will move through different stages. We have provided a quick overview of each stage below.

In Draft

- The In Draft stage means that the study is with the study team (you). In this stage, the study team can make edits to the application.
- When the IRB returns a submission to the study team, the submission will move back to the In-Draft stage to allow for editing.

Awaiting Authorization

- Each time a study is submitted, it will move from In-Draft to Awaiting Authorization.
- During this stage, the submission must be certified by all study personnel listed on the application (PI, Co-PI, Faculty Sponsor). This ensures that every member of the study team is satisfied with the edits.
- Please note, the IRB has not received your submission until all study personnel have clicked “certify” on the submission details page.

Pre-Review

- When your application is submitted and certified by all study personnel, your study will move into the Pre-Review stage.
- Pre-Review means the IRB has received your submission. The majority of the IRB review occurs during the Pre-Review stage.
- Once received, an IRB analyst will conduct a cursory review of your application to ensure we have all the information and documents necessary to complete a preliminary review. This cursory review usually occurs within 3 business days of receipt.
- If additional information or documents are needed to facilitate our review, your submission will be returned to you to request these
- changes. Your study will be assigned to an analyst once it is ready
- for review. Preliminary and any subsequent reviews may take 15–20 business days to complete depending on the IRB's current workload.

Under Review

- Studies will only move into the “Under Review” stage when the analyst has completed his or her review and the study is ready for IRB approval.

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*required

✓ I have read and understand the above information.

Finding Help

The IRB has several resources available to assist you with the application process. Please review the below information, or contact our office if you need assistance.

Help Button Text (?)

- Some questions within the application may have help text available.
- Please click on the question mark to the right of these questions to find additional guidance.

Need Help? Visit our website, [redacted] to find:

- Cayuse How-Tos
- FAQs
- Supporting document templates

Contact Us:

- [redacted]
- [redacted]
- Office Hours: M-F; 8:00 AM-4:30 PM

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*required

✓ I have read and understand the above information.*required

Acknowledgment

Please acknowledge that you have reviewed and understand the above information. You can refer back to this information at any time.

I acknowledge that I have read and understand the above information. Take me to the IRB application. ✓

Project Information

*required

What type of project are you seeking approval for?

Please make the appropriate selection below.

✓ Research

- Research is any undertaking in which a faculty member, staff member, or student collects information on living humans as part of a planned, designed activity with the intent of contributing relevant information to a body of knowledge within a discipline.

Archival or Secondary Data Use Research ONLY

- Archival data is information previously collected for a purpose other than the proposed research. Examples include student grades and patient medical records.
- Secondary data is data that was previously collected for the purpose of research. For example, a researcher may choose to utilize survey data that was collected as part of an earlier study.

Doctor of Nursing Practice (DNP) Scholarly Project

- This option is specific to doctor of nursing practice (DNP) students' evidence-based practice scholarly projects.

Doctor of Ministry (DMin) Project

- This option is specific to Doctor of Ministry (DMin) student projects.

*required

Please indicate the primary purpose of this project:

Why is this project being proposed?

✓ Doctoral Research

*Note: Students must enter themselves as PI and their faculty sponsor under Faculty Sponsor.

*required

Have you passed your dissertation proposal defense?

Doctoral candidates may not submit their project for IRB review until they have successfully passed their proposal defense.

✓ Yes

No

N/A

Masters Research

Undergraduate Research

Faculty or Staff Research

Class Project

Other

Study Personnel

Please fill in all associated personnel below.

Please note: All study personnel must complete CITI training prior to receiving IRB approval. The IRB will accept either of the following CITI courses: "Social & Behavioral Researchers" or "Biomedical & Health Science Researchers."

- IRB Training
- Information CITI Training Website

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*required

Primary Contact

The individual who will receive and respond to a communication from the IRB should be listed as the primary contact. For student projects, the primary contact will be the student researcher(s). For faculty projects, the primary contact may be the researcher or a student(s), administrative assistant, etc., assisting the faculty member. The same individual may be listed as the principal investigator.

Name: Brandy Clayton
Organization: Nursing
Address: [redacted]
Phone: [redacted]
Email: [redacted]

*required

Principal Investigator (PI)

The principal investigator (PI) is the individual who will conduct the research or serve as the lead researcher on a project involving more than one investigator. For theses or dissertations, the student should be listed as PI.

Name: Brandy Clayton

Organization: Nursing
Address: [redacted]
Phone: [redacted]
Email: [redacted]

Co-Investigator(s)

Co-investigators are researchers who serve alongside the principal investigator and share in the data collection and analysis tasks.

*required

Faculty Sponsor

Projects with students serving as the PI must list a faculty sponsor, typically a dissertation or thesis chairperson/mentor.
Name: RuthAnne Kuiper
Organization: Nursing
Address: [redacted]
Phone: [redacted]
Email[redacted]

*required

Will the research team include any non-affiliated, non-LU co-investigators?

For example, faculty from other institutions without Liberty University login credentials. Note: These individuals will not be able to access the IRB application in Cayuse; however, the information provided below allows the LU IRB to verify the training and credentials of all associated study personnel. Yes

✓ No

Conflicts of Interest

This section will obtain information about potential conflicts of interest.

*required

Do you or any study personnel hold a position of influence or academic/professional authority over the participants?

For example, are you the participants' supervisor, pastor, therapist, teacher, principal, or district/school administrator?

✓ Yes

*required

State the name of the individual(s) with the position of influence or authority.

Brandy Clayton

*required

What position of influence or authority do you or other study personnel hold over the participants?

For example, teacher, principal, administrator, pastor.

I am a clinical instructor with this program, who conducts hospital clinicals with the students.

No

*required

Explain what safeguards are in place to reduce the likelihood of compromising the integrity of the research.

For example, address the potential conflicts in the consent process and/or describe what steps you will take to emphasize that the pre-existing relationship will not be impacted by participation in the research.

Safeguards for this will be to keep the information anonymous, keep the simulation scenario simple, educate them on the need for the simulations and remind them there is no penalty or effect on their grade for these simulations.

---

*required

Do you or any study personnel have a financial conflict of interest?

For example, do you or an immediate family member receive income or other payments, own investments in, or have a relationship with a non-profit organization that could benefit from this research? Yes

✓ No

Funding Information

This section will request additional information about any funding sources.

*required

Is your project funded?

Yes

✓ No

*required

Use of Liberty University Participants

Please make the appropriate selection(s) below:

✓ I do not plan to use LU students, staff, or faculty as participants.

- Note: Use of LU students, faculty, or staff also includes the use of any existing data.

I I plan to recruit LU students from a limited number of specific, identified departments, student organizations, clubs, or teams (e.g., students taking a residential psychology course, members of the women's hockey team, etc.).

I plan to recruit students because they meet a specific set of demographic criteria (e.g.,

✓ Male, freshmen, Hispanic, etc.), and I will advertise my study through word of mouth, social media, or flyers hung on campus.

- After your study is approved by the IRB and before you can post any flyers, you will need to have the flyers approved by [redacted]

I I plan to recruit students because they meet a specific set of demographic criteria (e.g., male, freshmen, Hispanic, etc.), and I will require university assistance to identify and recruit my participants (i.e., LU personnel will need to run a database query to identify eligible individuals and send your recruitment email on your behalf.)

I plan to recruit faculty and/or staff.

*required

Purpose

Please provide additional details about the purpose of this project. This section should be easy to read for someone not familiar with your academic discipline.

Write an original, brief, non-technical description of the purpose of your project.

Please DO:

- Include a BRIEF description of your research hypothesis/question
- Provide a narrative that explains the major constructs of your study
- Explain how the data will advance your research hypothesis or question

Please DO NOT:

- Exceed 500 words
- Copy and paste your abstract or proposal into the text box

The significance of this study is to show that simulation within a nursing program can effectively increase the knowledge and understanding of fetal monitoring. Education within nursing programs is vital and ongoing. While educators can provide didactic instruction, the clinical aspect also must be achieved as this is where students show knowledge, understanding, and comprehension. Multiple authors have studied the effects of simulation on student learning. The foundational knowledge of fetal monitoring can be presented, but actively demonstrating knowledge and understanding of the fetal strip outputs for interpretation and interventions can be problematic for students. Simulation practice can assist faculty with meeting course objectives. The use of simulation practice will effectively allow students to enhance and increase their knowledge and understanding of fetal monitoring. Simulation practice can provide faculty with a competency assessment of student knowledge and understanding of fetal monitoring. Simulation practice can effectively offer students and faculty ways to close fetal monitoring knowledge gaps. Simulation practice can bridge the gaps with learning

This study aims to determine if a relationship exists between a student's obstetrical simulation practice and increased knowledge gained for fetal monitoring interpretation. This study also sought to determine the relationship between a student's knowledge and understanding of fetal monitoring after simulation practice would transfer to the clinical setting and the gain over time.

This study will examine the following research questions:

RQ1: What is the students' perceived knowledge and understanding before and after obstetric simulation practice?

RQ2: How do obstetric simulation practices increase undergraduate pre-licensure BSN students' clinical reasoning and judgment using fetal monitoring?

RQ3: What impact does the repeated obstetric simulation practice have on student knowledge and understanding and their clinical reasoning and judgment of fetal monitoring by the end of their obstetric course?

Investigational Methods

Please indicate whether your project involves any of the following:

*required

Does this project involve the use of an investigational new drug (IND) or an approved drug for an unapproved Use?

Yes

✓ No

*required

Does this project involve the use of an investigational medical device (IDE) or an approved medical device for an unapproved Use?

Yes

✓ No

Participant Information

Participant Criteria

Please provide additional information about your participants.

*required

What characteristics make an individual eligible to be in your study (i.e., your inclusion criteria)?

- For example, do your participants have to be 18 or older? Must they work in a specific career or field? Do they have to be part of a specific racial or ethnic group?

- If you will have multiple participant populations/groups, like a teacher group and an administrator group, please list the populations/groups separately and provide the inclusion criteria for each.
- If your participants will necessarily be 18 years old or older due to their occupation (e.g., licensed teachers, military personnel, etc.) or another aspect of your criteria (e.g., senior citizens), the 18-or-older age requirement does not need to be listed below.

Recruitment will be voluntary, with an open verbal invitation to participate. The purposive sample will consist of 30-40 students recruited from Saint Martin University BSN program and currently enrolled in their obstetrical course.). All participants will be greater than 18 years of age. No one will be excluded based on race, ethnicity, or gender

*required

What characteristics make an individual ineligible to be in your study (i.e., your exclusion criteria)?

- For example, will you exclude persons under 18 years of age?
- Note: Exclusion criteria are not simply the inverse of inclusion criteria--these are specific characteristics that would disqualify an individual from participating.

Not enrolled in a nursing BSN Program or not enrolled in their Obstetrical

course *required

Are you related to any of your participants?

Yes

✓ No

*required

Types of Participants

Who will be the focus of your study? (Check all that apply).

- ✓ Adult Participants (18+)
- Minors (under 18 years)
- Seniors (65+)
- ✓ College or University Students
- Armed Forces Members (active duty, retired, discharged, etc.)
- Persons Residing in the European Union (EU)
- Inpatients, Outpatients, or Patient Controls
- Pregnant Women
- Fetuses
- Individuals with Cognitive Disabilities
- Individuals with Physical Disabilities
- Individuals Incapable of Giving
- Consent Prisoners or Institutionalized
- Individuals
- Specific Ethnic or Racial Group(s)
- Other Potentially Elevated Risk Populations

*required

Please provide a rationale for selecting the above groups(s).

(i.e., Why will these specific groups enable you to answer your research question? Why is the inclusion of these groups necessary?)

Pregnant women carry the fetus that will be fetal monitored, and with the use of simulation, those can be duplicated and will allow nursing students to read and interpret fetal monitoring

*required

Provide the maximum number of participants you plan to enroll for each participant group.

You will not be approved to enroll a number greater than the number listed. If at a later time it becomes apparent that you need to increase your sample size, you will need to amend your protocol prior to doing so. As appropriate, sample sizes should be justified following the study design and methodology. 30-40

Screening

Please make note of the following guidelines:

- Screening involves ensuring that the individuals who express interest in your study meet your study criteria.
- Screening occurs before study data is collected from individuals.
- Screening may involve the collection of some demographic information, but that is not the purpose of screening.
- Screening does not involve deciding who among your screened and consented participants will engage in your separate study procedures.

*required

How and when will you screen your potential participants?

Common options are listed below:

Potential participants will answer screening questions when they talk to me in person/call/email me to express their interest in my study.

Potential participants will click on a link in the recruitment email to a screening survey.

Potential participants will be emailed a link to a screening survey after they contact me to

express their interest in my study.

I/a designated official from my study site(s) will identify individuals who meet my study criteria and contact them by email, etc.

I will list my participant criteria in my recruitment document and consent form, but I will not utilize additional screening procedures.

✓ Other (describe):

*required

I will myself personally recruit participants with verbal recall for students.

If you will use a screening survey/questions, please attach your screening document(s) as separate Word documents* here.

*If you are using a proprietary screening tool (e.g., PAR-Q), it can be submitted as a
PDF.

Note: If any screening documents will need to be provided in a different language, the translated documents should also be attached here.

Recruitment

Recruitment of Participants

This section will collect additional information on the recruitment of potential participants.

*required

How will you contact potential participants to recruit them for your study?

Select the recruitment method(s) you plan to use:

Email/Phone

Social Media

Flyer/Handout

✓ In-person/Verbal

Select the specific method(s) you will use:

I will set up a table/display/approach individuals in a public location and tell interested individuals about my study.

I will obtain permission to set up a table/display/approach individuals in a private location and tell them about my study.

✓ Other (describe):

*required

I will physically stand in their class and call for participation, explaining the needs and desire to conduct research.

Other (describe):

*required

Does your study have a limited recruitment window?

E.g., The study site is a summer camp that is only open for three months out of the year, the site only allows data collection during specific months, etc.

✓ Yes

*required

Please provide the following information below:

1. The latest date when your study can begin.
2. An explanation for why your study is limited to this specific time frame.

November 1, 2022, through November 28, 2022, as the students are in their obstetrical course window. If this window is missed, November 2023 will be the next opportunity. DISCLAIMER: We cannot guarantee that we will meet your timeline, but this information will help us to schedule our reviews. NOTE: Because we review the research applications of all LU students, your planned graduation date is not a valid reason for requesting a faster review.

No

*required

Attach your recruitment documents as separate Word documents here.

Depending on your above responses, you may need to attach multiple recruitment documents:

- Email(s)
- Letter(s)
- Social media
- post(s) Flyer(s),

etc.

Brandy Clayton Verbal script template_liberty-changes.docxSample documents: Recruitment (Letter/Email), Recruitment (Follow-up), Recruitment (Flyer), Recruitment (Social Media), Recruitment (Verbal) Note: If any recruitment documents will need to be provided in a different language, the translated documents should also be attached here.

Consent

Determination of Consent Waiver Eligibility

The below questions will help us determine if your project qualifies for a waiver of consent, consent elements, or signed consent.

*required

Does your project involve deception?

Deception may include, but is not limited to, the following:

- Withholding the full/true purpose of the study.
- Withholding information about experimental/control groups.
- Audio/video recording or photographing participants without their knowledge.

Yes

✓ No

*required

Does your project involve anonymous data collection methods?

Anonymous means you will not be able to link individual participants to their personal responses at any time (e.g., anonymous surveys).

✓ Yes

No

*required

Does your project involve a participant population where signing forms is not the norm?

A "yes" response would only apply in very specific situations with certain cultural groups where signing documents could put the person in danger, or where signing a name would be seen as culturally improper/offensive.

Yes

✓ No

*required

Waiver of Signed Consent

Please answer the below questions.

*required

Would a signed consent form be the only record linking the participant to the research?

✓ Yes, only the signed form would link the participant to the study.

No, other records/study questions link the participants to the study.

*required

Does a breach of confidentiality constitute the principal risk to participants?

✓ Yes, while unlikely, the primary risk is a potential breach of confidentiality.

No, there are other risks involved than a breach of confidentiality.

*required

Does the research pose no more than minimal risk to participants?

(i.e., no more risk than that of everyday activities) ✓ Yes, the study is minimal risk.

No, the study is greater than minimal risk.

*required

Does the research include any activities that would require signed consent in a non-research context?

(e.g., liability waivers)

Yes, there are study-related activities that would normally require signed consent.

✓ No, there are not any study-related activities that would normally require signed consent

*required

Are the subjects or their legally authorized representatives (LARs) members of a distinct cultural group or community in which signing forms is not the norm?

Yes, the subjects/their LARs are members of a distinct cultural group or community in which signing forms is not the norm. There is an appropriate alternative mechanism for documenting that informed consent was obtained.

No, the subjects/their LARs are not members of a distinct cultural group or community in which signing forms is not the norm.

*required

Will you provide the participants with a written statement (i.e., an information sheet that contains all of the elements of an informed consent form but without the signature lines) about the research?

✓ Yes, participants will receive written information about the research.

No, participants will not receive written information about the research.

Obtaining Parental Consent and Child Assent

This section will gather details about the parental consent and child assent processes.

*required

Does your study require parental/guardian consent?

If any of your participants are under 18 years of age, parental consent is most likely a requirement. Yes

✓ No

*required

Is child assent required for your study?

Assent is required unless the child is not capable of assenting due to age, psychological state, or sedation OR the research holds out the prospect of a direct benefit that is only available within the context of the research.

- Children under the age of 13 should receive a separate child assent form written at their grade level that they can read or that can be read
- to them.

Children between the ages of 13 and 17 can provide assent on the parental consent form.

Yes

✓ No

General Data Protection Regulation (GDPR) Consent

This section will gather details about the consent process for persons residing within European Union (EU).

*required

Does your study involve the collection of data from or about persons in the European Union (EU)?

Yes

✓ No

*required

Obtaining Consent

This section will gather details about the consent process.

*required

How and when will you provide consent information to participants?

Depending on your research plan, you may utilize more than one option. As appropriate, please select the method(s) you plan to use:

Consent information will be provided as a Word/PDF attachment to my recruitment email(s).

Consent information will be provided as a Google Form or other online document linked to my recruitment document/sent via a separate email.

Consent information will be sent as an email attachment after a potential participant responds by phone/email/private message to my recruitment call/email/social media post.

Consent information will be provided as the first page participants see after clicking on the survey link/scanning the QR code embedded in my recruitment email/flyer.

Consent information will be handed to the potential participant(s) in person (i.e., a physical

✓

copy) prior to taking part in any study activities.

Other (describe):

*required

How and when will signed consent be obtained?

Most studies will involve either anonymous data collection or confidential data collection. However, some may involve both (e.g., an anonymous survey and confidential interview). With this in mind, please make the appropriate selection(s) below:

My study involves anonymous data collection methods.

✓

- Anonymous means you cannot link individuals to their data at any time.

*required

Please acknowledge the following:

- I acknowledge that I will still need to provide consent information to my participants.

✓

- I am requesting a waiver of the requirement that consent forms be signed and returned.

My study involves confidential data collection methods.

- Confidential means you will be able to link individuals to their data, but will use pseudonyms or codes to conceal identities.

I'm not sure.

Please attach your consent form(s) as separate Word documents.

If you have multiple participant groups, you may need to submit a consent form for each group.

Brandy Clayton IRB Consent-changes.docx Sample documents: Consent, Consent (Medical), Consent (Blood Draw)

Note: If any documents written in a language other than English will need to be provided to potential participants, the translated documents should also be attached here.

Procedures

Study Design

This section gathers additional information about planned procedures.

*required

Will your study involve any of the following?

Check the applicable boxes. If none apply, select "N/A."

- Extra costs to the participants (tests, hospitalization, etc.)
- Alcohol consumption
- Protected Health Information (from health practitioners/institutions)
- VO_2 Max Exercise
- Pilot study procedures (which will be published/included in data analysis)
- Use of blood
- The use of rDNA or biohazardous material
- The use of human tissues or cell lines
- Fluids that could mask the presence of blood (including urine/feces)

Use of radiation or radioisotopes

✓ N/A

Procedures

This section will gather additional information about all planned study procedures.

*required

In an ordered list, please describe the procedures for each participant group.

Be concise. Please include time estimates for each procedure. For example:

1. Online survey. 10 minutes.
2. Interview. 30-45 minutes.

If different participant groups are involved, you must also specify which procedures correspond to each group. For example:

1. Online Survey. 15 minutes. (All participants).
2. Focus Group. 45 minutes. (4-5 participants from Group A).
3. Recorded Interview. 30 minutes. (3 participants from Group B).

informed consent will take 10
minutes. The Pre-test survey
will take ten minutes.
The obstetrical simulation will take 40 minutes
The post-test survey will take ten minutes
Debrief will take 20 minutes
Self-Journaling will take 10 minutes per three clinicals

Please attach all of your data collection instruments as separate Word documents*.

*If any of your data collection instruments are proprietary/validated instruments, you may submit them as PDFs.

Possible attachments may include the following:

- Survey/Questionnaire questions
- Interview questions
- Observation protocols
- Session outlines
- Prompts
- Checklists
- Educational handouts, etc.

Brandy Clayton Assessment tool for faculty Simulation Learning.docx

Brandy Clayton Fetal Monitoring Simulation.docx

Brandy Clayton Reflective Journal Questions for Debriefing.docx

Brandy Clayton Verbal script template_liberty-changes.docx

Brandy Clayton pre_post survey tool -changes.docx

Note: If any documents written in a language other than English must be provided to participants, the translated documents should also be attached here.

Note: If you are using a survey link, the survey link must also be provided above using the attach button.

Compensation

For research purposes, compensation involves reimbursing participants for their time and effort spent completing your research procedures. Compensation is not the same as benefits to participation, which are addressed later in the application.

Please make note of the following guidelines:

- Compensation for students or others in a group setting cannot be offered unless each participant will receive the same amount of compensation for each completed procedure. An opportunity involving equal time and effort to receive the same compensation must be made available for individuals who choose not to participate. ● Certain states outlaw the use of lotteries, raffles, or drawings as a means of compensating research participants. Your IRB analyst may offer additional guidance regarding this matter.
- Research compensation exceeding $600 per participant within a one-year period is considered income and will need to be filed on the
- participants' income tax returns. If your study is grant funded, the Office of Sponsored Programs (OSP) policies may affect how you compensate participants. Contact the IRB or OSP for additional information.

*required

Will this project involve participant compensation?

Compensation may include gift cards, meals, extra credit, etc. Yes

✓ No

Study Sites & Permissions

This section with gather information about study locations and any necessary permissions.

*required

Please state the actual location(s)/site(s) at which the study will be conducted. If the study will occur online, state "online/virtual."

Be specific. Include the city, state, school/district name, clinic name, etc.

This study will be conducted at Saint Martin University, Olympia Wa in November 2022.

*required

Will you need to receive conditional IRB approval before your study location(s) will grant permission?

The conditional IRB approval letter states that a study is ready for complete IRB approval once documentation of permission is received.

✓ Yes

No

Please submit any permission letters you have obtained.

- If you are still in the process of obtaining permission letters, they can be uploaded at a later time.
- If you would like us to review your permission request template(s) or permission letter template(s), please submit those here.
- Acceptable permission documentation includes signed statements on official letterhead and/or time and date stamped email correspondence originating from an appropriate official/authority.

Saint Martin approval Dr. Nutter.pdf Sample documents: Permission Request, Permission Letter

Data Security

Privacy & Data Analysis

This section will collect additional information about how you plan to protect privacy and analyze your data.

*required

For each procedure, you listed in the procedures section, describe the steps you will take to protect the privacy of your participants. Guidance is provided below:

- If you will conduct interviews, will they take place in a private setting where others cannot overhear the conversation? Where will your
- interviews occur? If you will collect health-related, physical, athletic performance data, or biospecimens, will you do so in a place and manner that allows for participant privacy? Examples of data include height, weight, BMI, running speed, and blood samples. Where will your data collection occur?
- If you plan to use online surveys, will you utilize a survey platform that offers adequate security? How does the platform ensure privacy?
- If you plan to use paper surveys, how will the surveys be collected in a manner that will prevent others from viewing individual responses? How will they be collected, and by whom?

Pre- and post-surveys are anonymous in conjunction with the self-reflected journals. No student name or reference will be made.

*required

Where will the data be stored, and who will have access to the data?

- Examples of where include a password-locked computer, a locked drawer, a locked filing cabinet, etc.
- Examples of who include the researcher, the researcher and faculty chair/sponsor, etc.

Only the researcher will have access to the pre/post survey and self-reflected journals. Information will be kept in a locked box and the key in a secure area, only with the researcher.

*required

Will you destroy the data after the retention period ends?

It is strongly advised that data be retained for a minimum of 3 years after the study has been completed.

✓ Yes

*required

Describe how the data will be destroyed.

I.e., it will be deleted from the computer, paper copies will be shredded, etc. Pre and Post surveys, along with journals, will be shredded.

No

*required

Will you retain the data or biological samples, if applicable, for future research?

Yes

✓ No

*required

How will the data be analyzed?

As applicable to your methodology (i.e., quantitative, qualitative, mixed methods), briefly describe the method(s) you will use to analyze your data.

One-group pretest-posttest design study will be used to collect data. Pre-and post-survey questions to determine the relationship between students' perceived knowledge and understanding of fetal monitoring compared to knowledge and understanding acquired with simulation practice. Structured journaling debriefs post-simulation with reflective questions. Faculty during the simulation must ensure that students can recognize the six components of a fetal monitoring heart rate: what a normal fetal baseline is, what accelerations are, the three varying decelerations, and what contraction is noted to resemble. Quotative data collection will include Comparative scales that will be used to determine the relationship between pre and post-survey scores. There will be two ways the results are validated and deemed reliable for this project. Self-evaluation scores of 1 to 3 are the comparative scale. The non-parametric analysis is a reliable and valid way to assess these scores. Results will show a difference between the pre-test-reflected competency number and the post-test-reflected numerical value. If the scores increase on the Likert scale, it will demonstrate an

increased fetal monitoring knowledge and understanding. The results will not be manipulated, edited, or altered. Qualitative data will include Qualitative analysis for this study will be word quantification, analysis, and encoding from the reflective journaling; this program will allow an effective way for text mining and content analysis of the data to organize, code, and analyze the reflective journaling data into categories aligned with the social cognitive concepts. The common themes from these codes refer to observations of knowledge work, observations of thinking strategies, judgments of self-improvement, judgments of self-competence, judgments of resources, judgments about social interactionsself-reactions, self-correction strategies

*required

Please describe any plans you may have for the publication or presentation of your data.

Plans include publication for your thesis or dissertation, if applicable. Data will be distributed to the university and hopeful for publication.

Will this project involve the use of archival data or secondary data?

- Archival data is information previously collected for a purpose other than the proposed research. Examples include student grades and patient medical
- records.

Secondary data is data that was previously collected for the purpose of research. For example, a researcher may choose to utilize survey data that was collected as part of an earlier study.

- If you plan to collect documents from participants or an organization (e.g., meeting minutes, policies, syllabi, notes, etc.) please choose "yes."

Yes

✓ No

*required

Media Use

This section gathers additional information about any planned use of media and/or audio/video devices.

*required

Will this project involve any of the following?

Check the applicable boxes. If none apply, select "N/A."

- Audio recording of participants
- Video recording of participants
- Taking photographs of participants
- ✓ N/A

Note: If you would like to use participant documents or photographs in presentations or publications beyond your research, you will need to have them sign a materials release form.

Does your study involve anonymous data collection methods, confidential data collection methods, or both?

- Confidentiality means that the researcher can identify participants and link them to their data, but the researcher will not reveal participant identities to anyone outside of the study.
- Anonymity means that although the researcher knows whom he or she invited to participate in his or her study, once the data is collected, the researcher cannot link individuals to their personal data. This means that no personally-identifying information can be collected in an anonymous study.

✓ My study involves anonymous data collection methods.

My study involves confidential data collection methods.

My study involves both anonymous and confidential data collection methods.

*required

Anonymous Data Collection

This section will gather additional information about the anonymous aspects of your project.

*required

Please explain how you will ensure that the data is anonymous.

For example, will you not collect names, email addresses, or other identifying information on your survey or will a research assistant collect your study data and remove the identifiers before giving the data to you?

There will be no collection of names, phone numbers, email addresses, or other identifying information on the survey or journals. Only the researcher will have access to the pre/post survey and self-reflected journals. Information will be kept in a locked box and the key in a secure area, only with the researcher.

Risks & Benefits

Risks

This section will gather information about any potential risks involved with your project.

*required

No study is without risks. Please check the applicable box(es) for any potential risks associated with your study:

Information risks (e.g., loss of privacy and/or breach of confidentiality if the data is lost or stolen)

Psychological or emotional risks (e.g., fear, stress, guilt, triggering of past emotional experiences, etc.)

Social risks (e.g., social stigma)

Economic risks (e.g., loss of employment or insurability)

Physical risks (e.g., fatigue; pain or discomfort; potential for injury, illness or disease, or

✓

death)

Legal risks (e.g., risk of prosecution, mandatory reporting)

Genetic privacy risk (e.g., stigmatization, self-stigmatization, insurance coverage or employability limits, etc.)

*required

List the steps you will take to minimize each of the risks you've just identified above.

For example, data will be stored on a locked computer only accessible to the researcher/study team; study participants will be directly monitored for any signs of fatigue/illness, etc.

Provide fetal monitoring review before simulation to decrease stress, ensure the simulation is a nonstressful experience, and ensure physical stress or risk is eliminated.

Ethical considerations are at a minimum. Participants will consent before the study and data collection. Participants will be instructed that participation is voluntary and will not affect student grades. The results will be anonymous. Pre- and post-survey, journals, and debrief will have no identifiable information relating to the students. Participants will always be protected from harm. The project aims to gain insight into the effectiveness of simulation in student learning and retention of fetal heart monitoring. The university will also be protected from harm.

.

*required

Will alternative procedures or treatments that might be advantageous to the participants be made available?

Yes

✓ No

*required

Is this project considered greater than minimal risk?

Remember, minimal risk means that the probability and magnitude of harm or discomfort anticipated in the research are not greater in and of themselves than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests. Yes

✓ No

Benefits

This section will gather information about any potential benefits involved with your project.

- Direct benefits are those benefits that the participants may receive from taking part in your study.
- Compensation for participation is not a benefit, so it is not listed in this section.

*required

Please check the applicable box(es) for any direct benefits associated with your study:

✓ Psychological or emotional benefits

✓ Learning benefits

✓ Physical benefits

Diagnostic or therapeutic benefits

✓ Other (describe):
*required the implementation of fetal monitoring course within their curriculum with the use of simulation, therefore allowing students to understand and comprehend fetal monitoring in a safe arena

*required

Provide details about the expected direct benefits.

For example, participants will increase their knowledge/skills as a result of the intervention provided; participants will receive a copy of their diagnostic test results, etc.

This study seeks to determine if the simulation can assist students with understanding fetal monitoring. Most courses do not offer an in-class fetal monitoring course. This study seeks to see if the simulation can assist with implementing fetal monitoring with the use of simulation in the student's curriculum.

- Benefits to society are those benefits that individuals who share characteristics with your participants but were not part of your study may receive, along with general benefits to science and humanity.

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*required

Provide details about the expected benefits to society.

For example, increased public knowledge on the topic, improved learning outcomes, etc.

Implement simulation in conjunction with an in-person fetal monitoring course to understand how to interpret fetal monitoring in programs all over.

Evaluation of Risks and Benefits

This section establishes whether or not the study is worth doing based on the risks and benefits described.

*required

Evaluate the risk-benefit ratio.

Why is the study worth doing, even with any identified risks?

To make program-wide changes in a very important subject that often gets overlooked or deemed unimportant.

Attachments

Human Subjects Training Documentation

Note: This upload is only required for non-affiliated, non-LU personnel. If you are affiliated with LU, we can view your CITI training report.

Sample documents: CITI Program Website

External Investigator Agreement

Note: This upload is only required for non-affiliated, non-LU personnel. If you are affiliated with LU, you can provide certification within the Cayuse system.

Proof of Permission to Use LU Participants, Data, or Groups

Note: If you are not using LU participants, data, or groups, you do not need to include an attachment here.

DNP Permission

Note: If you are not in the Doctor of Nursing Practice Program (School of Nursing), you do not need to include an attachment here.
Sample documents: Permission Request, Permission Letter

Screening

Note: If your study does not involve a screening instrument, you will not need to provide an attachment here.

Recruitment

Note: If you are strictly using archival data, you may not need to include an attachment here.

Brandy Clayton Verbal script template_liberty-changes.docxSample documents: Recruitment (Letter/Email) , Recruitment (Follow-up), Recruitment (Flyer), Recruitment (Social Media), Recruitment (Verbal)

Parental Consent

Note: If your study does not involve minors, you will not need to provide an attachment here. Sample documents: Consent (Parental)

Archival Data Forms, Templates, or Collection Sheets

Note: If you are not using archival data, you will not need to provide an attachment here.
Archival Data Permission

Note: If you are not using archival data, you will not need to provide an attachment here.

Sample documents: Permission Request, Permission Letter

Data Collection Instruments

Note: If you are strictly using archival data, you may not need to provide an attachment here.

Brandy Clayton Assessment tool for faculty Simulation Learning.docx

Brandy Clayton Fetal Monitoring Simulation.docx

Brandy Clayton Reflective Journal Questions for Debriefing.docx

Brandy Clayton Verbal script template_liberty-changes.docx

Brandy Clayton pre_post survey tool -changes.docx

Site Permission

Note: If you do not require external permission(s) to conduct your study, you may not need to provide an attachment here.

Saint Martin approval Dr Nutter.pdf sample documents: Permission Request, Permission Letter

Child Assent

Note: If your study does not involve minors, you will not need to provide an attachment here.

Sample documents: Child Assent

Consent Templates

Note: If you are strictly using archival data, you may not need to provide an attachment here.

Brandy_Clayton_IRB_Consent-changes.docxSample documents: Consent, Consent (Medical), Consent (Blood Draw)

Debriefing

Note: If your study does not involve deception, you will not need to provide an attachment here.

Sample documents: Debriefing

GDPR Consent

Note: If your study does not involve European Union (EU) residents, you will not need to provide an attachment here.

Sample documents: Consent (GDPR) , Data Transfer Agreement (GDPR)

Date: 10-8-2022

IRB #: IRB-FY22-23-292
Title: HOW DOES OBSTETRIC SIMULATION IMPACT UNDERGRADUATE PRE-LICENSURE BSN STUDENTS' CLINICAL JUDGMENT RELATED TO USING AND UNDERSTANDING FETAL MONITORING?
Creation Date: 9-14-2022
End Date:
Status: Approved
Principal Investigator: Brandy Clayton
Review Board: Research Ethics Office
Sponsor:

Study History

Submission Type	Review Type	Decision
Initial	Exempt	Exempt

Key Study Contacts

Member	Brandy Clayton	**Role** Principal Investigator	**Contact**	[redacted]
Member	Brandy Clayton	**Role** Primary Contact	**Contact**	
Member	RuthAnne Kuiper	**Role** Co-Principal Investigator	**Contact**	

Saint Martin's University Institutional Review Board
Approval Letter

Saint Martin's University OMB Control Number: 0990-0279; IORG Number: 0004988
IRB#: **« 2022-08-05-EX »**

October 7, 2022

Brandy Clayton
Saint Martin's University

Dear Brandy Clayton:

IRB#: **« 2022-08-05-EX »**
TITLE OF PROPOSAL: HOW DOES OBSTETRIC SIMULATION IMPACT UNDERGRADUATE PRE-LICENSURE BSN STUDENTS' CLINICAL JUDGMENT RELATED TO USING AND UNDERSTANDING FETAL MONITORING?

This letter is to officially notify you of the approval of your project by the Institutional Review Board (IRB) of Saint Martin's University for the Protection of Human Subjects. It is the Board's opinion that you have provided adequate safeguards for the rights and welfare of the participants in this study. Your proposal seems to be in compliance with this institution's Policies and Standards and the DHHS Federal Regulations for the Protection of Human Subjects (45 CFR 46) and has been classified as **exempt.**

Date of Review: **September 30, 2022**

You are authorized to implement this study as of the Date of Final Approval: **October 7, 2022**. This approval is Valid Until: **« October 7, 2023»**.

Please include the assigned IRB number as well as OMB Control and IORG Numbers on the Informed Consent Forms. Please submit a copy of the form to the IRB office with the numbers included.

This project should be conducted in full accordance with all applicable sections of the IRB Guidelines and you should notify the IRB immediately of any proposed changes that may affect the status of your research project. You should report any unanticipated problems involving risks to the participants or others to the Board. For projects that continue beyond one year from the starting date, the IRB will request continuing review and update of the research project. Your study will be due for continuing review as indicated above. The investigator must also advise the Board when this study is finished or discontinued.

If you have any questions, please contact me or any other SMU IRB member.

Sincerely,

[redacted]

Jeremy Newton, Ph.D.
IRB Chair

Cc: VPAA

APPENDIX F: INFORMED CONSENT

Title of the Project: How Does Obstetric Simulation Impact Undergraduate Pre-Licensure BSN Students' Clinical Judgment Related to Using and Understanding Fetal Monitoring?
Principal Investigator: Brandy Clayton, Ph.D. Student, Liberty University

Invitation to be Part of a Research Study

You are invited to participate in a research study. To participate, you must be 18 or older, an undergraduate BSN nursing student, and in the obstetrical course.

Taking part in this research project is voluntary, and not participating will not affect course grades, and no special incentive will be granted.

Please take time to read this entire form and ask questions before deciding whether to take part in this research.

What is the study about and why is it being done?

This study seeks to determine if simulation will assist instruction in effective teaching and learning fetal monitoring, skill knowledge, and understanding. This study also seeks to determine if a significant relationship exists between the students' perceived self-efficacy of clinical reasoning with fetal monitoring pre- and post-simulation practice and if the incorporation of simulation within a maternal-child course will significantly impact students' knowledge and understanding of fetal monitoring.

What will happen if you take part in this study?

If you agree to be in this study, I will ask you to do the following things:

1. Complete a pre-test survey. The survey will take about 10 minutes. It will be anonymous.
2. Participate in a 40-minute fetal-monitoring obstetrical simulation. The simulation will entail an obstetric scenario that allows students to identify fetal monitoring patterns as learned in the pre-simulation review.
3. Complete a post-test survey. This survey will take about 10 minutes and will also be anonymous.
4. Complete a debrief post-simulation. This debrief will take 20 minutes and allows a period of self-reflection. The debrief is anonymous. The debrief will discuss the positives and negatives that occurred with the simulation as a learning experience.
5. Complete two journals with prompted questions. These journal will allow self-reflection and will take about 10 minutes each. They will also be anonymous.

How could you or others benefit from this study?

The direct benefits participants should expect from participating in this study include learning benefits because of the fetal-monitoring simulation in the maternal-child health course. Students may experience improved understanding because of the simulation.

Benefits to society include engaging all nursing programs to include simulation in the maternal-child health course and using it as a means to instruct fetal monitoring

What risks might you experience from being in this study?

The risks involved in this study are minimal, which means they are equal to the risks you would encounter in everyday life.

How will personal information be protected?

The records of this study will be kept private. Research records will be stored securely, and only the researcher will have access to the records.

- Participant responses will be anonymous.
- Data will be stored on a password-locked computer and may be used in future presentations. Hard copy data will be stored in a locked box. After three years, all electronic records will be deleted, and hard copy data will be shredded.
- Journals will be written by the students, and answers will be transcribed.

How will you be compensated for being part of the study?

Participants **will not** be compensated for participating in this study

What are the costs to you to be part of the study?

There is **no** cost to participate in the research study.

Does the researcher have any conflicts of interest?

The researcher serves as a clinical instructor with this program, who conducts hospital clinicals with the students. To limit potential or perceived conflicts, the study will be anonymous, so the researcher cannot link the journals or surveys to the students. The researcher has no financial interest in the outcome of this study.

Is study participation voluntary?

Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with Liberty University or Saint Martin University. If you decide to participate, you are free not to answer any questions or withdraw before submitting the surveys or reflective journals without affecting those relationships.

What should you do if you decide to withdraw from the study?

If you withdraw from the study, please inform the researcher that you wish to discontinue participation and do not submit your study materials. Your responses will not be recorded or included in the study.

Whom do you contact if you have questions or concerns about the study?

The researcher conducting this study is Brandy Clayton. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact her at [redacted]r [redacted] You can also contact her faculty sponsor Dr. Ruth Kuiper at [redacted]

Whom do you contact if you have questions about your rights as a research participant?

Suppose you have any questions or concerns regarding this study and want to talk to someone other than the researcher. In that case, **you are encouraged** to contact the Institutional Review Board, [redacted].

Disclaimer: The Institutional Review Board (IRB) is tasked with ensuring that human subjects research will be conducted in an ethical manner as defined and required by federal regulations. The topics covered and viewpoints expressed or alluded to by student and faculty researchers are those of the researchers and do not necessarily reflect the official policies or positions of Liberty University.

Your Consent

Before agreeing to be part of the research, please be sure that you understand what the study is about. You will be given a copy of this document for your records. If you have any questions about the study later, you can contact the researcher, Brandy Clayton, using the information provided above.

Saint Martin's University OMB Control Number: 0990-0279; IORG Number: 0004988 IRB#: « 2022-08-05-EX »