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Using High-Fidelity Simulation to Prepare Nursing Students in the Obstetrical Environment

Cynthia Ann Dixon

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Using High-Fidelity Simulation to Prepare Nursing Students in the Obstetrical

Environment

by

Cynthia Dixon

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Submitted by: Approved by:

_____   _____
Cynthia Dixon   Candice Rome, DNP, RN

_____   _____
Date   Date

Abstract

Aim: The goal of this study was to evaluate senior nursing students and use of high-fidelity simulation in the development of critical thinking skills.

Background: Nursing students are only given limited opportunities in the specialty areas, such as obstetrics, and often lack the skills and confidence necessary to provide safe and effective care as they join the health care industry as new graduates.

Methods: The senior nursing students were brought into the simulation lab and given a new scenario on a preeclampsia patient. The students were given ten minutes to ask questions of the patient, complete a focused assessment, call the physician with the data gathered and develop and implement a plan of care. The students were evaluated as to whether or not they met expected clinical reasoning benchmarks during the high-fidelity simulated experience. Descriptive analysis was used to evaluate and summarize the statistical findings.

Results: Analysis of the data based on the PREPARED ™ Simulation Assessment Tool demonstrated that the students did not "Meet Expectations" as they were not able to satisfactorily perform in each category. However, reviewing their written reflections after the simulation scenario revealed some of the clinical reasoning skills that they were not able to verbalize during the exercise.

Conclusion: The goal of this study was to use simulation to help foster the development of clinical reasoning and critical thinking of nursing students to better prepare them for the professional nursing role especially in specialty areas such as obstetrics where the learning opportunities are extremely limited. The analytical data of this quantitative study did not reflect improved clinical reasoning or critical thinking;

however, the reflective writings of the students did provide some positive insight to this

process. Further research needs to be conducted evaluating the use of high-fidelity

simulation over an extended time to ascertain more definitive results.

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CHAPTER I

Introduction

Clinical opportunities for students have always been an uncontrolled variable in nursing education. The location of clinical sites, patient census, and the number of nursing students vying for the opportunity to provide care are major factors. High risk specialty areas such as obstetrics offer limited observation opportunities for these students. When the clinical opportunities are not available, or the students are only allowed a passive learning situation, the challenge falls to the nursing faculty to prepare future nurses in these specialty areas. Faculty are tasked with initiating the essential critical thinking skills as well as providing opportunities for students to become proficient in psychomotor skills needed with direct patient care. Simulation is becoming a popular teaching strategy providing interactive, hands-on opportunities for students to begin this journey in providing safe and effective care. This study evaluated the use of simulation in the development of critical thinking skills needed to provide appropriate care to patients in the obstetrical setting.

Purpose

There are many high risk areas in the health care field that restrict care provided by non-licensed professionals. As students are only given limited opportunities in these specialty areas, they often lack the skills and confidence necessary to provide safe and effective care as they join the health care industry as new graduates. The purpose of this research project was to evaluate the use of an obstetric high fidelity simulation scenario in the development of critical thinking skills that will help prepare the nursing students to be ready to provide care in this high-risk area.

Professional Significance

Today's health care system is a complex, highly technical, multi-level organization with multiple roles and responsibilities confronting newly trained nurses. Nurse educators have the daunting task of preparing nursing students for delivering safe and effective care in this arena (Doody & Condon, 2013). Low-fidelity simulations incorporating concepts such as role play, manikins, and case studies have been used for many years to enhance the learning of nursing students (Jeffries, Swoboda, & Akintade, 2016).

However, in the clinical setting, high risk specialty areas are more observational than hands-on for nursing students, putting them at a disadvantage by not being able to actively participate in patient care. Due to more and more clinical situations such as these, it has become vital that students gain experience by using high-fidelity simulations. High-fidelity simulations use a life-like computerized mannequin which can be programmed for different scenarios, providing a variety of responses and outcomes. These simulations allow the nursing students the opportunity to provide care, make mistakes, and learn in a controlled environment without fear of causing harm to patients. High-fidelity simulation scenarios are an innovative teaching method used to encourage the development of critical thinking skills of nursing students. (Fero et al., 2010). One such example, is Victoria ™ (Gaumard, 2015) and her newborn infant™ which are high-fidelity birthing simulators used to provide a variety of normal to high risk, mother and infant scenarios to gain experience in the labor and delivery setting.

Background

In 2009, The Carnegie Foundation for the Advancement of Teaching released a report describing the inadequacies and gaps in education for nurse's practicing in the acute care settings; based on data gathered from The Joint Commission, the National Council of State Boards of Nursing (NCSBN), and the Agency for Health Care Research and Quality. One of the report's findings noted that there was poor classroom instruction with limited integration between the classroom and clinical experiences (Tanner, 2010). In response to this report as well as the Institute of Medicine's report (2010), *The Future of Nursing: Leading Change, Advancing Health* providing a blueprint on how to change and improve the nursing profession, there has been a significant shift for educators to provide a more robust learning environment. Included in this goal of improvement are for educators to continue pursuing innovative teaching strategies in both the classroom and clinical settings to keep pace with the ever progressing healthcare system. One of these advanced approaches has been to increase the use of the simulation based education (Doody & Condon, 2013).

The use of simulation has been found to be an effective method of education, providing positive effects on the student's increase of knowledge and skills shown in both the classroom and in the clinical settings (Doody & Condon, 2013). Simulation has also been shown to improve the students' communication skills, teamwork ability, and even improved their confidence with hands-on opportunities.   A noteworthy consideration is that simulation activities should not replace the clinical practice and learning in real life situations but to supplement the students' learning in order to provide quality patient care (Doody, 2013).

Simulations are also being used in the hospital settings to provide new and continuing education for professional nurses. Simulation in the obstetrical setting has focused on teamwork in emergencies and has helped improve these skills. The Neonatal Intensive Care Unit (NICU) uses high-fidelity simulators with new orientees to help learn the most common neonatal diagnoses (Aebersold & Tschannen, 2013). High-fidelity simulators are computerized mannequins able to mimic a multitude of sounds, and can be programmed to have cardiac arrhythmias, seizures, or other changes in neurological status (Ferguson, Howell, & Parsons, 2014).

Critical thinking is another very important aspect of nursing. Faculty are tasked with fostering and developing the skill of critical thinking within the nursing student. The opportunity for experiential learning by using high-fidelity simulation can help promote the student's clinical reasoning and decision making skills (Adib-Hajaghery & Sharifi, 2016). Research has shown that using simulations has improved nursing student's critical thinking skills and helped them incorporate theory into their clinical practice (Adib-Hajaghery & Sharifi, 2016).

There are many benefits with students using simulations. Simulated settings allow the student to learn in a controlled environment, and allow the student to make mistakes without putting actual patients at risk for injury (Partin, Payne, & Slemmons, 2011). This experiential environment also makes it possible for the student to use learning methods that will improve their cognitive, affective, and psychomotor competencies (Lestander, Lehto, & Engstrom, 2016).

Today's health care system is ever evolving and technological advances are transforming care provided to individuals. New graduates are expected to promptly

incorporate evidenced-based practice and these new technologies into their routine. In order to meet the health care needs, faculty need to incorporate realistic educational opportunities into their teaching strategies (Alfes, 2011).

Conceptual Framework

Sister Callista Roy's adaptation model guides this study, which considers nursing and the environment. Sister Roy believed that adaptation occurs in response to environmental changes. The process of adaptation involves conscious awareness, learning, and self-awareness (Peptrin, 2016). Adaptation has been identified as adjusting or acclimating to maintain balance in ever changing situations (Schwartz-Barcott, 2006). Roy's Adaptation model theorized that human beings receive input as a stimulus, process the information, and produce a response that will either be successful (adaptive) or ineffective (Schwartz-Barcott, 2006). Understanding that external stimuli are derived from the environment and internal stimuli come from within the individual; the individual's response to received stimuli is exhibited in behaviors which can be observed and measured and essentially considered as adaptive or ineffective. An adaptive response is one that either maintains or improves health whereas an ineffective response has a negative effect on one's health and wellbeing. Roy described the role of the nurse as one to support health through the promotion of adaptation and using the nursing process to improve the person-environment interaction (Griffin, 2006). In considering Roy's Adaptation model during simulation experiences, nursing students gather patient specific data (environmental stimuli) and determine a patient-based plan of care (response). Based on the effects of treatment provided by the nursing student the patient's condition will either improve or decline (adaptive response). The nursing student has to evaluate

the changes in the patient's condition (environmental stimuli) and adjust the patient's plan of care accordingly. This is an ever-changing, ever-evolving cycle whereas the patient's health conforms based on the care provided by the nursing student. In this study, the researcher looked at the nursing student's behaviors in relation to the environmental stimuli. Did the nursing students adapt or respond appropriately to environmental stimuli which directly impacted the improvement or decline in the patient's health? By placing nursing students in the simulation scenarios, the educator can provide the opportunity for the student to receive the external stimuli and learn in these safe environments, allowing for learning (adaptation) and ability to provide safe and effective care when faced with similar situations in the professional setting.

Definition of Terms

For the purpose of this study, the following terminology has been defined to maintain verbiage continuity and prevent confusion during the discussion of simulation studies.

Clinical Judgment	*The art of making a series of decisions to determine whether to take action based on various types of knowledge. The individual recognizes changes and salient aspects in a clinical situation, interprets their meaning, responds appropriately, and reflects on the effectiveness of the intervention. Clinical judgment is influenced by the individual's previous experiences, problem-solving, critical-thinking, and clinical reasoning abilities.
Clinical Reasoning	*A process that involves both thinking (cognition) and reflective thinking (metacognition) to gather and comprehend data while recalling knowledge, skills (technical and nontechnical), and attitudes about a situation as it unfolds. After analysis, information is put together into meaningful conclusions to determine alternative actions.

Computer-Based simulations	*A simulation-based learning activity designed to provide an experience through the use of an alternative medium. Learners can complete specific tasks in a variety of potential environments, use information to provide assessment and care, make clinical decisions, and observe the results in action. Feedback can be provided during and after the interaction.
Critical Thinking	*A disciplined process that requires validation of data, including any assumptions that may influence thoughts and actions and then careful reflection on the entire process while evaluating the effectiveness of what has been determined as the necessary action(s) to take. This process entails purposeful, goal-directed thinking and is based on scientific principles and methods (evidence) rather than assumptions or conjecture.
Facilitator	*A trained individual who provides guidance, support, and structure at some or all stages of simulation-based learning including pre-briefing, simulation, and/or debriefing.
Fidelity	*The ability to view or represent things as they are to enhance believability. The degree to which a simulated experience approaches reality; as fidelity increases, realism increases. The level of fidelity is determined by the environment, the tools and resources used, and many factors associated with the participants. Fidelity can involve a variety of dimensions.
Conceptual Fidelity	*Ensures all elements of scenario or case relate to each other in a realistic way, so that the case makes sense to the learners (e.g., vital signs reflect the diagnosis)
Physical/Environmental Fidelity	*Factors such as environment, manikins, room, moulaged, equipment, noise, and/or props.
Psychological Fidelity	*Factors such as emotions, beliefs, and self-awareness of participants; the extent of which the simulated environment evokes the underlying psychological processes that are necessary in the real-world setting for the participant. The degree of perceived realism, including psychological factors such as emotions, beliefs, and self-awareness of participants in simulation scenarios.
Safe learning environment	*The emotional climate that is created through the interaction among all participants (including facilitators). In the positive emotional climate, all participants feel at ease

	taking risks, making mistakes, or extending themselves beyond their comfort zone Awareness of the psychological aspects of learning, the effects of unintentional bias, cultural differences, and attentiveness to one's own state of mind helps to effectively create a safe environment.
Simulation	*An educational strategy in which a particular set of conditions are created or replicated to resemble authentic situations that are possible in real life. Simulation can incorporate one or more modalities to promote, improve, or validate a participant's performance.

*These definitions are directly from the INACSL Standards of Best Practice: Simulation [SM] Simulation glossary (INASCL Standards Committee, 2016, pp. S39-S47).

Summary

Simulation has been used for many years as a teaching strategy. Simulations provide a safe setting in which the nursing student can practice different psychomotor, cognitive, and communicative skills without the risk of harming actual patients. Psychomotor skills have been found to be easily learned by hands on activities as with using low-fidelity simulations; while critical thinking, clinical judgment, and team building can be promoted while using high-fidelity, life-like mannequins. Students have also reported increased interest in participating in interactive learning opportunities (Kirkpatrick & DeWitt, 2016). Simulation has become very helpful in the learning environment especially for areas of high risk care where students have such limited opportunities to participate and provide direct patient care. This research evaluated the nursing student's critical thinking skills while using high-fidelity simulation.

CHAPTER II

Literature Review

Introduction

Simulation has become a popular teaching approach over the past several years and the exploration into simulation has definitely impacted the research community. Simulation scenarios and training sessions have proven themselves effective in the military and in aviation settings. The military use war games and simulation in their training programs while pilots use flight simulators to practice different possible aircraft malfunctions (Aebersold & Tschannen, 2013). Mock codes and simulated stoke scenarios are regularly used in hospital settings to keep healthcare members proficient with these skillsets. Low-fidelity simulation has been used for years in nursing education as a training aid allowing practice of basic skills before stepping into a clinical setting. High-fidelity simulation is making its way into the education setting for nurses and is gaining popularity.

The objective of the review of literature was to understand how effective simulation is in the healthcare settings. The articles reviewed had a fairly equitable distribution of quantitative and qualitative information. Interesting to note, were six studies that looked at both the quantitative and qualitative aspects and used supporting data to corroborate their respective findings. Searches in the ProQuest database used keywords including simulation, nursing students, obstetrics, and critical thinking.

Quantitative Studies

Quantitative research was conducted in nursing facilities using undergraduate nursing students at all levels of nursing education. A variety of simulations were used including obstetric and pediatric patient care, respiratory issues, a variety of med-surgical scenarios, mental health cases and general assessments. These studies evaluated data to determine whether or not using simulation as an educational tool demonstrated improved:

- assessment skills (Jones & Bursens, 2015; Simonelli & Paskausky, 2011)

- expanded nursing students' knowledge (Levett-Jones, Lapkin, Hoffman, Arthur, & Roche, 2011; Curl, Smith, Chisholm, McGee, & Das, 2016)

- increased the students' overall test scores (Gates, Parr, & Hughen, 2012; Simonelli & Paskausky, 2011)

- improved their critical thinking skills (Fero et al., 2010)

- enriched clinical reasoning (Correia, 2015)

- affected the self-confidence and satisfaction levels of the students (Alfes, 2011).

The methods used in quantitative studies consisted of either non-experimental or quasi-experimental convenience sampling of nursing students within various undergraduate nursing programs. Research was conducted along the spectrum of a single session to data collection over seven years. Studies in which the research was collected in single sessions reported inconclusive results when investigating the use of high fidelity simulation and the influence on enhanced learning or the development of critical nursing skills. (Fero et al., 2010) and (Levett-Jones et al., 2011). Consideration was given to the idea that a single exposure to simulation could not truly evaluate gained knowledge, skills

and abilities and that further investigation needed to be completed with multiple opportunities to truly see appropriate trends (Fero et al., 2010), (Levett-Jones et al., 2011). However, the quantitative studies that evaluated learning over an extended period of time reported positive findings demonstrating that working with high fidelity simulation provided increased knowledge, active learning, improved satisfaction scores and self-confidence in nursing students (Alfes, 2011; Curl et al., 2016; Jones & Bursens, 2015; Simonelli & Paskausky, 2012).

Qualitative Studies

The qualitative studies looked at the perceptions of the students and faculty involved with simulation activities to determine whether or not they found the learning opportunities beneficial. These studies were all non-experimental or quasi-experimental with descriptive phenomenological characteristics and all evaluated either the student's or the nursing faculty's perceptions of high-fidelity simulation. The data collection for these studies varied from one simulation experience to repeated simulations throughout the semester.

Throughout the review of the literature the results were resoundingly positive that simulation activities have been found to be very helpful to nursing students. Students reported that they enjoyed the simulation exercise and felt that it enhanced their learning of the theoretical concepts (Partin et al., 2011; Wotten, Davis, Button, & Kelton, 2010) and increased the reality of what was being taught in the course (Wotten et al., 2010). Students placed a higher value on active learning than passive learning by lecture (Doody & Condon, 2013). Students reported high fidelity simulation offered great opportunity to gain knowledge prior to attending a clinical experience (Doody & Condon, 2013).

Students described how they began to understand and implement nursing care (Lestander et al., 2016) and also reported gaining an appreciation of collaborating with peers, using teamwork to provide care, as well as practicing using therapeutic communication with patients and families (Wotten et al., 2010).

The research indicated that those who received traditional education without the benefit of high fidelity simulation were not trained to base decisions on evidence or to construct knowledge from experiences causing a larger gap between theory and practice (Kantar & Alexander, 2012). This effectively places nursing students at a disadvantage when joining today's nursing practice. Kantar & Alexander (2012) study indirectly supports the need to incorporate more active learning opportunities, such as using high fidelity simulation for nursing students, to help ensure those vital connections are made between theory and practice. Today's healthcare setting is quite complex and requires nurses to have highly developed problem-solving and decision-making skills (Partin et al., 2011). Using high-fidelity interactive learning opportunities help students link the theoretical concepts with evidence based practice and provides an excellent avenue to develop their clinical judgment (Partin et al., 2011).

Mistakes were also considered an invaluable lesson in learning while in the simulation environment (Lestander et al., 2015). Students explained that they were able to learn from mistakes and retained important lessons without causing harm to actual patient (Aquino, 2005) Students and faculty have reported that making mistakes in simulation can prevent mistakes in the clinical setting (Lestander et al., 2015; Aquino, 2005).

Qualitatively, the research has shown repeatedly how on a perceptional level, high-fidelity simulation has increased student learning. Students reported have an experiential base of knowledge to use when in the clinical setting. They were able to make the connections between theory and practice as well as become more proficient with their nursing skills. Students also conveyed an improved sense of self confidence after being involved with high-fidelity simulation activities.

Combined Studies

The combined studies reviewed data on both a quantitative and qualitative level to substantiate their research on the effectiveness of high-fidelity simulation in the nursing field. These studies used a mixed-methods, descriptive correlational approach to obtaining and reviewing data. Each study used convenience sampling of nursing students and faculty to gather information.

Similar to other studies discussed within this paper, qualitatively the students all provided positive feedback with using high-fidelity simulation. They enjoyed the interactive activities, the enhanced learning opportunities, and the improved self-confidence (Crouch, 2009; Grady et al., 2008; Smith, Witt, Klaassen, Zimmerman, & Cheng, 2012; Smith & Roehrs, 2009). Quantitatively, the data concurred with each of these studies and supported the qualitative findings.

One study (Dillon, Noble, & Kaplan, 2009) used simulation to foster collaboration between nurses and medical students during a mock code scenario. Students were tested pre-simulation and asked to consider the role of the nurse in relation to that of the physician. Results demonstrated the nursing students felt their role would be subservient to the physician while the medical students believed the nurse would be an

assistant to the physician or a member of the team. After the simulation, both groups concurred that the nurse and physician worked best in the collaborative role and that collaborative efforts delivered the best patient outcomes. Both the qualitative and quantitative findings respected interdisciplinary care and encouraged collaboration between physician and nurses.

The concept of mistakes has been addressed in multiple studies and was seen as a necessary learning opportunity for nursing students. Mistakes occurring during high-fidelity simulations were considered positive educational moments in order to prevent them from occurring in the clinical setting, potentially harming patients (Lestander et al., 2016; Aquino, 2005). One of the combined studies (Davis, Kimble, & Gunby, 2014) considered nursing faculty perceptions regarding high-fidelity simulation. A different perspective was provided by this study explaining that the faculty had mixed feelings regarding this teaching strategy. On one hand, the faculty interviewed felt using simulation provided a "safe environment" for students to learn without fear of harming patients and where it was acceptable to make mistakes. Several faculty members even described simulation as a setting where mistakes were an important piece of the learning puzzle. One faculty member even commented on the "aha" moment students would have after making an error. At the same time, this group of faculty were also concerned that the simulation setting was one where students would learn to make mistakes and that could carry over to the clinical setting causing a situation where patients could be harmed by poor learned behavior. It should be noted that the faculty members within this study were not as comfortable with simulation as a teaching strategy as they were with more traditional styles of education.

Strengths and Weaknesses of the Literature

Several strengths were found in the literature review. Quantitatively, the research showed repeated use of high-fidelity simulation improved the students' assessment skills and their test scores. The students also reported increased self-confidence and satisfaction in the nursing role. Active learning opportunities in conjunction with classroom lecture were more beneficial to students learning concepts than traditional learning alone. Simulation exercises provided a safe learning environment for the student to make mistakes.

Weaknesses in the literature review included small sampling in several studies. Quantitative results were not as definitive when used during single episodes of simulation. Qualitative findings by students were exceedingly positive towards using simulation; however, the quantitative data has not been as substantial. There were reported perceptions by traditional educators who felt that simulation settings were a place where students could "learn to make mistakes" yet expressed concerns that the "poor learned behavior" from simulation could carry over to actual patient settings. Overall, the strengths of the literature review findings outweighed the weaknesses.

Summary

The literature shows that using high fidelity simulation gives the undergraduate nursing students real world skills that can be transferred into their professional nursing role. Students have to make those vital connections between theory and practice and until they are exposed to those type of situations, they will not be able to make that link. Quantitatively, the research showed how repeated use of high-fidelity simulation improved the nursing students' assessment skills and test scores as well as their self-

confidence and satisfaction in the nursing role. Qualitatively, students repeatedly

reported how the active learning opportunity was so much more meaningful than the

traditional passive education. They learned how to collaborate with others, improve their

teamwork skills, and provide therapeutic communication. Students found that making

mistakes was an important lesson learned and were appreciative that it was not in an

environment where anyone could have been injured. Faculty need to remember that

making a mistake is a key learning point in a nursing student's education. High-fidelity

simulation has been found to be a "safe" arena to allow students the chance to make

mistakes without causing harm to real patients. It falls to the facilitator or faculty

member of the simulation to impart the importance of learning from the mistake, to

prevent it from occurring again; not to foster an environment where mistakes are a

learned behavior without consequences. The research has shown multiple benefits to

using high-fidelity simulation.

CHAPTER III

Methodology

Introduction

Clinical opportunities in the obstetrical area are offered as an observational opportunity which prevent nursing students from participating in direct care. As the students do not provide patient care, the goal of this study was to evaluate if exposure to high-fidelity simulation scenarios improved the clinical reasoning of nursing students during a patient care situation.

Setting

This research took place at a small private college located in a rural area of the southeastern United States; with only small hospitals that offer few opportunities to experience obstetrical deliveries. Most often times, care for pregnant patients labeled "high risk" occur at large facilities in cities hours away. Clinical practicums have become more difficult to obtain and once secured, are strictly observational allowing only for passive learning. With such limited occasions to experience obstetrical situations, high-fidelity simulation has become the prime opportunity for nursing students to gain experience and practical knowledge in this specialty area of patient care. High-fidelity simulation offers opportunities to learn how to provide care with difficult obstetrical conditions and develop clinical decision making skills (Gardner, 2007). The students have multiple simulation scenarios incorporated throughout the semester in the Maternal Child Care course.

Design and Sample

This was a quasi-experimental quantitative study assessing the fourth year nursing students during their first senior semester in the maternal/child course. Nineteen nursing students prepared at the baccalaureate level were eligible for the study. All were English speaking, and 18 years of age and older. Sample size was based on demographic location of the college and student enrollment in the School of Nursing. This was a convenience sampling due to the rural nature of the college and their limited obstetrical clinical opportunities.

Methodology

The students were brought into the simulation lab and given a new scenario on a preeclampsia patient. The students were given 10 minutes to ask questions of the patient, complete a focused assessment, call the physician with the data gathered and develop and implement a plan of care. Using the PREPARED^{TM} Assessment Tool – Preeclampsia, this researcher evaluated the students' clinical competency skills based on their actions. Were the students able to identify that this was a preeclamptic patient? Did the students ask about signs and symptoms that affect a preeclamptic patient? Did the students recognize that the elevated blood pressure, visual disturbances, and headaches as well as the generalized and pitting edema were signs of preeclampsia and report them to the physician? Did the students provide reassurance to the patient? Did the students complete a basic neurologic assessment on the patient including mental status, visual exam, and assessment of deep tendon reflexes? Did the students initiate continuous fetal heart monitoring? Did the students obtain a urine sample or have basic lab work drawn? Did the students call the physician with results? Did the students anticipate receiving

orders for intravenous fluid infusion, anticipate an order for magnesium sulfate infusion? Did the students anticipate a 24-hour urine collection? Did the students place the patient on seizure precautions? Did the students reevaluate any intervention provided? Each category will be evaluated on a "Met Expectation" or "Did Not Meet Expectation" level. There was not be any input from the faculty during the simulation scenario.

Data Collection

Data collection was completed by the researcher observing the students during a high fidelity simulation scenario. Data was collected in a single three-hour session. The students were evaluated as to whether or not they met expected clinical reasoning benchmarks during the high-fidelity simulated experience. Descriptive analysis was used to evaluate and summarize the statistical findings.

Instrument

The instrument to be used in this research study is the PREPARED ™ Simulation Assessment Tool. The PREPARED ™ Simulation Assessment Tool was created by Laura Fero, Ph.D. and used in a pilot study comparing video-taped simulation to high-fidelity simulation in 2009. The PREPARED ™ Assessment Tool developed by Dr. Fero was designed to specifically test simulation-based performance. The tool provides an overall rating of knowledge and performance in several areas. During the simulation the participants will be evaluated on their ability to recognize the clinical problem, report the crucial clinical information, initiate appropriate nursing interventions, anticipate possible complications and treatment of care, specify validations to support decisions of care and prioritize care of patient (Fero, 2009). Performance will be rated as a "Met Expectations" or "Did Not Meet Expectations" for the categories and overall performance. In order to

obtain a score of "met expectations" for the overall performance, students will be required to meet standards in the six categories of problem, report, execute, prioritize, anticipate, and evaluate.

Validity

The validity of the PREPARED ^{TM} Assessment Tool is limited as it has only been used in a pilot study evaluating student's clinical reasoning during simulation. Measures to ensure reliability of this study included this researcher facilitating the pre-briefing, assessing the students during the simulation, and conducting the de-briefing post scenario.

Ethical Considerations

Approval to conduct this study was obtained from the Dean of nursing from the college. Signed informed consent was obtained by those students agreeing to participate in the research. There were no conflicts of interest or potential harm to participants.

Summary

This was a retrospective quasi-experimental quantitative study designed to assess the critical thinking and clinical decision making skills of nursing students in their maternal child course. The PREPARED ^{TM} Simulation Assessment Tool was used to evaluate the student's ability to recognize the problem, report to the physician, prioritize and execute care, anticipate orders, and evaluate interventions.

CHAPTER IV

Results

Introduction

Analysis of this research was to evaluate the clinical decision and critical thinking skills of senior nursing students during their first semester in the maternal child course. This research study evaluated the use of simulation in the development of critical thinking skills needed to provide appropriate care to patients in the obstetrical setting.

Demographic Characteristics

Nineteen nursing students prepared at the baccalaureate level were eligible for the study. All spoke English, and were 18 years of age and older. Sample size was based on demographic location of the college and student enrollment in the School of Nursing. Eighteen nursing students consented to participate and their information was included in this research.

Analysis

Analysis of data was completed by the researcher computing the scores of the students, based on a "Met Expectations" or a "Not Met Expectations" evaluation criteria. (Table 1)

Table 1

Analysis of Data

	Met Expectations	Did Not Meet Expectations	Percentage
Problem	18	0	100%
Report	14	4	78%
Headache/Vision Changes	16	2	89%
Vital Signs	16	2	89%
Assessment Findings	12	6	67%
Execute	0	18	0%
Verbal Reassurance	18	0	100%
Basic Neurological Evaluation	0	18	0%
Fetal Heart Monitoring	9	9	50%
Lab work – CBC, CMP, UA	18	0	100%
Prioritize	18	0	100%
Anticipate	0	18	0%
IV fluid infusion	5	13	28%
Magnesium Sulfate Infusion	2	16	11%
24-hr urine collection	0	18	0%
Initiate seizure precautions	0	18	0%
Evaluate	15	3	83%

Evaluation of the objective data collected revealed 100% (18/18) students were able to identify the preeclampsia medical condition presented in the scenario. Seventy eight percent (14/18) of the students were able to report to the physician all the appropriate objective and subjective findings after interviewing and assessing the patient. One hundred percent (18/18) of the students provided verbal reassurance to the patient. All students ordered the appropriate basic lab work for their patient; although some contacted the physician preemptively and needed to be reminded to consider the labs that needed to be completed before contacting the physician with results. Only 50% (9/18) of the students initiated fetal heart monitoring. After all laboratory data was resulted 100% (18/18) of the students contacted the physician. During the simulation only 7 of the 18 students (39%) verbalized only one anticipatory care concept they might provide to the patient. Finally, 83% (15/18) of the students were able to verbalize that they would continue to monitor the patient's condition and evaluate their interventions. Based on the PREPARED[TM] Assessment Tool – 0% (0/18) students 'Met Expectations' as no one was able to score in all areas of identifying the problem, reporting to the physician, executing care, prioritizing care, anticipating further care, and evaluating interventions.

After the high-fidelity simulation the students were asked to reflect on the exercise and what each one learned from this activity. This was provided in written format for the researcher. An area where the students did not perform well during the simulation scenario was 'anticipating' further care of the patient. However, reading the reflective writings from the students provided more insight to the anticipatory care that they were unable to verbalize during the simulation. Students reported anticipating placing the patient on bedrest, obtaining laboratory work daily while in the hospital,

reassessing the patient's vital signs regularly monitoring for improvement, as well as continue fetal heart monitoring. There were two students who even reported if the patient was placed on a magnesium sulfate infusion, the nurse would need to monitor for toxicity and to have calcium gluconate available if that occurred. Repeatedly the students stated they wanted to provide ongoing emotional support for the patient and family. Reading their reflective work demonstrated that the early clinical decision making skills are being developed even though they are not yet vocalizing these concepts.

Summary

Analysis of the data based on the PREPARED ^{TM} Simulation Assessment Tool demonstrated that the students did not "Meet Expectations" as they were not able to satisfactorily perform in each category. However, reviewing their written reflections after the simulation scenario revealed some of the clinical reasoning skills that they were not able to verbalize during the exercise.

CHAPTER V

Discussion

Introduction

Analysis of the data determined that the students were not "Meeting Expectations" as they were not performing satisfactorily for each category. Reflection of the research results requires future considerations on how to proceed on a research level as well as how to improve the learning opportunities for nursing students.

Considering the results of this research, what did we learn and what does this mean? The quantitative data did not prove conclusively that using high-fidelity simulation has improved clinical decision making or critical thinking skills in nursing students. There needs to be more quantitative research evaluating the use of high-fidelity simulation and with extended assessment over time, not just a single scenario. It would be interesting to see if repeated exposure to high-fidelity simulation scenarios would improve the student's clinical decision making skills. Using high-fidelity simulation scenarios have given the students an opportunity to work with patients experiencing specific conditions that hopefully will better prepare them when they actually encounter similar situations in professional practice. There has always been a gap between theory and practice and simulation is a tool to help bridge that gap, and ease the transition between students to practicing nurse.

Limitations

Limitations for this study stipulate that the sample was small and students were evaluated at a single point in time instead of over repeated scenarios. The PREPARED ™ Simulation Assessment Tool being used has been used in a pilot study previously; however, has not developed long standing reliability and validity.

Implications for Nursing

The research has shown that the military have implemented simulation for training purposes (Aebersold & Tschannen, 2013) and many larger hospitals have incorporated using simulation to better prepare their nursing staff for emergent situations. Practicing different roles and procedures can be helpful for nursing staff to become comfortable with and maintain familiarity with equipment not used regularly. Practice and familiarity of equipment and procedures during emergent situations has been found to improve patient outcomes (Partin et al., 2011).   As research has shown improved patient outcomes with the practice of emergent scenarios; many certification courses have incorporated using simulation and scenarios as a practical portion in their testing. The Advanced Cardiac Life Support (ACLS) courses and the Pediatric Advanced Life Support (PALS) courses are sponsored by the American Heart Association (AHA) (2016); and the Neonatal Resuscitation Program (NRP) course is co-sponsored by the American Academy of Pediatrics and the American Heart Association (AAP/AHA) (2016). All of these certification courses combine traditional learning with hands on practical application. Testing involves both a written examination as well as successful completion of simulation scenarios demonstrating appropriate clinical reasoning and demonstrating appropriate technique and skill.

Similarly using high-fidelity simulation can help make those vital connections for students between theory and practice; and providing repeated exposure to high-fidelity simulations scenarios while in nursing school can help imprint the theoretical concepts learned in the classroom which can better prepare the student for professional practice.

Recommendations for Future Research

Recommendations for future research first include a larger sample size for statistical validity. This researcher would also like to evaluate students by using the same PREPARED[TM] Simulation Assessment Tool in a multiple exposure high-fidelity simulation study. Single exposure does not seem to provide the quantitative results that repeated exposure can provide. As the first exposure creates a link between theory and practical for the students; evaluating their assessment skills, diagnostic considerations, anticipatory care, and evaluation of interventions during repeated exposure to high-fidelity simulation scenarios could show marked levels of improvement in clinical reasoning and further develop those vital critical thinking skills. It would also be important to consider if repeated exposure to high-fidelity simulation scenarios could improve the nursing students understanding of theory and improve their practice skills.

Summary

Studies have shown the importance of training nursing staff on conditions such as shoulder dystocia and other obstetrical emergencies to optimize possible outcomes and reduce the risk of errors (Gardner, 2007). Practicing emergent scenarios in a controlled setting have helped train nurses on the proper techniques and skills required during critical situations which can greatly improve patient outcomes. Gardner (2007) also related a study using simulation by Jude et al, comparing two groups of medical students.

One group of medical students was provided information on vaginal deliveries via traditional instruction while the other group received simulation-based training. The study reported that the students who learned through the simulation experience described having greater confidence in their abilities when facing a vaginal delivery in a real clinical setting (Gardner, 2007). Being able to participate in providing care offered more foundational learning than just learning in the classroom setting (Gardner, 2007).

The goal of this study was to use simulation to help foster the development of clinical reasoning and critical thinking of nursing students to better prepare them for the professional nursing role especially in specialty areas such as obstetrics where the learning opportunities are extremely limited. The analytical data of this quantitative study did not reflect improved clinical reasoning or critical thinking; however, the reflective writings of the students did provide some positive insight to this process. Further research needs to be conducted evaluating the use of high-fidelity simulation over an extended time to ascertain more definitive results.

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