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The Effect of High-Fidelity Human Patient Simulation on Stress Levels of Associate Degree Novice Nursing Students

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by

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Abstract

The clinical learning environment is an important component in the educational development of a student nurse. Nursing students have identified the clinical experience as one of the most stress producing components of their nursing education. Past research has shown high levels of stress can lead to decreased learning, affect clinical performance, increase clinical errors, and threaten physical or psychiatric wellbeing. Nurse educators' primary responsibilities are to help students effectively cope with their initial stress and facilitate student learning by applying the knowledge they gain in the classroom to the clinical environment. To allow students the opportunity to integrate theory into practice, the use of high-fidelity human patient simulation is becoming more widely accepted in nursing education as an instructional methodology. This study demonstrated a relationship between the use of high-fidelity human patient simulation and the reduction of stress levels in novice nursing students that has not been previously reported in the literature.

The purpose of this study was to investigate the effect of high-fidelity human patient simulation on the stress levels of associate degree novice nursing students prior to their first clinical experience. Fifty-five associate degree nursing students from one technical college tested the hypothesis that novice nursing students who receive practice on a high-fidelity simulator prior to their first clinical day will experience less stress and increased client system stability than those novice student nurses who do not.

This study used a quasi-experimental, pretest-posttest comparison group research design to examine self-reported stress levels on the Student Stress and Coping Inventory Clinical Experiences subscale (SSCI). Control group participants attended two days of

clinical in a skilled nursing facility on a long-term care unit. Intervention group participants attended a simulated clinical experience with a high-fidelity human patient simulator followed by a clinical day the same skilled nursing facility as the control participants. Betty Neuman's Systems Model was used to investigate whether a simulated first day clinical experience will perform as a primary prevention as intervention method on associate degree novice nursing students' system stability to reduce stressor reaction and protect the flexible line of defense.

Study results confirmed the hypothesis and revealed that intervention participants who did not report any experience in healthcare and participants who reported no employment in healthcare identified significantly lower levels of stress on their SSCI posttests compared to control group participants whose posttest stress scores increased. Preparation using a simulated first day clinical experience with a high-fidelity mannequin demonstrated to be a primary prevention as intervention method and increased novice nursing student system stability. Research findings confirmed a significant difference in overall mean stress scores between the intervention and control group participants who did not report any experience in healthcare and those who were not employed in healthcare. Control group participants reported higher stress scores following their initial clinical experience whereas intervention participants reported a decrease in stress following a simulated first day clinical experience and their first clinical day.

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Chapter I: Introduction

"Tell me and I forget. Teach me and I remember. Involve me and I learn."

Benjamin Franklin

The purpose of nursing education is to prepare future nurses to function in the current complex healthcare environment. Nursing students are educated to participate as members of an interdisciplinary healthcare team, use critical thinking skills to make clinical decisions for safe patient care, and communicate effectively with patients and their support systems. A critical component of nursing education is exposure to the clinical environment. This educational process presents many challenges and stressors for nursing students. Currently, undergraduate nursing enrollment has seen an increase in nontraditional students with diverse backgrounds (Moscaritolo, 2009). Nontraditional students are adults entering the college setting with work and life experiences frequently unrelated to nursing who need to balance work, home, and school responsibilities (Moscaritolo, 2009). Stress can generate from these multiple responsibilities and interfere with students' nursing education. Nowhere is this stress more prevalent than in the students' initial clinical experience. Nurse educators play an essential role in establishing a learning environment that reduces students' potential stressors. Incorporating educational practices that can reduce some of the stress associated with these challenges is constructive and essential to student nurses' well being. High levels of stress may lead to decreased student learning and disruptions in their physiological and psychological health. According to the American Institute of Stress (n.d.), the effects of stress include a multitude of physical and emotional symptoms affecting the immune, cardiovascular, and gastrointestinal systems (http://www.stress.org/Effects_of_stress.htm). This knowledge can be used to develop a nursing curriculum that focuses on reducing students' perceived

stressors by altering clinical situations in which learning and performance may be impaired. To help students meet course objectives, nurse educators should focus on developing a variety of learning strategies and interventions that will enable them to effectively cope with the stressors of the clinical environment.

The introduction of high-fidelity human patient simulation into the nursing curriculum as an instructional pedagogy for the clinical component is one method to prepare students for the clinical environment. While the use of simulation in a variety of forms has been used in nursing education for many years, recent improvements in technology have created computerized, interactive, full-scale mannequins with the ability to create patient care scenarios that respond physiologically to nursing interventions. Simulation, based on the educational theories of constructivism and adult learner-oriented instruction, is emerging as a new innovative teaching method in nursing education (Jeffries, 2007). Through scenario-based simulations and debriefing, students develop their skills in the affective, cognitive, and psychomotor domains. Clinical practice with a human patient simulator allows for an immersive, experiential learning activity. Students are active participants in a hands-on experience that integrates didactic learning and builds on previous knowledge and experiences. Unlike the traditional classroom lecture setting, simulation allows the nursing student to practice in an environment that is as close to a "real-life" clinical situation as possible and provides the opportunity for active, spontaneous critical thinking. According to Leigh and Hurst (2008), high-fidelity human patient simulators have bridged the gap between theory and practice.

Background

Stress has become such an ingrained part of our vocabulary and daily existence that is it has become a fact of life for many people. The American Psychological

Association's 2007 "Stress in America" poll found that one-third of people in the United States report experiencing extreme levels of stress; of those, nearly one-in-five report they are experiencing high levels of stress 15 or more days per month (http://www.apa.org). Dr. Hans Selye first popularized the concept of stress in the 1950s. He theorized that all individuals respond to all types of threatening situations in the same manner. Selye's work was based on the premise that any activity or emotion can cause stress necessitating a reaction from the individual to change or adapt their behavior before exhaustion ultimately occurs (http://www.stress.org/hans.htm).

Research has clearly demonstrated that undergraduate nursing students have identified the clinical learning environment as one of the most stress producing experiences of their nursing education (Beck & Srivastava, 1991; Blum, Borglund, & Parcells, 2010; Bremner, Aduddell, & Amason, 2008; Cook, 2005; Ghaffari & Conco, 2007; Gorostidi et al., 2007; Jones & Johnston, 1997; Oermann & Gaberson, 2006). Specifically, nursing students have stated the initial clinical experience has provided the most anxiety (Admi, 1997; Beck, 1993; Kleehammer, Hart, & Keck, 1990; Pagana, 1988; Sharif & Masoumi, 2005). Nurse educators should examine the latest research to identify what interventions can be instituted to decrease the stress and anxiety students experience in the initial clinical experience. It is not anticipated that all anxiety students perceive can be relieved, but if clinical learning is to be facilitated, anxiety must be kept at a reduced level (Kleehammer et al., 1990).

Nurse educators are challenged to provide clinical experiences in an environment that facilitates student learning and fosters emotional stability, especially for the novice nursing student. Today's nursing students have to be prepared to solve problems quickly and make appropriate decisions in the complex, fast paced flow of the clinical

environment. Incorporating high-fidelity human patient simulations into a nursing curriculum as a teaching methodology offers nurse educators the opportunity to meet the students' educational needs by providing them with an interactive, practice-based instructional strategy (Jeffries, Clochesy, & Hovancsek, 2009). These simulations can help enrich a clinical learning environment by promoting students to think critically, solve problems, and care for diverse patients in a nonthreatening, safe environment (Jeffries et al., 2009). Issenberg et al. (2005) concluded that in scenario-based patient simulations, students are able to integrate into practice what they have learned in lecture without the fear of injuring an actual patient (as cited in Leigh & Hurst, 2008). Human patient simulators provide students the ability to practice complete patient care, assessment and technical skills, decision making, teamwork, delegation, and management in a secure environment (Kuznar, 2007). Additional advantages of scenario-based human patient simulation identified by research include: the clinical setting can be realistically re-created, active learning can occur, errors can be corrected and discussed immediately, no threat to patient safety, consistent experiences for all students, scenarios can be paused for reflection and discussion, acquisition and retention of knowledge, enhanced critical thinking and psychomotor skills, increased confidence and clinical judgment, and use of recorded sessions for debriefing (Lasater, 2007; Medley & Horne, 2005; Rauen, 2004).

Debriefing takes place at the end of the scenario session and is an essential element to the simulation experience. It allows students to view their recorded performance and discuss their verbal and nonverbal communication techniques as well as their nursing skills in a nonjudgmental environment. Reflective learning occurs as the students discuss the process, interventions, outcomes, and application of the scenario to clinical practice (Jeffries, 2005). Debriefing reinforces the positive aspects of the

experience, involves the students in critical thinking, and encourages problem-solving techniques in a supportive evaluation process.

Although researchers in the past have identified many aspects of perceived stressful situations for nursing students in the clinical environment, there is a lack of current research investigating this area. Of those studies, only a few have focused on the effect of high-fidelity human patient simulation on the reduction of stress levels for novice students (Alinier, Hunt, Gordon, & Harwood, 2006; Bremner et al., 2008). Most simulation research has centered on the acquisition of clinical skills, knowledge acquisition, evaluation of specific competencies, critical thinking, student satisfaction, self-confidence, self-efficacy, clinical judgment, and communication with baccalaureate nursing students (Bambini, Washburn, & Perkins, 2009; Blum et al., 2010; Lasater, 2007; Medley & Horne, 2005; Nehring, Lashley, & Ellis, 2002; NCSBN, 2009; Radhakrishnan, Roche, & Cunningham, 2007; Rauen, 2004). Only one research study indentified the use of high-fidelity human patient simulation with associate degree nursing students (Kuznar, 2007). According to Oermann and Gaberson (2009) simulated experiences may be effective in reducing some of the anxieties nursing students experience by allowing them to practice their skills, but more research is needed.

Furthermore, a review of the literature was unable to provide evidence of any research studies that used Cohen's Student Stress and Coping Inventory Nursing Clinical Experiences subscale to identify nursing students' clinical stressors.

Purpose

The aim of this quasi-experimental study was to investigate the effect of high-fidelity human patient simulation on the stress levels of associate degree novice nursing students prior to their first clinical experience. In addition, high fidelity human patient

simulation will be used as primary prevention as intervention method in Neuman's Systems Model to investigate the effect on associate degree novice nursing student system stability.

Research Hypothesis

Associate degree novice student nurses who receive practice on a high-fidelity human patient simulator prior to their first clinical day will experience less stress and increased system stability than those novice student nurses who do not.

Research Questions

The following research questions were developed for this study:

1. Will clinical practice on a high-fidelity human patient simulator reduce stress levels of novice associate degree nursing students prior to their first clinical experience?
2. Does preparation on a high-fidelity human patient simulator perform as a primary prevention as intervention method in Neuman's Systems Model to increase associate degree novice nursing student system stability?

Definition of Terms

The following operational definitions were used in this research study:

Stress – Hans Selye described stress as the "nonspecific induced biological response of the body to any demand placed upon it" (as cited in Freese, 2006, p. 319).

Neuman defined stressors "as tension-producing stimuli with the potential for causing system instability" (as cited in Fawcett, 2005, p. 322).

Cohen (2001) used this explanation of stress for her Inventory: “stress is defined as something in a person’s environment that he/she believes or feels is upsetting, threatening, or endangering to him/her” (p. 227).

High-Fidelity Human Patient Simulator – a computer assisted, lifelike human mannequin who’s verbal and physiological responses mimic realistic changes in “patient’s” cardiovascular, respiratory, neurological, metabolic, genitourinary, and pharmacological condition. A high-fidelity human patient simulator has anatomically correct pulses, measurable blood pressure, heart and lung sounds, bowel sounds, blinking eyes with reactive pupillary response, and can speak in preprogrammed voices or through a microphone by the individual operating the simulation scenario.

Simulation – defined by Jeffries (2005) is an activity that mimics the reality of a clinical environment and is designed to demonstrate procedures, decision-making, and critical thinking through techniques such as role playing. A simulation may be very detailed and involves the use of devices such as mannequins to closely simulate reality.

Theoretical Significance

Nurse educators face complex challenges as they strive to teach the new technology-savvy generation of nursing students. Today’s students require educational instruction to be fast-paced and interactive. Meeting these challenges will require creative new approaches to transform teaching practices for the learning environment of the future. The interactive, sophisticated computer technology of the high-fidelity human patient simulator has appeal for contemporary learners (Durham & Alden, 2008).

Simulation involves the students in the educational process whereby they can witness immediate results of their actions and interventions. Furthermore, simulations provide a mechanism for students to apply their knowledge and practice their technical

skills before entering the clinical learning environment. Through the incorporation of human patient simulations into the nursing curriculum nurse educators have the opportunity to meet the students' educational needs by providing them with an interactive, practiced-based instructional strategy (Billings & Halstead, 2009).

Additionally, nurse educators are challenged with reducing the identified stressors affecting present day nursing students. Practice using high-fidelity human patient simulation is an opportunity for students to become more familiar with the clinical learning environment thereby reducing their stress levels before the initial clinical experience.

Theoretical Framework

The Neuman Systems Model (NSM) provided the theoretical framework for this research study to explore high-fidelity human patient simulation as an interventional strategy in order to decrease stress levels in novice nursing students prior to entering the clinical learning environment. While Neuman originally developed the model as a teaching aid, it is now used globally as a nursing conceptual model and a grand nursing theory (Aylward, 2006; Freese, 2006). As a model, it has been used as a conceptual framework for research, been adapted to a wide variety of nursing practice areas, and incorporated into all levels of nursing education (Freese, 2006). According to Fawcett and Gigliotti (2001), the Neuman Systems Model "…provides clear direction in describing stressors; explaining the factors that influence reactions to those stressors; and testing the effects of primary, secondary, and tertiary prevention of stressor reactions…" (p. 339).

Graphically, the model is depicted by a series of concentric rings that represent Neuman's core concepts which are; client/client system, lines of resistance, flexible line

of defense, and normal line of defense. Within the model a client system is defined as an individual, family, group, or community. The client system is a combination of five interacting variables; physiological (bodily structure and function), psychological (mental processes and relationships), sociocultural (social and cultural functions), developmental (life-developmental processes), and spiritual (spiritual belief influence) (Aylward, 2006; Fawcett, 2005; Freese, 2006). These protect against the impact of and reaction to perceived stressors. The client as a system is the basic central core structure for the NSM and was addressed from the individual perspective of the novice associate degree nursing student for this research study.

The lines of resistance are a series of broken concentric rings that surround the basic core structure. These rings represent resource factors that help defend against a stressor reaction and attempt to stabilize the client system.

The normal line of defense is a solid ring which lies outside the lines of resistance. It represents the client/client system's normal or usual level of wellness and stability state.

The flexible line of defense is the model's broken ring outer boundary that protects the structure from instability caused by penetration from harmful stressors. This outer ring acts as the client system's first protective mechanism. According to Neuman, the flexible line of defense is an "accordion-like mechanism that acts like a protective buffer system to help prevent stressor invasion of the client system" (Aylward, 2006, p. 283). The relationships of the client's system five interacting variables affect the degree to which individuals are able to use their flexible line of defense against possible reactions to a stressor (Freese, 2006).

The central focus of the Neuman Systems Model is based on the wellness of the client system in relationship to environmental stressors and reactions to those stressors (Fawcett, 2005). For novice nursing students who are frequently faced with numerous stressors during their clinical experience, this focus is particularly relevant. The NSM concepts of client system, psychological variable, stressor, flexible line of defense, primary prevention as intervention, stressor reaction, and client system stability were used in this study on the effect of high-fidelity human patient simulation related to the stress levels of ADN novice nursing students. The precise problem to be studied is the effect of primary prevention as intervention on the impact of a stressor to promote client system stability.

Neuman's definition of stress for the Systems Model was derived from Hans Selye's research which described stress as the "nonspecific induced biological response of the body to any demand placed upon it" (Freese, 2006, p. 319). This demand requires identification and adaptation to the stressor(s) before it invades the system's outer boundary's protective flexible line of defense. According to Neuman, stressors are the "tension-producing stimuli that have the potential to disrupt system stability" (as cited in Freese, 2006, p. 322).

Stressor, as defined in this research study, is the first clinical experience in the ADN student rotation. A stressor must penetrate the flexible line of defense before it is capable of penetrating the rest of the client system. In an effort to guard against this penetration, primary prevention as intervention methods are implemented to prevent stressor invasion. Prevention as intervention is described in Neuman System's Model as "purposeful actions to help the client retain, attain, or maintain system stability" (Freeze, 2006, p. 322). This intervention can begin at any point that a stressor is identified or

suspected, but before a reaction has occurred and the normal line of defense has been invaded (Aylward, 2006; Fawcett, 2005). The goal of primary prevention is to promote and protect the client wellness state by reducing the possibility of a stressor encounter and strengthening the client's flexible line of defense (Fawcett, 2005). Primary prevention as intervention in this research study is the educational session of a simulated first day clinical experience on a high-fidelity human patient simulator.

Stressor reaction is defined by Neuman as "the amount of energy required for the client to adjust to the stressor" (as cited in Freese, 2006, p. 322). Stressor reaction is identified in this study as the psychological variable in the flexible line of defense. It is represented by perceived stress that novice associate degree nursing students recognize before and after an educational intervention or clinical experience. This reaction will be measured by pretest and posttest scores on the Student Stress and Coping Inventory Nursing Clinical Experiences subscale (SSCI).

Additionally, the effects of the primary prevention as intervention will be measured by the difference in the scores on the pretest and posttest SSCI of the intervention and control groups. Results from this research study will test this intervention on client system stability. According to Neuman, stability is defined as "…a desired state of balance in which the system copes with stressors to maintain an optimal level of health and integrity" (as cited in Freese, 2006, p. 321).

Chapter II: Review of the Literature

A review of current literature was conducted using Academic OneFile, the Cumulative Index to Nursing and Allied Health Literature (CINAHL) Plus with full text, and Healthsource Nursing and Academic Edition electronic databases. Research articles were limited to full text, scholarly (peer reviewed) journals from 2005 to present. An initial search for research related to the reduction of stress levels of novice nursing students using high-fidelity simulation did not yield any results. Therefore, key words used to search were clinical stress, novice nursing students, and high-fidelity simulation. This search produced a large number of articles that were reviewed for inclusion in this research study. The following articles were selected based on their relationship to the chosen research topic. In addition, a review of current literature was conducted for research articles utilizing the Newman Systems Model. One article was appropriate for inclusion in this study.

High-Fidelity Human Patient Simulation

A descriptive study conducted by Kuznar (2007) measured associate degree nursing students' perceptions of satisfaction with learning using a high-fidelity Human Patient Simulator (HPS). The purpose of this study was to expand current knowledge of HPS use in nursing education. A twenty-one item survey was developed by the researcher and was based, with permission, on a survey created by Feingold, Calaluce, and Kallen (2004). Research questions developed for this study included: participants' overall satisfaction with the HPS experience, realism of the simulation environment, satisfaction with faculty developed scenarios, and increased participants' confidence levels prior to actual clinical experience specifically in the areas of patient assessment, data collection, critical thinking, decision making, technical skill development, and

prioritization. These specific areas were measured on a survey developed by the researcher using a five-point Likert-type scale ranging from very dissatisfied (1) to very satisfied (5). Reliability and validity were not established with this survey. To address these issues, the researcher asked 10 practicing nurses who were recent graduates and 20 registered professional nurse educators who were familiar with HPS methodology to evaluate the survey for content validity. Students in the final semester of their nursing program at a moderately sized midwestern technical college were asked to participate in the study. Thirty-seven of 43 students provided demographic data and completed the survey. The participants were asked to base their answers on their HPS experiences from three separate courses during their nursing program. Results indicated that the participants were highly satisfied with learning using HPS technology. Participants felt the simulation laboratory provided them with realistic clinical experiences, increased confidence in technical skill development, and facilitated the development of prioritization skills. Limitations of the study include a narrow focus of associated degree nursing students at one technical college in the Midwest. Additionally, the survey used in the study had not been tested to establish reliability and validity. In conclusion, overall results of the study indicated most of the participants agreed or strongly agreed they were not only satisfied with their HPS experiences, but that the simulator had improved their learning.

Bremner, Aduddell, Bennett, and VanGeest (2006) investigated the value of using high-fidelity human patient simulation technology as an educational methodology from the perspective of novice nursing students. A qualitative and quantitative analysis of student's perceptions to simulation was conducted in four areas of interest including teaching/learning utility, realism of the Human Patient Simulator (HPS), limitations to

the HPS methodology, and confidence/comfort levels with the use of HPS in teaching assessment skills during clinical scenarios. The researchers hypothesized the results of this study would lead to the establishment of best practice areas using HPS methodology with novice nursing students. Fifty-six novice students enrolled in a baccalaureate degree nursing program conducted a head-to-toe assessment using the HPS during their assigned nursing course. After the initial assessment, faculty members adjusted preprogrammed changes in the HPS physical characteristics. Each student was prompted by a faculty member to "recheck the patient". Upon completion of this learning exercise, 41 of the 56 students completed a two-part questionnaire about their experience. The first section of the questionnaire was scored with a Likert rating scale to identify the participants' overall perceptions of their experience with the HPS, their opinion as to whether the simulator experience should be a mandatory or voluntary component of the nursing curriculum, if the experience gave them confidence in physical assessment skills, and if the HPS experience relieved some stress or anxiety on the first clinical day at the hospital. The second section of the questionnaire requested comments in written form from the participants after completion of their clinical experience in the course. Findings demonstrated that 95% of the participants rated the HPS experience from good to excellent and 68% indicated the simulation should be a mandatory component of their nursing education. Furthermore, 61% of the participants felt that the experience gave them confidence with their physical assessment skills, whereas 42% reported that the HPS experience relieved some of the stress associated with the first day of clinical for novice students. Qualitative data indicated the participants perceived the benefits of HPS as an educational methodology and thought it was beneficial to their clinical preparation. The most cited limitation to this educational methodology by the participants was not

having enough time to work with the simulator. In conclusion, this study documented the value of HPS technology as an educational methodology in the four areas of teaching/learning utility, realism, confidence/comfort, and limitations. Participants felt the HPS experience provided active learning and allowed them to build confidence before the first day of clinical. Based on the results of the study the following areas were recommended best practices when using the HPS: well-articulated learner outcomes, establish a clear connection to course/clinical objectives; establish ongoing training and supervision of faculty, staff, and participants; collaboration with student and faculty in planning, implementation, and evaluation of each HPS session; and integrate a debriefing session after each HPS experience.

Radhakrishnan, Roche, and Cunningham (2007) designed a quasi-experimental pilot study to evaluate the effects of using systematic practice with a Human Patient Simulator (HPS) on the clinical performance of second degree senior BSN students. Participants were randomly assigned to either the intervention or control group. The sample consisted of 10 female and two male participants. Each member of the intervention group participated in two, one-hour practice simulations, evenly spaced during the semester. The researchers developed two variations of a clinical simulation for the intervention group. These situations involved two patients with complex diagnoses, one of whom developed a medical emergency. The control group completed their clinical requirements with no simulated practice. All aspects of the participants' clinical education were the same for both groups. The study participants were evaluated at the end of the semester using a faculty developed Clinical Simulation Evaluation Tool (CSET). The objectives evaluated were safety, basic assessment, prioritization, problem-focused assessment, ensuing interventions, delegation, and communication. Results

demonstrated that students in the intervention group achieved significantly higher scores for safety and basic assessment skills than students in the control group. No other significant differences in clinical performance were found in the clinical objectives tested. The researchers hypothesized that the students who had additional practice sessions with HPS complex patient management simulations would perform better in every aspect of clinical performance. Although this was not the case, the results of this study suggested that practicing patient safety measures such as hand hygiene and proper patient identification along with assessment techniques and monitoring of basic vital signs during clinical simulation exercises improved nursing students' performance. Limitations identified by the researchers included a small homogenous convenience sample size, no alternate experience for the control group such as a written case study, and lack of a pretest simulation at the beginning of the semester. In conclusion, it is indicated from this study that students who practiced with the HPS in addition to their usual clinical requirements had significantly higher scores than the control group for safety and basic assessment skills on the CSET.

Alinar, Hunt, Gordon, and Harwood (2006) designed a study to determine the effect of scenario-based simulation training on nursing students' clinical skills and competence. The aim of this study was to critically appraise the value of the use of simulation in nursing education. A pretest/posttest design was used with volunteer undergraduate nursing students (n = 99) who were in their second year of a Diploma of Higher Education Nursing program in the United Kingdom. Researchers compared the performance of nursing students in traditional clinical settings (control group, n = 49) with those that were exposed to scenario-based simulation training (experimental group, n = 50) using a 15-station Objective Structured Clinical Examination (OSCE). After an

initial OSCE assessment session, students were randomly assigned between the two groups. The OSCE is an assessment composed of several short exercises or stations through which students rotate individually for a given time. For the purposes of this study students had 5 minutes to rotate through four theoretical stations with questions on safety and nursing practice and 11 stations that required clinical knowledge, technical ability, and communication skills. The experiential group, as well as following their normal clinical curriculum, was exposed to two simulation sessions focusing on patient care and clinical skills. The researchers hypothesized the experimental group would perform better on the OSCE posttest than the control group. As an ethical consideration, students who had been assigned to the control group were invited to attend the simulation training sessions after the study was completed. Before the start of the second OSCE, all students completed a questionnaire regarding demographic data, the use of technology in nursing practice, and their level of confidence and stress when working in a technological environment. Results indicated that students in both groups improved their clinical performance on the second OSCE; however students in the experimental group obtained statistically significant higher performance scores than those in the control group. Questionnaire results used a 5-point Liker scale (1, not stressful; 5, very stressful) and demonstrated that the two groups differed only slightly with respect to perceptions of stress and confidence. The main limitation of the study cited that the two OSCEs and the simulation experience were not part of the Nursing curriculum. Participants often participated in the study on their own time and many had outside family commitments. This made the study more difficult to manage and more resource intensive. In conclusion, this study demonstrated that intermediate-fidelity simulation was useful as a training technique in nursing education. The simulation experience enabled small groups

of participants to practice in a safe, controlled environment, act on their own judgment, and allowed them to learn from their mistakes.

The National Council of State Boards of Nursing (2009) conducted a pilot study to examine the effectiveness and applicability of high-fidelity simulation alone and in combination with clinical experience on clinical performance, self-confidence, and knowledge acquisition/retention of nursing students. Demographic data was collected to reveal age, sex, race, previously held degree(s), and previous health care work experience. A randomized controlled design with repeated measures of pre and posttreatment was used to address the variables of this study. Confidence was defined using the explanation of self-efficacy in Albert Bandura's Social Cognitive Theory. All senior baccalaureate nursing students enrolled in a required critical care course in two separate cohorts (2006 and 2007) were invited to participate in the study. A total of 58 students chose to take part in the research. Simple random selection was used to determine assignment to one of the following three groups: clinical without simulation (30 hours of clinical preceptorship with a critical care nurse), simulation without actual clinical experience (30 hours of simulation), or simulation plus clinical experience (15 hours of simulation and 15 hours of clinical). Measurements of knowledge acquisition and retention were assessed with written examinations before and after the clinical or simulation experiences. The examination consisted of 50 items that reflected course content. Clinical performance was measured based on the students' ability to provide nursing care during three patient care scenarios. Scores for each scenario were generated from a blueprint, based on the nursing process and developed by nurses who were experts in the care of critically-ill clients. Performances of the three groups of students were compared to determine if there was an advantage of high-fidelity simulation-based

learning over actual clinical experience. In addition, each student was videotaped for further analysis of their performance. An evaluation tool was developed for this study and students' actions were rated for adequacy. Self-confidence was assessed using a 12 item Likert-type scale created by the researchers. The response option of each item ranged from 1 (strongly disagree) to 4 (strongly agree). Higher scores indicated greater self-confidence. Results did not establish any significant difference in the change of knowledge acquisition/retention or clinical performance between the groups. Performance for students in the clinical/simulation and clinical alone groups were rated higher by the faculty reviewing the video tapes than students in the simulation only group. Students in the simulation and clinical/simulation groups had a statistically significant increase in their self-confidence level following their simulation experiences. Several study limitations were noted by the researchers. First, the instruments used were created to fit the purpose of the study. Although face validity and reliability were strong, construct validities were not established. Additionally, no inter-rater reliabilities were established. While the study was designed as a randomized trial, it was not double blind. Lastly, the small sample size of each group limited the conclusions that could be drawn from this study. In conclusion, the results of this study proved to be inconclusive in demonstrating the effect of high-fidelity simulation on nursing students' knowledge acquisition and retention. However, the study provided evidence that clinical experience in combination with simulation training may increase self-confidence and provide the best performance outcomes for beginning senior level nursing students.

Sources of Stress Experienced by Nursing Students

A review of literature revealed nursing students associated clinical experiences with high levels of anxiety. Students identified the most stressful time as the initial

clinical experience. Sharif and Masoumi (2005) used a focus group design to investigate nursing students' opinions and experiences regarding their clinical practice. Ninety nursing students (30 each from the second, third, and fourth year) at Shiraz University of Medical Sciences in Iran were randomly selected to participate in the study. These students were divided into nine focus groups of ten participants. Qualitative research was gathered using nine open-ended questions to obtain participants' opinions related to their clinical experience. The first two questions asked the participants to describe their feelings about nursing in general and were used as ice breakers to stimulate discussion and place participants at ease. The remaining questions focused specifically on the participants' clinical experiences. Data was collected at each session through written notes and audio tape. A public health graduate acted as an observer who attended all focus group discussions and helped the researchers by taking notes and observing the students non-verbal behavior during the sessions. Immediate debriefing was held after each focus group. Data was analyzed through written responses from the researchers and observer, transcription of audio tapes, and observer notes for non-verbal communication such as gestures and behavior. The qualitative data analysis from the focus groups led to the emergence of four themes; initial clinical anxiety, theory-practice gap, lack of reliable clinical supervision, and professional role confusion. First, participants described the difficulties experienced at the beginning of the clinical placement. They expressed concern about the possibility of harming a patient through their lack of knowledge and nursing skills. Almost all of the participants had identified feeling anxious in their initial clinical experience. Fourth year participants felt their stress levels had reduced as their training and experience progressed. Secondly, participants identified a lack of integration of theory into clinical practice. The focus group discussion concentrated on the lack of

opportunities to practice what they had learned in the classroom and laboratory in the clinical settings. Clinical supervision during clinical practice was identified as the third theme. Participants saw their instructors in an evaluative role rather than a teaching role. They expressed concerns that the nursing unit manager and staff nurses were too busy and unprepared to act as an instructors in the clinical placement. Lastly, participants stated their clinical duties were not really professional nursing. Focus group data revealed participants learned that nursing is a professional occupation requiring knowledge, training, and skills which they were unable to demonstrate due to their role restrictions in the clinical setting. In conclusion, the results of this study clearly identified the initial clinical experience as extremely stressful. Nursing student participants experienced anxiety as a result of feeling incompetent in knowledge and professional nursing skills for complex patient care. They desired more clinical supervision and expressed a gap between theory and clinical practice. Researchers suggested the themes that emerged from this study are important for nurse educators to use in designing strategies for more effective clinical experiences.

A prospective, longitudinal cohort study was conducted by Gorostidi et al. (2007) to explore the evolution of nursing students' perception of stressors associated with clinical practice. The research sample consisted of students registered for their first year of study at the San Sebastian Nursing School in Spain. In order to identify what was considered by nursing students to be the most stressful aspects of clinical training, the researchers developed a questionnaire which measured the degree of perceived stress in 41 potential situations. The questionnaire was administered four times during a three year period to the same group of nursing students; before initiating clinical training and during their last week in clinical at the end of their first, second, and third years of school.

Data collected included demographic information and components from the KEZKAK and State-Trait Anxiety Inventory (STAI) questionnaires. The KEZKAK is a bilingual questionnaire that was developed by the researchers to measure nursing student's stressors in clinical practice. It consisted of 41 items and asked the students to rate how much the described situation worried them (0: not at all; 1: a little; 2: quite; 3: a lot). The STAI questionnaire measured 2 aspects of anxiety: trait-anxiety (predisposition to anxiety) and state-anxiety (the anxiety level reported several days before answering the questionnaire). Sixty-nine of the 125 students who began the study answered the questionnaire completely on all four occasions. Nine principle factors of stress were reported by nursing students in this study. They were: lack of competence, contact with suffering, uncertainty and powerlessness, lack of control in the relationships with patients, emotional involvement, patients seeking a closer relationship, being harmed in the relationship with patients, and relationships with tutors and companions. The factor reported by students to cause the highest level of stress was lack of competence. This factor lost it stressor power progressively during the study, but nevertheless remained the most stressful at the end of the students' clinical training. In addition, the other reported eight factors demonstrated a general decrease in stress scores and remained ranked in the same order of importance from the beginning to the end of the study. Researchers hypothesized this generalized weakening of stressor power was likely due to progressive exposure to clinical work, observational learning, supervised clinical training, and the gradual acquisition of experience. Several limitations were noted by the researchers in this study. First, the final sample size was 53.1% of the initial population. There were two reasons cited for the exclusion: the student did not pass the examinations necessary to progress to the third year, or the student did not fully complete all the answers required

on the questionnaire on all four occasions. Secondly, even though reported results were similar to other studies reviewed by the researchers, generalization of this study may be limited by cultural dependence. In conclusion, nursing students should be informed in advance of the perceived evolution of stressors associated with the profession. Once aware that the stressors may reduce as they gain experience during their clinical training, nursing students can begin to form strategies to help them cope with related stress.

The aim of Bremner, Aduddell, and Amason's (2008) research study was to provide an analysis on the impact of the use of human patient simulation as a teaching strategy for first-year baccalaureate nursing students in relation to their clinical experience. Specifically, researchers examined the effects of a hands-on session with a Human Patient Simulator (HPS) on the anxiety levels of nursing students prior to their first clinical experience. In addition, the relationship between students learning and coping styles along with the HPS educational technology was explored. Research methodology for this study consisted of an experimental design using randomized intervention groups over two consecutive college semesters. The target population consisted of a convenience sample of sophomore level nursing students enrolled in a large baccalaureate nursing program in the southeastern United States. Students (n = 149) were randomly divided into two groups during the spring and fall semesters. The intervention group (n = 71) received an educational session using the HPS one week prior to their first clinical experience. The control group (n = 78) practiced in a skills lab during the same time frame. Both groups reviewed patient safety concerns, vital signs, and basic physical assessment skills. Three instruments were given to the students and used to measure study outcomes. A questionnaire designed by the researchers to collect demographic data and evaluate the learning experience was given to both groups after

their educational sessions and repeated one week after their hospital clinical experience. Secondly, researchers used the Self Assessment Inventory to measure the students learning styles and assessed personal characteristics specific to stress and coping. The Inventory is a Likert-type assessment designed to be administered to adult nursing program populations. Lastly, students also completed the State-Trait Anxiety Inventory (STAI). The STAI is comprised of the STAI-A trait scale and the A-State scale. These self-reported scales measured two distinct anxiety concepts and allowed the researchers to examine students' normal state of anxiety versus their anxiety related to the first clinical experience. Results showed there were no significant differences between the interventional and control groups related to the demographic data, students' learning and coping styles, and anxiety levels. The Self Assessment Inventory indicated a majority of the students preferred visual and tactile learning styles and were group learners. These types of learning styles correlated with the use of HPS technology as an appropriate education strategy. Results from the researchers' questionnaire for the intervention group indicated students believed the HPS experience was positive and should be a component of the nursing curriculum, relieved their stress on the first day of clinical, increased their confidence with physical assessment skills, and decreased their anxiety about starting the clinical experience. The variance between the groups' means on the pre and post tests for both semesters demonstrated a significant difference in the comfort levels between the intervention and control group. The intervention groups reported lower scores on the STAI anxiety scales following their HPS session and one week after the start of their clinical experience. In conclusion, this study established evidence-based educational methodology for using HPS sessions to assist BSN students with their anxiety level prior to their first clinical experience.

Cook (2005) investigated the relationship between junior and senior generic baccalaureate nursing students' perceptions of personally and professionally inviting teaching behaviors of clinical nursing faculty. In addition, the researcher compared students' self-reported state anxiety while interacting with faculty during their clinical experiences. A synthesized theoretical framework adopted from Novak and Purkey's invitational education theory and Spielberger's State-Trait Theory of Anxiety guided the research study. This framework proposed that when students perceive faculty to convey inviting or positive behaviors, lower state anxiety levels and increased learning and performance capabilities will result. Ten nursing programs were chosen from a stratified, random sampling of accredited generic baccalaureate nursing programs in the United States. A total of 229 students (123 juniors and 106 seniors) with a mean age of 26 years comprised the final sample. The majority of the participants were full-time, female students enrolled in medical-surgical nursing courses who had spent more than six clinical days with the instructor they chose to rate for the study. The Clinical Teaching Survey (CTS), Spielberger's State Anxiety Scale (S-Anxiety Scale), and a 15-item demographic data questionnaire were used as instruments for this descriptive, correlational, and comparative study. The 44-item CTS was used to measure nursing students' perceptions of personally and professionally inviting teaching behaviors of clinical nursing faculty. Participants were asked to rate the faculty member on each teaching behavior using a 5-point Likert scale ranging from 1 (very seldom) to 5 (very often/always). Examples of personally inviting teaching behaviors on the CTS included faculty sharing their own clinical experiences with students, taking time to talk with students about their own out-of-clinical activities, exhibiting a sense of humor, showing appreciation for students' presence in the clinical area, and showing sensitivity to

students' feelings. Spielberger's S-Anxiety Scale was used to measure nursing students' perceptions of their own state anxiety when interacting with the clinical nursing faculty member during their current clinical experience. The S-anxiety scale consisted of 20 items rated on a scale from 1 (not at all) to 4 (very much so). Essential characteristics measured by the anxiety scale included feelings of tension, nervousness, worry, and apprehension. Results indicated junior nursing participants' ratings reflected perceptions of more personal and professional teaching behaviors by clinical faculty than those of senior nursing participants. No reported statistically significant difference was found when junior and senior participants' perceptions of state anxiety during interaction with faculty at clinical experiences were compared. Furthermore, results demonstrated senior level nursing students believed they need just as much or more support from clinical faculty members as junior level nursing students since they face more complex and demanding clinical assignments. Specifically, both groups perceived faculty inviting behaviors to be demonstrating respect for students, expressing pleasure with a clinical group, selecting appropriate patient assignments, and acting friendly and trustful of students. When these events occurred, study results found both groups perceived that their state anxiety levels were lower. The researcher identified the lack of ethnic demographic data as a limitation of this study and noted additional research is needed to identify how ethnic and cultural variables influence perceptions of personally and professionally inviting teaching behaviors. In addition, further research would be necessary to determine how nursing students' perceptions of inviting teaching behaviors and student anxiety levels relate to actual learning and performance in the clinical setting. In conclusion, the findings of this study provided support to the synthesized theoretical framework developed by the researchers. The study demonstrated that nursing students'

perceptions of personally and professionally inviting teaching behaviors of clinical nursing faculty influence and decrease their state anxiety level in the clinical setting.

Neuman Systems Model

A review of the literature for Betty Neuman's Neuman Systems Model elicited an extensive number of descriptive and experimental studies, research instruments, as well as practice and educational tools that have been developed using this model. Although application of Neuman's model has been well documented in the areas of nursing research, education, administration, and practice, there was no information available in relating this theoretical framework to stress levels experienced by nursing students. The following research study was chosen for its relationship of the Neuman's System Model to maternal-student role stress.

Gigliotti (2007) broadened previous research conducted in 1999 and 2004 on stress levels experienced by non-degreed, married, midlife (37 years and older), undergraduate nursing majors who were born in the United States. This study's aim was to improve both the external and internal validity of Gigliotti's model of Maternal-Student Role Stress (MSRS) in midlife women. Specifically, the study examined relations between psychological involvement in the student role, children's support, children's situation-specific support, and MSRS for midlife women who are mothers and non-degreed undergraduate students. The researcher defined MSRS as "the experienced conflict and ambiguity concerning responsibilities toward one's children and oneself". The researcher proposed that midlife women enrolled in college were experiencing at least two transitions that could act as stressors and increase the risk for normal line of defense invasion related to a stress response such as MSRS. In addition, the researcher suggested that flexible line of defense variables and transition conditions can moderate

this risk of invasion. The sample for this study was composed of women undergraduates at a large public university in the northeast United States who were 35 years of age or older (n = 69). In addition, they were mothers whose youngest child was six to 18 years old and presently living at home. Research evaluation methods consisted of demographic data and three questionnaires. The Perceived Multiple Role Stress Scale (PMRS) was used to measure participants' role stress that results exclusively from the maternal and student roles. Psychological involvement in the student role was evaluated by the Student Role Involvement Questionnaire (SRIQ). Finally, the Norbeck Social Support Questionnaire (NSSQ) determined situation-specific social support. Data collection for this study included how much each participant perceived they were respected or admired for being a mother and a student (affect), agreed with their being a mother and a student (affirmation), and could help them (money, time for studying, etc.) as a mother and a student (aid). Results demonstrated student role involvement (SRI), children's (generic) support (CS), and children's situation-specific support (CSSS) had a significant effect on decreasing maternal-student role stress. CSSS was then subdivided to ascertain whether children's situation-specific affect (CSSAffect), affirm (CSSAffirm), or aid (CSSAID) had a greater effect on MSRS. CSSAID was found to carry the most statistical significance and accounted for 23% of the MSRS variance. Together SRI in combination with CSSAID predicted the greatest variance at 28% of MSRS. In conclusion, this research study supported Gigliotti's midlife women's MSRS model's ability to be generalized to women of varied marital status, countries of origin, and college major. In particular, this study demonstrated that children's situation-specific aid is the best predictor of decreased maternal-student role stress. In relation to Neuman Systems Model, this study found that in the presence of strong main effects, flexible line of

defense variables (SRI and children's CSSS) are conceptualized as working together to moderate risk factors. This supported Neuman's propositions concerning the buffering capability of flexible line of defense variables. Additionally, the Neuman System Model proposed that nursing interventions be aimed at prevention for the primary, secondary, and tertiary levels. Therefore, from the results of this study, interventions should be investigated at the secondary level with midlife women who are already experiencing maternal-student role stress.

Chapter III: Methods

This study used a quasi-experimental, pretest-posttest comparison group research design to examine self-reported stress levels of novice nursing students before and after a simulated clinical experience with a high-fidelity human patient simulator.

Sample

The convenience sample for this study was nursing students who were enrolled in their initial clinical component course at a technical college in the southeastern United States. Two consecutive cohort nursing classes were used to obtain a significant sample size. Participants who were currently employed as Certified Nursing Assistants or Patient Care Technicians and/or those who reported employment in healthcare were excluded from the data analysis.

Setting

This study was conducted at a large public two-year technical college in the southeastern United States. Established in 1962, the college serves over 15, 000 students and is spread over four campus locations throughout the county. The Southern Association of Colleges and Schools has accredited the college for 136 Academic programs. These include 36 Associated Degree programs, 9 Diploma programs, and 91 Certificate programs. Curriculum offerings include associate degrees in business, computer technology, health sciences, engineering technologies, industrial technologies, and public service as well as university transfer courses.

The nursing program was established over 30 years ago and is accredited by the State Board of Nursing and the National League for Nursing Accrediting Commission. The nursing program has a current enrollment of approximately 500 students and emphasizes practical experiences in a variety of health care settings.

The simulation experience was conducted using the technical college's on campus Simulation Technologies and Training Center (STAT). The STAT Center is a 3,800 square foot custom designed facility that depicts seven different environments including an emergency room, intensive care room, labor and delivery area, neonatal resuscitation area, standard patient hospital room, home or skilled nursing facility bedroom, and a city street where a car accident has occurred. Portable and wireless, eight different simulators can be utilized in each of these areas. An audio-visual system allows students to see and hear their simulated experiences during the debriefing process.

The clinical site for this research study was a 180 bed, 24-hour Skilled Nursing Facility. This facility is owned by a for-profit corporation and is currently licensed by the Department of Health and Environmental Control (DHEC). Located in the same county as the technical college, the facility offers a full range of extended care services including therapeutic and rehabilitative programs. The facility provides services for physical, occupational, speech, respiratory, and nutritional therapies. In addition, hospice, psychiatric, dementia, and Alzheimer specialized care is available. There are a total of 20 registered nurses (RN), 25 licensed practical nurses (LPN) and 93 certified nursing assistants (CNA) currently employed by this facility. Staffing ratios are mandated by DHEC and require the LPN to patient ratio at this facility to be 30:1. The CNA to patient ratio is census driven and averages 9:1 on day shift, 13:1 on evening shift, and 22:1 on night shift.

The facility is compromised of three separate 60 bed units and has an average daily census of 173 short-term and full-time residents. Unit I is solely dedicated to short-term stay for primarily orthopedic post-surgical patients and offers rehabilitation and restorative care. Unit II provides medical and non-medical care to persons who have a

chronic illness or disability. Some of these illnesses and diseases include arthritis, Alzheimer's disease, chronic obstructive pulmonary disease, congestive heart failure, coronary artery disease, diabetes, cerebrovascular accident, dementia, debility, depression, gastroesophageal reflux disease, hypertension, osteoporosis, and peripheral vascular disease. These persons reside at the facility since they can no longer be cared for at home or in the community. Residents on this unit require assistance with activities of daily living such as dressing, bathing, toileting, ambulation, and nourishment. The unit has predominately female residents. Ages of the current resident population vary greatly from 38 to 100 years old with a mean age of 84 years. This long-term care residential unit was used for the nursing students' initial clinical experience.

Unit III is a combination of both short-term rehabilitation patients and long-term care residents.

Instrumentation

Two instruments were used to gather data for this study**.** First, the Student Stress and Coping Inventory (SSCI) developed by Barbara Jaffin Cohen was used with permission to conduct this study (Appendix A). The purpose of this inventory was to identify psychological stress factors in nursing students' environments and the ways students cope with this stress (Cohen, 2001). The SSCI consisted of five self-reported stress subscales and a coping scale. Each subscale was examined separately and demonstrated internal consistency, reliability, and concurrent validity (Cohen, 2001). For the purpose of this research study only the Nursing Clinical Experiences subscale was deemed necessary and appropriate. This subscale consisted of 24 items that are rated on a 4-point Likert scale with 1 indicating "not at all stressful" to 4 indicating "extremely stressful" (Appendix B).

Secondly, demographic data was obtained using a researcher developed survey for information regarding students' age, gender, highest educational level achieved, and previous healthcare experience, and place of healthcare employment including type of facility and number of years employed (Appendix C).

Ethics

Institutional Review Board approval was obtained from Gardner-Webb University (Appendix D) and the technical college's Vice President for Education prior to the distribution of surveys (Appendix E). The participants received a consent form that explained participation in this study was voluntary and confidential (Appendix F). Participants were informed they could decline to participate without penalty and withdraw from the study at any time without giving any justification. In addition, the consent form included an explanation of the research as well as the potential benefits and lack of foreseeable risks. The title of this research study was altered on the consent form by omitting the word "stress" to prevent any unintentional bias. Participants in the intervention and control groups took part in the same clinical and simulation experience at different times during their course rotation. To protect anonymity, a participation code was assigned and used for data collection. An instructor in the course informed the participants privately of their assigned code and kept the compiled list until data collection was completed. This list was destroyed upon completion of the research.

A STAT Center consent form that included confidentiality and permission to videotape during simulation experiences had been previously signed by all students as required by the nursing program.

Data Collection

Data collection began with distribution of the consent forms. The researcher explained the study and reviewed the consent form with nursing students enrolled in their first clinical course. An opportunity was provided by the researcher to answer any student questions. Consent forms were collected and placed in an envelope by a disinterested party who was a nursing instructor in the course. Simple random sampling was used to divide study participants into four clinical groups.

Demographic data surveys and the pretest Student Stress and Coping Inventory Nursing Clinical Experiences subscale were placed in an envelope that was identified only by the participant code. The course instructor distributed envelopes to participants prior to their first clinical day without the researcher present. Once all envelopes were distributed the researcher entered the room, gave instructions, reviewed both instruments, and allowed time to answer participants' questions. The researcher was not in the room during the completion of instruments. Participants placed the instruments in the assigned envelope and returned them to a box the researcher prepared for this study.

Posttest Student Stress and Coping Inventory Nursing Clinical Experiences subscale surveys were distributed after participants completed their first week of assigned clinical rotation. Distribution and collection for the posttest followed the same procedure as the pretest method.

Data collection for Cohort A began in August 2010 and concluded in September 2010. Data collection for Cohort B began in September 2010, followed the same procedure as Cohort A, and was completed in October 2010. Clinical nursing instructors who participated in this study were the same for Cohort A and Cohort B. The researcher took part in both Cohorts intervention group simulation and clinical experience.

Procedure

Clinical nursing instructors who participated in the simulation experience were briefed by the researcher prior to the beginning of the educational session. The instructors were oriented with the patient care scenario and objectives for this simulated first day clinical experience. In lieu of attending clinical in their assigned skilled nursing facility, two clinical groups (intervention) attended a simulated experience with a high-fidelity human patient simulator. The clinical experience was developed by the researcher to resemble an initial first day assignment in a skilled nursing facility. Students were required to wear their clinical nursing uniform and assembled in a classroom adjacent to the STAT Center.

Initially, general instructions about the simulation experience and clinical expectations were reviewed. Next, the students had an opportunity to review information about the "resident" they would be providing care for from a chart that was designed by the researcher for this study. Students' assigned resident was an 86 year old male with a history of diabetes, congestive heart failure, arthritis, dementia, debility, and Parkinson's disease. He is a widower who fell last month at his daughter's home. He was admitted to the long-term care facility after unsuccessful attempts at rehabilitation for a fractured right femur. He is incontinent of bowel and bladder, needs assistance with activities of daily living, and is partial weight bearing for transfers. Clinical expectations required students to complete a plan of care and additional course specific charting for this experience.

Students were randomly placed in pairs and instructed to interact with the simulator as if "he" was a "real resident" in a skilled nursing facility. The scenario experience required the students to be professional at all times and provide patient safety

while obtaining vital signs, providing a partial bed bath, changing a urine and fecal soiled brief, dressing and grooming, and assisting with breakfast. Vital signs were normal and changed with each participation group. Students were given 20 minutes to complete the assigned nursing responsibilities with the simulator in a section of the STAT Center that was decorated to resemble a long-term care bedroom. The high-fidelity human patient simulator was operated by the STAT center simulation specialist who responded as the "resident's" voice to the students. The scenario was observed behind a one-way glass mirror by the students' clinical instructor and the simulation specialist. Students were aware they were videotaped as part of this simulation experience.

The patient care scenario was followed by a 20 minute debriefing session where the students watched and critiqued their videotaped performance. To guide the debriefing session the students' clinical instructor used the following questions:

1. Were you able to act as if this simulation was a real clinical situation?
2. How did you work together as a team? (Divided up responsibilities)
3. What do you think you learned from this experience?
4. What areas/techniques could you improve on?
5. Do you feel this experience was beneficial?

The instructor commented on the student's performance while offering positive reinforcement and suggested areas for improvement. At the end of each debriefing session students were reminded of the need for confidentiality and asked not to reveal any part of the simulation experience to their classmates.

Intervention participants followed this simulation experience with their regular assigned 4 ½ hour clinical rotation in the skilled nursing facility on the long-term care unit the following day. The clinical day began with an orientation to the facility and

assigned long-term care unit. Additionally, the orientation process included an overview of the emergency procedures presented by the facility's Plant Operation Safety Officer.

Next students were placed in the same pairs as the day before to gather data on their assigned resident. The nursing student to instructor ratio was 8:1. Each pair of students was assigned one resident on the long term care unit of the skilled nursing facility. Following the data collection process, students were introduced to their residents by the clinical instructor and instructed to provide the resident with any required nursing care. This care involved obtaining vital signs, providing a partial bed bath or shower, changing a urine and or fecal soiled brief, dressing and grooming, changing bed linens, transferring to a wheelchair, ambulating with a cane or walker, demonstrating a closed unoccupied bed, and assisting with breakfast. Students were required to document their resident's care on the Facility's forms in addition to the course specific required charting. Post conference was held during the last 30 minutes of the clinical day to review care plan information and discuss the clinical experience.

Two clinical groups (control) attended two consecutive 4 ½ hour clinical experiences in a Skilled Nursing Facility as assigned by the course curriculum. While the intervention groups were at the STAT Center for their first clinical day, nursing students who were assigned to the control group received an orientation to the clinical facility and the long-term care unit. The orientation procedure followed the same guidelines as the intervention group. Students were placed in pairs to complete their data collection, assigned resident's care including ambulation and nutritional needs. Documentation on the Facility's forms and care plan requirements were reviewed by the clinical nursing instructor. Post conference was held during the last 30 minutes. The following day

control group students repeated similar nursing care for their second clinical experience with the same resident care assignment.

The identical simulation and clinical experiences were repeated for Cohort A and Cohort B. The same long-term care residents were used for both Cohort A and Cohort B's clinical assignments.

Data Analysis

Data was analyzed using the Statistical Package for the Social Sciences (SPSS) Windows version 18.0.

Chapter IV: Results

The researcher distributed consent forms for participation in this study to 62 nursing students, and of those, 55 students agreed to take part in the research. The data collected from the surveys for the participants in Cohort A (n = 29) and Cohort B (n = 26) were combined together and then analyzed separately by their assigned Control or Intervention group. Survey results were coded and entered in the Statistical Package for the Social Sciences (SSPS) Windows version 18.0 for analysis.

Demographic Information

Demographic information obtained for this study included the categorical variables of age, gender, and highest educational level attained. Additionally, participants were asked to identify any previous healthcare experience including the number of years of work experience and place of employment.

The participants in this study ranged from 20 to 50 years with a mean age of 32.45 years (SD = 8.31). A large majority of the sample were female participants (n = 50) compared to the number of males (n = 5) that participated. In this study the greatest percentage of participants have completed either a high school diploma 45.5% (n = 25) or bachelor's degree 41.8% (n = 23). Participants who identified themselves as Certified Nursing Assistants and Patient Care Technicians represented 32.7% (n = 18) of the sample compared to 45.5% (n = 25) of participants who had no previous experience in healthcare. Years of work experience in a healthcare field ranged from one to twenty with a mean of 2.85 years. The majority of study participants (60%) reported no employment in a healthcare field. Table 1 represents the frequencies and percentages for the demographic characteristics of the sample.

Table 1

Demographic Characteristics of the Sample

Variable	Frequency	Percentage
Age		
20-25	13	23.6
26-31	16	29.1
32-37	12	21.8
38-43	5	9.1
44-50	9	16.4
Gender		
Male	5	9.1
Female	50	90.9
Highest Educational Level		
High School	25	45.5
Associate Degree	5	9.1
Bachelor Degree	23	41.8
Master Degree	2	3.6
Doctoral Degree	0	0
Previous Healthcare Experience		
None	25	45.5
Certified Nursing Assistant	13	23.6
Patient Care Technician	5	9.1
Other	12	21.8
Place of Healthcare Employment		
None	33	60.0
Hospital	13	23.6
Long Term Care Facility	7	12.7
Clinical Agency (Home Health Care)	2	3.6
Years of Work Experience in Healthcare Field		
0	33	60.0
1-5	10	18.2
6-10	8	14.5
11-16	1	1.8
17-20	3	5.5

Note. N = 55

Research Question 1

Descriptive and inferential statistics were used to address the first research question concerning the possible association of a simulated clinical experience on the reduction of stress levels of novice nursing students. The mean distributions and standard deviations of pretest and posttest scores on the Student Stress and Coping Inventory Clinical Experiences subscale (SSCI) were used to analyze the control and intervention groups. An independent samples *t*-test was used to compare the means of the pretest and posttest summative scores for the control and intervention groups to determine if there was a significant change in stress levels.

Participants who were Certified Nursing Assistants and Patient Care Technicians were excluded from this data analysis. The results supported the research hypothesis that nursing students in the intervention (n = 17) group would experience less clinical stress following a simulated clinical experience and have lower scores on the posttest SSCI (M = 1.65, SD = 0.32) compared to their pretest scores (M = 2.34, SD = 0.48). In comparison, the control (n = 8) group posttest scores (M = 2.21, SD = 0.17) increased from pretest scores (M = 1.63, SD = 0.45). The 95% confidence interval for the difference of the means between the intervention and control groups ranged from –0.82 to –0.25 for pretest scores and –0.04 to 0.43 for posttest scores.

The *t*-test results demonstrated a significant difference in pretest scores between the intervention and control groups on the SSCI, $t(23) = -3.56$, $p = .002$ equal variances assumed. The *t*-test was repeated for posttest scores and once more the results demonstrated a significant difference between the intervention and control groups, $t(23) = 4.60$, $p = .000$ equal variances assumed. Table 2 reports the mean distributions and significance for the two groups with no experience in healthcare.

Table 2

Contrast of Mean Distributions and Significance for Participants With No Experience in Healthcare

Variable	*n*	*M*	*SD*	*t*(23)	*p*
Pretest					
Control	8	1.63	0.45	–3.56	.002*
Intervention	17	2.34	0.48		
Posttest					
Control	8	2.21	0.17	4.60	.000*
Intervention	17	1.65	0.32		

Note. * indicates significance at $p < .05$

Data analysis was repeated on those participants who did not report any employment in healthcare ($n = 33$). The mean distributions and standard deviations of pretest and posttest scores on the Student Stress and Coping Inventory (SSCI) were used to analyze the control ($n = 14$) and intervention ($n = 19$) groups for this selected sample population. An independent samples *t*-test was conducted to determine if there was a statistical difference between the mean summative pretest and posttest stress scores for the intervention and control groups for this population sample. The results supported the research hypothesis for these participants. The intervention group reported lower scores on the posttest SSCI ($M = 1.64$, $SD = 0.31$) compared to their pretest scores ($M = 2.37$, $SD = 0.47$). In comparison, the control group posttest scores ($M = 2.09$, $SD = 0.33$) increased from pretest scores ($M = 1.81$, $SD = 0.50$). The 95% confidence interval for the difference of the means between the intervention and control groups ranged from –0.91 to –0.22 for pretest scores and 0.23 to 0.68 for posttest scores.

The *t*-test results demonstrated a significant difference in pretest scores between the intervention and control groups on the SSCI, $t(31) = -3.31$, $p = .000$ equal variances assumed. The *t*-test was repeated for posttest scores and once more the results demonstrated a significant difference between the intervention and control groups, $t(31) = 4.10$, $p = .000$ equal variances assumed. Table 3 represents the mean distributions and significance for the two groups with no employment in healthcare.

Table 3

Contrast of Mean Distributions and Significance for Participants With No Employment in Healthcare

Variable	*n*	*M*	*SD*	*t*(31)	*p*
Pretest					
Control	14	1.81	0.50	–3.31	.000*
Intervention	19	2.37	0.47		
Posttest					
Control	14	2.09	0.33	4.10	.000*
Intervention	19	1.64	0.31		

Note. * indicates significance at $p < .05$

A paired samples *t*-test was conducted to compare pretest and posttest SSCI scores for the intervention group of participants with no employment in healthcare ($n = 19$). The results indicated that the mean posttest score was significantly lower ($M = 1.64$, $SD = 0.31$) than the mean pretest score ($M = 2.37$, $SD = 0.47$); $t(18) = -6.19$, $p = .000$. The 95% confidence interval for the mean difference between the two scores was –0.98 to –0.49. These results support the hypothesis that intervention participants will report decreased stress levels after receiving practice on a high-fidelity simulator prior to their first clinical day. Table 4 represents the pretest/posttest scores for intervention participants with no employment in healthcare.

Table 4

Contrast of Scores for Intervention Participants With No Employment in Healthcare

Variable	*n*	*M*	*SD*	*t*(18)	*p*
Intervention					
Pretest	19	2.37	0.47	–6.19	.000*
Posttest	19	1.64	0.31		

Note. * indicates significance at $p < .05$

A paired samples *t*-test was repeated to compare pretest and posttest SSCI scores for the control group of participants with no employment in healthcare ($n = 14$). The results indicated that the mean posttest score ($M = 2.09$, $SD = 0.33$) and the mean pretest score ($M = 1.81$, $SD = 0.50$); $t(13) = 2.14$, $p = .052$ did not demonstrate a statistical difference. The 95% confidence interval for the mean difference between the two scores was –0.00 to 0.57. These results cannot confirm a significant difference between the pretest and posttest scores for these participants. Table 5 represents the scores for control participants with no employment in healthcare.

Table 5

Contrast of Scores for Control Participants With No Employment in Healthcare

Variable	*n*	*M*	*SD*	*t*(18)	*p*
Control					
Pretest	14	1.81	0.50	2.14	.052
Posttest	14	2.09	0.33		

Note. *p* was significant at < .05 level

Research Question 2

The second research question was similarly analyzed using inferential statistics to determine if preparation on a high-fidelity simulator performed as a primary prevention as intervention method to increase novice nursing student stability, thereby reducing their stress levels. The mean distributions and standard deviations were used to analyze the differential mean scores on the SSCI Clinical Experiences subscale pretest and posttest for the control and intervention groups. An independent samples t-test was used to determine if there was a statistical difference in mean stress scores between the control and intervention group.

Participants who were Certified Nursing Assistants and Patient Care Technicians were excluded from this analysis. The results of the *t*-test $t(23) = -6.24$, $p = .000$ equal variances assumed, indicated a significant difference between the mean stress scores of the intervention and the control group. These results supported the research hypothesis that preparation on a high-fidelity simulator will increase novice nursing student stability by reducing their stress levels. Participants in the intervention group reported less stress ($M = 0.68$, $SD = 0.51$) compared to participants in the control group ($M = -0.58$, $SD = 0.36$). The 95% confidence interval for the difference in means ranged from –1.69 to –0.85 equal variances assumed. Table 6 represents the mean differences and significance for the two groups.

Table 6

Difference in Mean Stress Scores for Participants With No Experience in Healthcare

Variable	*n*	*M*	*SD*	*t*(23)	*p*
Control	8	–0.58	0.36	–6.24	.000*
Intervention	17	0.68	0.51		

Note. * indicates significance at $p < .05$

Data analysis was repeated on those participants who did not report any employment in healthcare ($n = 33$) to determine if preparation on a high-fidelity simulator performed as a primary prevention as intervention method and increased stability of stress scores for the intervention group compared to the control group.

An independent samples t-test was used to determine if there was a statistical difference in mean scores between the two groups. The results of the *t*-test $t(31) = –5.41$, $p = .000$ equal variances assumed, indicated a significant difference between the mean scores of the intervention and the control group. These results confirmed the research study hypothesis. Participants in the intervention group reported less stress ($M = 0.73$, $SD = 0.52$) compared to participants in the control group ($M = –0.26$, $SD = 0.53$). The 95% confidence interval for the difference in means ranged from –1.37 to –0.63 equal variances assumed. Table 7 represents the mean differences and significance for the two groups.

Table 7

Difference in Mean Stress Scores for Participants With No Employment in Healthcare

Variable	*n*	*M*	*SD*	*t*(31)	*p*
Control	14	–0.26	0.53	–5.41	.000*
Intervention	19	0.73	0.52		

Note. * indicates significance at $p < .05$

Summary of Highest Stress Scores

Overall, the control and intervention group participants indicated the same two highest stressful clinical experiences on both the pretest and posttest SSCI. Both groups reported the "possibility of making an error (e.g. medication or assessment)" as most stressful on the SSCI followed by "meeting own expectations in caring for clients". Participants who reported years of healthcare work experience were excluded from these results.

Control participants mean score for "level of own competency (e.g. feeling of preparedness for client care)" increased from the pretest ($M = 2.29$, $SD = 0.99$) to the posttest ($M = 2.71$, $SD = 0.61$) compared to the intervention participants pretest score ($M = 2.79$, SD = 0.79) and was not included in the top five posttest results.

The five most stressful clinical experiences for the selected control participants on the pretest are shown in table 8 and the posttest results are shown in table 9.

Table 8

Highest Pretest Stress Scores for Control Participants With No Employment in Healthcare

	Pretest	
Variable	M	SD
Possibility of making an error (e.g., medication, assessment of client)	2.57	0.85
Meeting own expectations in caring for clients	2.57	1.16
Evaluation of performance by nursing staff	2.43	0.85
Preparing for clinical assignments	2.29	0.83
Level of own competency (e.g. feeling of preparedness for client care)	2.29	0.99

Note. $n = 14$

Table 9

Highest Posttest Stress Scores for Control Participants With No Employment in Healthcare

	Posttest	
Variable	M	SD
Possibility of making an error (e.g., medication, assessment of client)	3.00	0.88
Meeting own expectations in caring for clients	2.71	0.83
Level of own competency (e.g. feeling of preparedness for client care)	2.71	0.61
Being in an emergency situation	2.64	1.15
Evaluation by instructor(s) (e.g. being observed)	2.50	0.85

Note. $n = 14$

Table 10 shows the five highest stressful clinical experiences reported by the selected intervention participants on the pretest. Table 11 shows the posttest results.

Table 10

Highest Pretest Stress Scores for Intervention Participants With No Employment in Healthcare

	Pretest	
Variable	M	SD
Possibility of making an error (e.g., medication, assessment of client)	3.05	0.85
Meeting own expectations in caring for clients	2.84	0.83
Evaluation of performance by nursing staff	2.84	0.60
Level of own competency (e.g. feeling of preparedness for client care)	2.79	0.79
Own abilities to meet requirements of clinical assignments	2.79	0.63

Note. $n = 19$

Table 11

Highest Posttest Stress Scores for Intervention Participants With No Employment in Healthcare

	Posttest	
Variable	M	SD
Possibility of making an error (e.g., medication, assessment of client)	2.37	0.60
Meeting own expectations in caring for clients	2.05	0.71
Evaluation by instructor(s) (e.g. being observed)	2.05	0.71
Evaluation of performance by nursing staff	1.95	0.71
Being in an emergency situation	1.89	0.74

Note. $n = 19$

Difference in Clinical Experience Stress Scores

Data analysis was conducted to determine the greatest difference in each clinical experience between pretest and posttest scores on the SSCI. Pretest and posttest means of control and intervention group participants without any reported healthcare employment were compared. Table 12 displays the six highest differences between pretest and posttest results for the control group selected participants. Clinical experiences with the greatest increase in stress after their first clinical experience were "being in a new environment" and "being in an emergency situation".

Table 12

Greatest Increase in Stress Scores for Control Participants With No Employment in Healthcare

Variable	Pretest M	Posttest M	Difference
Being in a new environment/situation	1.79	2.43	–0.64
Being in an emergency situation	2.14	2.64	–0.50
Exposure to experiences that will prepare me for nursing practice (e.g. level of assignment)	1.79	2.29	–0.50
Possibility of making an error (e.g. medication, assessment of client)	2.57	3.00	–0.43
Level of own competency (e.g., feeling of preparedness for client care)	2.29	2.71	–0.43
Organizational structure of clinical agency (e.g., channels of communication and authority)	1.38	1.79	–0.43

Note. $n = 14$

Table 13 displays the six highest differences between pretest and posttest results for the intervention participants who did not report any employment in healthcare. Clinical experiences with the greatest decrease in stress after simulation and their first clinical experience were “condition of clients assigned (e.g., dying, critically ill, disfigured clients)” and “own abilities to meet requirements of the clinical assignment”.

Table 13

Greatest Decrease in Stress Scores for Intervention Participants With No Employment in Healthcare

Variable	Pretest M	Posttest M	Difference
Condition of clients assigned (e.g., dying, critically ill, disfigured clients)	2.68	1.63	1.05
Own abilities to meet requirements of the clinical assignment	2.79	1.84	0.95
Exposure to contagious disease / ”catching” something from client(s)	2.32	1.37	0.95
The physical environment of the clinical agency (e.g., equipment, odor, sights)	2.21	1.26	0.95
Evaluation of performance by nursing staff	2.84	1.95	0.89
Level of own competency (e.g. feeling of preparedness for client care)	2.79	1.89	0.89

Note. $n = 19$

Chapter V: Discussion

This study was conducted to determine the effect of high-fidelity human patient simulation on stress levels of associate degree novice nursing students. The purpose of this study was first to determine if preparation using a simulated first day clinical experience on a high-fidelity mannequin would reduce stress levels of those participants when compared to a control group who did not experience simulation. The second purpose was to determine if preparation on a high-fidelity human patient simulator would perform as a primary prevention as intervention method in Neuman's Systems Model to increase client system stability by preventing stressor invasion.

Analysis of Data

Research question 1: Will clinical practice on a high-fidelity human patient simulator (HPS) reduce stress levels of novice ADN nursing students prior to their first clinical rotation?

This research study showed a decrease in stress as measured on the Nursing Clinical Experiences subscale of the SSCI for the intervention group participants through use of the HPS. The researcher believed that the study participants who were Certified Nursing Assistants (CNA) and Patient Care Technicians (PCT) would not experience stress in their initial nursing student clinical rotation due to their experience in the healthcare field. This was confirmed when data analysis was performed on the entire sample of participants. Posttest stress scores on the SSCI were not significant ($p = .113$ equal variances not assumed, p was significant at the .05 level). Data analysis was repeated after removing the CNA and PCT population from the sample. Findings revealed a significant difference between intervention and control participants pretest and posttest scores on the SSCI (Table 2). In addition, intervention participants indicated less

stress after attending a simulated clinical experience with the HPS prior to their first day of clinical in a skilled nursing facility compared to control participants who attend clinical without simulation.

Demographic data provided the researcher with information that demonstrated although some participants identified themselves as a CNA and/or PCT, they did not have any employment in healthcare. These participants may have recently completed the certification process but have not been hired in these roles. The researcher analyzed the data removing any participant that reported employment in healthcare to see if these results would demonstrate significant findings. This data revealed a larger sample of participants. Pretest and posttest stress scores between the intervention and control participants again demonstrated significance (Table 3) confirming the research hypothesis. Intervention participants reported less stress on their posttest scores than the control participants.

To assure a significant difference between pretest and posttest scores for the intervention and control participants a paired-samples *t*-test was used. Data analysis was conducted on the sample population with no employment in healthcare. The results demonstrated a significant difference for the intervention participants for a decrease in stress between the pretest and posttest scores (Table 4). Although the control group posttest scores increased from their pretest scores the results were inconclusive to determine that these participants experienced statistically higher stress levels (Table 5).

Research question 2: Does preparation on a high-fidelity human patient simulator (HPS) perform as a primary prevention as intervention method in Neuman's Systems Model to increase associate degree novice nursing student system stability?

This question was analyzed by comparing the difference in mean scores between control and intervention participants on the SSCI. Certified Nursing Assistants and Patient Care Technicians were once again removed from this data analysis. The results revealed intervention participants mean stress scores were significantly lower compared with the control group (Table 6).

Data was analyzed again for the sample population who did not report any employment in healthcare to compare the difference in mean scores between control and intervention participants. The increase in sample size did not affect the findings. Once more the results were significant and showed intervention participants stress scores lower when compared to the control group (Table 7).

These results demonstrated that the simulated first day clinical experience using simulation performed as a primary prevention method to decrease stressor reaction and promote student nurse system stability. In Neuman's System Model there is an emphasis on attaining and maintaining the highest possible level of health through purposeful intervention (Fawcett, 2005). Simulation is reported as the purposeful intervention in this research study needed to strengthen the students' flexible line of defense against stressor reaction.

Ancillary Findings

There were some unexpected findings discovered during the research process that were not part of the hypothesis. However, they were deemed to be of value for this discussion. Clinical nursing instructors who participated in the research reported that they were better prepared to help their clinical group of nursing students after watching their simulated performance. The instructors stated that since they were responsible for eight nursing students in the clinical setting, they did not always have the opportunity to

observe each student performing every nursing skill. Their observations of verbal and non-verbal interactions as well as clinical skills enabled them to identify strengths and weakness in their assigned nursing students. This allowed which allowed them to concentrate on specific areas of student performance in the clinical setting. The instructor's ability to identify weaknesses in individual student performances is a valuable part of this simulated clinical experience. In addition, clinical instructors reported a decrease in their own stress levels following the simulated clinical experience.

Results of the debriefing sessions were summarized by the researcher and clinical nursing instructors. Overall, participants reported they had a hard time treating the high-fidelity simulator as a "real" resident and felt the skills they performed would be easier once they get to the clinical setting. This finding is consistent with research conducted by Bremner et al. (2008), but contradicts other research study results where nursing students found the simulated clinical experience with a high-fidelity mannequin to be realistic (Feingold et al., 2004; Kuznar, 2007; Lasater, 2007; Medley & Horne, 2005). Intervention participants reported they thoroughly enjoyed the learning experience. Comments such as "a tremendous help", "felt more prepared for clinical", "beneficial", "fabulous", "gave me the opportunity to see the areas I need to improve on", "got me in the mind frame for clinical", and "I'm so glad we did this before going to clinical" were recorded. These comments demonstrated positive student feedback in regard to the simulated learning experience and were consistent with previous research (Alinier et al., 2006; Bambini et al., 2009; Bremner et al., 2006; Feingold et al., 2004; Kuznar, 2007; Ravert, 2004).

The "possibility of making an error (e.g., medications, assessment of client)" and "meeting own expectations in caring for clients" were identified by the control group

(Tables 8 and 9) and the intervention group (Tables 10 and 11) as the highest stressful clinical experience. Although the control group demonstrated an increase and the intervention group a decrease in stress, it was an unexpected result for both groups to identify the same two clinical experiences on the pretest and posttest. Similar results were found in a study by Beck and Srivastava (1991), who reported that nursing students identified lack of clinical experience, unfamiliar areas, difficult patients, fear of making mistakes, and being evaluated by faculty members as the most anxiety producing situations in their initial clinical experience. Additionally, Sharif and Masoumi (2005) found nursing students reported the most anxiety producing initial clinical experiences were fear of making a mistake (fear of failure) and being evaluated by faculty members. Kleehammer et al. (1990) and Pagana (1988) also found that fear of making mistakes was a source of high anxiety for nursing students.

"Level of own competency (e.g. feeling of preparedness for client care)" was identified by control participants as one of the highest increases in stress, whereas intervention participants reported this clinical experience as one of the highest decreases (Tables 12 and 13). These findings corroborated earlier research studies that demonstrated a positive correlation between practice on a high-fidelity HPS and increased nursing student clinical competency (Alinier et al., 2006; Bambini et al., 2009; Bremner et al., 2006; Lasater, 2007; National Council of State Boards of Nursing [NCSBN], 2009; Nehring et al., 2002; Radhakrishnan et al., 2007).

Implications for Nursing

Findings from this research study add to the growing body of nursing knowledge by recognizing nursing students' perceptions of stress in their initial clinical experience.

As a result of this research, nurse educators can utilize the data analysis to intervene and prevent nursing students' stress. Nursing programs that have access to high-fidelity simulation should consider its implementation for novice nursing students prior to their first clinical experience.

Research findings from this study advance nursing's understanding of the influence of prevention interventions on the relationship between stressors and client system stability. In Neuman's System Model nursing actions are labeled prevention as intervention and are initiated to keep the client system stable. In this case the nursing actions are those of the nurse educator. Nurse educators who incorporate this type of simulated clinical experience as a method of prevention to reduce stress levels of novice nursing students will prevent stressor reaction, and strengthen the student's flexible line of defense. Nurse educators are responsible for the learning needs of a diverse student population. This is especially true for clinical nursing faculty. Clinical nurse educators have a responsibility to provide students with a variety of experiences that encourage and facilitate learning. Reducing stress levels of novice nursing students will aid in this learning process. These students will be more receptive to their patients needs, clinical instruction, and be better equipped to perform as a member of the healthcare team.

Limitations of the Study

The major limitation of this study involved the small sample size of associate degree nursing students at one technical college. The exclusion of Patient Care Technicians and Certified Nursing Assistants with reported healthcare employment further limited this study. As a result, this study's findings were difficult to generalize for all novice nursing students. Furthermore, additional research will be needed to investigate whether the present findings can be generalized to other associate degree

nursing programs as well as baccalaureate nursing programs in other parts of the United States.

Extraneous variables related to the setting and procedure presented additional study limitations. Potential variables beyond the researcher's control include, but are not limited to environmental factors of the STAT Center and long-term care unit, differences in personalities of STAT Center and clinical nursing instructors, and the mood of the participant.

Communication of Results

The researcher communicated results of this study to the technical college where the research was conducted. This included the STAT Center Simulation Specialists, nursing faculty, and the Vice-President for Education. Study results were also communicated to the skilled nursing facility's Director of Nursing and long-term care unit staff.

Implications for Further Research

The results of this research study are an initial finding on the effect of high-fidelity human patient simulation on stress levels of novice nursing students. Due to the limited sample population, the researcher suggests this study be replicated in other associate and baccalaureate degree nursing programs in different areas of the United States to prove the validity of the study. Additionally, future studies may explore the effect of high-fidelity human patient simulation on stress levels of the clinical nursing faculty prior to their novice nursing students' first clinical day.

Replication of this study using the SSCI Clinical Experiences subscale will be necessary to confirm that preparation on a high-fidelity human patient simulator acts as a method of prevention by intervention in Neuman's System Model to increase client

system stability. Validation of this research study by replication will confirm high-fidelity human patient simulation as evidence-based best practice for clinical teaching in nursing education.

Summary

Undergraduate nursing students have identified the initial clinical experience as one of the most stress producing components in their nursing program. High levels of stress can affect student's clinical performance, lead to decreased learning, and increase the risk of physical or psychiatric illnesses (Beck & Srivastava, 1991; Bremner et al., 2008; Kleehammer et al., 1990; Moscaritolo, 2009). This quasi-experimental, pretest-posttest comparison group research study appeared to be the first to test high-fidelity human patient simulation as a means to reduce stress prior to nursing students' first clinical experience. Furthermore, a literature search was unable to provide evidence of previous research studies involving HPS, nursing student initial clinical stress, and the use of Cohen's Stress and Coping Inventory Nursing Clinical Experiences subscale.

Research study findings demonstrated the use of HPS as a means to decrease stress levels of novice nursing students prior to their first clinical experience. Findings also demonstrated that simulation acts as a primary method of prevention to prevent stressor invasion and increase client system stability in novice nursing students.

As a result of this study's findings the researcher-developed simulated first day clinical experience has been adopted into the technical college's nursing curriculum. All nursing students are required to attend simulation prior to their first clinical day.

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Appendix A

Permission to use Student Stress and Coping Inventory

Appendix B

Student Stress and Coping Inventory

Nursing Clinical Experiences subscale

Student Stress and Coping Inventory

Used with permission by Dr. Barbara Jaffin Cohen

STRESS IS DEFINED AS SOMETHING IN A PERSON'S ENVIRONMENT THAT HE/SHE BELIEVES OR FEELS IS UPSETTING, THREATENING, OR ENDANGERING TO HIM/HER.

These items describe situations or experiences which may be perceived as stressful.
In responding to these answers you are to consider only the time period that has elapsed since the BEGINNING OF THIS 5 WEEKS.

Please *circle one answer* indicating the level of stress that you experience.

II. NURSING CLINICAL EXPERIENCES	1 not at all stressful	2 slightly stressful	3 moderately stressful	4 extremely stressful
1. Evaluation by instructor(s) (e.g., being observed)	1	2	3	4
2. Meeting own expectations in caring for clients	1	2	3	4
3. Availability of instructor(s) for assistance	1	2	3	4
4. Receptiveness of instructor(s) for assistance	1	2	3	4
5. Level of own competency (i.e., feeling of preparedness for client care)	1	2	3	4
6. Condition of clients assigned (e.g., dying, critically ill, disfigured clients)	1	2	3	4
7. Age of client	1	2	3	4
8. Sex of client (i.e., client of same sex/opposite sex)	1	2	3	4
9. Communicating with clients	1	2	3	4
10. Interaction with members of the health care team	1	2	3	4
11. The physical environment of the clinical agency (e.g., equipment, odor, sights)	1	2	3	4
12. Own abilities to meet requirements of clinical assignments	1	2	3	4
13. Exposure to experiences that will prepare me for nursing practice (e.g., level of assignment)	1	2	3	4
14. Possibility of making an error (e.g., medication, assessment of client)	1	2	3	4
15. Exposure to contagious disease/"catching" something from client(s)	1	2	3	4
16. Performing psychomotor skills	1	2	3	4
17. Being in an emergency situation	1	2	3	4
18. Organizational structure of clinical agency (e.g., channels of communication and authority)	1	2	3	4
19. Being in a new environment/situation	1	2	3	4
20. Evaluation of performance by nursing staff	1	2	3	4
21. Preparing for clinical assignments	1	2	3	4
22. Traveling to clinical setting	1	2	3	4
23. Evaluation of performance by client(s)	1	2	3	4
24. Physical contact with a stranger	1	2	3	4

Participant code_____ **Pretest/Posttest**

Appendix C

Demographic Data Survey

The Effects of High-Fidelity Human Patient Simulation

on Associate Degree Novice Nursing Students

Demographic Survey

Please complete the following information.

1. Age in years _____

2. Male ☐ Female ☐

3. Highest Educational Level
   - High School ☐
   - Associate Degree ☐ Major _____
   - Bachelor Degree ☐ Major _____
   - Master Degree ☐ Major _____
   - Doctoral Degree ☐ Major _____

4. Previous Healthcare Experience
   - Certified Nursing Assistant ☐
   - Patient Care Technician ☐
   - Other (please specify) _____

5. Place of Healthcare Employment
   - Hospital ☐
   - Long Term Care Facility ☐
   - Clinical Agency (Home Health Care) ☐

6. Years of Work Experience in Healthcare Field _____

Appendix D

Gardner-Webb University Institutional Review Board Approval

Appendix E

Institutional Approval to Conduct Research

Appendix F

Informed Consent

INFORMED CONSENT TO PARTICIPATE IN A RESEARCH STUDY

The Effects of High-Fidelity Human Patient Simulation
on Associate Degree Novice Nursing Students

INTRODUCTION

You are being asked to participate in a research study conducted by Sallie Beth Todd, from the Nursing Department at Gardner-Webb University. This research is in partial fulfillment of the thesis requirements for the Degree of Master of Science in Nursing. You were selected to participate in this study because you are enrolled as a student at Greenville Technical College in your first clinical nursing course.

PURPOSE OF THE RESEARCH

The purpose of this research is to examine what effects, if any, preparation on a High-Fidelity Human Patient Simulator has on novice nursing students prior to their first clinical rotation. This study will be conducted during your normal clinical time in the first three weeks of NUR 108/109.

DESCRIPTION OF THE PROCEDURE

If you decide to participate in this research study you will be randomly assigned to a clinical group based on your clinical location preference. You will be asked to complete a demographic survey to provide general research data. In addition, you will be asked to complete a twenty-four question survey during your first week of class. After you have completed 1 week of clinical experience, you will be asked to complete the initial survey again. This will end your involvement in the research study.

POTENTIAL RISKS

There are no foreseeable harmful risks or discomforts involved in participating in this study. This study will be conducted as part of the usual curriculum experiences that are part of the nursing program.

POTENTIAL BENEFITS

There will be no direct personal benefits from participating in the research study. The anticipated benefit of this study is a better understanding of the effects of High-Fidelity Human Patient Simulation when preparing novice nursing students for their first clinical experience.

Initials

_____

INFORMED CONSENT TO PARTICIPATE IN A RESEARCH STUDY

The Effects of High-Fidelity Human Patient Simulation
on Associate Degree Novice Nursing Students

CONFIDENTIALITY

The records from this study will be kept confidential. No individual identities will be used in any research or publications resulting from the study. All surveys will be given codes and securely stored in locked files during the research process. The surveys will be destroyed after the study is completed. Your simulation experience will be videotaped as part of the debriefing process. You have previously signed the Simulation Technologies and Training Center (STAT) confidentiality statement in AHS 160.

CONTACT INFORMATION

If you have any questions at any time about this research study or the procedures, you may contact the researcher, Sallie Beth Todd, at 6 Sparrow Point Court Simpsonville, SC 29680 and 864-962-5299. If you have further questions about the study you may contact, Dr. Rebecca Beck-Little, Thesis Advisor, at Gardner-Webb University P.O. Box 7268 Boiling Springs, NC 28017 and 704-406-4000.

PARTICIPATION

Your participation in this research study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at any time and this will have no influence on your grade for this course. If you withdraw from the study before data collection is completed your data will be returned to you or destroyed.

CONSENT

I have read the above information and understand the procedures as they were described. My questions have been answered to my satisfaction, and I agree to participate in this research study. I have received a copy of this form.

_____ _____

Signature of Participant Date

_____ _____

Signature of Investigator Date