Chest Wound Simulation and Its Effect on Self- Confidence of Baccalaureate Nursing Students

by

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ABSTRACT

The purpose of this study was to determine the effect of chest wound simulation on the self-confidence of senior baccalaureate nursing students at a small southern Colorado state-supported university. Using a qualitative, experimental design, 29 students were randomly assigned either to the experimental or to the control group. Students in both the experimental and the control groups completed a pre- and post-simulation survey designed to measure student confidence in the care of the patient with a chest wound.

Statistical analysis demonstrated that the students in the control and experimental group started at the same confidence level but that the experimental group showed statistically significant growth (t=−5.16, p=.000) in confidence as compared with the control group. Cohen’s d demonstrated a large effect size (4.84). Since effect size measures practical significance, it can be concluded that the intervention made a practical difference.

The results of this study support the use of chest wound simulation for increasing baccalaureate nursing students’ perceptions of self-confidence in caring for patients with significant chest injury.
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Chapter I
Introduction

Background and Significance of the Problem

The use of simulations during the course of instructional teaching has long been valued as a way to simultaneously introduce the physical experiences associated with real-time procedures and develop fundamental understanding in nursing students about procedures. Given the requirement that nurses learn fundamental technical skills during the course of their nursing education, the use of simulation as a pedagogy for nursing students has increased recently (Hravnak, Beach, & Tuite, 2007). There is fear, however, that the high costs of such programs outweigh the benefits. Also, there is fear that the hands-on instructional style required by simulation learning methods will not leave time for proper material instruction, leaving a class of nursing students with an underdeveloped understanding of certain important nursing principles and facts. The evidence, however, does not support this argument.

One reason that simulation is increasingly used as a pedagogy for developing technical nursing skills is the improvement of simulation technology and materials. “The advent of increasingly sophisticated and costly life-size high fidelity mannequins has focused greater attention on practice laboratories than ever before” (Kardong-Edgren, Starkweather, & Ward, 2008: p. 12). Though there has been some reluctance by programs to adopt the often costly simulation equipment (Starkweather & Kardong-Edgren, 2008), the overall tendency for nursing programs is to incorporate more hands-on learning experiences that occur in laboratories, which means an increase in the use of technical
simulations (Feingold, Calaluce, & Kallen, 2004). There is also sufficient empirical evidence to back claims about the effectiveness of training. Dori and Bulcher (2005) found that novice students who relied on simulation learning as part of their instruction attained better grades and superior learning outcomes than students who relied only on traditional, non-simulation learning, teaching methods for instruction.

The purpose of the Bambini et al (2009) study was to evaluate the effectiveness of simulated clinical experiences as methods to increase the self-efficacy/self-confidence of novice nursing students. The results of this study showed that participants whose instruction included simulation learning components had a higher self-efficacy than those participants who had not had simulation learning in their curriculum (Bambini, Washburn, and Perkins, 2009). In addition, the findings suggested that nursing students who participate in simulated clinical experiences were significantly more likely to have greater confidence in assessing the fundus, breasts, vital signs, and lochia. Finally, the results of the study suggested that such students were also more likely to develop better communication skills and improved clinical judgment (Bambini, Washburn, and Perkins, 2009). In addition, to self-confidence, this study found evidence in support of a measure that is likely to improve clinical and academic performance of nursing students.

Blum, Borglund, and Parcells (2010) also investigated relevant performance effects of high-fidelity nursing simulation. The researchers in this study measured the effects on self-confidence and clinical competence, both of which were measured by professor observation. The researchers also measured caring for patients. The fifty-three baccalaureate students were divided into two groups, one of which participated in simulation-enhanced laboratory sessions, while the other group participated in traditional
modes of instruction. The results showed that there was an overall increase in both self-confidence and clinical competency for the students in the group that participated in the simulation sessions. Self-confidence and clinical competency were both assumed by researchers to be markers of improved performance in clinical settings. However, the findings showed no significant differences in the levels of care for patients between the two groups. Nevertheless, the results of the study provide further evidence that simulated learning opportunities improve performance for nursing students.

Statement of the Problem

Simulations of experiences of and procedures on victims of traumas are especially important; as such experiences often evoke strong emotions in inexperienced nurses. It is, thus, critical that nursing students experience life-like simulations of certain procedures, especially those in which the patient has suffered a trauma, such as a chest wound. By simulating such procedures and situations, nursing students actually experience similar sensory perceptions to what they will experience in treating real-life traumas. While the use of high-fidelity simulation learning methods may improve the clinical performance of nursing students for a wide range of nursing activities, the use of such simulation methods for trauma victims, as mentioned earlier, is particularly important. Trauma victims generally require immediate attention, which can put increasing pressures on nurses. Additionally, trauma victims often present gruesome sights that can make it difficult for nurses to handle. Learning from case studies in textbooks may not provide adequate experiences to deal with traumas. Instead, high-fidelity simulation learning methods can make the adjustment from academic nursing student to practicing clinical nurse much easier and smoother for nurses, especially when dealing with traumas. The
increase in confidence and self-efficacy will likely better prepare nurses for traumas. Additionally, having hands-on experience, albeit simulated experience, will likely leave new nurses more able to adequately handle traumas in clinical settings. A study by Neil (2009) provided strong evidence that simulation learning methods significantly increase the confidence that nursing students have in treating wounds. Additionally, the results of this study provided considerable evidence that simulation learning methods improve clinical competency, as it relates to wound care. This strongly supports the notion that further investigation is required of simulation learning methods and, in particular, if and how they improve the clinical performance of nurses in the care of wounds.

The treatment of chest wounds are, of course, no exception to the potential improvements that simulation learning methods may provide. In fact, the treatment of chest wounds, given the often gruesome and trying nature of chest wounds, would likely benefit from simulation learning methods. After all, treating chest wounds can be a life or death situation for the patient, a situation that involves intense concentration by health care professionals. Given the gravity of chest wound treatment, it is important that sufficient research be performed on the methods of instruction for providing the best possible care for such wounds. Like other very serious injuries, chest wounds often require immediate and demanding care, putting increased pressure on nurses and practitioners. The importance of pedagogical studies on the effects of simulation learning methods on nursing students performance, competence, and confidence, as well as how these factors translate to clinical performance, is, thus, very high. Because the increased use of simulation learning methods is a relatively recent event, there is a relative dearth of evidence on the effectiveness of specific applications of simulation learning methods.
While the evidence presented earlier provides support for simulation learning methods improving the competency and confidence with which nursing students treat wounds, there is not specific evidence supporting the efficacy of simulation learning methods improving the competency or self-confidence of nursing students in treating chest wounds. The research question was: Does a chest wound simulation increase baccalaureate nursing students’ self-confidence?

**Statement of Purpose**

The purpose of this study was to determine the effect of chest wound simulation on the self-confidence of senior baccalaureate nursing students.
Chapter II

Review of Literature

Relevant Literature

Pedagogical studies often involve either tests of validated outcomes or opinion surveys on performance (Saks & Allsop, 2007). This study relied on a theoretical framework that emphasizes the importance of real-life training modules, justified by the literature. Surveys and tests are utilized to measure performance and comprehension of the material. As the role of simulation training becomes more defined and clearer with advancements in simulation technology, theoretical literature will continue to expand for the field, likely at the same pace.

The current role of simulation training in the medical field is growing quickly (Kunkler, 2006). Currently, simulation training is viewed by many practitioners and instructions as being a complementary supplement to the in-classroom studies for certain areas, while it remains crucial in other areas where it has been consistently used for decades (Kunkler, 2006). In a review of literature on simulation-based education in nursing, McGaghie, Issenberg, Petrusa, and Scalese (2010) conclude that simulation training in nursing education has grown in the past 40 years and will likely continue increasing over the next several decades. Additionally, the researchers conclude that “simulation-based nursing education is a complex service intervention that needs to be planned and practiced with attention to organizational contexts” (McGaghie et al., 2010).

Determining the effectiveness of simulation-based education in the medical field can be categorized into two varieties: formative and summative (Rudolph, Simon,
Raemer, & Eppich, 2008). Performance feedback for educational simulations, thus, can be formative in that its purposes improve the performance of student practitioners, while such feedback can be summative in that the feedback is measured incrementally throughout a course. Four steps concerning the formative feedback resulting from educational simulations are recording any gaps in knowledge or performance, measuring any feedback resulting from the gap that can be used to describe the gap, determining the basis for which this gap can be reduced and then filled, and, finally, close the gap through targeted instruction (Rudolf et al., 2008).

One of the primary factors of simulation learning that may increase both academic and professional performance of nursing students is patient satisfaction. One study revealed that nursing students who participate in high-fidelity simulation exercise in the course of their instruction tend to have higher levels of satisfaction with courses and being nursing students (Smith & Roehrs, 2009). Satisfaction can increase motivation to learn and perform well in classes. However, the study showed that there were significant differences among satisfaction levels in nursing students. The satisfaction ratings were highly correlative with certain design factors in the simulation learning exercises. The design factor with the strongest correlation to satisfaction levels in this study was objectives, which indicated that there were clear objectives to be met during the course of the simulation exercise and that such objectives were highly relevant to the practice of nursing (Smith & Roehrs, 2009). The design factor with the second strongest correlation to satisfaction levels was problem solving, which indicated that there was the presence of a problem in the exercise in which the student was required to solve to complete the exercise (Smith & Roehrs, 2009). The design factor with the third strongest correlation
was support, which indicated that the instructors were highly available for support and assistance during the course of the exercise (Smith & Roehrs, 2009). These three design factors, in particular, are important factors in simulation learning in nursing programs to be effective at increasing student satisfaction, which can lead to an improved educational experience, an improved understanding of important practical nursing concepts and applications, and even improved patient outcomes.

Another primary factor of simulation learning that may improve the performance of nursing students is self-confidence. Smith and Roehrs (2009) also included self-confidence in their study. The results indicate that the same design factors that were shown to correlate most strongly with student satisfaction also correlate most strongly with self-confidence. A study by Bambini, Washburn, and Perkins (2009) also supports the notion that simulation learning can improve the learning outcomes of novice nursing students, except this study provides outright support for the incorporation of clinical simulation into the curricula of nursing programs, while the Smith and Roehrs study provided conditional support.

One of the most important aspects of assessing the success of any pedagogical method in medical field training is that debriefing must be diagnostic (Salas et al., 2008). Additionally, the training organization must provide a highly supportive environment for learning, one in which questions are encouraged (Salas et al., 2008). Another important aspect is that proper and relevant cooperation and collaboration between leaders and team members is encouraged, which is especially important in cases of simulation-based medical education given the importance of efficiency and effective teamwork on patient outcomes and performance (Salas et al., 2008). Such training programs should also
include a focus on both the art and the science of the learning process as a whole and the
debriefing process specifically (Salas et al., 2008). There should also be a heavy focus on
making all team members reasonably comfortable when working with others during
simulation training (Salas et al., 2008). In addition, because research suggests that each
training session should only focus on a few critical learning outcomes, measuring
performance should be restricted to these outcomes (Salas et al., 2008).

Measuring the effectiveness of simulation-based training programs requires high
levels of curriculum integration (Issenberg, 2006). Because simulation-based training is
only a complement to other forms of instruction, such as lectures, problem-based
learning, and readings, assessments of simulation-based training should be aware of this
complementary role in measuring performance (Issenberg, 2006). In fact, research
suggests that learning the fundamental procedural skills required in the medical field can
become oversimplified without the proper clinical contexts (Issenberg, 2006).

Alinier, Hunt, Gordon, and Harwood (2006) investigated the specific effects of
scenario-based simulation training methods on typical nursing students. In particular, the
study examined the effects on the clinical skills and competence of the students. The
researchers in this study used full-scale realistic, high-fidelity medical simulation for
training healthcare professionals. This practice, the researchers argued, is becoming more
common. Access to the sort of technology that allows for such training is simpler than
ever before, as there has opened several simulation centers across the world. Also, there
has become increasing availability on the open market for more sophisticated, as well as
affordable, high-fidelity patient simulators. Nevertheless, there is relatively little
scientific evidence that this technology is any better than the more traditional techniques used in the education of for undergraduate nursing students.

The Alinier, Hunt, Gordon, and Harwood (2006) study was a pre-test/post-test design. The volunteer undergraduate students, numbering 99 in total, were all in the second year of a program for a Diploma of Higher Education in Nursing in the United Kingdom. The researchers used a 15-station Objective Structured Clinical Examination. Participants were randomly allocated to either a control or experimental group. For participants in the experimental group, simulation training was added to their normal curriculum. The control group did not receive simulation-based training. Afterwards, all of the participants were re-tested and asked to complete a questionnaire. For each group, the data was collected in 2003. Both groups improved their performance on the second of the two Objective Structured Clinical Examinations. The average test scores, respectively, increased by 7.2 and 14.2 percentage points between the first exam and the second. Here, the difference between the two means was statistically significant. On the other hand, students’ perceptions of both stress and confidence, which were each measured on a 5-point Likert-like scale, were very similar between the two groups at 2.9 and 3.5 for the control group.

Alinier, Hunt, Gordon, and Harwood (2006) concluded that the addition of simulation-based training may enable small groups of students to practice their skills and increase their confidence in a safe and controlled environment, teaching the students how better to react appropriately in critical patient care situations. Training that accomplishes these goals, the researchers argued, is very valuable in instructor efforts to properly equip
students with a number of technical, as well as non-technical, skills before the students are required to use them in practice settings (Alinier, Hunt, Gordon, & Harwood, 2006).

Birch et al. (2007) sought to determine precisely the most effective method for the delivery of training to nursing staff in the management of obstetric emergencies. This research study was conducted in the District General Hospital in the UK, which delivery approximately 3,500 women annually. Thirty-six nurses, comprising of junior and senior medical staff were included as research subjects for this study. All of the staff members were put into only one of six professional groups, with six participants being assigned to each group. For this study, three teaching methods were employed: lecture-based teaching, simulation-based teaching or a combination of the two. All groups were randomly assigned to participate in a full day of training in the management of Post-Partum Hemorrhaging, which utilized one of the three teaching methods. The two measures assessed were domain-specific knowledge and performance. These measures were measured pre-test, post-test, and during a follow-up meeting that occurred three months after the post-training. In addition to an assessment of domain-specific knowledge and clinical performance, semi-structured interviews were conducted with half of the original participants one year after their training sessions. This interview explored other measures, including anxiety, confidence, communication, domain-specific knowledge, enjoyment and transferable skills.

The results of the Birch et al. (2007) study indicate that all groups improved in both their performance and domain-specific knowledge of the management of Post-Partum Hemorrhaging. The groups that were taught using simulation only was the only group that clearly demonstrated a sustained improvement in the clinical management of
the case presented to the students, confidence in their abilities and skills, communication skills and domain-specific knowledge. A drawback of the study is that given the sample sizes the study did not reach statistical significance. However, the simulation-based training group reported more transferable skills as well as less anxiety in their subsequent emergencies of the same nature as the training. Meanwhile, the other two groups reported improved multidisciplinary communication, indicating that each group may have received different benefits from the training. The researchers found that while obstetrics should be considered a high risk specialty, in which many types of emergencies are quite common, the process of training nurses to manage such emergencies is a very important aspect of risk management in this department. Additionally, traditional modes of risk management strategies that are based not on simulation training, but incident reporting and event analysis, are reactive and often ineffective. On the other hand, simulation-based training was shown to be appropriately proactive in leading to a substantial reduction in errors and minimizing risk in obstetrics, improving teamwork and communication skills, and giving students a number of transferable skills that can further improve their clinical performance.

Brannan, White, and Bezanson (2008) investigated the effectiveness of a human patient simulator, to be used as a tool for experiential learning. This tool provides a mechanism in which students participate in clinical decision-making, allowing the students to both practice their skills and observe outcomes from the clinical decisions of others. In general, the purpose of the Brannan, White, and Bezanson (2008) study was to compare the specific effectiveness of two unique instructional methods, one involving simulation-based training and the other featuring only classroom training. The
researchers also sought the best practice of the two to teach specific nursing education content for junior-level nursing students. The measures used in this study were cognitive skills relating to performance and confidence. Additionally, the instructional methods used in this study featured an interactive approach that made use of the human patient simulator method, in a strict comparison with traditional classroom lecture training. The results of the study showed that the use of a teaching strategy that involved the human patient simulator method made a positive difference among nursing students, in particular with their regard to the ability to successfully answer questions on a test of relevant cognitive skills. However, the measured confidence levels of the participants were not found to be significantly increased with the addition of the human patient simulation method.

Brown and Chronister (2009) presented a comparative research study intended to determine the specific effect of simulated activities of practice that are related to critical thinking skills, as well as self-confidence during the course of a nursing course for electrocardiogram. The method for this study featured a treatment group of seventy students who received simulation on a weekly basis and more than 450 minutes of lecture time. Meanwhile, the control group for this study featured a group of seventy students who also received lectures on a weekly basis, but did not receive the simulation training. The results of this study indicate that both critical thinking and self-confidence measures indicate that there were not any significant differences between the two groups. However, the second-semester senior students scored significantly higher in both critical thinking and self-confidence measures than those from the first semester, though such measures were accounted for in the data analysis. Pre-simulation and post-simulation self-
confidence measures were shown to be significantly improved by the simulation. Consequently, the researchers concluded that higher critical thinking marks are significantly associated with confidence levels. Also, student employment and focus on a telemetry unit was found to be increased among those students in the simulation group.

Griggs (2003) sought to determine whether the use of a specific Human Patient Simulator had any significant effects concerning the medical domain-specific knowledge gain for undergraduate nursing students. Also, the researcher investigated whether the use of the Human Patient Simulator had any specific effect on student' perceptions of anxiety, competence in performing procedures, competence in working with patients with specific diagnoses, or decision-making ability. The Griggs (2003) study made use of a researcher-developed multiple-choice clinical examination that was used to assess the aforementioned measures. This tool also was used to assess student nursing domain-specific knowledge in each group and included a detailed forty item Likert-scale type survey that was used to assess the student perceptions of anxiety. Also measured was student competency in being able to properly perform particularly relevant procedures, as well as competence in being able to work closely with patients who had certain diagnoses. Finally, the assessment measured the decision-making abilities of each student. The original sample for the study included 27 senior undergraduate nursing students who were taking an advanced medical-surgical clinical nursing course at a local university in Chicago. The sample was divided into two groups, one that relied partially on simulations and one that relied entirely on non-simulation educational means. The results of this study showed that the inclusion of a specific Human Patient Simulator training session towards an advanced surgical clinical nursing course actually had no
effect on the measured medical-surgical domain-specific knowledge of the nursing students. Additionally, the results of the study suggested that the Human Patient Simulator training had no significant effect on the levels of anxiety for the student, on the perceptions of competency as a nurse for the students, or even on the student perceptions of their own decision-making abilities. In all, the researchers concluded that the use of simulation-based training for this specific course was not more effective than traditional educational means.

Howard (2007) sought to determine whether the specific use of a particular human patient simulator serves as an effective educational intervention among nursing students. The researchers in this study investigated whether using this simulator turned out to be a more effective educational tool than simply the use of targeted interactive case (ICS) studies. The primary measures of this in regard to domain-specific knowledge gain and critical thinking abilities and assessed the student’s perspective related to the experiences. Kolb’s Experiential Learning Theory provided the framework. A multi-site, quantitative quasi-experimental two group pre-test and post-test design was utilized with a sample of 49 nursing students from two different nursing programs at a simulation center. After permission was obtained, the diploma and baccalaureate nursing students were pre-tested using a custom-designed Health Education Systems Incorporated (HESI) exam based upon ICS and Human Patient Simulator content, randomly assigned to either the ICS or Human Patient Simulator group, received the educational intervention, then were post-tested using another HESI exam based upon the same test blueprint. The HESI Scores were used to measure domain-specific knowledge gain and critical thinking ability. The students in this study also completed a detailed researcher-developed Human
Patient Simulator evaluation form that was used to assess the particular perspectives of the students on the teaching strategies used.

The researchers in this study used an ANCOVA to measure the outcomes. The results showed a significant difference in the domain-specific knowledge gained under the HESI Conversion Score and the HESI Scores. Additionally, a statistically significant difference was discovered in the critical thinking abilities of the students who were in the simulation group, based on the Critical Thinking sub scores of the students. In fact, the Human Patient Simulator group scored significantly higher that the control group on the posttest for critical thinking skills. Also, the results of the study suggested that student perception of the Human Patient Simulator experiences were significantly more positive than those in the case study group, especially when it came to critical thinking abilities and the ability of the students to transfer the knowledge to a clinical setting. The findings of the study also included support for students in the simulation group having a stronger need for inclusion in undergraduate education programs, having a better understanding of relevant concepts, decreased nervousness measured during the test, decreasing anxiety associated with being in a clinical setting, and, finally, that the simulation-based education acts as an effective substitution for clinical experiences. The results of this study supported the continued use of simulation technology among undergraduate student going into the field of nursing. Meanwhile, the study demonstrated the effectiveness of simulation as an innovative and practical teaching strategy, argued the researchers. The study further validated positive experience among nursing students for simulation-based education and training, while confirming that the use of simulation-based training has a
positive cost/benefit analysis in regard to the required resources for simulation use in an undergraduate nursing curriculum.

Linden (2008) argues that there has been limited research on simulation-based training in the general nursing education field. Linden (2008) states, “Initial research indicates that clinical simulation in nursing education has potential to be an effective method for teaching critical thinking, teamwork, and management of a variety of patient conditions. The majority of research in nursing education focus on qualitative studies of student and/or faculty perceptions related to clinical simulations” (p. 22). Linden (2008), instead, relied on quantitative measures to determine the efficacy of simulation-based training and is a quasi-experimental study that sought to compare the specific effect of clinical simulation-based training with traditional teaching. The specific measures of this study include the critical thinking of nursing students measured through assessment during their first clinical course. A total of ninety-seven students who were part of an associate degree nursing program participated in this study. The students were randomly sorted into two comparison groups which experienced traditional education means based on traditional teaching strategies, which involved classroom assignments, lectures in class that were followed by an examination to test for comprehension. Meanwhile, the experimental group in the study experienced traditional preparation in addition to a skills laboratory and clinical simulation-based learning program, before taking the same examination as participants in the other group.

The results of the Linden (2008) study showed that there was a significant increase in the cognitive learning outcomes for the experiential groups when compared to the control, or comparison, groups. The researchers found a number of important
implications for nursing education, such as that the implementation of clinical simulations that are specifically based on the “Linden Cycle of Learning Theoretical Model” for nursing students can help bridge the gap that exists between signature pedagogy with theoretical and clinical experiences that can improve the clinical domain-specific knowledge, which can help students build a knowledge foundation for improved critical thinking abilities. Furthermore, the researchers in this study argue that the clear evidence for the effectiveness of clinical simulation in the nursing field should alter significantly the signature pedagogy for all nursing education programs. In other words, the pedagogical transformation for nursing education programs should move such programs from the current two-step process of theory and clinical learning to an advanced system that goes from theory to simulation and, only then, to clinical application.

McCausland, Curran, and Cataldi (2005) developed an instructional development pilot program that used enrichment activities in order to determine the specific effects that using a human patient simulator has on the critical thinking and the self-efficacy of nursing students. For this study, 24 nursing students who were in their third semester of a nursing program at a private university took part in this program. The dependent variables in this study included assessed scores for critical thinking and self-efficacy. In this study, pre-scores in these two areas were the covariates. Additionally, the independent variables in this study included group and individual learning styles. The participants in this study were sorted by learning style and were randomly assigned to be a part of one of two groups. The first group in this study discussed the patient cases in a classroom setting. The second group in this study used a Human Patient Simulator to
simulate real patient cases. The participants in this group were also asked to perform several relevant nursing actions. An analysis of the outcomes of the two groups was conducted relying on a linear model, in which group and learning styles were measured, along with the pretest scores acting as a covariate. No group had significant gains in their critical thinking disposition scores. On the other hand, self-efficacy gains and critical thinking total scores were shown to be higher for both groups. None of the learning style factors had any significant effect on the learning outcomes for either of the groups. Moreover, the Human Patient Simulator group was discovered to be significantly more enthusiastic and energetic about the content-specific learning and showed much more of a desire for future learning sessions of the same style. The researchers, therefore, concluded that the use of a Human Patient Simulator was more helpful for students and led to an increase in confidence in such students in caring for patients.

Ruggenberg (2008) sought to investigate the efficacy of a particular simulated clinical experience on the domain-specific knowledge acquisition for nursing students. Additionally, the researchers investigated the transfer of knowledge to the nursing field, as well as the promotion of effective learning practices, which included active learning, collaboration, and patient engagement. This study featured two groups, a pretest-posttest experimental design, a single independent variable, and six dependent variables. The independent variable was the learning method used, while the six dependent variables were the following: domain-specific knowledge acquisition, far transfer, near transfer, active learning, engagement, and collaboration. In this study, fifty-eight nursing students were randomly assigned to a learning method. This study featured only two learning methods, simulation learning and scenario-based learning. Students in the simulation
group, of which there were thirty, were provided with a learning session that lasted one hour and included a simulation using a human patient simulator and, then, discussion. Students in the control group, of which there were twenty-eight, were provided only with a one-hour learning session in which traditional methods of instruction were used, which involved written material, video presentations, and a focused group discussion. All students filled out an assessment which measured the aforementioned dependent variables.

The results of the Ruggenberg (2008) study indicated that there were no significant differences between the two types of learning method groups for any of the cognitive dependent variables. However, a significant difference was discovered between the two groups two specific affective dependent variables, active learning and engagement. The simulation group showed significantly higher active learning and engagement scores. This study suggests that simulation-based learning is an effective method for nursing students, especially as it pertains to active learning and engagement. Additionally, there appear to be no advantages to traditional learning techniques that are not shared by simulation-based learning, at least concerning the measures discussed for the Ruggenberg (2008) study.

Shepherd, Kelly, Skene, and White (2007) conducted literature review on studies that sought to compare the effects of traditional and simulation-based learning approaches for nursing students. The researchers sought, in particular, to investigate the specific effects of three learning interventions for graduate nurse knowledge acquisition and skills. The researchers hypothesized that patient assessment skills among graduate nurses who had successfully completed a simulation-based education activity would have, on average,
better scores on knowledge and skill assessments, compared with those student who had only completed traditional education activities that had no simulation-based components. The results of this review showed that the mean test scores for nurses who were in simulation-based training groups were significantly higher than the same scores of those students who were in the traditional learning group or PowerPoint/lecture-based group. The researchers concluded that simulation-based education appears to be as effective or even more effective for developing critical thinking skills and knowledge acquisition for graduate nursing students.

Cant and Cooper (2010) held that while many studies showed that some simulation techniques were a sound method of education and that such techniques had certain benefits over traditional educational techniques, only around half of such studies actually compared simulation with a formidable traditional educational technique for nursing education. Additionally, such studies were only able to show that any additional gain in domain-specific knowledge, critical thinking, and perceived clinical confidence were, at best, relatively small. The researchers held that the clear lack of variation between the simulation education techniques and strategies and the other similarly interactive traditional education strategies may have reduced the comparative effect. Simulation education was, on the other hand, shown to be superior in many of the studies with reference to its effect on domain-specific knowledge compared with traditional lecture-based teaching when only one method of teaching was used. The researchers, therefore, reviewed twelve studies, finding several problems associated with every study, casting doubt on the widespread conclusions held by the researchers of such studies.
The result of the Cant and Cooper (2010) review was that there were high levels of variability in assessing educational outcomes among nursing students. In other words, some studies learning was assessed prospectively, while for others assessment was based only on retention a week or up to a month after the learning session. Potential bias is high, the researchers found. Furthermore, the researchers held that in many of the studies the validated assessment instruments used to measure the dependent variables required specific technical ability by the students, yet were often not included as confounding variables. Moreover, the validity of these instruments has come into question. Meanwhile, often the assessment measures used in these studies were often indirect and self-reported, which can introduce bias, especially for confidence measures. After all, while it is generally recognized that nurse competence requires significantly more than the domain-specific knowledge in the clinic and, therefore, must include synthesizing knowledge, such applications are difficult to measure. The proxy measures used by researchers, may cause such students to respond differently to simulation-based learning conditions. The researchers of this review found that, in general, the results were somewhat supported and valid, though many more studies should be conducted using different assessment measures to bolster such conclusions.

Barry et al. (2008) investigated research evidence for the efficacy of simulation-based training among nursing students. The researchers chose studies that used a simulator as an educational intervention. Additional inclusion criteria was that specific student outcomes were measured. The most common outcomes were participation, attitudes, domain-specific knowledge and skills. For this review all of the studies met one or more training criteria for effectiveness. The researchers discovered ten specific
features of medical simulations as educational interventions. The most common feature for such training simulations was discovered to be repetitive practice. Prospects for students to participate in focused and repeated practice in which the intention was skill improvement, rather than simple entertainment or play, was found to be required for proper learning in high-fidelity medical simulations. Repeated practice includes intense and frequent student engagement in a focused, precise domain. Ability repetition in practice periods gave students chances to correct mistakes, refine their work, and demonstrate procedures and relevant actions automatically and with almost no effort. The researchers discovered that the results of repetitive practice improve skill acquisition in shorter times than mere exposure to common clinic work. Additionally, such repetition in a controlled environment improved the transfer of skilled behavior from the controlled simulator settings into direct patient care settings. That is, students who participated with direct contact with simulators performed better with live patients. It was also discovered that medical simulations and simulation-based procedures must be accommodating to student schedules and not too physically taxing, in order for proper student practice to occur. In fact, forty-three journal articles found repeated practice to be a key for proper use of high-fidelity simulations in medical education.

Another finding of Barry et al. (2008) involves proper curriculum integration. Twenty-seven of the studies included in the final stage of this systematic review cite integration of simulation-based exercises in the typical medical school or postgraduate educational curriculum as an important feature for effective use. Simulation-based education should not be an uncommon activity, but must be developed in the ways student performance is evaluated. Also, the use of simulation-based training in the
medical field should be developed into a student’s usual training schedule. Effective medical learning develops from proper student engagement in thoughtful practice with clinical problems and strategies in simulated surroundings in addition to patient care experience. Furthermore, medical education using simulations is a required component of the proper curriculum. Optional exercises have been found to be much less effective. Range of difficulty level was also discovered to be a key factor in proper simulation-based training exercises for nursing students. The researchers found that effective learning is enhanced when students are presented with opportunities to engage in the practice of particular medical skills that vary widely in difficulty. Students should, of course, begin at basic skill levels before demonstrating mastery with regard to specific objective criteria and standards. Students should then, the researchers argue, proceed to simulation-based education at progressively higher difficulty levels. While every student has a unique learning curve, long-run learning outcomes, measured objectively, should always be identical across all students. In fact, researchers found that fifteen of the 109 studies covered in the review address the importance of the specific range and scope of task difficulty as key variables for simulation-based medical education.

Barry et al. (2008) also found that simulation-based training programs were more effective when they employed multiple learning strategies. The researchers held that this was likely because the adaptability of high-fidelity medical simulations require multiple learning strategies as both a feature and actual use of the simulation tool or device. Multiple learning strategies include instructor-centered teaching involving large groups or small groups and individual, independent learning. It was discovered that optimal use of high-fidelity simulations in different learning situations depends heavily on the
educational objectives that are addressed, as well as the extent that students have prior learning experience on the subject. In general, educational tools should match the educational goals of the program. High-fidelity medical simulations that are highly adaptable to several different learning strategies are more likely to fulfill this goal. Capture clinical variation was discovered to be another important feature of medical simulations for educational purposes. High-fidelity medical simulations that can capture or signify a widespread diversity of patient difficulties or conditions are clearly more beneficial than simulations having a thin patient range. Simulations capable of selection from many patient demographics and responses to treatment can increase the quantity and diversity of patients that students meet. Increasing the diversity of simulated patients perceived by students helps to normalize the clinical curriculum across educational positions, thus, giving equity to smaller programs where the range of real patients may be relatively low. Such simulations may also give students exposure and practice experience with unlikely problems in which the presentation frequency is typically low, though the stakes are high.

Another feature discovered by Barry et al. (2008) is the level of control over the learning environment. The researchers discovered that in a controlled clinical environment, nursing students can correct patient care mistakes with few adverse consequences, and instructors can concentrate on student learning rather than patient outcomes. High-fidelity simulations are ideal for work being completed in controlled and forgiving environments, in contrast with the uncontrolled nature of most patient care settings. Teaching in a controlled environment allows trainers and students to focus on teaching without much distraction. This also reflects a clinical and educational
philosophy focused on ethical teaching involving students and patients. The usefulness of education in a controlled environment using high-fidelity medical simulations was mentioned in 10% of the articles Barry et al. (2008) assessed. Individualized learning is yet another key feature. The chance for students to have reproducible, consistent educational experiences in which they are active participants is an imperative quality in the use of high-fidelity medical simulations. In other words, learning experiences should be individualized for students, with the techniques adapted to the needs of the students. Simulations allow multifaceted clinical jobs to be divided into their constituent parts for educational mastery in order at variable rates. Learners can take responsibility for their own educational development within the scope of curriculum. Another important feature is how defined the outcomes or benchmarks are during the simulations. In addition to individualized learning in a controlled educational environment, high-fidelity medical simulations may feature well defined outcomes or benchmarks for student achievement in many different points of assessment. Such goals are simple with objective measures. Students are more likely to develop key skills if the outcomes are distinct and suitable for their level of training. Finally, the last feature discovered is simulator validity. There are many types of educational validity. In the Barry et al. (2008) review, validity refers to the degree of fidelity that the simulator provides as an estimate to multifaceted clinical circumstances, philosophies and tasks. High simulator validity is vital to aid students and helps them increase their perceptual -What? Clinical students prefer this realism with opportunities for hands-on experiences to traditional classroom discussions and lectures.

Effken and Doyle (2001) sough to determine how cognitive style interrelates with interface design to influence student abilities to learn to use computer simulations. In this
study, eighteen nursing students were assigned to two separate groups, determined by their cognitive styles. The participants were asked to solve three physiologic problems using three separate interface designs: a strip-chart display, an integrated balloon display, and an etiologic display. Researchers discovered that the specific effects of cognitive style on student performance were arbitrated by the interface designs used, though such effects decreased over time with practice.

Feingold, Calaluce, and Kallen (2004) investigated student and faculty perceptions on a computerized universal patient simulator in a simulated clinical scenario. Students who used the simulator in clinical simulation activities in this undergraduate program during two consecutive semesters filled out a 20-item survey on a 4-point Likert scale. Four faculty members were also surveyed using a similar 17-item tool with an identical response scale. Survey items that were related to the reality, measured by fidelity metrics, of the simulations, the pace and flow of the medical simulation, the capability to transfer skills learned to real clinical settings, and the worth of the simulated clinical experiences. Results indicate that the majority of the students and faculty identified the simulations as being very realistic and highly valuable to learning outcomes. Nonetheless, only about half of the students stated that the skills developed in the clinical simulation would transfer very well to an actual clinical setting, while all of the faculty thought so. Moreover, faculty members stated that executing the simulated clinical scenario required extra time and resources.

Goolsby (2001) sought to develop an improved understanding that the role computer-assisted simulations play for nurse practitioner education. The researchers observed eight students completing a simulated case. The results indicate that each
student established their own perspectives on how to complete the task. Misconstruction of information was common among all students and the lack of a live patient interaction may have affected the reasoning process of the students. Furthermore, the students showed a developed ability to take a perspective on the case study, based mostly on previous nursing experience. Students, in general, obtained adequate data on which to base diagnoses.

Goldenberg, Andrusyszyn, and Iwasiw (2005) sought to determine the effect of classroom simulation on undergraduate nursing student self-efficacy during a health course. The results show that the overall self-efficacy scores of the students increased significantly after the two sessions of simulated case studies. The results suggest that the students had increased perceived confidence during the health class as a consequence of the simulation-based teaching.

Rhodes and Curran (2005) sought to determine whether the use of a Human Patient Simulator tool actually enhanced critical thinking and the clinical judgment for nursing students. The researchers hypothesized that the active participation by students in a variety of relevant clinical scenarios will strengthen a student’s aptitude to make suitable medical decisions. These practices assist the beginner nursing student in the natural progress from beginner to advanced, the scholars argued. While the simulation practice may cause some worry, students are better able to concentrate on patient care, the researchers held, because no actual harm is occurring during the exercise. Thus, the targeted use of simulated scenarios throughout an undergraduate curriculum may be helpful in improving student confidence concerning patient care decisions.
One problem for the evaluation of simulation-based training programs is that the areas of competencies covered by such programs are very narrow, while the actual competencies required for high quality medical practices are complex and deep (Downing, 2003). Consequently, measuring the outcomes of simulation-based training can be difficult. There are, currently, three primary means by which data is obtained in measuring the performance outcomes of simulation-based training (Downing, 2003). The first is by observational, in which researchers rate the performance of students who are participating in simulations exercises (Downing, 2003). While far from perfect, this measure fits well with the general simulation scheme. Studies have found significant levels of bias in observational ratings, however, unless the conditions under which the observations occurred were very controlled (Downing, 2003). The second means to measure the performance of trainees come directly from trainee responses, either through constructed responses, in which “the candidate is instructed to write a patient note or respond to a simulated patient question” or selected in which multiple choice questions were given to the trainee (McGaghie et al., 2010: p. 56). These responses tend to produce results with higher reliability than observational methods (Downing, 2003). Finally, the third type of measure is through sensors, in which information is relied through sensors and analyzed (Downing, 2003). McGaghie et al. (2010) argue that a look at the historical record of recent research in the medical field suggests that the successful measurement of performance outcomes for simulation-based educational training in the medical field is “one of the greatest challenges now facing the field” (p. 56).

In addition to the evidential support for simulation learning methods improving the overall performances, self-confidence, and competency of nursing students, there is also
strong evidence that nursing students and faculty generally believe that such methods are beneficial to students. One study on students and faculty perceptions of simulation learning methods showed that both the students and faculty in the survey considered simulation learning methods to be beneficial to students, particularly their clinical competency (Kaddoura, 2010). A comparison of traditional teaching methods and clinical simulation on relevant nurse practitioner knowledge showed no statistically significant differences between the two groups (Scherer, Bruce, & Runkawatt, 2007). While, on one hand, this finding can be considered a negative finding for simulation learning methods, on the other hand, it suggests that traditional case study teaching methods are not more effective at developing relevant knowledge in nursing students, which can be considered a positive finding for simulation learning methods. After all, the major benefits of simulation learning methods include improve clinical performance, higher clinical competence, higher confidence, improved self-efficacy, and stronger communication skills. These benefits do not typically include an improved textbook understanding of the concepts taught in nursing classes. The benefits of simulation learning methods are more practical than epistemological. Thus, the finding that there were no significant differences between the two types of instruction should be viewed, at the very least, as providing no supports against simulation learning methods in the nursing profession.

**Nursing Theoretical Framework**

The theoretical framework for this study is led by research by Benner (1984) concerning the acquisition of nursing skills as a developmental process. Under Benner’s approach, senior-level nurses are trained by experienced faculty. The nursing instructor relies on a large bank of relevant knowledge, drawing on such knowledge so rapidly that
the instructor does not have to think about performing the simulated instruction. The patient-monitoring function of Benner’s model is particularly useful for simulated patient care instruction. As students gain clinical knowledge and experience, they begin to comprehend the components of cases presented in a clinical setting. Simulation allows students to participate in specific disease process presentations with expert instruction present before, during and immediately afterward. The de-briefing aspect of case engagement and discussion reinforces clinical skill competence allowing the student to gain confidence and clinical skill. Furthermore, the therapeutic intervention domain and the management of changing conditions domain are each relevant to simulation-based learning frameworks. The heavy reliance on instructor guidance, not so much in teaching specific information, but rather the processes and procedures, in simulation-based learning with chest wound simulation is closely linked to Benner’s approach.

**Key Words**

Chest Wound - Any blunt force injury to the bony thorax -causing interruption in normal respiratory patterns.

Simulation-based educational training in the nursing field- Exercises that are intended to simulate the real-life circumstances involved in the treatment of a particular medical condition.

High-fidelity simulation – according to the Merriam Webster Online Dictionary “to simulate” means to ‘give or assume the appearance or effect of, reproducing the appearance, character or condition of’. Fidelity is the term to depict the precision or degree of realism of the simulation system (Seropian et al., 2004). The digital simulator is
used to create an educational environment that is non-threatening and interactive for students to receive hands-on experience.

Human Patient Simulator (HFS)- according to Galloway (2009), “whole body mannequins (adult, child, or infant) that are capable of responding to certain medications, chest compressions, needle decompression, chest tube placement, and other physiologic interventions and subsequent responses”. HFS is a convincing computerized mannequin that can be coded to respond to realistic inputs in an effort to imitate the reality of a patient in a clinical environment.

Self- Confidence can be defined as trusting the reliability of one’s own judgment and performance (Jeffries, 2005). The Jeffries instrument categorizes self-confidence as a measure of how confident students are concerning the skill and knowledge presented on caring for patients in simulation.
CHAPTER III

Method

Description of the Research Design

The purpose of this study was to determine the effect of chest wound simulation on the self-confidence of senior baccalaureate nursing students. Using a qualitative, experimental design, 29 senior accelerated baccalaureate students, enrolled in NSG 420 (Nursing Care of the Adult II) at a small southern Colorado university, participated in the study. Through random selection, fifteen students were selected for the experimental group and fourteen for the control group. The experimental group participated in a high fidelity simulation of a patient with a chest wound. All students completed a self-confidence survey pre and post simulation. The control group did not participate in the simulation activity, but were offered the simulation experience after the study was completed.

The investigator controlled the independent and dependent variables by manipulation. The independent variable was the chest wound simulation. The dependent variable was the student self-confidence. The design allowed the researcher to determine if high fidelity simulation improves perceived student self-confidence. Advantages of the qualitative experimental design was ease of data collection and efficient means of comparing pre and post self-confidence surveys. The collected data from the study could be accurately measured and quantified resulting in precise statistical analysis. The advantages of experimental design are the use of control groups, randomization and the manipulation of experimental variables.
Protecting Human Subjects

Prior to the recruitment of subjects, written approval for this study was obtained from the university’s Institutional Review Board (IRB) to assure the participants’ protection. The investigator completed the requisite training determined by the Department of Nursing and the university. The study was conducted in accordance with the United States and international standards of Good Clinical Practice and regulations endorsed by the department and institution involved.

All information related to study participants was maintained in strict confidence and administered according to the requirements of the IRB. Participant consent forms, graphic data and survey tool results were kept in a locked desk. All confidential documents will be maintained for five years, after which time, they will be destroyed by the investigator. All study documents (e.g. source documents, regulatory documents and data collection tools) will be available for review by authorized auditors, such as the IRB.

Although the research posed no physical threat to participants, there was a risk of psychological distress due to the potentially disturbing image of a patient with a chest wound. The following measures were employed to minimize the psychological harm to subjects: (1) subjects were informed about the duration and logistics of the simulation and encouraged to ask questions prior to consenting to participate; (2) prior to the simulation, subjects were briefed on the appearance of the moulaged simulation manikin; (3) an explanation that the subjects had a right to decline participation and withdraw at any time; (4) the investigator provided written contact information for subjects to inquire
about any part of the study if needed; (5) explanation of the rules and regulations regarding confidentiality and privacy requirements.

**Identification of the Population and the Sample**

Student participants in the study were recruited from the senior accelerated baccalaureate nursing program enrolled in NSG course number and course name at the study university. All students signed a consent form to participate in the study. Randomization of experimental and control groups was accomplished by whether or not a student was able to participate in the simulation on the date and times provided. Fifteen students agreed to participate in the simulation and comprised the experimental group. Fourteen students could not participate in the simulation on the pre-arranged time but agreed to complete the survey tool pre and post simulation. The control group was offered an opportunity to participate in the simulation at a later date after the data collection was completed. All students signed a consent form to participate in the study. Students were identified on the survey tool by the last four digits of their university personal identification number (PIN). The students were informed that participation in the study would not affect their academic standing. And that they could refuse to participate at any time. No demographic data was collected.

**Instrument**

The simulation used for the study was designed for the summative evaluation of senior accelerated baccalaureate nursing students participating in a Laerdal clinical assessment module (CAM) simulation of a patient with a chest wound resulting in a tension pneumothorax. The Laerdal CAM standards of care are consistent with the

The self-confidence survey tool from the Laerdal clinical assessment module is designed to measure student confidence in demonstrating eleven procedural items related to the care of the patient with a chest wound. The tool has five columns numbered from one to five denoting the level of self-confidence with the number one designated as “Cannot do this at all (never having attempted, nor observed the procedure)” to number five, “Very confident or routinely performs the procedure” (Appendix A). Each student in both the experimental and control group completed the survey instrument at the same time; one day prior to and one day after the simulation.

**Procedure**

The skills lab at the study university was utilized for the simulation of the patient scenario. The high fidelity Laerdal Sim Man® was programmed with the tension pneumothorax scenario. The experimental group of fifteen students, divided into groups of three, were assigned to one of five, forty-five minute blocks of time to complete the scenario. On the day of the simulation, each student was oriented to the lab simulator, simulator rules and expectations of performance. The study investigator spent the first fifteen minutes with each student reviewing the definitions, anatomy, assessment findings and appropriate nursing interventions for a patient with significant chest wound resulting in a tension pneumothorax. The review was based on the care of the trauma patient with a tension pneumothorax, (TNCC, 7th edition). Students were provided with all the materials and equipment necessary to perform appropriate assessments and needle decompression of the tension pneumothorax on the simulator. The students were given fifteen minutes to
complete the simulation and fifteen minutes to debrief and ask questions regarding the simulation. The students were asked not to share their simulation experiences until after all participants had completed the post-simulation survey. The following day, all student participants in the control and experimental groups completed the same self-confidence survey tool.

Data Analysis

Data analysis was used to attempt to answer the research question: Does a chest wound simulation increase baccalaureate nursing students’ self-confidence? Nominal data from the Self Confidence Survey tool was compiled for analysis. Analyses were completed on the data to determine if the students had a statistically significant growth in self-confidence as a result of participation in the simulation. After using these analyses, the researcher determined that the results and conclusions are able to be defended. The research findings are in Chapter IV: Results.
Chapter IV

Results

The purpose of this study was to determine the effect of chest wound simulation on the self-confidence of senior baccalaureate nursing students. Four related analyses were conducted on the collected data. The first analysis examined whether there was a statistically significant difference between the experimental group and the control group in their pre-test scores. As Table 1 indicates, the pre-test scores between the scores were quite close, and an independent samples t-test showed no significant difference ($t = .91, p = .37$), meaning the experimental and group control groups started at the same level of confidence. Any differences in growth after that were not a function of pre-test differentials.

Table 1 Descriptive Statistics

<table>
<thead>
<tr>
<th>Measure</th>
<th>Experimental ($n = 15$)</th>
<th>Control ($n = 14$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Pre-test</td>
<td>3.07</td>
<td>.74</td>
</tr>
<tr>
<td>Post-test</td>
<td>4.35</td>
<td>.40</td>
</tr>
<tr>
<td>Difference</td>
<td>1.28</td>
<td>.76</td>
</tr>
</tbody>
</table>

The second analysis used paired samples t-tests to examine if each group separately showed significant growth from the pre-test to the post-test. As shown in Table 1, both groups saw growth in confidence from the pre-test to the post-test. Moreover, the
growth for both groups was statistically significant (experimental: $t = -6.49, p = .000$; control: $t = -3.54, p = .004$).

The third analysis used an independent samples t-test to compare the difference scores between the groups. This analyzes whether one group saw significantly more growth than another. The difference score was derived by subtracting the mean pre-test score from the mean post-test score for each person. This measures the main effect of growth in the comparison between groups. As Table 1 illustrates, the experimental group saw substantially greater growth than the control group. Moreover, the t-test results indicate the difference in growth between groups was statistically significant ($t = -5.16, p = .000$).

The final analysis examined effect sizes, using Cohen’s $d$, for the comparisons made above. As a reminder, inferential tests, like those used above, measure statistical significance—is the difference between groups greater than what might be expected by random chance or error. Effect size measures practical significance—does the intervention make a practical difference. One can find statistical significance but have small effect sizes, indicating the difference is greater than by random chance or error, but the practical effect could be small, suggesting the costs associated with the intervention may not worth the investment.

Starting with the pre- to post-differences for each group separately, the effect size for the experimental group, as indicated in Table 2, was large, but the effect size for the control group was small (by convention, $d < 0.4$ is small, around 0.5 is moderate, and $d > .65$ is large). The effect size for the difference score comparison, however, was very large.
### Table 2 Effect Sizes

<table>
<thead>
<tr>
<th>Group</th>
<th>$D$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental pre to post</td>
<td>1.73</td>
</tr>
<tr>
<td>Control pre to post</td>
<td>.36</td>
</tr>
<tr>
<td>Difference score comparison</td>
<td>4.84</td>
</tr>
</tbody>
</table>

#### Limitations of the Study

There were some limitations associated with the study. First, the sample size was small with only 15 students participating in the HFS and 14 in the control group. Second, the logistics associated with scheduling students to participate in the lengthy HFS precluded large numbers of students taking part related to limited facilities in a rural university.

Third, although the pre simulation self-confidence survey demonstrated no statistically significant difference in confidence between the experimental and control group ($t= .91$, $p=.37$), there was no provision in the study to determine participant’s relevant experience in healthcare or emergency services. Fourth, the fact that both control and experimental groups demonstrated a significant growth in self-confidence (experimental: $t= -6.49$, $p=.000$; control: $t= -3.54$, $p=.004$) leads to the assumption that there was communication between the groups regarding the simulation prior to completing the post simulation survey, which resulted in the control group having an increase in self-confidence without participating in the simulation.
Chapter V
Conclusions and Recommendations

Conclusions

The purpose of this study was to determine the effect of chest wound simulation on the self-confidence of senior baccalaureate nursing students. The results of this study support the use of a high-fidelity chest wound simulation for increasing baccalaureate nursing students’ perceptions of self-confidence. This study has reinforced the benefits of simulation-based education for nursing students. The use of simulations during the course of instructional teaching has long been valued as a way to simultaneously introduce the physical experiences associated with real-time procedures and develop fundamental understandings in nursing students about procedures. The hands-on instructional style required by simulation learning methods allows a real-time understanding of important nursing principles and facts.

Dori and Bulcher (2005) found that novice students who relied on simulation learning as part of their instruction attained better grades and superior learning outcomes than students who relied only on traditional, non-simulation learning, teaching methods for instruction. This current study demonstrated the effectiveness of a simulated chest wound experience as a method to increase the self-confidence of nursing students. The results of this study showed that participants whose instruction included the chest wound simulation had higher self-confidence scores than those participants who did not have the simulation experience.
Since trauma situations often evoke strong emotions in inexperienced nurses, it is critical that nursing students experience life-like simulations of certain procedures, especially those in which the patient has suffered a trauma, such as a chest wound. By simulating such procedures and situations, nursing students actually experience similar sensory perceptions to what they will experience in treating real-life traumas. While the use of high-fidelity simulation learning methods may improve the clinical performance of nursing students for a wide range of nursing activities, the use of such simulation methods for trauma victims is particularly important.

Additionally, trauma victims often present gruesome sights that can make it difficult for nurses to handle. Learning from case studies in textbooks may not provide adequate experiences to deal with traumas. Instead, high-fidelity simulation learning methods can make the adjustment from academic nursing student to practicing clinical nurse much easier and smoother, especially when dealing with traumas.

**Recommendations**

Having hands-on experience, even simulated experience, will likely leave new nurses more able to adequately handle traumas in clinical settings. Since simulation learning methods improve clinical competency, further investigation could be done about simulation learning methods and, in particular, if and how they improve the clinical performance of nurses in the care of the patient with trauma. More research could be performed on the methods of instruction for providing the best possible care for such trauma patients.
Further research could be conducted to determine if a chest wound simulation that increased student self-confidence also increased their critical thinking. Future studies may also focus on using new measures for assessing the dependent variable of this study.

Another recommendation would be to conduct a longitudinal study of nursing students to determine whether simulation based clinical education provides newly employed graduate nurses more confidence in the clinical setting than a control group of nursing students with traditional lecture/case review education.

**Summary**

High fidelity simulation is increasingly being utilized in nursing education to enhance students’ skill and competence. Performance of HFS does appear to improve student’s self-confidence compared with students who do not participate in HFS. The positive effects of improved self-confidence in caring for patients with significant injuries through simulation may have positive impact on improving patient outcomes.
References


Shepherd, I. A., Kelly, C. M., Skene, F. M., & White, K. T. (2007). Enhancing graduate nurses’ health assessment domain-specific knowledge and skills using low-


Appendix A: Self-Confidence Survey

Last four digits of your PID#___________________

Please check the number that best describes your level of self-confidence in performing nursing actions for a patient experiencing a chest injury resulting in a tension pneumothorax.

1= Cannot do this at all (never have attempted, nor observed the procedure)

2= Not confident (never have attempted but have observed the procedure)

3= Somewhat Confident (have attempted and observed the procedure)

4= Confident (have attempted and observed procedure several times)

5= Very confident (routinely performs the procedure)

<table>
<thead>
<tr>
<th>Nursing Actions</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performs ABCD Survey</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrates basic airway maneuvers</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recognizes respiratory distress</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrates effective bag-mask ventilation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrates bilateral lung auscultation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recognizes clinical signs and symptoms of a tension pneumothorax</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrates correct needle decompression</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrates how to secure decompression site with appropriate dressing</td>
<td></td>
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<tr>
<td>Demonstrates cardiac and respiratory monitoring</td>
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<tr>
<td>Performs pain assessment</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Describes on-going monitoring and need for chest tube placement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix B: Consent Form

Consent Form
Colorado State University-Pueblo
College of Engineering, Education and Professional Studies
And
The Department of Nursing
Consent to Take Part in a Research Study

Subject’s Last Four Digits of PID:

Title of Research: Chest Wound Simulation and its Effect on Self Confidence of Baccalaureate Nursing Students

Investigator’s Name: Patrick Stanifer

Consent for the Research Study: This is an important document. If you sign it, you will be authorizing Colorado State University-Pueblo to perform a research study using you as a subject. Please take your time to it carefully. Do not sign it unless you are comfortable participating in this study.

Purpose of Research: You are being asked to participate in a research study to determine if a chest wound simulation in the classroom can increase confidence levels in senior baccalaureate nursing students.

This research project is being completed in partial fulfillment to obtain a master’s degree in science with a major in nursing in the educator track at Colorado State University-Pueblo.

Procedures and Duration: The following procedures will be performed on the research study group:

1. After you sign the consent form, you will be asked to complete a self-confidence survey form before and after completing the chest wound simulation. This portion of the study will take about 10 minutes each.
2. You will participate in a chest wound simulation which should take about 20 minutes.
3. A post-simulation debriefing will take place at the completion of the simulation which should take about 20 minutes.

Risks and Discomforts/Constraints: You will be viewing potentially disturbing images of a patient with a simulated chest wound. You will be asked to complete two self-confidence surveys; before and after the chest wound simulation. This portion of the study should take about 10 minutes each.

Benefits: Your participation in this project will provide you more exposure to patient care through the use of simulation in the classroom.

Initials
Consent Form

Alternative Procedures: The alternative is not to participate in this study.

Reasons for Removal from the Study: You may be required to stop before the end of the study for any of the following reasons:

- If all or part of the study is discontinued for any reason by the investigator or university authorities.
- If you fail to adhere to requirements for participation established by the researcher.

Voluntary Participation: Participation in the study is voluntary and you can refuse to be in the study or stop at any time. There will be no negative consequences if you decide not to participate or to stop.

Responsibility for Cost: No cost is involved.

Confidentiality: In any publication or presentation of research results, your identity will not be used. You will be identified by the last four digits of your PID only. Every effort will be taken to protect you from having any of this information divulged to anyone other than those who are directly involved in the conduction of this study.

Consent:

I have been informed of the reasons for this study.

I have had the study explained to me.

I have had all my questions answered.

I have carefully read this consent form, have initialed each page and have received a signed copy.

I gave consent/permission voluntarily to participate in this study.

______________________________  ______________________________
Subject                                      Date

______________________________  ______________________________
Witness to Signature  Date

Investigator: Patrick Stanifer 719.251.5682

Initials __________
Appendix C: Approval Letter

2200 BONFORTE BOULEVARD PUEBLO, COLORADO
81001-4901

COLLEGE OF HUMANITIES AND SOCIAL SCIENCES 719-549-2625
DEPARTMENT OF PSYCHOLOGY FAX: 719-549-2705

4.7.14

IRB Review

Proposal Title: Chest Wound Simulation and Its Effect on Confidence of Baccalaureate Nursing Students

Principal Investigator: Stanifer

New application

Dear Mr. Stanifer,

Thank you for submitting your IRB application “Chest Wound Simulation and Its Effect on Confidence of Baccalaureate Nursing Students”. This application has been reviewed according to the policies of this institution and applicable federal regulations. The review category for this application is Exempt. This letter serves as notification that you now have IRB approval for a period of 12 months from the date of this letter. The expiration date for your approval is 4.7.15. Once human research has been approved, it is the Principal Investigator’s responsibility to report any changes in research activity related to the project, including revisions or amendments, serious adverse consequences, renewal or completion. If you have any question, please contact me at barbara.brettgreen@colostate-pueblo.edu. Thank you for your concern regarding the protection of human subjects, and good luck with your research.

Best Regards,

Barbara Brett-Green, Ph.D.

IRB Chair
CURRICULUM VITAE

PATRICK A. STANIFER RN, BSN, CEN
8978 SQUIRREL CREEK RD
BEULAH, COLORADO 81023
HOME- 719.485.8978

EDUCATIONAL BACKGROUND

Colorado State University, Pueblo, CO
Master of Science Nursing
- Projected completion - 6/2015

University of Southern Colorado, Pueblo, CO
Bachelor of Arts- Secondary Science Education
Biology/ Minor Chemistry 1993-1995

University of Southern Colorado, Pueblo, CO
Bachelor of Science Nursing 1987-1991

Pueblo Central High School, Pueblo, CO
High School Diploma 1977

LICENSED and CERTIFICATIONS

Registered Nurse Colorado Licensure – July 1991 to present

Certified Emergency Nurse- Expires 12/18/2016

Advanced Cardiac Life Support Course Director- Expires March 2017
Pediatric Advanced Life Support Course Director- Expires March 2017

Advanced Cardiac Life Support Instructor - Expires March 2017
Pediatric Advanced Life Support Instructor- Expires March 2017

Trauma Nurse Core Curriculum State Faculty Director/Instructor – No Expiration
Emergency Nurse Pediatric Course Director/Instructor Expires July 2016

Advanced Stroke Life Support Instructor- Expires November 2016
Fundamentals of Critical Care Support Instructor Expires June 2016
FACULTY APPOINTMENTS

St. Mary Corwin Medical Center Paramedic Academy Instructor 2005-2006

Visiting Lecturer: Colorado State University-Pueblo, College of Nursing 2006- present

Wilz Trauma Symposium Lecture: *Open Thoracotomy in the Emergency Department. March 2011*

Wilz Trauma Symposium Lecture: *Trauma Team Development. February 2013*

EMPLOYMENT

Director Emergency Services, Intensive Care Unit, Stroke Program and Psychiatric Services- 3/2008 to present

Trauma Service/ED/Post-op Surgical Educator/Injury Prevention Coordinator 2007- 2009

Trauma Nurse Coordinator- St. Mary Corwin Medical Center- 2005 to 2007

Emergency Department Staff/Charge Nurse- St. Mary Corwin Medical Center- 1991- 2005

Teacher: Biology and Chemistry, Rye High School- 1999-2005

PROFESSIONAL SOCIETIES

Emergency Nurses Association

Society of Trauma Nurses