

STUDENT'S LEVEL OF SELF-EFFICACY OBTAINED WITH CLINICAL  
SIMULATION

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## ABSTRACT

<b>RESEARCH PAPER:</b>	Student's level of self-efficacy obtained with clinical simulation
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A common problem for nursing educators continues to be finding enough clinical sites for all nursing students. The option of incorporating clinical simulation experience into the clinical schedule may be a beneficial teaching and learning method. "Use of clinical simulation in nursing education provides numerous opportunities for students to learn and apply theoretical principles of nursing care in a safe environment" (Bambini, Washburn, & Perkins, 2009, p. 79). The purpose of this study is to determine if self-efficacy in student nurses is increased by use of HFS as a teaching/learning method. This is a replication of Bambini, Washburn, and Perkins' (2009) integrated, quasi-experimental, repeated-measures study. The framework for this study is self-efficacy theorized by Bandura (1977, 1986). The population for this study is junior level baccalaureate nursing students from a school of nursing in the Midwestern area of the United States. These students are required to participate in the clinical simulation experience as part of the curriculum for obstetrical rotation prior to actual clinical experience within the hospital setting. Results from this study will help guide nursing educators in use of clinical simulation as part of students' clinical experiences to increase self-efficacy.

## Chapter I

### Introduction

According to a publication of the Robert Wood Johnson Foundation, (RWJF, 2010), it is predicted that by 2025, the United States will be significantly lacking more than 260,000 registered nurses unless substantial changes are made in nursing education. Nationwide, prelicensure nursing programs are annually rejecting thousands of qualified applicants due to shortage of faculty as well as clinical placement sites (RWJF). Results from an eight year survey of nursing schools conducted by the American Association of Colleges of Nursing, AACN, determined the number of qualified applicants rejected from entry-level BSN programs increased steadily from 3,600 in 2002 to 52,115 in 2010 (AACN, 2010). According to Allan and Aldebron (2008), data suggest if available educational capacity were increased to meet enrollment demand, approximately 30,000 qualified nursing applicants per year could be enrolled thereby eliminating predicted future nursing shortage.

A 2009 AACN survey of nursing schools revealed among other barriers to increasing BSN enrollment, lack of clinical sites, 60.8%, and lack of faculty, 61.4%, were the most common. Other barriers included lack of classroom space, budget constraints, and lack of clinical preceptors. Lack of faculty has been attributed to various issues, such

as retirement, poor salaries, and inadequate number of nurses with appropriate degrees qualified to teach in schools of nursing (RWJF, 2010). A recent analysis of data obtained from a survey of registered nurses from 1970 to 1994 revealed only 6% of associate degree nursing graduates go on to obtain a higher degree, such as a master's of science in nursing, MSN, and/or a doctoral degree in any field. In comparison, 20% of BSN graduates will seek an advanced degree. If these trends continue, will be difficult to adequately increase nursing faculty to meet future demands as advanced degrees of either a MSN or a doctorate is required for most teaching positions (Aiken, Cheung, & Olds, 2009).

Limited availability of appropriate clinical sites remains a major obstacle to expanding nursing programs, which contributes to the significant nursing shortage. Experts suggest utilizing clinical placements in settings other than acute care, and developing opportunities for experience during nontraditional hours. Another suggested option is to expand the use of technology by learning clinical skills through simulation (RWJF, 2010).

### *Background and Significance*

Webster's (2003, p. 720) defines simulate as "to look or act like." This would include a wide variety of teaching strategies used in nursing education, from role playing communication skills or practicing CPR on manikins, to using oranges for learning subcutaneous and intramuscular injection techniques. In more recent years, low-fidelity to high-fidelity mechanical simulators have been utilized with practice in a safe learning environment (Sanford, 2010).

According to Ward-Smith (2008), simulated scenarios for World War II pilot training was the first documented use of higher level simulators. This teaching strategy continues today in training pilots in specific simulated situations. The Institute of Medicine declared simulation as a teaching strategy in 2003, to be used in educational training programs (Ward-Smith). Limited research is available on effectiveness and outcomes when using simulated scenarios in nursing education. With emphasis on safe and accurate care to patients, using simulators allows for practice in a non-threatening environment. The National League for Nursing, NLN, endorsed simulation use to prepare students for complex clinical and critical thinking skills in 2003 (Sanford, 2010). In 2007, a three-year research study was begun by NLN to evaluate use of simulation in nursing education. The study included educators from not only the United States, but from eight other countries as well, including China, Scotland, Norway, Japan, Chile, Canada, and Australia. The research project called Simulation Innovation and Resource Center, SIRC, had the goal of developing web-based courses that utilized high-technology simulations. The result of the study was construction of a resource web site that would be available to assist educators with scenario design (<http://sirc.nln.org/>) (Hovancsek, et al., 2009).

Hovancsek et al. (2009) reported patient safety as a priority concern, and use of simulators can help educate and prepare nurses for a variety of mock disasters. Mock drills with participants from other professionals such as physicians, paramedics, firefighters, police, and military can better prepare individuals as well as communities for disasters. The authors also determined with an increased demand for higher quality

healthcare on both national and international levels, utilizing simulation can improve health care (Hovancsek et al.).

Although use of high-fidelity simulation in nursing education has increased, concrete research is lacking, with many studies resulting in opinion polls. Educators identify need for research in this area, as not all are in favor of simulator use (Sanford, 2010). Schiavenato (2009) reports need for further research of high-fidelity simulation in nursing education, with request for theory to explain and support this teaching strategy.

Utilizing simulation experiences as a portion of students' clinical rotation assists with the issue of lack of clinical sites (Sanford, 2010). Jeffries (2009) reports in some states, state boards of nursing are allowing simulation to be counted for up to 25 percent of real clinical time required of students. Jeffries further predicts an increased use of high fidelity simulators along with much higher tech simulators as more evidence is found to support as a teaching strategy (Jeffries).

Sanford (2010) reports simulation lacks supportive theory and evidence-based research, with high cost to support along with increased time consumption for already overwhelmed faculty. The author further cautions much more research is needed in high-fidelity simulation, to avoid high-priced simulators simply occupying beds in nursing labs (Sanford).

With the shortage of nurses along with lacking numbers of nursing faculty and available clinical sites, implementation of high-fidelity simulation into nursing curriculum needs investigation and consideration. This research could be beneficial to nursing faculty and students, as well as to the health care industry and general public utilizing health care.



### *Problem*

A common problem for nursing educators continues to be finding enough clinical sites for all nursing students. The option of incorporating clinical simulation experience into the clinical schedule may be a beneficial teaching/learning strategy. The use of high-fidelity simulation, HFS, as a learning tool provides a mechanism by which students can participate in clinical decision making, observe outcomes from clinical decisions, and practice skills. With the increase of technology in nursing education, research is needed to investigate the impact simulation laboratory experiences have on nursing students' critical thinking, self-confidence, self-efficacy, student satisfaction, and cognitive learning. Confidence of students may be increased at the actual clinical sites as a result of increased self-efficacy obtained from practice in simulation lab.

### *Purpose*

The purpose of this study is to determine if self-efficacy in student nurses is increased by use of HFS as a teaching/learning method. This is a replication of Bambini, Washburn, and Perkins' (2009) integrated, quasi-experimental, repeated-measures study.

### *Research Questions*

The following questions will guide the study:

1. Do simulated experiences increase the self-efficacy of students preparing to enter the obstetrics clinical setting?
2. What are students' perceptions of the simulated clinical experience?
3. What effect does previous experience working with patients have on students' perceived level of confidence in their clinical skills?

### *Conceptual Framework*

The framework for this study is self-efficacy theorized by Bandura (1977, 1986). According to Bambini et al. (2009, p. 79,) “self-efficacy is an indicator of a person’s perception of how well he or she is prepared to successfully accomplish a task.” Bandura (1977, 1986) further describes self-efficacy as “the belief in one’s capabilities to organize and execute the courses of action required to manage prospective situations” (Bandura, 1995, p. 2). Belief in ability to succeed in a particular situation determines how people feel, think, and behave (Bandura, 1994). Self-efficacy impacts motivation, behavior, and psychological states (Bandura, 1977).

Self-efficacy plays a major role in how challenges, tasks, and goals are approached. Bandura (1994) describes individuals who have a strong sense of self-efficacy: consider challenging issues as problems to be mastered; develop a stronger sense of commitment to activities and interests; find a deeper interest in activities; and recover quickly from disappointments and setbacks. In contrast, Bandura (1994) gives the following characteristics to people with a weak sense of self-efficacy: focus on negative outcomes and personal failings; lose confidence in personal abilities; avoid challenging tasks; and feel difficult situations and tasks are beyond capabilities.

According to Bandura (1994), there are four major sources of self-efficacy: mastery experiences; social modeling; social persuasion; and psychological responses. Mastery experiences are the most effective way of achieving high levels of self-efficacy. As successful performance of a task strengthens sense of self-efficacy, failure in dealing with a challenge or task weakens self-efficacy. With social modeling, witnessing successful completion of a task by others increases belief that one can master similar

challenges and succeed. Social persuasion or verbal encouragement from others can help people overcome self-doubt and achieve goals, by believing have the skills and capabilities to be successful. Psychological responses and emotional reactions to situations play an important role in self-efficacy. Stress levels, moods, physical reactions, and emotional states all impact how a person feels about personal abilities in a situation. Bandura (1994) suggests people can improve sense of self-efficacy by elevating mood and minimizing stress when facing challenging or difficult situations.

In applying Bandura's (1977, 1986) self-efficacy theory, the study will examine simulated clinical experiences as a teaching/learning method to increase the self-efficacy of student nurses. This study is a replication of Bambini et al's (2009) integrated quasi-experimental study.

### *Definition of Terms*

#### *Simulated Experiences*

Conceptual: Webster's (2003, p. 720) defines simulation as "the imitative representation of the functioning of one system or process by means of the functioning of another."

Operational: The simulation experience will serve as the intervention in the study.

#### *Self-Efficacy*

Conceptual: Bandura describes self-efficacy as "the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations" (Bandura, 1995, p. 2).

Operational: The Wilcoxon matched-pairs signed-ranks test will be used to compare individual items on the returned surveys to detect changes in levels of self-

efficacy. Themes expressed in open-ended questions will be identified with a method similar to the constant comparison method of Glaser and Strauss (1967).

### *Limitations*

The study is limited by a non-random sample of participating students as well as by the small sample size. Students may hesitate to actively participate and take role seriously; therefore, skewing results and interpretations. In addition, validity is not cited for all study instruments which may alter data.

### *Assumptions*

Assumptions of the study include:

1. Participants will answer survey questions in an honest manner.
2. Participants will actively engage during simulation experiences.
3. Students with increased self-efficacy will experience increased self confidence and carry over into clinical experiences in the healthcare settings.

### *Summary*

A common problem among nursing faculty continues to be locating an adequate number of sites to be utilized for clinical experiences by nursing students. Literature reveals the option of incorporating clinical simulation experience into the clinical schedule may be a beneficial teaching strategy. Confidence of students may be increased at the actual clinical site as a result of increased self-efficacy obtained from practice in simulation lab. The purpose of this study is to determine if self-efficacy in student nurses is increased by use of high-fidelity simulation, HFS, as a teaching/learning method.

Results will help guide nursing educators in use of clinical simulation as part of students' clinical experiences.

## Chapter II

### Review of Literature

A common problem for nursing educators continues to be finding enough clinical sites for all nursing students. The option of incorporating clinical simulation experience into the clinical schedule may be a beneficial teaching and learning method. The use of high-fidelity simulation, HFS, as a learning tool provides a mechanism by which students can participate in clinical decision making, observe outcomes from clinical decisions, and practice skills. With the increase of technology in nursing education, research is needed to analyze the effect on nursing students to investigate the impact simulation laboratory experiences have on critical thinking, self-confidence, self-efficacy, student satisfaction, and cognitive learning. “Use of clinical simulation in nursing education provides numerous opportunities for students to learn and apply theoretical principles of nursing care in a safe environment” (Bambini, et al., 2009, p. 79). Confidence of students may be increased at the actual clinical sites as a result of increased self-efficacy obtained from practice in simulation lab. The purpose of this study is to determine if self-efficacy in student nurses is increased by use of HFS as a teaching/learning method.

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Self-efficacy plays a major role in how challenges, tasks, and goals were approached. Bandura (1994) described people who have a strong sense of self-efficacy: consider challenging issues as problems to be mastered; develop a stronger sense of commitment to activities and interests; find a deeper interest in activities; and recover quickly from disappointments and setbacks. In contrast, Bandura (1994) gave the following characteristics to people with a weak sense of self-efficacy: focused on negative outcomes and personal failings; lost confidence in personal abilities; avoided challenging tasks; and felt difficult situations and tasks were beyond capabilities.

According to Bandura (1994), there were four major sources of self-efficacy: mastery experiences; social modeling; social persuasion; and psychological responses. Mastery experiences were the most effective way of achieving high levels of self-efficacy. As successful performance of a task strengthens sense of self-efficacy, failure in dealing with a challenge or task weakens self-efficacy. With social modeling, witnessing successful completion of a task by others increased belief that one can master similar

challenges and succeed. Social persuasion or verbal encouragement from others could help people overcome self-doubt and achieve goals, by believing they have the skills and capabilities to be successful. Psychological responses and emotional reactions to situations play an important role in self-efficacy. Stress levels, moods, physical reactions, and emotional states all impact how a person feels about personal abilities in a situation. Bandura (1994) suggested people can improve sense of self-efficacy by elevating mood and minimizing stress when facing challenging or difficult situations.

Applying Bandura's (1977, 1986) self-efficacy theory, the study will examine simulated clinical experiences as a teaching/learning method to increase the self-efficacy of student nurses. This study is a replication of Bambini's (2009) integrated quasi-experimental study.

### *Organization of Literature*

The literature review reveals selected studies of high-fidelity simulation (HFS) that address three basic themes: self-efficacy and confidence; critical thinking skills and knowledge acquisition; and satisfaction of both students and faculty. Several studies explored a combination of these themes. The studies included some that utilized qualitative methods to reflect students' thoughts and feelings related to the use of HFS, as well as some studies that employed quantitative methods to investigate the significance of the concepts being examined.

### *Self-Efficacy and Confidence*

Simulation can help nursing students increase knowledge needed to deal with various issues of practice experiences. Goldenberg, Andrusyszyn, and Iwasiw (2005) conducted a study to investigate the effect on confidence related to health teaching from



classroom simulation on third-year baccalaureate nursing students. The conceptual framework was Bandura's (1977, 1986) theory of self-efficacy (Goldenberg et al., 2005).

This study took place in a university located in southwestern Ontario, Canada. A convenience sample was obtained from a population of 66 third-year, full-time and part-time baccalaureate nursing students enrolled in a 13-week course entitled Professional Issues II: Teaching and Learning. Although all students participated in the simulations, completion of an evaluation questionnaire was voluntary and occurred two weeks after completion of the course. Twenty-two usable questionnaires were collected, for a 33% return rate. All 22 participants were female, generic baccalaureate students, and 86% were younger than age 25 (Goldenberg et al., 2005).

A researcher developed, two-part, 63 item Baccalaureate Nursing Student Teaching-Learning Self-Efficacy Questionnaire was derived from the researchers' experiences and from the literature (Boyd, Graham, Gleit, & Whitman, 1998; Rankin & Stallings, 2001). Three experts in nursing education validated content, with face validity achieved through pilot testing with seven fourth-year nursing students who had completed the same course the previous year. In addition to inquiring about demographic data, questionnaires assessed students' degree of self-efficacy related to health teaching both before and after the workshop. Participants were asked to recall and rate perceptions of confidence considering all phases of the teaching-learning process, assessment, planning, implementation, and evaluation, using a 4-point scale, ranging from "completely lacking in confidence" to "very confident." An optional answer of "not applicable" was also included. Additional comments through open-ended questions were

also requested, as well as students' ratings of simulation as a teaching strategy (Goldenberg et al., 2005).

Findings from Goldenberg et al. (2005) were that students' self-efficacy scores were significantly higher following the simulation experience, reflecting greater overall confidence related to health teaching after participating in the workshop than before. Significant differences were also found between students' pretest and posttest scores for the assessment, implementation, and evaluation phases of health teaching. Self-efficacy scores were unchanged for planning, possibly due to insufficient time to implement a teaching plan. No significant relationships were found between students' health teaching scores and selected demographic variables. More than half of the students rated the simulations as effective, with slightly more than one third rating as very effective (Goldenberg et al., 2005).

The authors concluded simulation as a teaching method to increase students' perceptions of self-efficacy related to health teaching was supported. As active participation by students in role-playing case studies was a useful strategy to increase confidence, this simulation strategy can also be applied to enhance other learner behaviors. Goldenberg et al. (2005) recommended replicating this study using a larger sample in more than one setting. The authors further suggested testing students' self-efficacy at time points before and after simulation activities to improve the study design (Goldenberg et al., 2005).

In another study, Brannan, White, and Bezanson (2008) compared the effectiveness of two instructional methods to teach specific nursing education content, acute myocardial infarction, AMI, on junior-level nursing students' confidence and

cognitive skills. The study took place at the WellStar College of Health and Human Services, Kennesaw State University. The population included the 107 baccalaureate nursing students enrolled in the adult health nursing course for the fall or spring semester. All 107 students participated. The fall semester included 53 students which were identified as group 1 of the study, the control group. The spring semester included 54 students which were identified as group 2, the interventional group. Criteria for inclusion in the study included that the participants were all admitted into the nursing program and went through the same admission criteria. Enrollment into the adult nursing course for the specified semesters was another criterion for the participants. Demographic data included ethnicity, gender, and age. Educational characteristics were also collected which included prior nursing experience, prior cardiac nursing experience, and grade in first nursing course (Brannan et al., 2008).

A prospective, quasi-experimental, pretest and posttest comparison group design was used. Dependent variables included levels of cognitive skill and confidence in treating a patient with AMI. The independent variable was instructional method, with classroom lecture versus use of the HFS method. Group 1, the control group, received the traditional lecture method of instruction. Group 2, the interventional group, received instruction using the HFS method. Before undergoing the designated instructional method, both student groups completed pretesting, which included the Acute Myocardial Infarction Questionnaire, AMIQ, a cognitive skills test. In addition, students completed a Confidence Level, CL, tool, and a demographic data form. The same AMIQ and CL tools were also administered as posttests after completion of the instructional method (Brannan et al., 2008).

Parallel forms of the AMIQ were utilized to measure students' level of cognitive skills in nursing care of AMI. Each version of the AMIQ was a 20 item multiple-choice questionnaire, with scores ranging from 0 to 20. Higher scores indicated higher levels of cognitive skill in nursing care of these patients. Questions were developed from major content reflecting conventional standards of care for nursing care of a patient with AMI. Two raters were in agreement regarding the categorization of the content areas used in this study. These individuals were experienced educators and experts in care of patients with AMI and confirmed the content validity of the two test versions (Brannan et al., 2008).

Results of the study showed demographic and educational characteristics were similar for both groups of participants. The study indicated students who received the HFS instructional method achieved significantly higher AMIQ posttest scores than did students who received the traditional lecture teaching approach. Another finding of the study was the confidence level among students who participated in the HFS instructional method did not significantly differ from those students who received the traditional lecture teaching approach (Brannan et al., 2008).

Conclusions were that while there are positive components of traditional teaching methods, learner-centered strategies that actively engage students and involve decision making and realistic patient responses may be more useful for students learning complex content. Brannan et al. (2008) had two other conclusions. First, the development and implementation of simulation experiences requires significantly greater use of faculty resources in terms of time, compared with the traditional classroom approaches.

Secondly, more research is needed to determine best practices and use of the simulator to achieve optimum learning outcomes (Brannan et al., 2008).

Gordon and Buckley (2009) conducted a study to examine the extent to which high-fidelity simulation, HFS, enhanced the engagement and confidence of medical-surgical graduate students in response to clinical emergencies. Another goal was to identify aspects of simulation that participants found most beneficial to learning (Gordon & Buckley).

The setting was an Australian university, with 50 students participating in a graduate course related to clinical emergencies. Gordon and Buckley (2009) provided the following demographic data about participants: mean age was 34.1; average age of experience as a registered nurse 8.7 years; 46 of the 50, 92%, were female; 38 of the 50, 76%, worked in a clinical area; and 35 of the 50, 70%, practiced in medical-surgical areas. Most participants, 84%, had received training in basic life support while only 16% had received advanced life support skills training. None had previously participated in high-fidelity immersive simulation (Gordon & Buckley).

A descriptive study design was utilized. Students reported confidence in responding to patient clinical emergencies by completing a questionnaire before and after participating in HFS training. These questionnaires were identical in content and consisted of 14 questions requesting participants to rate perceived ability regarding technical and nontechnical aspects of emergency response. Specifically, questions related to recognition, prioritization, and recruitment of help; leadership skills; team communication skills; and immediate intervention skills to manage airway, breathing, and circulation and perform defibrillation. Respondents rated ability and confidence to

perform the task on a Likert scale ranging from “not at all,” scored as a 1, to “a great deal,” scored as a 4. Following the simulation experience, students identified aspects of simulation found most useful to learning on a Likert scale ranging from “a great deal,” scored as 4, to “not at all,” scored as 1. Questionnaires from before and after the HFS were compared, with descriptive statistics utilized to characterize the sample. Participants were involved in at least three scenarios and in varying roles. Scenarios were recorded and viewed live by other students, and then the entire group viewed the playback before debriefing (Gordon & Buckley, 2009).

Before HFS, participants reported high levels of confidence in ability to recognize unstable patients, call for help when appropriate, and identify priorities. Following HFS, students claimed increased confidence in ability to identify priorities and recognize unstable patients. Participants also reported increased confidence in ability to initiate treatment to correct airway obstruction, breathing difficulties, altered circulation, and to perform defibrillation. Concerning nontechnical skills, participants reported improved confidence in assuming leadership, communicating effectively with team members, and utilizing resources and external experts in emergency situations. Ninety-four percent identified formal debriefing as the most useful area of the simulation experience (Gordon & Buckley, 2009).

Gordon and Buckley (2009) concluded: regardless of student level of clinical experience or previous emergency training, students reported technical and nontechnical skills utilized during an emergency response improved after simulation; improvements were shown despite aspects of technical and nontechnical skills being scored highly before simulation; and debriefing was reported as the most beneficial aspect of HFS. The

authors also concluded simulation appears to be an effective engaging teaching modality for graduate nurses' responses to patient emergencies (Gordon & Buckley).

In a related study, Bambini et al. (2009) evaluated use of simulated experiences as a teaching/learning tool to determine the impact of simulation on self-efficacy of nursing students. Bandura's Self-Efficacy Theory (1977, 1986) was utilized as the conceptual framework for the study. "Self-efficacy is an indicator of a person's perceptions of how well one is prepared to successfully accomplish a task" (Bambini et al., 2009, p. 79).

The study was conducted at a midsized college of nursing in the Midwest by a lab coordinator and two faculty members. Population for the study was students in a baccalaureate nursing program in the first semester of undergraduate clinical experiences. The final sample was 112 students, with 20 completing follow-up surveys along with the pretests and posttests. Demographic data revealed: average age of 24.85; 57% had previous health care experience; and 26% had completed baccalaureate degrees (Bambini et al., 2009).

A repeated measures pretest, posttest, along with a follow-up survey was the design study. Students took pretest before clinical simulation, and posttest after simulation. Data from pre and post tests were compared to evaluate levels of confidence and self-efficacy in students. Surveys consisted of six questions using a 10-point scale, with choices ranging from 1 = not at all confident, to 10 = very confident. Three open ended questions were also utilized in the posttest and follow-up surveys. Content validity was established. The surveys were used to determine significant changes in self efficacy in students' postpartum nursing skills (Bambini et al., 2009).

Findings indicated a significant increase in nursing students' self-efficacy, an increase in students' confidence with assessing vital signs, breasts, fundus, lochia, and in providing patient education. In addition, qualitative data revealed students found simulation experience a valuable learning method with three themes identified. Both verbal and nonverbal communication with the patient and families was identified as the first theme, as students learned the importance of communicating not only with the patient, but with significant others as well. The second theme, psychomotor skills and patient interaction, indicated experience gave increased confidence in both areas. Clinical judgment was the third theme. "Students reported that they learned the importance of prioritizing assessment skills, when and how to intervene, and how to better identify abnormal physical assessment findings" (Bambini et al., 2009, p. 81).

"Advances in technology during the last decade have generated opportunities to create realistic simulations during which nursing students can develop and demonstrate clinical judgment without endangering real patients" (Bambini et al., 2009, p. 81). Additional conclusions from the study were that HFS can be effective in increasing students' self-efficacy in ability to perform clinical skills, with suggestion to increase the use of simulation in nursing education as educators integrate simulated experiences into future nursing curriculum (Bambini et al., 2009).

#### *Critical Thinking Skills and Knowledge Acquisition*

Experimental learning and high fidelity simulators need to be evaluated to determine the effectiveness of teaching complexity of patient problems and /or events on nursing students. One area needing evaluation is affects of high fidelity simulation, HFS, on development of clinical judgment of nursing. Lasater (2007), conducted a study to



investigate the experience dimension using HFS experiences with students and the effect the experience has on participants' development of clinical judgment. Adult Experiential Learning theories of Kolb (1984) and Schön (1987) claim experience dimension as the core concept, with experience being the direct study or participation in an event to gain knowledge (Lasater, 2007).

The School of Nursing at Oregon Health & Science University was the setting for this study. The sample was 48 junior level students who were enrolled in the course, The Care of the Acutely Ill Adult. Thirty-nine of the 48 students, 81%, were observed and became the focus group of the study (Lasater, 2007).

Students were videotaped during the 90 minute sessions for accurate analysis. The definition of clinical judgment as well as the conceptual framework used for observations was reviewed with the group. Several predetermined questions were used to prompt if needed but the main idea was to allow students to moderate own group with as little leader involvement as possible. Some open-ended questions were utilized to occasionally clarify meaning or intent of the student's comment. The focus group data analysis was retrospective. Main themes or categories were recognized as important after organization of data (Lasater, 2007).

Thirteen primary themes were identified by the author, and then condensed into five major categories. First category, the strengths and limitations of HFS, with the most frequently mentioned comment being simulation was an integrator of learning, bringing theory and skills together and forcing students to use critical thinking. The simulator had limitations as well, mainly no visual or nonverbal communication. Second category, the paradoxical nature of simulation, such as the provocation of anxious and stupid feelings,

yet increased learning and awareness. Students admitted high levels of anxiety, yet were relieved that Sim Man couldn't really die. Third category, an intense desire for more direct feedback about performances. Students expressed a strong desire for more direct feedback from facilitator, including the severity of patient outcomes as a result of actions. Fourth category, the value of students' connection with others. Students expressed meaningful learning as a result of the group working together. Fifth category, some general recommendations for better facilitation and learning centered on improving reflection through debriefing process, providing more structured observation for those not engaged in simulation, and increasing time for active engagement in simulation scenarios. The 13 identified primary themes and subsequent five categories were self-explanatory revealing how students interpreted simulation experience (Lasater, 2007).

Conclusions were that high fidelity simulator (HFS) allowed students to build clinical judgment but there needed to be more research to determine the effects of HFS on development of clinical judgment along with performance of simulation with skill in real clinical settings. HFS has benefits for faculty by direct observation of clinical judgment and conscientious feedback but requires learning new teaching strategies (Lasater, 2007).

With the increased use of HFS in the education and training of healthcare students and professionals, data regarding the impact on student performance and acceptance are lacking. Corbridge, McLaughlin, Tiffen, Wade, Templin, and Corbridge (2008) conducted a study to determine how confidence and knowledge acquisition are affected by HFS, and to assess the importance of simulator training as perceived by acute care nurse practitioner, ACNP, students.

The setting was the University of Illinois at Chicago, UIC, with seven senior ACNP students participating in a single simulation. The extensive scenario, lasting 2.5 hours, involved a patient with septic shock and pneumonia. Each student completed a written test and confidence survey, both before and after HFS, as well as a postsimulation perception survey (Corbridge et al., 2008).

A prospective, pretest-posttest study without a control group was the study design. Evidence-based knowledge was assessed by a 13-question validated written test with assessment of confidence by a 2-question, 5-point Likert scale survey. Following simulation, a 5-question, 5-point Likert scale survey was used to assess satisfaction as well as opinions of importance in ACNP training. Using a paired t-test, written test scores were analyzed and reported as mean correct responses with standard deviation. Confidence levels in both managing a patient requiring mechanical ventilation and a patient in circulatory shock were assessed before and after simulation, and then analyzed using a paired t-test. A 5-point Likert scale survey with responses ranging from “strongly agree” to “strongly disagree” was used for postsimulation perception evaluation (Corbridge et al., 2008).

Results revealed an increase in mean correct responses on the written test after simulation, with six of seven students improving number of correct responses while one student had same number of correct responses as before HFS. Student confidence in both ability to manage circulatory shock as well as in managing a patient on a ventilator improved after simulation from generally “somewhat not confident” to “very confident.” “Students either “agreed” or “strongly agreed” that simulation enhanced critical thinking

skills and evidence-based practice, and that the experience was fun, realistic, and should be a mandatory part of ACNP education” (Corbridge et al., 2008, p. 13).

Conclusions were that a single HFS with a 2.5 hour critical care scenario increased confidence and acquisition of knowledge in senior ACNP students. Other studies in HFS with medical education have shown similar results. Corbridge et al. (2008) further concluded that confidence levels, not necessarily skills, increased after simulation. The authors noted as healthcare education increases use of HFS, is essential to remember direct patient contact time cannot be replaced (Corbridge et al.).

Seybert, Kobulinsky, and McKaveney (2008) conducted a study “to investigate the use of simulation in developing and assessing pharmacy students’ ability to use critical thinking skills and knowledge in order to solve problems related to cardiovascular disease” (p. 2). The setting was the University of Pittsburgh School of Pharmacy in collaboration with the Peter M. Winter Institute for Simulation, Education, and Research, WISER, located on the University of Pittsburgh campus. The study took place in Fall 2006, with 102 students, 62 females and 40 males, completing the Pharmacotherapy of Cardiovascular Disease course. Simulated patient scenarios were used to enhance traditional teaching methods in development of problem-solving and critical-thinking skills. Pre- and post-simulation written tests and a satisfaction survey were used to obtain data. Eighty-nine of the 102 students, 87%, completed the satisfaction survey (Seybert et al.).

The class was divided into 15 groups of 6-7 students each for the simulation sessions. Specific points were allotted for the eight domains analyzed in the final case scenario. These points were totaled then averaged per group of students. Responses to

survey questions before and after simulation were based on a 5-point Likert scale, with 1 = poor or strongly disagree to 5 = excellent or strongly agree. Written examinations were given before and after simulations on dysrhythmia management as well as on myocardial infarction. Percentages from pre-simulation tests were compared to post-simulation results (Seybert et al., 2008).

Findings concerning the final case scenario were that 95.8% was the average score for all groups, with 10 of the 15 receiving 100% of available points. On 6 out of 8 domains, groups achieved >95%. “Collection and interpretation of data” was the area with lowest number of points as average score was 7.9 out of a possible 10. “ Patient counseling, introduction to patient, verbal communication of plan, and problem list development” were areas of highest levels of student performance. Satisfaction survey results showed improvement in confidence levels of students in interpreting patient data and performing physical assessments. Improvement in ability to develop pharmacotherapy plans and solve problems was also identified by students following simulations. Examination scores following HFS on both dysrhythmia management and myocardial infarction showed improvements in student knowledge and understanding (Seybert et al., 2008).

The authors concluded simulation technology creates a safe environment for students to utilize knowledge acquired in the classroom and carry over into the lab where can assess and care for patients. From simulations, students increased levels of knowledge of cardiovascular pharmacology and confidence. Seybert et al. (2008) suggested further exploration of combining HFS with traditional teaching methods.

With the increase of technology in nursing education, research is needed to analyze the effect of HFS on nursing students. Lewis and Ciak (2011) conducted a study to investigate the impact simulation laboratory experiences have on critical thinking, self-confidence, student satisfaction, and cognitive learning.

The study took place at a multidisciplinary training and research facility for simulation-based education. All students enrolled in the Growing Family Nursing course between September 2006 and December 2007 were eligible for the study, with 63 students participating by taking part in one simulation day. A comparable group of students, who took the course during a summer semester and did not have the simulation experience, served as a control group for standardized testing. Student population was primarily Caucasian women with an average age of 28 (Lewis & Ciak, 2011).

A pretest and posttest, in conjunction with the simulation lab, was utilized to measure changes in knowledge or cognitive learning. The 13-item Student Satisfaction and Self-Confidence in Learning tool, developed by the National League for Nursing, NLN, was used to assess student satisfaction with simulation as well as how confident students felt about applying skills learned in lab to the clinical setting. This tool assesses self-confidence, eight questions, and satisfaction, five questions, using a 5-point Likert scale, with scores ranging from 1 = strongly disagree to 5 = strongly agree. Commercial tests from Assessment Technologies Institute, ATI, were used to measure cognitive learning as students completed the maternal-newborn and nursing care of children areas (Lewis & Ciak, 2011).

Findings indicated a significant gain in knowledge from pretest to posttest. For all 63 students, the mean pretest score was 0.664 with a 95% confidence interval. Sixty-two

students completed the posttest, with a mean test score of 0.823 and a 95% confidence interval. Using the NLN tool, positive results were confirmed for self-confidence and satisfaction. On the 5-point Likert scale, the overall mean for self-confidence in learning was 4.35, while the overall mean for satisfaction with the simulation experience was 4.33 (Lewis & Ciak, 2011).

Although the authors stated that simulation provides an effective means of improving knowledge in a safe clinical atmosphere free of patient harm, no definitive conclusions could be drawn regarding critical thinking and experience in high-fidelity human simulation training. Self-confidence, satisfaction, and cognitive learning of students need continued monitoring for revision and quality analysis, while additional research is needed to explore ways to assess critical thinking and how it relates to simulation. The authors further suggested students not only need to be actively involved in the simulation experience, but also have the ability to manipulate the environment (Lewis & Ciak, 2011).

### *Satisfaction*

As simulation experiences are used to improve teaching and learning, it is important to determine level of satisfaction of students and faculty with simulation. Feingold, Calaluce, and Kallen (2004) administered satisfaction survey tools to baccalaureate students in an advanced acute care of the adult class after students had two experiences with a patient simulator. Survey subscales were created to evaluate realism, transferability, and value of the experiences.

Participants included baccalaureate nursing students enrolled in the course, Advanced Acute Care of the Adult, for both the fall and spring semesters of one

academic year. Fifty students were enrolled for fall semester (Group 1) and 47 spring semester (Group 2). Twenty-eight, 56%, fall students completed the survey while 37, 78.7%, spring semester students completed, for a total response rate of 67% for both semesters combined. Demographics of the two groups were similar with combined data of 96.8% female, and 44.4% in age range of 23 to 30. Majority of students, 82.5%, identified themselves as Anglo with the remainder self-identifying as either minority, 14.3%, or mixed ethnicity, 3.2% (Feingold et al., 2004).

Students were given a 20 item satisfaction survey that related to value of experience, ability to transfer skills into real clinical situations, and the realism of the simulated experience. A 4-point Likert scale was used by the researchers to obtain student responses, ranging from 1 = strongly disagree to 4 = strongly agree on the three subscales: a) transferability of skills, three items, b) realism of simulation, four items, and c) value of experience, six items. The same 4-point Likert format was used in a 17 item survey tool to obtain feedback from faculty. The faculty survey included items related to need for faculty support and training for simulation (Feingold et al., 2004).

Findings revealed most faculty members and students identified simulations as valuable and realistic. While 100% of faculty believed skills learned in clinical simulation would transfer to a real clinical setting, only about half of the students agreed. Faculty reported utilizing the simulated clinical scenario required additional resources and time (Feingold et al., 2004).

The authors determined simulated clinical experiences with computerized patient models can be beneficial to teaching and learning for both students and educators in a baccalaureate nursing program. However, it was agreed extensive time and man power



are required to carry out a successful, well designed clinical simulation program. It was also agreed simulations would not replace real clinical experiences with real patients (Feingold et al., 2004).

Nurse educators are encouraged to develop appropriate learning opportunities that encourage use of critical thinking skills after assessing students' various problems, preferences, and learning styles. Fountain and Alfred (2009) conducted a study to determine if students' learning styles influence satisfaction when using high-fidelity simulation.

A convenience sample consisting of 104 baccalaureate nursing students participated in a simulation-enhanced learning activity in an advanced medical-surgical course across three campuses of one school of nursing. Prior to cardiac HFS in the lab, students attended a lecture on dysrhythmias and acute coronary syndrome, with five case studies presented on common patient cardiac problems. Debriefing followed simulations, allowing student reflection, then students were invited to complete a Student Satisfaction and Self-Confidence in Learning scale survey. Of the 104 nursing students, 78 completed the survey, for a 75% return rate (Fountain & Alfred, 2009).

“The National League for Nursing Student Satisfaction and Self-Confidence in Learning Scale is used to measure a student's personal attitudes about HFS activities” (Fountain & Alfred, 2009, p. 97). This 13-item instrument contained a 5-point Likert scale, with 1 = strongly disagree to 5 = strongly agree. Five item subscales were utilized to measure satisfaction of the simulation experience. Findings were correlated with information obtained from students' nurse entrance tests used to evaluate and identify visual, auditory, solitary, social, writing-dependent, and orally dependent learners. Data

were analyzed and correlations, tests of means, and descriptive statistics were obtained. Scores were measured for the six learning styles, with a stronger preference for a particular style represented by a higher number (Fountain & Alfred).

Fountain and Alfred (2009) found that social learning was the most common learning style preference of students (77%). Solitary learning, 53%, and social learning, 77%, were significantly correlated with satisfaction, as both groups indicated HFS enhanced the learning experience. Auditory learners, 57%, as well as visual learners, 67%, also had high satisfaction rates. Oral dependent learners had a 65% rate while writing dependent learners demonstrated a 53% satisfaction with simulation. Differences in satisfaction across campuses were not significant (Fountain & Alfred). Using one learning activity to engage students with multiple learning styles, such as case scenarios with HFS, can be a positive teaching strategy for nursing faculty (Fountain & Alfred).

Smith and Roehrs (2009) conducted a study to describe students' satisfaction with high-fidelity simulation, HFS, and the effect of HFS on nursing students' self-confidence as related to the simulation design. The framework used was the Nursing Education Simulation Framework (Jeffries, 2005, 2007). This framework

consists of five major components – teacher factors, student factors, educational practices, design factors, and outcomes – each with one or more associated variables. Design characteristics, for example, include five associated variables: clear objectives and information, support during the simulation, a suitable problem to solve, time for guided reflection/feedback, and fidelity or realism of the experience (Smith & Roehrs, 2009, p. 75).

Junior level students in a traditional BSN program at a public university in the western United States were experiencing their first medical/surgical course following nursing fundamentals. Sixty-eight of the 72 students enrolled, 94%, agreed to participate in the study. Respondents included 90% females with an average age of 23.4 years; and 69% who had no previous experience working in health care. Most students with previous health care experience had been patient care technicians or certified nursing assistants. Further, 82% of the students had experienced a patient with a respiratory disease in the clinical setting and 47% students reporting no previous experience working with HFS prior to the study (Smith & Roehrs, 2009).

The two instruments utilized for this study were developed by the National League for Nursing, NLN, including “the Student Satisfaction and Self-Confidence in Learning Scale and the Simulation Design Scale, SDS. Content validity for both instruments was accomplished by a review of 10 experts in medical/surgical nursing” (Smith & Roehrs, 2009, p. 76). Both self-report instruments utilized 5-point Likert scales, with options ranging from 1 = strongly disagree, to 5 = strongly agree. The SDS, which measured Objectives, Support, Problem Solving, Guided Reflection, and Fidelity, also provided the option for selecting Not Applicable as a response (Smith & Roehrs).

Smith and Roehrs (2009) found that although students were satisfied with HFS teaching method and felt confident in ability to care for a patient similar to the simulated patient, no significance was found between satisfaction and experience with the type of patient presented in the simulated scenario; and no significant differences were found in confidence of students who had previous experience with this patient type than those who did not have previous experience. The SDS, consisting of 20 items, revealed students

were positive about the presence of the overall design characteristics, Guided Reflection, Objectives, Support, Problem Solving, and Fidelity. However, only Objectives had a moderate correlation for both self-confidence and student satisfaction outcomes. No significant correlations were found between demographic characteristics and student satisfaction and self-confidence (Smith & Roehrs).

The researchers concluded that nurse educators should consider incorporating the five design characteristics of Objectives, Support, Problem Solving, Guided Reflection, and Fidelity when implementing a HFS experience, with special focus on Objectives and Problem Solving. Integration of a template would also be useful in assuring all design characteristics (Smith & Roehrs, 2009).

With incorporation of HFS into undergraduate nursing curricula and endorsement by professional nursing associations, Schlairet (2011) reported little evaluation has been done at curriculum or program levels. Using the Nursing Education Simulation Framework (NESF) developed by Jeffries (2005), Schlairet conducted a comprehensive program evaluation of baccalaureate nursing students' and faculties' perceptions and characteristics.

This study took place in a college of nursing at a regional university in the southeastern United States. Sample was obtained from a population of junior-level and senior-level baccalaureate nursing students who participated in simulated clinical experiences throughout the curriculum. One-hundred fifty of the 161 survey packets distributed to students were returned, for a 94% response rate. Seventy-eight percent of students were between the ages of 18 and 24, with average age of 24. Eighty-six percent

were female, and 69.3% of white race. Twenty-six full-time nursing faculty were also utilized for data collection (Schlairet, 2011).

Descriptive statistics were used to examine students' rating of simulation-related practices with the Education Practices in Simulation Scale, EPSS, which contained 16 items measuring educational practices within simulations. Data were measured on a 5-point Likert scale with 1 = strongly disagree to 5 = strongly agree, while importance of practice was measured on a 5-point Likert scale with 1 = not very important to 5 = very important. A 20-item Simulation Design Scale, SDS, was used to measure design features within the simulations with the same 5-point Likert Scale as for EPSS. Students' perceptions of associated self-confidence/satisfaction was analyzed with the instrument, Student Satisfaction and Self-Confidence in Learning, SSCL, a 13-item instrument with a 5-point Likert scale with 1 = strongly disagree to 5 = strongly agree. Reflective journals from students were used to capture students' perceptions following simulation. Both 6-item and 15-item surveys from faculty provided additional data (Schlairet, 2011).

Schlairet (2011) found students identified the value of high expectations, active learning, diverse learning practices, and collaboration in simulations. Students also valued support, feedback/guided reflection, information/objectives, and complexity related to simulation design. Simulations improve students' abilities to synthesize content, along with promoting simulation-related self-confidence and satisfaction. Findings showed some variation among students of different races and in basic baccalaureate vs. accelerated programs, which need to be further explored. Concerning faculty, four years following implementation of Simulation Demonstration Project, a majority of faculty were trained in simulation, with more than 50% actively using

simulation in teaching, accounting for 25% of total course clinical hours in curriculum (Schlairet).

Findings support continued integration of simulation within undergraduate nursing curriculum and have prompted development of a simulation evaluation plan to be incorporated into a school's existing program evaluation plan. Schlairet (2011), concluded the NESF was helpful in promoting ability to interpret results at curriculum level as well as in guiding evaluation of simulation (Schlairet).

### *Summary*

As educators incorporate use of high-fidelity simulation into nursing curriculum, evaluation is needed to determine effects of this teaching/learning method on students. Research suggests that students benefit from HFS incorporated into clinical experiences. This chapter has reviewed selected studies of HFS that address three basic themes: self-efficacy and confidence; critical thinking and knowledge acquisition; and student and faculty satisfaction. Data obtained should help determine gaps in knowledge as well as direction for further research.

Regarding self-efficacy and confidence, Goldenberg et al. (2005) determined students' self-efficacy scores were significantly higher following simulation experience, with more than half rating the simulations as effective, and more than a third rating as very effective. In contrast, Brannan et al. (2008) found the confidence level among students who participated in HFS instructional method did not differ significantly from those students who received the traditional lecture teaching approach. In another study, Gordon and Buckley (2009) concluded that although students reported high levels of confidence in ability to recognize unstable patients, call for help when appropriate, and

identify priorities before HFS, following HFS students claimed increased confidence in identifying priorities and recognizing unstable patients.

Participants further reported increased confidence in technical as well as nontechnical skills. Bambini et al. (2009) reported a significant increase in nursing students' self-efficacy as well as in confidence in ability to perform specific clinical skills. Corbridge et al. (2008) concluded a single critical care 2.5 hour HFS increased confidence in acute care nurse practitioner students, with mention of self-assessed confidence not implying increased skill. The authors further reported importance of direct patient contact time not being replaced by simulation. Lewis and Ciak (2011) reported positive results for attainment of self-confidence from HFS, while suggesting continued monitoring for revision and quality analysis in simulation as a teaching strategy. In another study, Smith and Roehrs (2009) determined after HFS, students felt confident in ability to care for a patient similar to the simulated patient, with no significance in confidence of students who had previous experience with this patient type than those who had no previous experience. In another study, Schlairet (2011) reported positive student perceptions of simulation related self-confidence following HFS, with suggestion of continued integration of simulation within undergraduate nursing curriculum.

Concerning critical thinking and knowledge acquisition, Brannan et al. (2008) determined students who received the HFS instructional method achieved significantly higher levels of cognitive skills than did students who received the traditional lecture teaching approach. Another conclusion, while traditional teaching methods may have positive components, learner-centered strategies, such as HFS, that actively engage students and involve decision making and realistic patient responses may be more useful

for students' learning of complex content. In a related study, Gordon and Buckley (2009) found regardless of level of clinical experience or previous emergency training, students reported technical and nontechnical skills utilized during an emergency response improved after simulation. Qualitative data from a study by Bambini et al. (2009) revealed students found simulation experience a valuable learning method with three themes identified. Both verbal and nonverbal communication with the patient and families was identified as the first theme, as students learned the importance of communicating not only with the patient, but with significant others as well. The second theme, psychomotor skills and patient interaction, indicated experience gave increased confidence in both areas. Clinical judgment was the third theme, as students indicated had developed increased skills in assessment, intervention, and identification of abnormal findings. From another study, Lasater (2007) reported students described HFS as being an integrator of learning, bringing theory and skills together and forcing students to use critical thinking. The author recommended that although simulation allows students to build clinical judgment, further research is needed to determine effect of HFS on development of clinical judgment, along with performance of simulation with skill in real clinical settings. Corbridge et al. (2008) determined senior acute care nurse practitioner students increased level of knowledge from a single 2.5 hour critical care scenario in a simulation lab. In another study, Seybert et al. (2008) reported improvements in student knowledge and understanding, as well as in planning and problem solving in pharmacy students following HFS. Lewis and Ciak (2011) indicated a significant gain in knowledge of students following simulation laboratory experiences, with no definitive conclusions regarding critical thinking and experience following HFS. Smith and Roehrs (2009)



revealed supporting learning styles while engaging students in HFS can enhance critical thinking skills. Also, case scenarios used in HFS can provide students with various learning style opportunities to apply new information in a safe, nonthreatening atmosphere. Schlairet (2011) found improvements from simulation in critical thinking, skill performance, and learning/knowledge, with suggestion to continue integration of simulation within undergraduate nursing curriculum.

Satisfaction of students as well as faculty is an important issue to consider when incorporating HFS into nursing curriculum. Regarding student satisfaction with HFS, Goldenberg et al. (2005) reported more than half of the students rated the simulations as effective, with slightly more than one third rating as very effective. Positive results were confirmed for student satisfaction in a study by Lewis and Ciak, 2011. Smith and Roehrs (2009) determined students were satisfied with simulated teaching method, with no significance between satisfaction and experience with the type of patient presented in the simulated scenario. Schlairet (2011) found students identified the value of high expectations, active learning, diverse learning practices, and collaboration in simulations. In addition, students valued support, feedback/guided reflection, information/objectives, and complexity with a positive perception of the simulation experience.

Brannan et al. (2008) had two conclusions concerning faculty satisfaction: the development and implementation of simulation experiences requires significantly greater use of faculty resources in terms of time, compared with the traditional classroom approaches; and more research is needed to determine best practices and use of the simulator to achieve optimum learning outcomes. Lasater (2007) reported HFS has benefits for faculty by direct observation of clinical judgment and conscientious feedback

but requires learning new teaching strategies. Findings from another study by Feingold et al. (2004) indicated: most faculty members and students identified simulations as valuable and realistic; while 100% of faculty believed skills learned in clinical simulation would transfer to a real clinical setting, only about half of the students agreed; and faculty reported utilizing the simulated clinical scenario required additional resources and time. Fountain and Alfred (2009) reported using one learning activity such as HFS to engage students with multiple learning styles can be a positive teaching strategy for nursing faculty. Schlairet (2011) suggested continued integration of simulation within undergraduate nursing curriculum, along with utilization of the NESP for guiding evaluation of simulation and interpreting results of HSF. As program costs continue to rise and opportunities for clinical experiences continue to decrease, more research needs to be conducted to further evaluate use of simulation in nursing education.

## Chapter III

### Methodology

A common problem among nursing faculty continues to be locating an adequate number of sites to be utilized for clinical experiences by nursing students. Literature reveals the option of incorporating clinical simulation experience into the clinical schedule may be a beneficial teaching strategy. Confidence of students may be increased at the actual clinical site as a result of increased self-efficacy obtained from practice in simulation lab. The purpose of this study is to determine if self-efficacy in student nurses is increased by use of high-fidelity simulation, HFS, as a teaching/learning method. This is a replication of Bambini, et al. (2009) integrated, quasi-experimental, repeated-measures study.

#### *Research Questions*

The following questions will guide the study:

1. Do simulated experiences increase the self-efficacy of students preparing to enter the obstetrics clinical setting?
2. What are students' perceptions of the simulated clinical experience?
3. What effect does previous experience working with patients have on students' perceived level of confidence in their clinical skills?

### *Population, Sample, and Setting*

The target population for this study will be all junior level baccalaureate nursing students from a single school of nursing located in the Midwestern area of the United States. These students will be required to participate in a clinical simulation experience as part of the curriculum for maternal-infant rotation prior to actual clinical experience within the hospital setting. The study will take place over four semesters with potential to include 200 students. Final sample will consist of students who complete both a pretest survey before the clinical simulation and a posttest survey following simulation. A follow-up survey will provide additional data. Criteria for inclusion consist of being a junior level baccalaureate nursing student enrolled in one of the maternal-infant courses within the two year time frame of the study, and completing both pretest and posttest, and follow-up surveys. Participation in the study will be voluntary and anonymous with no exclusion criteria. Demographic data collected will include age, education level, and previous experience with patients.

### *Protection of Human Rights*

The study will be presented to the appointed Institutional Review Board, IRB, at Ball State University for approval. Following approval from Ball State IRB, a letter of intention will be sent to the specific School of Nursing seeking permission to conduct the study. In addition, this letter will explain the purpose and time frame of study, along with population and instrument. A meeting with the school's Director of Nursing and obstetrical clinical instructors will be arranged to further explain details and answer questions in an effort to obtain final approval from the school. It will be emphasized that participation in the study will be voluntary and participants will remain anonymous. After

a thorough explanation of the process, students will be given an envelope containing a cover letter, an informed consent, a pretest, posttest, and follow-up survey. The consent will include a section for demographic data requesting age, educational level, and previous experience with patients. Students will be informed of the option to return blank surveys if do not wish to participate in the study. Participants will be instructed to not write their names on any material and reminded that all data collected will remain confidential. The only risk to participants will be if identified by demographic data, which can be omitted if preferred. Potential benefits to students would include personal realization of increased confidence from simulation and satisfaction from participating in a study to help nursing curricula improve teaching strategies.

#### *Procedure*

After approval from IRB and school of nursing, the four semester study will be implemented at the beginning of the next semester of obstetrical nursing rotation. Faculty and simulation lab personnel involved in the high-fidelity simulation, HFS, will be in-serviced on specifics of scenarios used for the simulations. All students will be given specific instructions to follow. The three surveys to be utilized will be printed on different colors in order to distinguish between pretest, posttest, and follow-up surveys. Each set of three surveys will be numbered to match responses then placed in a blank envelope along with cover letter and informed consent. The researcher's email and phone number for any questions will be provided in the cover letter. Demographic data requested will be included on the consent, with the statement that data may be omitted if participant prefers. Students will be reminded that participation is voluntary and data

obtained will remain anonymous, with option to return blank surveys if refuse to participate in study.

Prior to the simulation experience, students will be given sufficient time to complete and submit the pretest survey. Following simulation, participants will be instructed to complete posttest surveys, and to return in plain envelope provided to designated collection box located in a specified area within nursing building. Further instruction will be given to complete and submit follow-up survey after first day of clinical experience within a hospital setting, in identified secured collection box. This collection box will be checked daily with surveys collected and kept in a locked file cabinet, to be seen only by researcher and data entry personnel. All data collected will be destroyed at completion of study.

Students will be prepared for the lab experience with standard readings, videos and discussions normally encountered prior to actual clinical rotations. Students will participate in a three-hour high-fidelity simulation involving various scenarios related to care of mother and newborn. These scenarios will be monitored by obstetrical nursing faculty to maintain flow of content and consistency of simulation.

### *Instrumentation*

Three instruments will be used in this study to evaluate simulation experience as a teaching method. Each of the three questionnaires, pretest, posttest, and follow-up survey, will consist of six questions using a 10-point Likert scale, with scores ranging from 1 = not at all confident to 10 = very confident, with higher scores indicating a higher level of self-efficacy. The posttest and follow-up surveys will also contain three open-ended questions to obtain qualitative data. Content validity of surveys will be determined by

experienced obstetrical nursing faculty. The Wilcoxon matched-pairs signed-ranks test will be used to compare individual items on the returned surveys to detect changes in levels of self-efficacy of various obstetrical nursing skills. Themes expressed in open-ended questions will be identified with a method similar to the constant comparison method of Glaser and Strauss (1967).

### *Research Design*

This study will use an integrated, quasi-experimental, repeated-measures design. With this type of design, relationships between selected dependent and independent variables can be examined (Burns & Grove, 2005). Data will be collected three times, before simulation with pretest, after simulation with posttest, and again following first day of actual hospital clinical experience via follow-up survey. The simulation will serve as the intervention and be considered the independent variable, while self-efficacy of students will be the dependent variable.

### *Methods of Data Analysis*

Data obtained from surveys will be scanned and entered into a computer using the Statistical Package for the Social Sciences, SPSS, program. A t-test analysis will be utilized to compare the means of pretest and posttest summative scores to explore if has been a significant change in self-efficacy of students in performing nursing skills after the obstetrical simulation. Open-ended questions from the surveys will be analyzed using the Wilcoxon matched-pairs signed-ranks test to determine changes in self-efficacy of skills following simulation. These same procedures will be utilized to compare data from follow-up surveys with pretest and posttest information to determine if HFS increased levels of self-efficacy in actual clinical settings. Themes will be identified from analysis

of answers to open-ended questions by utilizing a method similar to the constant comparison method of Glaser and Strauss (1967).

*Summary*

The purpose of this study is to determine if self-efficacy in student nurses is increased by use of high-fidelity simulation, HFS, as a teaching/learning method. Results will help guide nursing educators in use of clinical simulation as part of students' clinical experiences. Furthermore, will be another means to aid students in increasing self-efficacy from the lab and transferring confidence into real-life clinical situations.



## References

- Aiken, L. H., Cheung, R. B., & Olds, D. M. (2009). Education policy initiatives to address the nurse shortage in the United States. *Health Affairs*, 28(4), 646-656.
- Allan, J. D., & Aldebron, J. (2008). A systematic assessment of strategies to address the nursing faculty shortage, U.S. *Nursing Outlook*, 56(6), 286-297.
- American Association of Colleges of Nursing (2010). Qualified applications turned away from entry-level baccalaureate nursing programs: 2002-2010. Retrieved from [www.aacn.nche.edu/Media/pdf/TurnedAway.pdf](http://www.aacn.nche.edu/Media/pdf/TurnedAway.pdf)
- Bambini, D., Washburn, J., & Perkins, R. (2009). Outcomes of clinical simulation for novice nursing students: Communication, confidence, clinical judgment. *Nursing Education Perspectives*, 30(2), 79-82.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191-215.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.
- Bandura, A. (1994). Self-efficacy. In V.S. Ramachaudran (Ed.) *Encyclopedia of human behaviour* (Vol.4, pp. 71-81). New York: Academic Press.
- Bandura, A. (1995). *Self-efficacy in changing societies*. New York: Cambridge University Press.
- Boyd, M. D., Graham, B. A., Gleit, C.J., & Whitman, N. I. (1998). *Health teaching in nursing practice. A professional model* (3<sup>rd</sup> Ed.). Stamford, CT: Appleton & Lange.

- Brannan, J. D., White, A., & Bezanson, J. L. (2008). Simulator effects on cognitive skills and confidence levels. *Journal of Nursing Education, 47*(11), 495-500.
- Burns, N., & Grove, S. K. (2005). *The practice of nursing research: Conduct, critique, and utilization* (5<sup>th</sup> Ed.). St. Louis, MO: Elsevier Saunders.
- Corbridge, S. J., McLaughlin, R., Tiffen, J., Wade, L., Templin, R., & Corbridge, T. C. (2008). Using simulation to enhance knowledge and confidence. *The Nurse Practitioner, 33*(6), 12-13.
- Feingold, C. E., Calaluce, M., & Kallen, M. A. (2004). Computerized patient model and simulated clinical experiences: Evaluation with baccalaureate nursing students. *Journal of Nursing Education, 43*(4), 156-163.
- Fountain, R. A., & Alfred, D. (2009). Student satisfaction with high-fidelity simulation: Does it correlate with learning styles? *Nursing Education Perspectives, 30*(2), 96-98.
- Glaser, B., & Strauss, A. (1967). *The discovery of grounded theory: Strategies for qualitative research*. New York: Sociology Press.
- Goldenberg, D., Andrusyszyn, M. A., & Iwasiw, C. (2005). The effect of classroom simulation on nursing students' self-efficacy related to health teaching. *Journal of Nursing Education, 44*(7), 310-314.
- Gordon, C. J., & Buckley, T. (2009). The effect of high-fidelity simulation training on medical-surgical graduate nurses' perceived ability to respond to patient clinical emergencies. *The Journal of Continuing Education in Nursing, 40*(11), 491-498.

- Hovancsek, M., Jeffries, P. R., Escudero, E., Foulds, B. J., Huseb, S. E., Iwamoto, Y., et al. (2009). Creating simulation communities of practice: An international perspective. *Nursing Education Perspectives*, 30(2), 121-125.
- Jeffries, P. R. (2005). A framework for designing, implementing and evaluating simulations used as teaching strategies in nursing. *Nursing Education Perspectives*, 26(2), 96-103.
- Jeffries, P. R. (2007). *Simulation in nursing education: From conceptualization to evaluation*. New York: National League for Nursing.
- Jeffries, P. R. (2009). Dreams for the future of clinical simulation. *Nursing Education Perspectives*, 30(2), 71.
- Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice-Hall.
- Lasater, K. (2007). High-fidelity simulation and the development of clinical judgment: Students' experiences. *Journal of Nursing Education*, 46(6), 269-276.
- Lewis, D. Y., & Ciak, A. D. (2011). The impact of a simulation lab experience for nursing students. *Nursing Education Perspectives*, 32(4), 256-258.
- Rankin, S. H., & Stallings, K. D. (2001). *Patient education: Issues, principles, practices* (4<sup>th</sup> Ed.). Philadelphia: Lippincott.
- Robert Wood Johnson Foundation (RWJF) (2010). Expanding America's capacity to educate nurses: Diverse state-level partnerships are creating promising models and results. *Charting Nursing's Future*. Retrieved from [www.rwjf.org/pr/product.jsp?id-64488](http://www.rwjf.org/pr/product.jsp?id-64488)

- Sanford, P. G. (2010). Simulation in nursing education: A review of the research. *The Qualitative Report*, 15(4), 1006-1011. Retrieved from <http://www.nova.edu/ssss/QR/QR15-4/sanford.pdf>
- Schiavenato, M. (2009). Reevaluating simulation in nursing education: Beyond the human patient simulator. *Journal of Nursing Education*, 48(7), 388-394.
- Schlairet, M. C. (2011). Simulation in an undergraduate nursing curriculum: Implementation and impact evaluation. *Journal of Nursing Education*, 50(10), 561-568.
- Schön, D. A. (1987). *Educating the reflective practitioner: Toward a new design for teaching and learning in the professions*. San Francisco: Jossey-Bass.
- Seybert, A. L., Kobulinsky, L. R., & McKaveney, T. P. (2008). Human patient simulation in a pharmacotherapy course. *American Journal of Pharmaceutical Education*, 72(2), Article 37.
- Smith, S. J., & Roehrs, C. J. (2009). High-fidelity simulation: Factors correlated with nursing student satisfaction and self-confidence. *Nursing Education Perspectives*, 30(2), 74-78.
- Ward-Smith, P. (2008). The effect of simulation learning as a quality initiative. *Urologic Nursing*, 28(6), 471-473.
- Webster's New World Dictionary*. (2003). New York, NY: Simon & Schuster.