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Impact of Human Patient Simulation on Nursing Students

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Running Head: IMPACT OF HUMAN PATIENT SIMULATION ON NURSING STUDENTS

**Perceptions of Nursing Students of the Impact that Human Patient Simulation had
on Their Clinical Experience**

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ABSTRACT

This qualitative descriptive study captures reflections from third year baccalaureate nursing students who were asked to describe their experience with high fidelity human patient simulation (HPS) and the impact this experience had on their clinical reasoning skills. Currently educators in Ontario struggle to secure appropriate clinical placements for nursing students. Clinical practice is necessary for students to bridge the theory-practice gap and to become safe, competent practitioners. Nurses employ a clinical reasoning process in order to make health care decisions and it is through experience in practice that nurses develop that skill. Simulation is one way in which clinical reasoning skills can be developed.

The study used individual interviews with six, third year nursing students who had participated in a quasi-experimental study where four days of their clinical time were spent in a high fidelity simulation laboratory. A detailed analysis of the transcribed data resulted in the emergence of the central theme of clinical confidence. Four interrelated components: realism, clinical scenarios, facilitation, and debriefing enhanced knowledge development and skill acquisition, which contributed to the development of confidence. Students were not able to articulate that HPS influenced their clinical reasoning skills; however, the four interrelated components contributed to the development of clinical reasoning. A focus group with five of the study participants followed the data analysis and confirmed the findings. The study also provided insight into students' perceptions of effective teaching/learning strategies in simulation environments.

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CHAPTER 1

INTRODUCTION

Background

Health care reform in Ontario has resulted in significant down-sizing of acute care hospitals, reducing clinical placement opportunities for nursing students (Skelton-Green & Baumann, 2000). The availability of adequate numbers of clinical placements for students has also declined as a result of increasing enrolment in nursing programs across the province (Joint Provincial Nursing Committee, 2001). However, the Council of Ontario University Programs in Nursing (COUPN) identified clinical placements as the cornerstone of preparing safe, competent practitioners (Council of Ontario University Programs in Nursing, 2002). In 2005, the Ministry of Health and Long Term Care invested \$20,000,000 for nursing schools in Ontario to purchase clinical simulation equipment and to set up simulation laboratories to help augment the clinical experience for nursing students (Ministry of Health and Long Term Care, 2004).

The opportunity to practice working with patients in the clinical environment is essential to ensure safe nursing practice (Skelton-Green & Baumann, 2000). One of the ways in which nurses provide safe care is by employing a clinical reasoning process to make health care decisions (Bakalis & Watson, 2005; Burns & Paterson, 2005; Chan, 2002; Cioffi, Purcal, & Arundell, 2005; Higuchi & Donald, 2002; Kuiper & Pesut 2004; Rew, 2000; Roche, 2002; Shapiro & Driever, 2004; Tabak, Bar-Tal, & Cohen-Mansfield, 1996). The clinical practice environment provides nursing students with the opportunity to synthesize and analyze patient data in order to make safe health care decisions while being supervised (Chartier, 2001; Simmons, Lanuza, Fonteyn, Hicks, & Holm, 2003).

Traditional hospital clinical environments are not always feasible for the facilitation of clinical reasoning for a variety of reasons. One is that hospital environments are not always conducive to student learning. Clinical instructors are often faced with having to be in several places at the same time, making it difficult to support students when needed (Aronson, Rosa, Anfinson, & Light, 1997). The clinical environment is also anxiety provoking, which interferes with the student's ability to think and perform (Mahat, 1998; Ross, 1988). Shorter lengths of patient stay in hospital also reduce learning opportunities for students (Rhodes & Curran, 2005) and lead to reduced opportunities for repeated experiences with the same patient. As well, students often lack confidence in their ability and experience, which clouds the ability to make sound clinical judgments (Haffer & Raingruber, 1998).

One possible educational opportunity to explore is the use of simulation laboratories in order to achieve clinical competence in a shorter time period with greater instructor support (Oermann, 2004). Aronson et al. (1997) found that, although students may have been taught the necessary theoretical elements to make safe clinical decisions, they were not able to link all of the pieces together, nor could they articulate the thinking processes involved. If students are able to explain the reasoning process, it may assist educators in identifying the learning needs of students.

Clinical reasoning skills play an integral part in clinical practice because these skills help nurses to synthesize and analyze patient data in order to make health care decisions (Chartier, 2001; Simmons et al., 2003). The development of clinical reasoning is necessary because it allows nurses to outline problems within the framework of the patient's environment and therefore provide safe patient care (Murphy, 2004). Simulation may be set up with a debriefing component that encourages improved clinical reasoning by allowing students to review clinical

decisions in a supportive and safe environment (Lasater, 2007; Rhodes & Curran, 2005). The simulation experience may also provide an avenue for cognitive rehearsal that can then be translated into the clinical setting.

Rationale

As an educator working at Algonquin College in Ottawa, Ontario, I have had the opportunity to be a clinical teacher for several years. Nurse educators have a duty to the public to ensure that students in clinical practice are providing safe care while developing their knowledge base as beginning practitioners. I struggle with trying to find clinical learning opportunities for students that are safe for student and patient, and support the learning in the theoretical domain. Because I am often pulled in several different directions at once in the clinical environment, one of the greatest dilemmas I face is providing learning experiences for students where they are adequately supported. I am not always able to observe and guide them through new experiences. I also find that many students are reluctant to ask the registered nurses on duty to observe them, because they feel that the nurses are not always receptive to providing help to students.

Students find the transition from the skills laboratory to the clinical setting very difficult (Medley & Horne, 2005). Before attending clinical placements in the hospital, students are required to practice skills in a laboratory setting. The aim is to provide them with an opportunity to practice skills in a risk-free environment that prepares them to work with patients. However, the focus is on the technical aspects of the skill and does not take into account other factors that may complicate practice with a live patient. For example, students practice giving injections by inserting a needle into a rubberized pad. Although this practice may enhance development of psychomotor skills, it does not account for other factors that may impede performance at the bedside, such as the potential harm the injection may cause the patient.

There is always an element of fear in the unfamiliar. Allowing students to practice in a risk-free environment, where they can develop both cognitive and psychomotor skills, helps to prepare them for working with the live patient. The focus for students is often on performing a skill rather than attending to patients' psychosocial needs. If students were allowed to practice skills using high fidelity simulators to the point of proficiency in the laboratory then in the clinical setting more time and energy could be spent focusing on other aspects of patient care like communication, a critical element in the patients' well being. My colleague Michelle Morley and I were interested in exploring how simulation may be used to augment the current clinical practice for nursing students. Michelle and I decided that we would like to do research from qualitative and quantitative perspectives.

Description of Quasi-Experimental Pilot Study

Michelle Morley (2007) did a quasi-experimental pilot study using simulation with third year baccalaureate nursing students. The experimental group of 10 students spent four clinical days in a simulation laboratory setting in the middle of a 16 day medical surgical rotation (Morley, 2007). The experimental group members then returned to the hospital settings to join their original clinical groups. The control group stayed in the traditional hospital setting for the four days. Once the clinical experience was finished, the 10 experimental group participants and five control group students participated in an objective structured clinical examination (OSCE) to assess competencies. The investigator also compared the experimental group's marks on the accompanying theory course with those of nine control group students. The results indicated no statistically or clinically significant differences in competency levels between the experimental and control groups during the OSCEs or on the course grades although the study's power to detect these differences was small due to a small sample size.

Participants in the experimental group took part in clinical scenarios (Appendix A) using high fidelity human mannequins. Each group member played a variety of roles: the primary or secondary nurse, the observer, a family member, or the voice of the patient. The scenarios were videotaped and a debriefing process occurred at the end of each scenario. The professor for the simulation experience facilitated learning by having the participants reflect on what they were observing in themselves and each other during the debriefing process. She stepped in only when students needed assistance with the analysis. After the four day experience, participants went back to the hospital clinical setting to re-join the groups they were with previously.

Purpose and Significance of the Study

The purpose of this qualitative descriptive study was to build on the quasi-experimental study by following up with the experimental group students to ascertain their perception of the simulation experience and the impact of HPS on their clinical reasoning skills. A qualitative descriptive design was used, with individual interviews and a subsequent focus group discussion. Data collection took place after the student nurses had completed the pilot study. A description of students' experiences with simulation provides insight into the strengths and weaknesses of using simulation as an educational tool. Also, we can gain understanding of students' perceptions of the benefits and/or drawbacks of using simulation to replace clinical hours.

Using high fidelity simulation in the laboratory setting as part of clinical practice is a relatively new process in the field of nursing. Large sums of money have been allocated to help reduce the clinical shortage with simulation; therefore educators need to learn more about how simulation can be used to directly meet clinical demands. Both the benefits and disadvantages of using simulation warrant further investigation before establishing how it can be used most effectively in nursing education. Providing an alternative setting to the hospital may be only one

of the benefits of simulation. Because of its safety and potential for repetition and cognitive rehearsal, it may also offer opportunities for facilitators to help students learn how to think and use judgment for clinical practice (Lasater, 2007). Educators are able to facilitate this learning in simulations by teaching the reasoning process and observing students making clinical decisions.

Research Aim/Research Question

This research was a qualitative descriptive study on nursing students' perceptions of the use of human patient simulation (HPS). The aim of this research study was to learn the third year nursing students' perceptions of the impact of HPS. The questions were: 1) What was the 3rd year baccalaureate nursing students' perception of how the simulation experience influenced their subsequent clinical learning? and 2) How did 3rd year baccalaureate nursing students perceive that their experience with HPS influenced their clinical reasoning skills?"

CHAPTER 2

LITERATURE REVIEW

The purpose of my research is to see if students perceived a connection between clinical reasoning and simulation, and the impact of simulation on their subsequent clinical experience. Therefore, it is important to review the existing literature on all three areas, simulation, clinical education, and clinical reasoning, and their relationships to each other. Thus far, research on simulation in nursing education is limited, but research on clinical reasoning and clinical education is expansive (Alfaro-LeFevre, 2004; Andrews & Roberts, 2003; Hanson & Stenvig, 2008; Rew, 2000; Roche, 2002; Round, 2001; Seropian, Brown, Samuelson-Gavilanes, & Driggers, 2004; Simmons et al., 2003). In this chapter, the relevant literature on simulation, clinical education, and clinical reasoning will be reviewed. The chapter will conclude with a discussion of the gaps in the literature on simulation.

Simulation

It is important to define simulation and address its place in nursing education history. Simulation is a method of practicing or teaching that mimics real life with no risk to human beings (Feingold, Calaluca, & Kallen, 2004; Seropian et al., 2004). Simulation is identified in terms of fidelity, the level to which it mimics reality, and is categorized as low, moderate, or high (Seropian et al., 2004). Low fidelity simulation involves using equipment to learn a psychomotor skill, for example using oranges to practice injections, and has been used for many years in nursing education (Maran & Glavin, 2003). Moderate fidelity simulators, like the resuscitation dolls used to teach cardio-pulmonary resuscitation (CPR), have also been incorporated into nursing education for many years. These dolls measure whether the learner is

exerting the pressure needed to maintain circulation while performing CPR, but have limited complexity (Good, 2003).

High fidelity simulators have a greater capacity than low fidelity simulators to simulate real life through computer technology, allowing them to respond to nursing interventions (Seropian et al., 2004). This form of simulation allows students to work in a safe environment that is conducive to learning through repetition and analysis (Nehring, Lashley, & Ellis, 2002). Medley and Horne (2005) describe it as ‘the reproduction of the essential features of a real-life situation’ (p. 31). Various forms of high fidelity simulation, including both mannequins and standardized patients, have been used in medicine since the 1950’s but very little on high fidelity simulation in nursing has been reported (Peteani, 2004). Although research on simulation and nursing is scant, we are able to draw upon research in medicine and aerospace to explore the possibilities in nursing. My study involved the use of human patient simulators (HPS), a form of high fidelity simulation using mannequins that mimic reality (Nehring, Ellis, & Lashley, 2001; Seropian et al., 2004). Human actors, who most closely mimic reality, represent the highest form of fidelity. Using mannequins allows students to practice with skills that could potentially harm humans.

Most of the health related research involving HPS has been in medicine, with the focus on emergency medicine or triage training (Cleave-Hogg & Morgan, 2002; Eaves & Flagg, 2001; Henrichs, Rule, Grady, & Ellis, 2002; Morgan & Cleave-Hogg 2000b; Morgan, Cleave-Hogg, McIlroy & Devitt, 2002). A number of studies in medicine have found simulation to be a valuable tool as a means of assessing and or improving competency (Bradley & Postlethwaite, 2003; Maran & Glavin, 2003; Messenger, Rumsfeld, Carroll, Combes, & Chen, 2002; Morgan & Cleave-Hogg, 2002b; Tsai, Harasym, Nijssen-Jordan, Jennett, & Powell, 2003). It has also been

found to be effective to teach advanced life support skills or surgical techniques (DeVita, Schaefer, Lutz, Wang, & Dongilli, 2006; Gaba et al., 1998; Kneebone, 2003; Lighthall et al., 2003; Morgan & Cleave-Hogg, 2000b). Marshall et al. (2001) found that reported self-confidence levels improved for surgical interns after using HPS for trauma management.

Nursing research about the use of HPS as an educational tool was limited at the outset of my study (Bearnson & Wiker, 2005; Cioffi, 2001; Ravert, 2002; Schoening, Sitner, & Todd, 2006). Subsequently, there have been a number of research studies published on the impact of simulation in nursing education (Hoffman, O'Donnell, & Kim, 2007; Lasater, 2007; Radhakrishnan, Roche, & Cunningham, 2007; Scherer, Bruce & Runkawatt, 2007; Waldner & Olson, 2007; Wellard, Woolf & Gleeson, 2007) As simulation is incorporated into nursing curricula, nurse educators are starting to examine the effects of using human patient simulation as an educational tool (Nehring et al., 2001; Peteani, 2004). There are a few studies that found simulation to be an effective means of improving competency (Alinier, 2003; Hoffman et al., 2007; Nehring & Lashley, 2004; Robertson, 2006; Ross, 1998). There has also been research in nursing education that suggests that confidence develops with skill acquisition after using HPS (Alinier, Hunt, & Gordon, 2004; Freeth & Fry, 2005; Shepherd, Kelly, Skene, & White, 2007).

Alinier et al, (2004) assessed the effect on nursing students' competence and confidence of using HPS. Second year diploma nursing students were randomly allocated into experimental and control groups. Three sessions were organized, a first Objective Structured Clinical Exam (OSCE), a simulation session (experimental group only), and a second OSCE for both groups. Both groups were asked to complete a questionnaire at the start of the second OSCE session to identify demographic data, experience and comfort in working with technology, and their level of confidence. There was very little difference in competency between the two groups on the first

OSCE. On the second OSCE, the control group improved by 6.76% and the experimental group improved by 13.43%. Although the study was statistically significant the sample size was small and therefore less generalizable.

Feingold et al. (2004) studied the transferability, realism, and value of using HPS in baccalaureate nursing education. The study participants were enrolled in an advanced acute care of the adult course. Out of 97 students enrolled in the course, 67% agreed to participate in the study. The participants took part in two simulated clinical scenarios developed by nurse educators. The students were then asked to answer a 20-item questionnaire on transferability, realism, and the value of skills taught. The results indicated that half the participants believed that working with simulated patients enhanced their confidence and clinical competence, or prepared them for clinical practice. The majority found the scenarios were realistic and that they developed psychomotor skills.

A non-experimental, pilot, evaluation study was designed by Schoening et al. (2006) to identify and refine simulation learning activities, learning objectives, and student perceptions of the experience. The study results indicated that students felt an increase in confidence in the clinical setting after using HPS that provided repetitive experiences, focus on team work, and decision making in the simulation environment. In order for educators to understand the benefits of using simulation, it is important to understand what clinical education is.

Clinical Education

Clinical education provides nursing students with the opportunity to provide patient care incorporating what they have learned in both theory and the skills laboratory. Clinical education encompasses experiential learning, clinical teaching, and clinical learning. Simulation is a form of clinical education that may be used to augment the traditional practice experience. As

simulation is a fairly novel phenomenon in nursing education, it is important to explore the potential relationship between clinical practice and simulation. Clinical practice accounts for a large percentage of student time in nursing education (Andrews & Roberts, 2003; Hanson & Stenvig, 2008). It is therefore fundamental that educators understand the problems encountered in clinical practice and how to meet the needs of the student in the clinical learning environment. Research on clinical education, particularly on students' perceptions of the clinical experience, is plentiful (Corlett, 2000; Kelly, 2007; Freeth & Fry, 2005; Papp, Markkanen, & Von Bonsdorff, 2003; Ranse & Grealish, 2007; Sharif & Masoumi, 2005; Tiwari et al., 2005). A number of critical elements influence student outcomes in clinical placements: the clinical teacher, the clinical environment, and the characteristics of the student (Gaberson & Oermann, 2007; Gillespie, 2002; Hanson & Stenvig, 2008).

The Canadian Association of Schools of Nursing (CASN) established a task force in 2003 to review the challenges of nursing education. They defined clinical education as “any teaching/learning that occurs outside the physical environment of the school classrooms and clinical labs.” (p. 3). While laboratory experiences are excluded from this definition, simulation may provide a bridging experience from skills laboratory to direct patient care. Clinical practice provides the opportunity for students to apply their theoretical knowledge to patient care in a supervised environment in order for students to become safe practitioners (Benner, 2001; Corlett, 2000; Corlett, Palfreyman, Staines & Marr, 2003; COUPN, 2002; Gaberson & Oermann, 2007; Jensen & Givens, 1999).

Both simulation and traditional clinical environments involve experiential learning; however, they do have specific differences (Waldner & Olson, 2007). The simulation environment is generally controlled, whereas the hospital setting is dependent upon patient care

opportunities and circumstances (Feingold et al., 2004; Seropian et al., 2004). Both environments offer an opportunity for students to reflect on their learning but the process may be somewhat different (Schoening et al., 2006). In the hospital, debriefing often takes place at the end of the day as a post conference and involves reflecting on the day's experiences (Lasater, 2007). The simulation laboratory provides the opportunity to debrief after each clinical scenario, and may have the added element of the students being able to observe and reflect on their own video taped performance (Schoening et al., 2006).

Experiential Learning

Benner's (2001) research on nurses in practice identifies that nurses' ability improves through experience. Clinical education provides students with the opportunity to attain knowledge and develop skills through a variety of experiences with real patients, using problem solving, critical thinking, and decision making (Gaberson & Oermann, 2007). Larew, Lessans, Spunt, Foster, and Covington (2006) incorporated Benner's concepts of novice to expert in identifying the performance characteristics and learning needs of nurses with varying levels of competency in a simulation learning environment. They developed scenarios that allowed students to go from simple to complex situations in a safe learning environment. Parr and Sweeney (2006) also found that critical care students needed to go from simple to complex situations in order to feel more confident to make decisions in the critical care area. Simulation also supports problem solving and critical thinking by allowing students to think-aloud during the clinical scenarios (Schoening et al., 2006). Thinking aloud during scenarios teaches the students to reflect and analyze what they are doing.

David Kolb (1984) describes experiential learning as a process through which the learner builds knowledge by reflecting in and on action. The knowledge developed is transferable and

built upon with new experiences. Waldner and Olson (2007) suggest that Benner's (2001) model of skill acquisition and Kolb's experiential learning model could provide the theoretical basis for students developing nursing knowledge when using simulation. Going directly from a skills laboratory to the clinical environment is not necessarily conducive to reflection and the development of reasoning skills because the skills laboratory setting supports psychomotor skill development only (Schoening et al., 2006). The simulation environment may be set up in a way that can support the reasoning process, with the teacher's role as a critical factor in facilitating that process (Lasater, 2007).

Clinical Teaching

Morgan and Warbinek (1994) defined clinical teaching as: "acting and interacting with students, clients, and other health care professionals in settings where people are in need of health care to promote both the maximum learning of students and the maximum health of clients" (p. 161). Clinical educators play a significant role in supporting student learning and can greatly influence a student's feelings of confidence to practice (Duffy & Watson, 2001). Presently, clinical educators are faced with the challenge of providing learning opportunities while ensuring that students are practicing safely in a constantly changing environment. Duffy and Watson (2001) suggest that the role is multi-faceted; the teacher acts as advisor, supporter, practice regulator, and networker.

Nurse educators have a duty to the public, ensuring that students practice safely in the clinical environment. The College of Nurses of Ontario (CNO) lists a number of indicators for the educator role within the Standards of Practice (CNO, 2002). These indicators include: providing students with an opportunity to practice in a safe environment that supports a reciprocal relationship between student and educator, being a role model who enables others to

develop confidence, supporting students in becoming reflective practitioners, planning and implementing creative learning opportunities, communicating the level of preparation and objectives for learning, and supporting critical thinking and discussion on ethical issues (CNO, 2002). Fulfilling all these roles in increasingly demanding clinical environments creates concern for many nurse educators (CASN, 2003; Duffy & Watson, 2001; Paton, 2005). As a result of patient complexities and shortages of placements, clinical educators face challenges in providing learning opportunities for students (CASN, 2003; COUPN, 2002). Therefore, simulation may provide an opportunity to address student needs that are not being met in the clinical environment and to prepare them better to function in complex situations (Medley & Horne, 2005; Radhakrishnan et al., 2007; Ross, 1998).

Clinical Learning

Clinical learning involves student experiences in a clinical setting. This learning environment presents a number of stressors expressed by nursing students. Most of the research on clinical education is represented by student nurses' perceptions of that experience (Campbell, Larrivee, Field, Day, & Reutter 1994; Cook, 2005; Freeth & Fry, 2005; Kelly, 2007; Lofmark & Wikblad, 2001; Mahat, 1998; Mikkelsen-Kyrkjebø & Hage, 2005; Papp et al., 2003; Ranse & Grealish, 2007; Sharif & Masoumi, 2005; Tiwari et al., 2005). Student anxiety represents the over-riding theme from the research on clinical learning (Campbell et al., 1994; Cook, 2005; Randall & Binding, 2004; Sharif & Masoumi, 2005; Suliman & Halabi, 2007). Mahat (1998) found that the following stressors contributed to student anxiety: initial experiences, interpersonal relationships, ability to perform roles, heavy workload, and feelings of helplessness. Other researchers indicated that supportive environments enhanced student learning and developed confidence (Ranse & Grealish, 2007; Suliman & Halabi, 2007). Other factors that

are relevant to student learning involve the nurses on the unit and teacher facilitation (Campbell et al., 1994; Freeth & Fry, 2005; Papp, et al., 2003; Suliman & Halabi, 2007). In Ranse and Grealish's (2006) study on a dedicated education unit, students indicated that being accepted as part of the health care team helped reinforce knowledge and increase confidence. Research on student perceptions of teachers indicates that teachers who are excited about nursing and who integrate theory into practice had the most positive influence on students learning (Campbell et al., 1994).

Clinical education should provide an opportunity for students to apply theoretical knowledge in practice but students often express that the clinical environment does not support this (Hewison & Wildman, 1996). In a number of studies, students indicated that they did not have opportunities to practice what they had learned in theory, either because the patient situations did not occur or they were not involved because they were students (Corlett, 2000; Freeth & Fry, 2005; Hewison & Wildman, 1996; Mikkelsen-Kyrkjebo & Hage, 2005; Sharif & Masoumi, 2005). The factors mentioned above influence how students learn in clinical settings. The simulation environment may provide different opportunities that can address these concerns. Scenarios can be designed to reflect what is being taught in theory and students can be encouraged to think critically by reflecting on their experiences.

Clinical Reasoning

There are a number of terms used in the literature to describe the reasoning process in nursing. They include: clinical reasoning, clinical decision-making, diagnostic reasoning, critical thinking, and clinical judgment. There are no standard definitions of these terms and their relationship to each other tends to be assumed rather than explored separately. I am focusing on clinical reasoning in this research because it implies a thinking process and I am also looking at

clinical decision making as the outcome of the reasoning process. Clinical reasoning and clinical decision making are related in that decision making is the outcome of the reasoning process (Alfaro-LeFevre, 2004; Rew, 2000; Roche, 2002; Round, 2001; Simmons et al., 2003). There is an applied process of thinking through problems that helps nurses to make decisions. Reflecting on and evaluating decisions facilitates knowledge development for subsequent decision making.

Definitions

Clinical reasoning. Clinical reasoning is defined in a number of ways, incorporating a broad range of terms such as clinical judgment or diagnostic reasoning. Clinical reasoning and clinical judgment are used interchangeably in the literature. For the purpose of this paper I chose the following definition for clinical reasoning: “a recursive cognitive process that uses both deductive and inductive cognitive skills to simultaneously gather and evaluate assessment data” (Simmons et al., 2003, p. 701).

Clinical decision-making. Clinical decision-making is the process by which health care practitioners arrive at clinical decisions that impact the care of the patient (Simmons et al., 2003). Clinical decisions are the outcome of the clinical reasoning process. The process of decision-making involves assessing the data and identifying what is relevant in order to choose a plan of action that will determine the best possible patient outcomes (Gaberman & Oermann, 2007).

Clinical Reasoning in Nursing Education

It has been clearly identified that clinical reasoning is recognized as an essential cognitive tool necessary for nurses to make clinical decisions in practice (Gaberman & Oermann, 2007; Simmons et al., 2003). What is not clear from the literature is what constitutes clinical reasoning and how to teach this skill to nursing students. Various ideas are presented by researchers on how to teach student nurses to think about the reasoning process. As clinical

reasoning is a main thread in nursing schools internationally, it must be thoroughly understood and supported (Alfaro-LeFevre, 2004; Burns & Paterson, 2005; Higuchi & Donald, 2002; Roche, 2002).

There are a number of ways that using clinical reasoning will develop knowledge and enhance practice, leading to safe clinical decisions. Rew (2000) asserts that clinical reasoning is an intuitive process in nurses that develops with time, education, and experience. Banning (2008) identifies clinical reasoning in nursing as an “assimilation, analysis and differentiation of health care evidence” (p. 8). Lee, Chan and Phillips (2006) would also argue that the reasoning process involves problem solving skills that require information processing and making clinical judgments based on data assessments.

Schank (1990) believed that clinical judgment is strengthened through the use of teaching methods that focus on application, analysis, synthesis, and evaluation while allowing the learner to practice essential skills in an active way. Del-Bueno (1983) also observed that nurses’ knowledge of content and theory does not necessarily translate into clinical decisions at the bedside. She recommended that clinical judgment should be taught using a variety of modalities such as experiential, simulated, and hypothetical methods. Experience helps students to become familiar and comfortable working with patients. Simulation and hypothetical learning allow the students to practice in a safe environment that mimics reality by taking theoretical knowledge and applying it in practice. This provides an opportunity for students to rehearse before working with the live patient.

Clinical reasoning is influenced by a number of factors that are not always controlled through the education process alone. Garrett (2005) conducted a phenomenological study using a sample of 21 fourth year nursing students undertaking a nursing management module. The

students produced a concept map of their perceptions of clinical decision-making. The following themes were identified as influencing clinical reasoning: “quality of care, professional practice, clients/patients, skills of knowledge and attitudes, external factors, decision-making process, and personal impact” (Garrett, 2005, p. 34).

Benner (2001) asserts that expert nurses readily grasp problems related to patient care, recognize influencing factors and their connections, and know how to intervene. Having experience allows the expert to think differently and manage patient care according to previous sets of information. Tabak et al., (1996) studied the decision-making differences between experienced and novice nurses and found that expert nurses showed greater certainty with decision-making based on prior experience. When knowledge is applied in practice, expert reasoning can take place (Van der Vleuten & Newble, 1995). Kautz, Kuiper, Pesut, Knight-Brown, & Daneker, (2005) found that students who used a guided reflection model were more confident in their ability to make clinical decisions. With guided reflection, students are taught to think of the patient’s situation from a holistic perspective (Kautz et al., 2005). Clinical educators were seen by researchers as integral in facilitating clinical reasoning skills (Kautz et al., 2005).

Teaching clinical reasoning can only be effective if educators understand how students develop thinking skills and how those skills are enhanced. Initially students learn about reasoning from a theoretical perspective prior to experiential learning in clinical practice (O’Neill & Dluhy, 1997). The clinical environment provides opportunities for students to incorporate what is taught in theory while providing care and to develop reasoning skills as they learn to modify care based on patients’ particular circumstances (Daly, 2001; Farrell & Bramadat, 1990; Haffer & Raingruber, 1998). Haffer and Raingruber (1998) suggest that having increased confidence levels is also an influential factor in enhancing clinical reasoning.

Rew (2000) asserts that students can only develop reasoning skills by being taught to reflect on their experiences. Clinical conferencing was previously identified as one way in which educators can accomplish reflection (Copeland, 1990; Lassater, 2007) but it is problematic in the clinical environment. Reflection takes place in the clinical setting in the form of a debriefing session after clinical experiences. As debriefing generally takes place at the end of a clinical day, participants are often tired or may have difficulty recalling events that took place hours before. Comer (2005) suggests that students need to be taught the process of reflection through systematic review of clinical scenarios. Other researchers refer to the 'Think Aloud Approach' in which students analyze clinical scenarios as a reflective exercise to enhance clinical reasoning (Banning, 2008; Funkesson, Anbacken, & Ek, 2007). Unless students are able to understand their mistakes, it is difficult for them to develop reasoning skills and be effective decision makers. Donald Schon (1988), the forefather of research on reflection, described thinking on action as "thinking back on what we have done in order to discover how our knowing-in-action may have contributed to an unexpected outcome" (p. 26).

Clinical Reasoning and HPS

Clinical reasoning is a necessary element of all nursing programs. Simulation may provide an opportunity to teach clinical reasoning skills that can then be transferred to the bedside in clinical. Cioffi et al. (2005) investigated the effect of high fidelity simulation on the clinical decision-making of midwifery students in a post-test design. They found that students who experienced simulation, as opposed to those who did not, were more likely to collect clinical information, make fewer inappropriate inferences, and have a higher confidence level at the bedside. Aronson et al. (1997) set up laboratory experiences for students to address the concerns from clinical nursing professors that students are unable to make clinical decisions. The

professors also indicated that there is little time in clinical teaching to facilitate problem solving with students. Students anecdotally evaluated the experience as a way of making the experience real without the added stress of having to provide care for a real human. They indicated that their confidence level increased and their ability to think critically improved. A number of studies have incorporated reflective thinking into simulation curricula, particularly through debriefing (Brandt-Baldwin, 2007; Jeffries, 2005; Lasater, 2007; Murphy, 2004; Rhodes & Curran, 2005; Schoening et al., 2006). Reflective thinking is directly related to clinical reasoning (Copeland, 1990; Funkesson et al., 2006; Kuiper, Heinrich, Matthias, Graham, & Bell-Kotwall, 2008; Kuiper, & Pesut, 2004; Murphy, 2004). Murphy states that “reflection and articulation that are focused on connecting new experiences to existing knowledge will enhance the development of clinical reasoning” (2004, p. 227). The literature indicates that clinical reasoning can be facilitated through reflection on and in practice (Schon, 1988). The debriefing process has also been identified as a means to support reflection in simulation (Lasater, 2007; Schoening et al., 2006). Simulation laboratories can be set up to both teach the reasoning process and to evaluate how students think by using the think out loud approach (Banning, 2008).

Gaps in Literature

When I first explored the subject of simulation and nursing education, very few studies existed on the impact of simulation as a teaching tool for undergraduate nursing students. What is plentiful is research on clinical nursing education, particularly on student perceptions of the clinical experience (Freeth & Fry, 2005; Gillespie, 2002; Glawe-Mailloux, 2006). Until approximately 2005, the focus of literature on simulation for the health care disciplines was on the use of simulation as a teaching tool for skill acquisition (McCausland, Curran, & Cataldi, 2004; Medley & Horne, 2005; Nehring et al., 2001). There were a few quantitative studies on the

effect of HPS with post-graduate nursing students, particularly in the field of anesthesiology and triage nursing (Henneman & Cunningham, 2005; Hoffman, O'Donnell, & Kim, 2007), but very little on simulation with undergraduate students. A number of anecdotal accounts in both medicine and nursing suggest the benefits of HPS as a teaching tool for skill acquisition and knowledge development (Cioffi et al., 2005; Morgan et al., 2002; Alinier, 2003; Kneebone, 2003; Feingold et al., 2004; Morgan & Cleave-Hogg, 2000a).

Clinical reasoning has been identified as a critical outcome of the clinical experience to ensure safe practitioners (Jensen & Givens, 1999). Therefore my interest was to identify if a link existed between the simulation experience and clinical reasoning. Rhodes and Curran (2005) suggested that simulation may improve students' judgment skills. Recently, Lasater (2007) researched and identified a link between clinical reasoning and simulation.

Very little research exists to ascertain students' personal perceptions of using HPS as an adjunct to or replacement for clinical practice. Such research is needed to understand the impact of simulation on learning in order to best implement simulation in nurse education. Students' perceptions of clinical reasoning in HPS will help us gain insight into what helps or hinders the reasoning process. Clinical decision-making is the quintessential component of safe nursing practice. However, there is little research to suggest how HPS can help with the process of teaching reasoning skills to nursing students.

CHAPTER 3

METHODS

This chapter outlines the research approach employed in this study, the assumptions and biases of the researcher, the data collection method, data analysis, and the methods to ensure rigor. My research objectives were to ascertain student nurses' perceptions of learning in a simulated environment and to learn whether they perceived that HPS had an impact on their clinical reasoning skills in clinical practice. Using a qualitative descriptive approach allowed for descriptive information about student perceptions of the simulation experience to be analyzed. My purpose was to gain insight about the participants' experience through their reports. Student perceptions of their experience with HPS may provide insight for nurse educators into the ways in which simulation could best be incorporated into nursing curricula.

Research Approach

Qualitative research serves to uncover what lies beneath a phenomenon where there is limited knowledge on the subject (Polit & Beck, 2004; Sandelowski, 2000; Strauss & Corbin, 1990; Thorne, Kirkham, & MacDonald-Emes, 1997). There is little research in nursing education on the use of simulation as a teaching tool; therefore a qualitative approach was chosen to answer the research questions. Qualitative research is about "persons' lives, stories, behaviour, but also about organizational functioning, social movements, or interactional relationships" (Strauss & Corbin 1990, p. 17). Furthermore, qualitative research may uncover what lies behind a phenomenon (Strauss & Corbin, 1990). As there is a clear gap in knowledge related to simulation and nursing education, the qualitative descriptive approach was an appropriate method to use for my study.

Qualitative Descriptive Approach

Qualitative descriptive research is described by Sandelowski (2000) as basic or fundamental in comparison to other methods of qualitative research. Sandelowski (2000) describes it in three ways; first, it is categorical as opposed to non-categorical, second, it is less interpretive than other qualitative approaches and, thirdly, it does not require a “conceptual or otherwise highly abstract rendering of data” (p. 335). Qualitative, descriptive research differs from the traditional qualitative approaches of phenomenology, grounded theory, or ethnography in that it offers a low inference interpretation of data as opposed to a conceptual or abstract analysis of data (Sandelowski, 2000). Traditional methods of qualitative research tend to adhere closely to a theoretical position (Thorne et al., 1997).

Although qualitative descriptive studies do not typically have a theoretical premise, researchers do use some of the approaches of other qualitative approaches, such as sample selection, data coding and analysis, and assessing rigor (Sandelowski, 2000). However, neither Sandelowski (2000) nor Thorne et al., (1997) provide details on the processes involved, such as data collection and data coding. The data collection and analysis methods suggested by Miles and Huberman (1994) and Strauss and Corbin (1990) were used for my study because they provided a framework to analyze the data.

Assumptions and Biases of Researcher

The assumptions that a qualitative researcher may have going into the study can influence the way in which questions are asked and the conclusions reached (Miles & Huberman, 1994; Polit & Beck, 2004). The researcher is the instrument and therefore influences the way in which the questions are posed (Polit & Beck, 2004). Before describing the details of analysis, it is important to state my assumptions and biases as a researcher studying this topic. One of my

major assumptions was that students would benefit from participating in an HPS experience. I believed that the way in which the simulation experiences were developed would enhance students' ability to reason clinically. I believed that simulation might prove to be beneficial as a means to facilitate clinical reasoning skills that could then be transferred to the clinical setting.

It is my personal bias that students are often not adequately prepared to meet the demands of the current medical-surgical environment. HPS provides the opportunity to experience clinical challenges in a safe environment because it is an intermediate step from the low fidelity experience to the clinical experience. I assume that HPS will better prepare students for clinical experiences than the traditional method of going from a clinical skills laboratory to the hospital setting. Having an opportunity to practice skills using HPS could provide them with cognitive skills necessary to develop clinical reasoning.

Data Collection

The data collection technique employed was consistent with Sandelowski's (2000) and Thorne et al.'s (1997) recommendation of using open ended, individual interviews to gain a broad perspective (Appendix B). The questions were modified as the interviews progressed, as a result of constant comparative analysis and reflection on previous interviews (Miles & Huberman, 1994; Morse & Field, 1995). As well, field notes and memoing were used with each interview to capture non-verbal cues from participants and to help guide subsequent interviews (Miles & Huberman, 1994). Once the interviews were finished and the data was analyzed, a focus group discussion took place as a means of member checking (Morse & Field, 1995; Polit & Beck, 2004).

Sample Selection

The study sample consisted of the 10 students who had participated as the experimental group in Michelle Morley's (2007) pilot study. Ethics approval was obtained from the research ethics boards of the University of Ottawa and Algonquin College (Appendix C). The researcher from the pilot study was asked to recruit participants from the experimental group. All 10 of the experimental group participants from the pilot study were contacted to see if they would be willing to participate in my study. The recruiter was provided an email (Appendix D) and a telephone transcript (Appendix E) of what to say to the potential participants. A detailed description and a consent form for both the individual interviews and focus group were provided to all of the members of the experimental group (Appendix F).

This was purposive sampling because all of the people who had participated in another study were asked to take part in my study (Fain, 1999; Polit & Beck, 2004). The goal was to have all of the members of the pilot study participate. Six of ten participants from the pilot study consented. The participants then contacted me to indicate their interest in taking part in the study and to arrange an interview time. All six of the participants brought a signed consent to the interview and retained another signed consent form for their own records. The interview process was explained in detail at the start of each interview and participants were made aware that they could stop the interview at any time.

Setting

All of the interviews occurred at Algonquin College in my office. Each participant was offered the opportunity to be interviewed elsewhere, but none chose this option. The offer was made to ensure that participants were comfortable in the setting chosen for the interviews. The

interview times were set by the participant and researcher at a time that was most convenient for the participant.

Individual Interviews

Data collection consisted of semi-structured interviews (Appendix B). The guide was developed after reviewing pertinent literature and consultation with the thesis supervisor and committee members. The questions were open-ended and included follow-up probes which served to clarify participant responses (Morse & Field, 1995). This type of questioning also encourages the respondent to use his/her own words or ideas (Polit & Beck, 2004). The content of the interviews was based on the students' perceptions of the experience of simulation and the relationship between simulation and clinical reasoning. Participants were also asked to comment on the strengths and/or weaknesses of using HPS.

The interviews took place between April and May 2006 and ranged in length from 35-45 minutes. Transcription took place immediately following the interviews with four of the six participants and within days for the other two. An initial analysis began in April, followed by a more detailed analysis after all of the interviews were completed. The preliminary analysis served as a baseline to modify questions to participants during subsequent interviews. Field notes were taken during each interview to identify "relationships within the data" (Morse & Field, 1995, p. 112).

Saturation. An important element in qualitative research is that the sample size is large enough to reach saturation, the point at which no new information is heard or descriptions have become repetitive (Fain, 1999; Polit & Beck, 2004). It was determined that saturation was reached using six participants because much of what the participants were saying was similar and no new concepts were identified in the last interviews.

Focus Group Interview

The focus group interview was held to verify whether my analysis of the individual interviews and the model I had developed reflected the participants' perceptions of the simulation experience. The findings from the analysis were presented to five of the participants in January 2007. All six of the participants had agreed to take part; however on the day of the focus group, one of them had to cancel. The focus group lasted approximately 75 minutes. During the discussion, the model was drawn on a white board and a description of each component of the model was provided for participants to reflect upon and discuss as a group.

A volunteer observer and I took detailed notes throughout the focus group. Although a tape recording device was used, it proved to be ineffective because the quality of the recording was too poor to clearly identify what individuals were saying. The focus group notes were transcribed by the researcher and the volunteer. The volunteer had manually recorded the discussion and within twenty-four hours transcribed the data electronically. To help with recall, notes transcribed by the volunteer were immediately compared to my notes.

Data Analysis

Sandelowski (2000) suggests that qualitative content analysis should be used for qualitative descriptive research. In qualitative content analysis, "data-derived codes are systematically applied, but they are generated from the data themselves in the course of the study" (Sandelowski, 2000, p. 338). This method of analysis helped to shape the data throughout the analysis (Sandelowski, 2000). Once the data was categorized and coded, a central theme and its sub-components were identified, and a conceptual model was developed to illustrate the relationships among components.

Constant Comparative Analysis

Data collection, analysis, and interpretation occurred simultaneously. Strauss and Corbin (1990) recommend constant comparative analysis because it allows the researcher to get new ideas to obtain better quality data. Similarly, Sandelowski (2000) describes this process as “reflexive and interactive as researchers continuously modify their treatment of data to accommodate new data and new insights about those data” (p. 338). During the interview process, the questions were modified as a result of reviewing the tapes and reflection on the interviews. While listening to the interviews, I took notes to provide probes for successive interviews.

Field notes, consisting of personal reflections on the interviews, were maintained throughout. The field notes included researcher perceptions of comments made by participants in response to the interview questions and included non-verbal cues, such as head nodding that might have indicated a contradiction to a verbal response. If participants had difficulty answering questions or needed clarification, that was also recorded in the field notes. Using field notes while transcribing the audio recordings ensured accuracy. Once transcriptions were complete, audio tapes were reviewed again to ensure that nothing was missed.

Polit and Beck (2004) suggest that coding the data with another person early on supports inter-rater reliability. The first transcript was reviewed and coded by my thesis supervisor. The independent codings were compared and differences were reconciled. The review of data provided similar results, with only small variations.

Data Coding

Once the interview data were collected and transcribed, the computer software program N-VIVO® was used to facilitate coding and indexing of the material. Miles and Huberman

(1994) suggest that using a software package to compile data saves time and effort when there are large volumes of data to filter through. A master list of codes was developed and imported into the computer program, allowing me to put segments of the transcriptions into the various codes. In order for me to organize my data from a large volume to manageable parts, I used a three step coding process as suggested by Miles and Huberman (1994), descriptive, interpretive, and pattern coding. This method is similar to open, axial, and selective coding identified by Strauss and Corbin (1990). However, the purpose of Strauss and Corbin's (1990) coding methods, used for Grounded Theory, is to create or test a theory, while this study sought to identify factors and their relationships.

Descriptive Coding. Descriptive coding involves the initial recognition of similar statements or passages that lead to the identification of common threads or ideas. Some examples of the descriptive coding occurred with words like 'communication' and 'reality' which were used a number of times by participants in the individual interviews. Once common words or sentences were identified, eight descriptive codes were established. These were identified as the sub-components of the interpretive codes.

Interpretive Coding. Using the eight descriptive codes, I looked at the relationships among them to refine the analysis. The eight codes included: theory practice gap, assessment, organizational skills, safety and practice, communication, teacher approach, differences between simulation and hospital teaching, and reflection. Within the eight codes there were a number of connections that allowed focus on four components of the simulation experience. The four components included: clinical scenarios, realism, facilitation, and debriefing. These four components encompassed the sub-components that were eight descriptive codes. These particular components stood out prominently from the participant interviews. Miles and

Huberman (1994) describe this process as interpretive coding, where the codes are further integrated and refined so that patterns or themes emerge.

Pattern Coding. At this point I could see that the four inter-related components (clinical scenarios, realism, facilitation, and debriefing) were connected as relevant in making students feel that they had increased their knowledge base and enhanced their clinical skill level. These two factors led the participants to feel more confident for clinical practice. Therefore, clinical confidence was identified as the central theme that encompassed all the factors, components, and sub-components.

Development of Model

To explain to the participants my interpretation of the data from the interviews and their interrelationships I developed a model (Figure 1, p. 33). When looking at how best to illustrate the relationships among the levels of coding in a way with which the participants could identify, I chose a pyramidal structure. The outcome of the simulation experience was that students gained more confidence for clinical practice through increased knowledge and skills. The first, or lowest, level of the pyramid represents the descriptive codes that make up the components of the simulation experience which is represented by the second level. Clinical scenarios, realism, facilitation and debriefing were all part of the simulation environment. After experiencing the various aspects of simulation, participants had attained knowledge and skill which made up the third layer of the pyramid. Confidence, the main theme, represented as the fourth level, comes from progressing through the stages represented by the first, second, and third levels of the pyramid and is represented as its apex. The thesis committee and I met at this point to review the findings and analysis to make suggestions for revisions. Subsequently, a focus group with the participants was held for verification.

Methods to Ensure Rigor

Qualitative research provides greater understanding of people or phenomena and therefore the methods employed to ensure rigor are markedly different from those of quantitative research (Fain, 1999; Long & Johnson, 2000; Miles & Huberman, 1994; Polit & Beck, 2004). Trustworthiness is the major criterion for rigor in qualitative research, defined as “the degree of confidence qualitative researchers have in their data, assessed using the criteria of credibility, transferability, dependability, and confirmability” (Polit & Beck, 2004, p. 734).

Credibility

Credibility refers to confidence in the truth of the data (Polit & Beck, 2004). Lincoln and Guba (1985) suggest that prolonged engagement in the data helps to support credibility. The data in this study were reviewed a number of times following each interview, again once the tapes were transcribed, and finally four times during the coding process. Peer debriefing, another strategy to ensure credibility, occurred through verification with members of the thesis committee (Long & Johnson, 2000; Polit & Beck, 2004) throughout the study, causing a number of revisions to be made prior to presenting the findings to the focus group.

Data triangulation is also a means to ensure credibility. It is “the use of multiple data sources for the purpose of validating conclusions” (Polit & Beck, 2004, p. 716). Data was collected and information was confirmed as necessary with participants as a means of “member checking” during individual interviews and the focus group (Polit & Beck, 2004). Michelle Morley’s study (2007) was also used as a source of data triangulation because the same people participated in research on simulation using different research methods. Her study confirmed what participants had stated about the way in which the experience occurred.

Dependability

Dependability of data in qualitative research refers to whether the process of the study is consistent over time, across researchers and methods (Polit & Beck, 2004). There is a risk of data inconsistency when the data is expansive or when it takes an extended period of time to gather the data (Weed, 2005). There was a time lag of four months from the time that the participants took part in the simulation study and the interviews. However, the participants appeared to be able to answer the questions without difficulty in recall. All six participants were interviewed over a two week period. Although the focus group took place 10 months after the individual interviews, the participant's perspectives on the experience had not changed.

An inquiry audit is an independent review of the documents by an external reviewer (Polit & Beck, 2004). As a Master's student, I asked my thesis supervisor to review the documents with me in order to ensure dependability. Once the data was coded and analyzed, my thesis committee reviewed the analysis to verify the presentation of themes.

Confirmability

Confirmability refers to the objectivity of the data (Miles & Huberman, 1994; Morse & Field, 1995; Polit & Beck, 2004). One way to ensure confirmability is through a process referred to as bracketing (Burns & Grove, 1999; Fain, 1999; Polit & Beck, 2004). It is used to identify bias prior to and during the interview process. Bracketing is defined as "identification of any previous knowledge, ideas, or beliefs about the phenomenon under investigation" (Fain, 1999, p. 167). Personal assumptions and biases were identified early in the process. After each interview, indicators of preconceived notions about the experience were recorded in the margins of the interview script. For example; because of the belief that students would benefit from the

simulation experience, how the questions were asked was reviewed to detect any projection of my personal beliefs onto the participants.

Another method of ensuring confirmability is keeping an audit trail, “a systematic collection of materials and documentation that allows an independent auditor to come to conclusions about the data” (Polit & Beck, 2004, p. 435). This study’s audit trail included: personal field notes, interview transcripts, data analysis, questionnaires used for each participant interview with notes in the margins, and a journal of researcher reflections throughout the interview and analysis process. The researcher’s personal reflections were recorded in field notes to help identify bias when transcribing and coding the data.

Transferability

Qualitative research focuses on the uniqueness of the human situation and not necessarily on replicating the data with similar populations (Morse & Field, 1995). When research is described in detail, including the subject and the participant responses, future investigators can assess the transferability to their own situation (Lincoln & Guba, 1985). Streubert and Carpenter (1995) refer to transferability as occurring when “findings have meaning to others in similar situations” (p. 26). Detailed descriptions of the findings can be found in Chapter Four of this thesis. Also Miles and Huberman (1994) suggest that generalizability is attained based on the analysis of the sample. The researcher’s detailed description of the study and circumstances allows others to assess whether the study applies to their situation and determines generalizability. If another sample of third year baccalaureate nursing students, as described in Chapter Four, is provided with an experience similar to the one in this study, their reflections on the experience will probably contain similarities.

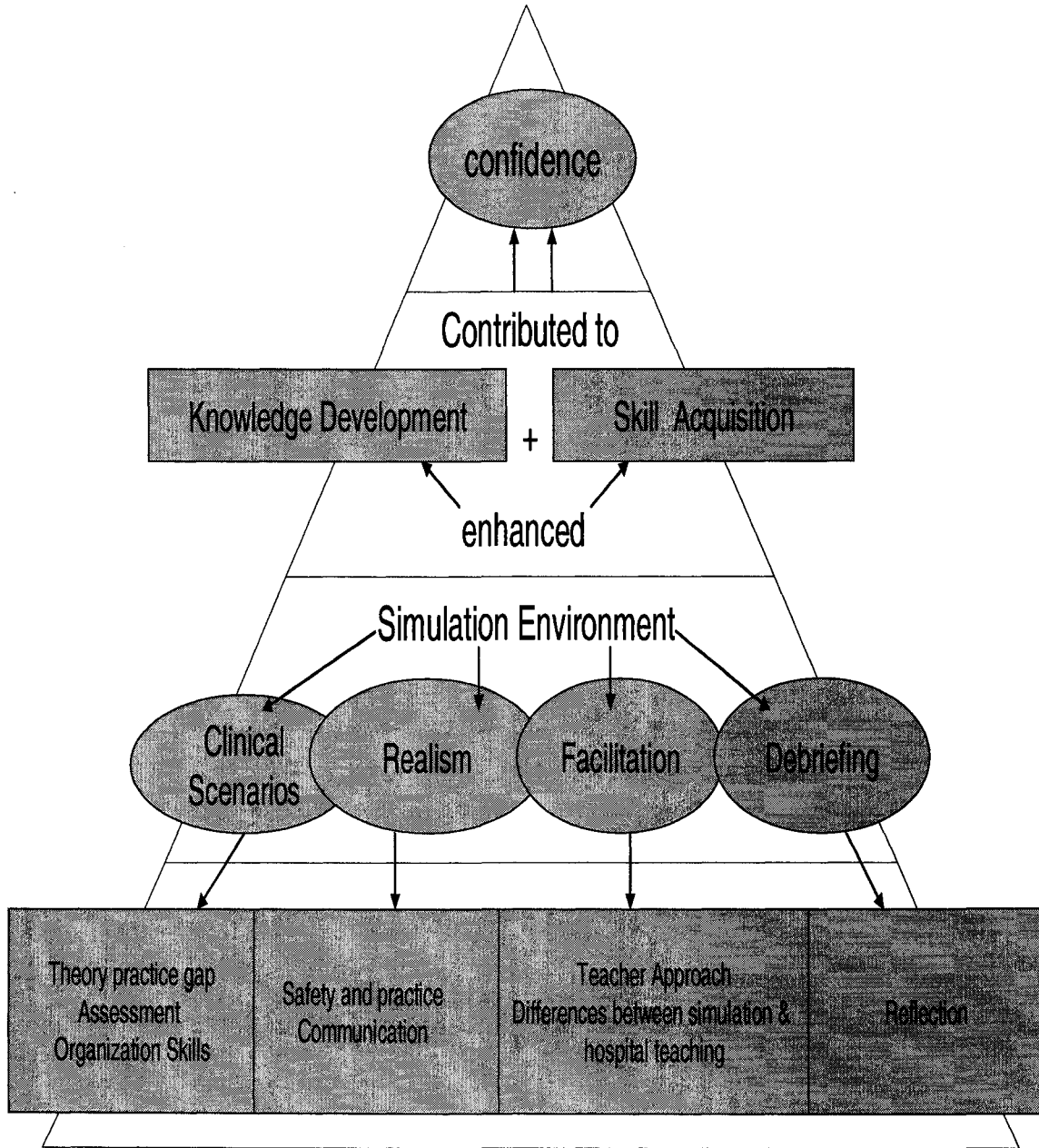


Figure 1 Confidence Development in Simulation

CHAPTER 4

FINDINGS

The research questions proposed for this study were 1) What were 3rd year baccalaureate nursing students' perception of how the simulation experience influenced their subsequent clinical learning? and 2) How do 3rd year baccalaureate nursing students perceive that their experience with HPS influenced their clinical reasoning skills? My belief was that participants would identify an improvement in their ability to clinically reason and make clinical decisions. However, the findings did not show a direct relationship between HPS and clinical reasoning; participants reported they were generally more confident when they returned to clinical practice in the hospital setting.

The following chapter will describe the participants in the study and their perceptions of the impact of simulation on their subsequent clinical learning are presented using the model developed. The influence of HPS on their clinical reasoning skills will be explored and finally, unanticipated issues raised by the students will be reported.

Participants

Five of the study participants were female and one was male. They ranged in age from 21 to 47 years. Five of the six participants had some form of post secondary education before entering nursing; one had both a college diploma and a baccalaureate degree, one had a college diploma, and three had taken college and/or university courses prior to entering nursing. Three of the participants were born outside of Canada and one had obtained a university education in her country of origin. Three of the students identified some previous experience with simulation; one in another program and two indicated that their health assessment course from year one incorporated some form of simulation.

Choosing Simulation

The participants were asked why they chose to take part in the study in order to gain some insight into the motivation of the participants and to see if this may have affected the study results. Four of the participants stated that they had participated because they believe that research is an important aspect in the development of nursing practice and that participation might enhance their own experience as nursing students. One participant stated that she decided to join the study because she did not like the hospital experience that she was in. Four of the participants indicated that they were curious about the simulation and that they liked to experience new ways of learning.

Well because it was a new experience and it was involving all the new equipment in the new simulation lab which sounded really interesting and I like things that are different. (Participant E)

When I heard about it, I was told that I would get more experience which was true. Also if I was a nurse and I needed, you know, to do research and I would want the people to help me. That was one reason but also a lot of it was because the experience, I didn't know what to expect but it was a good experience. I loved it. (Participant A)

Model

The model was developed based on the findings from the study that describe how students perceived the simulation experience. The model is represented in a pyramid structure with 4 connected but distinct levels. The participants described a number of aspects of their experience which were then coded. The first level of the pyramid represents the descriptive codes which were divided into sub-components. These sub-components were grouped into the 4 components of the second level that represented the important elements of the simulation environment. These components in turn contributed to the factors in the next level of development of knowledge and skill. These factors led eventually to the overriding theme of increased confidence. The relationship of the four interrelated components of the simulation

experience will be described in detail as they relate to the conditions that produce knowledge, skill, and confidence. In addition, the relationship between the participant responses and the research question will be examined and identified. The components are illustrated in a pyramid diagram (Figure 1, p. 33). The following section will illustrate the elements of each level of the model.

The Simulation Environment

The environment in which the simulations occurred proved to be an important part of the participants' perceptions of their experience. They were asked to identify what they liked and/or disliked, and what if any were the advantages and/or disadvantages of the simulation experience. Their responses led to the identification of 12 sub-components. Through further analysis, these subcomponents were grouped into four important inter-related components that constituted the simulation environment. Clinical scenarios incorporate the theory practice gap, assessment, and organizational skills. Realism incorporates safety and practice, and communication. Facilitation includes teacher strategies, and differences between facilitation in clinical and simulation settings. And finally, debriefing incorporates a reflective process. The diagram of the model shows connected circles to illustrate the inter-relationship of the components. The subcomponents are represented by the boxes in the first level of the pyramid.

Clinical Scenarios

The clinical scenarios (Appendix A) developed for the quasi-experimental study provided each student with an opportunity to provide care for the simulated patient while being supervised by the clinical teacher. Students were expected to complete an assessment and were able to make mistakes without being penalized. They could reflect on their performance as they debriefed by watching themselves on video at the end of each scenario. Experiencing the clinical scenarios

helped students to bridge the theory practice gap, and to develop assessment and organizational skills.

Due to the obvious safety risk of making mistakes with a live patient, the simulation experience is different from that in the hospital setting. Three of the participants indicated that the clinical scenarios in the simulation study provided unique opportunities to learn what they had not experienced in the hospital setting.

Participants noted that in the scenarios they were given the opportunity to be the primary nurse, and commented that this is not the same in the hospital setting where, as students, they frequently have to step back.

I really believe that we were given harder situations than we would have seen in the hospital. (Participant B)

They also stated that many times when critical incidents occurred with patients in hospital they were forced into the role of the observer because of lack of necessary knowledge, skill and judgment. They reported that being the observer rather than the participant creates stress for future experiences when they are on their own.

Because in the clinical experience you don't get to have a situation like the one I had experienced in the study. When they give you a case in clinical we are always placed aside as a student, we don't take part into the action of things. (Participant A)

One of the participants expressed it was the scenarios that helped with knowledge development.

We got both, you know, simulated scenarios, and I think that the bulk of the learning came from the fact that we were using scenarios...I mean the scenarios, that allows you to put it all together and the simulation part of it is good for some stuff, you know, like listening to chest sounds and bowel sounds but we could have just as easily been doing these scenarios on our peers and I think the learning situation would have been similar. (Participant C)

Theory-practice gap. Participants indicated that the simulation experience helped them to bridge the theory practice gap because it mimicked what they were learning in theory and provided them with an opportunity to practice.

It matched what we were learning in theory and we don't always get the opportunity for that in clinical. (Participant B)

Clinical practice is supposed to help students to bridge the theory practice gap but five of the six participants indicated that the opportunities do not always present themselves in the hospital clinical setting. They indicated that in the clinical setting, they are more often observers and are therefore it is more challenging to learn. The participants identified practicing the scenarios to be advantageous because it helped them to make sense of what they were learning in class.

More illness and more in depth situations like, what would you do in this situation? And there was a case of chest pain and glucose monitoring and all those things and I didn't really get to see that in the hospital. (Participant D)

Some participants felt that because of what they practiced in the simulation setting they were better prepared when the same situation occurred in the hospital setting.

There was me and my colleague, and there was a patient that was having really bad chest pain. So I got to use whatever I learned in the simulation lab at the clinical setting which was good because my clinical teacher wasn't there at the time. I recognized the symptoms and knew what to do because of what I had practiced. (Participant A)

Assessment. All of the participants expressed a greater degree of comfort in doing what they described as a head to toe assessment on a patient after practicing it a number of times in simulation scenarios. They said that this was a unique experience provided in simulation because the opportunity for a full assessment in the clinical setting is rare. Three of them stated that they did not feel that they had adequate opportunity to practice this skill in the first two years of their education.

That was a real eye opener. [The professor] started with the head to toe and whatever you learned in the first two years [that] you had missed. (Participant B)

They also felt that once they were comfortable with the technical aspects of the assessment, it helped them to focus more on the patient and communication skills. The clinical scenarios were designed to provide the students with an opportunity to assess their patients and reflect, and then assess again in a subsequent scenario. By thoroughly assessing their patients and watching their mistakes, they felt that they had become more proficient.

So in the simulation it gave me the experience to be able to develop a pattern on how to, uh, go through the whole head to toe assessment. (Participant A)

One of the participants expressed that being so comfortable with a head to toe assessment allowed for concentration on specific patient concerns, particularly pain management. "I felt comfortable to move on with my assessment and focus on the important things like knowing if they were in pain or not, just talking with them" (Participant B). One of the participants acknowledged pain as an important aspect in assessing patients that is often missed by students in clinical placements because their focus is on the task of doing a physical assessment.

The other students didn't really understand that, you know, and so when we were doing the head to toe assessment, to me, the pain was the first priority. And they wanted to continue with the head to toe assessment, and they wanted to deal with the pain later. And I understand that, no, you've gotta deal with the pain first. You have to do the basic things like take the vitals so that you know whether or not you give pain medication, but get the patient comfortable. (Participant E)

Organizational Skills. Organization as a nurse is essential; being able to prioritize patient care and to plan ahead helps to prepare for unforeseen events. Practicing the scenarios more than one time and being able to reflect on their mistakes helped the participants to develop organization skills. Four of the participants stated that they were more organized when they went back to the hospital setting.

I feel that the simulation experience did a lot to sort of help me put that all together. (Participant B)

I learned that in simulation you have to prioritize the patient's needs. (Participant A)

Realism

Realism in simulation has both positive and negative aspects. The fact that simulation is not real provided the participants with the opportunity to practice giving complex care in difficult situations in a safe environment. On the other hand, participants reported that using mannequins does not replace working with live patients. The simulation experience differed from working with the real patient because communication is an essential part of patient care. Participants indicated that, although the simulation experience was worthwhile, they were concerned about the lack of reality of using simulation instead of working with the real patient. They recognized that, because they were working with mannequins, they focused on the physical skills rather than the holistic approach to patient care.

Particularly something like nursing where it's very much an interpersonal sort of thing and you've got this robot lying there that has this constant neutral expression on its face. It is, you know, when you're assessing a patient in real life, I mean, you can see if you do something and it causes them pain. You know there's going to be facial expressions and reactions and all that sort of stuff which you don't get with the simulation. (Participant B)

I thought that it wasn't real enough at times when it came to showing expressions of his emotion, the features, it just was, I don't know, I found it difficult to just have a person, as soon as you put a voice, the one that you have in the control room it gives you a better idea of that, 'Oh it's a person that you're interacting with' and I didn't like the way the sign, the expression on the face, the eyes weren't real. (Participant A)

Safety and practice. Participants believed that the simulation experience provided a unique opportunity to practice in a safe environment. They also recognized that using the mannequins to practice the scenarios provided them with opportunities for learning that are not always available in the hospital setting. The chance to practice affords them the opportunity to make mistakes and learn from that experience. Using the mannequins in a clinical scenario is one step closer to working with the live patient than the skills laboratory. Most often students

practice their clinical skills in a laboratory setting that does not involve using high fidelity simulation.

At one point we had a patient going into shock and we had to make a decision and I don't think we would ever be at that point. I mean, if we found ourselves, then we would have to deal with it but we wouldn't be actually treating the person and calling the doctor and being in charge of that. So I think we got, what I liked about it was perhaps being exposed to situations that we wouldn't have gotten in clinical. (Participant D)

I thought it was a good way of learning because you could make a mistake without injuring anybody. It's more because you're doing it. You're seeing it. Whereas in the regular lab it's the instructor just telling you or you're just watching videos. But in the simulation lab you're actually doing it with a patient and it sticks in your head. (Participant F)

Communication. Four of the participants stressed that communication is extremely important and they felt it was difficult to emulate the lived experience using a simulator instead of a real patient. They indicated that, with a live patient, communication should be the primary focus. Participants recognized the importance of communicating with their patients as an essential aspect of the assessment that cannot be emulated with a mannequin. Two of the participants also indicated that they were more cautious in a real situation because they knew that how they responded to a patient would influence the patient's reaction and potentially health outcomes. They stressed however, that being able to practice with a mannequin allowed them to focus on communication rather than tasks with live patients.

What I found with the simulation, we were very focused on tasks and procedures and you almost forget to talk to them even though you know that someone's in the control room. You perhaps aren't doing as much teaching or perhaps as much interaction as you would with a normal person. (Participant C)

We did have a family, one of them acts as a family member and comes in and acts really worried and stuff like that, but it's not the same. (Participant B)

With a patient, the situation could vary because, depending on the patient's mood, depending on whether the patient could deteriorate and that could affect you as a nurse. (Participant E)

Facilitation

During each interview, facilitation was a key focus of discussion for the participants. Participants found a number of factors related to teaching that had a positive influence on their experience. In particular, the participants identified the teacher as being very supportive and encouraging participants to ask questions and problem solve. They felt that they were treated with respect and, because it was a non-threatening environment, were not afraid to make mistakes.

Teacher Approach. The teacher stood back and let them play out the scenario and problem solve as a team. There were a number of resources available to them in the simulation laboratory, such as medical surgical textbooks, drug guides, equipment, the teacher, and even colleagues that supported their knowledge development. During the debriefing process, the professor encouraged and allowed them to express their feelings and concerns, which contributed to their comfort with reflection. The teacher allowed the participants to take risks with their learning by letting them discover their own mistakes and explore their abilities.

I liked the fact that there was somebody. I could always see the clinical instructor. I had access to the clinical instructor all the time. I knew where she was. I could tell if she was busy. And I found that, in my clinical experience, sometimes I would be left alone, you know, for a couple of hours and I'd be struggling with something, and I didn't know where to go. (Participant F)

The resources were there, um texts, the nursing drug books were there and I just found the clinical instructor was available. It was easy to go to and get your answer you could also talk to your colleagues and see how they interpreted a situation and how they would deal with it. (Participant B)

Participants indicated that the professor knew when to step in when they needed help and when to allow them to make their own mistakes. They knew she was there if they needed her and she only intervened when the students were 'stuck' and could not move forward. They also identified that she had to intervene less and less as they progressed through subsequent scenarios.

She intervened when we were struggling, like she had a sense that we needed her. (Participant C)

Differences between simulation and hospital teaching. Five of the participants indicated that there was a difference in how the simulation experience was facilitated compared to the hospital experience. They indicated that having access to the teacher at all times helped them to learn, whereas in the clinical setting consulting the clinical teacher is not always possible because the teacher is with other students.

Because in clinical you might have a situation and you are ready to go, but there is nobody else there so you have to call a nurse and she might be busy, but it has to get done, so you let her do it. (Participant B)

Five of the participants reported that when they returned to the clinical setting they needed to prove to the clinical instructor that they were not behind because of the simulation experience.

I wanted to help out and she said, 'well you know you can never replace patients.' She was very much against the idea of simulation and said I needed to be reoriented. But I don't feel that I missed anything. (Participant A)

Three of the participants indicated that one of the positive aspects of simulation was that they were able to feel like real nurses. They were able to work through an entire scenario and in clinical they were limited by either the clinical instructor or the clinical situation.

There needs to be clarity with the clinical instructors as to what we can do and what we cannot do. We still need some support but we should be allowed to do what we were taught. (Participant C)

So to be put in the situations like dealing with shock I think that you know how to make a decision, you know, just like to see on a monitor 'Oh his blood pressure is dropping.' 'What are we going to do? Check for signs. Call the doctor, do the IV'. I don't think that we would ever get to do that in clinical on our own but I felt prepared. (Participant B)

Debriefing Experience

After each scenario, students were debriefed as a group in a separate room where they viewed and reflected on the video tapes. The debriefing process involved personal reflection on

their performance and the associated feelings. Each participant was provided the opportunity to speak and encouraged throughout the process. Following the debriefing, students participated in subsequent clinical scenarios that built on the previous experience.

Reflection. Participants stated that the debriefing process helped them to analyze their performance through guided reflection. They were encouraged to use the reflective process from the debriefing when taking part in the new scenario. Participants regarded the debriefing experience as highly beneficial to their development of knowledge. Watching themselves on video was seen as intimidating but also valuable. They articulated that being able to see their performance was more meaningful for self reflection in comparison to having a clinical teacher critique their performance.

I think it's the visualization. It stays with you. (Participant E)

Participants expressed that they felt comfortable returning to the scenarios once they had debriefed and were anxious to get a chance to improve on their performance. They expressed feeling comfortable reflecting on their performance in a non threatening environment.

When she played the tape and we watched what I'd missed and what the next person missed and then we talked about it for an hour and then we all... went over what should be included in the head to toe and I just realized oh my goodness, I missed this. I got what was important but then we talked about the importance of doing it right away and then certain situations when you have to add this into it or that and that's what made it. (Participant B)

Three of the participants found that the video taping process was intimidating and initially caused some anxiety with the whole process.

So the video tape I didn't like it but it helped me reflect on my own experience. (Participant B)

Once they were able to see that everyone was subject to the same scrutiny they said that they found it a valuable experience for personal growth.

Another advantage I found is just the whole set up. The, you know, you have an opportunity to watch your peers, and to watch yourself on the video and that sort of thing. And it's a different experience watching yourself on the video than being there, you know, doing it. And so it helps you better reflect on, you know, how you could have done things better. (Participant E)

Knowledge Development and Skill Acquisition

The participants identified that the components of the simulation experience contributed to an increase in knowledge and skill acquisition. They believed that the changes were demonstrated when they returned to the clinical environment. They felt that they had increased their knowledge, had better organization skills, and an ability to bridge the gap between theory and practice. Overall the perception was that they had a sense of being prepared, felt comfort with doing assessments, and had a greater ability to ask questions.

I felt I was probably ahead of the other students [in the hospital clinical group]. (Participant D)

I had gained an advantage over them in that I had learned something different. (Participant F)

The critical factor in skill acquisition which contributed to increased confidence was the development of physical assessment skills. All of the participants emphasized that the focus on assessments was particularly valuable for their level of comfort when returning to the clinical setting. Becoming more proficient at doing assessments provided them with the ability to prioritize and be more organized.

I just knew what to do, it was like wow, I can do this and really focus in on what is important like managing a patient's pain. (Participant C)

Well at the beginning the whole idea of doing a head to toe assessment was, I don't think it was really reinforced enough. So that was one that I really got out of the experience, doing the head to toe. (Participant C)

I knew how to prioritize care after the experience. (Participant D)

It was nice in simulation to be the decision maker without consultation. You realize that you have power and knowledge. (Participant B)

Confidence

Confidence was the main theme identified through the analysis. Overall, the participants expressed that they were more prepared for clinical practice, and that they had greater knowledge and skills, leading to increased clinical confidence. Participant F believed that they “learned more than the students who had not participated in the study.” Four of the participants directly stated that they were more confident after participating in the simulation.

Participants were asked to summarize the overall influence of the simulation experience on their clinical practicum. The simulation experience provided participants with more confidence when they went back to the hospital setting. In most cases, students described feeling more prepared, or more comfortable taking some risks and asking more questions. They also described being comfortable with their knowledge base and organizational and assessment abilities.

I felt okay the first day back. I had to reorient myself a little bit, but then I felt that my skills and everything else that I knew was just about the same as everybody else and I didn't think that I had missed anything really. Yeah, it was a confidence thing. I felt way better after the study. (Participant B)

What I really liked about it was that you were able to make decisions [in simulations] with more confidence perhaps than in the clinical settings because you knew it was a mannequin. And I really feel like I was getting the hang of it and I think that I feel that the simulation experience did a lot to sort of help me put it all together. (Participant A)

One of the participants expressed confidence even though he/she received a negative response from the clinical teacher upon returning to the hospital clinical setting.

My instructor made it difficult for me to get back and was waiting for me to do something wrong. I felt so nervous, I could not sleep and went home crying after 2 shifts. I had to figure out why. My boyfriend noticed the change. I pulled myself together and asked to speak to her. It was a huge step to tell her how I felt. She said she needed to

evaluate me and see how I was doing and told me to talk to her anytime. It was a huge step. (Participant C)

Participants indicated that because they had greater knowledge, they were more comfortable in critical situations. Two participants indicated that they were confident in handling crisis situations because of what they had learned in simulation.

The other student [hospital clinical group] did not know what to do [client with chest pain] ...After that experience I felt better about my abilities. (Participant A)

Clinical Reasoning

One purpose of one of my research was to see if nursing students perceived that simulation influenced their ability to use clinical reasoning. Participants were asked to identify what clinical reasoning meant to them and then were asked to identify a clinical decision that they might have had to make after the simulation experience. Although participants had some difficulty in defining clinical reasoning, they were all able to articulate that it involved a thinking process.

Clinical reasoning, it's about, I think, looking at things and the consequences and actions. (Participant A)

Clinical reasoning I think it's sort of determining what priorities or patient needs come first, and I guess it is having the knowledge to know what is acceptable and what's not, the patient needs being a priority. (Participant D)

My understanding of clinical reasoning is taking the information that you have in the clinical environment including your assessment data and information from charts and understanding what's going on. (Participant C)

Participants did not indicate that the simulation experience influenced their ability to think differently in clinical practice; however, two participants indicated that the simulation experience supported clinical reasoning and decision making.

What I really liked about it is that you were able to make decisions probably with more confidence perhaps than in the clinical setting. (Participant B)

Decision Making in Clinical Practice

Participants found it difficult to articulate making clinical decisions without some prompting from me as to what constitutes a decision. All of the decisions they described required a degree of confidence in order for them to make the decision. Two examples that reflect this involved challenging a member of the health care team. In one instance, the participant had to tell a member of the health care team that he/she should be following universal precautions. The student found this experience to be very uncomfortable because she/he was “a student” and the health care worker had a lot more experience than she did. In the other instance the participant challenged both the clinical teacher and the nurse regarding a patient’s care.

But my patient needed a heparin injection at 1000 and I hadn’t done one before and I really wanted to do it and I talked to the clinical teacher and she said, “Yup, however you know we’re going to do it together” and I said, “Great” and then she was busy and I was waiting and waiting and... it was 1045. So I decided to tell the primary nurse the situation so she went ahead and gave it. I think before I would have waited around for maybe the clinical teacher and maybe interrupted her more because I would’ve asked her what to do about this. (Participant B)

One participant reflected on his/her ability to manage a stressful situation because the students were prepared through the scenarios in simulation.

I would have to say that the patient with chest pain (in clinical) was the hardest one because my instructor wasn’t there, and it was life and death. (Participant E)

Focus Group Discussion

The focus group discussion took place approximately ten months after the individual interviews. At that point participants were in fourth year and had participated in a fourth year simulation laboratory experience. During the focus group discussion, participants all agreed that the experience in the simulation study was valuable and that they felt more confident returning to the clinical setting after having spent time in the simulation laboratory. Participants had some reflections on how the study had influenced their practice in fourth year and reflected on the

differences between the simulation strategies in the study and their subsequent experience with simulation. They also provided valuable feedback for future studies using simulation. They believed that the simulation experience allowed them to be autonomous.

More self directed and empowered. (Participant D)

You learned because you wanted to know more. (Participant B)

One of the participants indicated that the simulation experience provided more confidence to speak up about an issue relating to patient care when a nurse was rude.

I stood up for myself with a nasty nurse in front of a full nursing station, face-to-face. I didn't back down because I believed that I was correct. My friend said I should just have shut up and backed off but I said, "No it was a pain issue". (Participant A)

Comparison of the Study with the Simulation Laboratories in Fourth Year

After participating in a subsequent simulation experience, the students were eager to discuss the differences between the two experiences. The second experience took place during the fall semester of their fourth year, when simulation was introduced as part of the curriculum. The experience was set up similar to the skills laboratory and the focus is on technical skills. It was not scenario based, and there was no video-taping or debriefing involved. There were at least 12 students per group, which meant that not all students participated actively in the experience.

Twelve students in a lab group were too many. The Sim wasn't working, and the teachers didn't know the technology either. (Participant C)

Most of the instructors in the fourth year laboratory were unfamiliar with teaching in a simulation environment, and were not provided with detailed instructions on how best to use the equipment. The comments of the participants reflect how particular components of the simulation study influenced their confidence levels. The components that were considered to be

of the greatest value included: group size, faculty technology training, clinical scenario development, facilitation, and the debriefing and reflection process.

Participants indicated that the group size was too big for each student to play a role in the simulation.

Sometimes you were just on the outside observing, and you couldn't always see what was going on, like you were not part of it. (Participant A)

Participants expressed that the teachers in the fourth year simulation experience did not appear to be comfortable with the equipment, which made the process seem disorganized.

They just didn't seem to be all that comfortable with what they were doing, like it was the first time for all of them. (Participant C)

They also expressed that teachers were directing them too much and not allowing them to be autonomous. There were no debriefing sessions provided at the end of their experience. They also stated that the fourth year simulation laboratories did not involve the use of clinical scenarios but instead they were just practicing skills.

In the study it was very well done, scenarios could actually help us to use our skills. In lab [fourth year laboratory] we didn't have scenarios. (Participant F)

It was just a better experience for learning, I got more out of the first one [simulation study]. I mean I left feeling confident [after the simulation study], and with the second I left feeling confused [in 4th year simulation laboratory]. (Participant D)

The simulation laboratories were fairly new to Algonquin College and not all of the educators were familiar with the use of the equipment. This was the first time that the laboratories were set up to fully integrate simulation into all of the laboratories and include the entire group of students. Participants identified differences in the way these simulation sessions were facilitated. They expressed concern that educators need to fully understand and appreciate the value of using simulation to augment clinical practice. According to the participants the facilitator can enhance or inhibit their learning potential.

Train the trainers is number one. (Participant B)

I had more comfort than the instructor in the technology, every one lost focus, felt it was pointless too. In lab we didn't do what we did in the study. We lost time because the instructor wasn't familiar with the equipment. (Participant D)

Key Points for Future Simulation Use

Participants indicated that there were a number of important factors about the way the simulation study was conducted that helped them to learn and to feel more confident. They believed that working in small groups provided them with opportunities to play a number of different roles to enhance their knowledge and develop confidence. They reported that the focus on one system or physical skill neither enhances their overall knowledge base nor helps prepare them for the clinical environment. Participants indicated that all of the factors together, clinical scenarios, realism, facilitation, and debriefing that were present in the study, were critical to preparing them for clinical placement practice.

CHAPTER 5

DISCUSSION

In the following chapter, the findings of the study will be discussed in relation to relevant research on simulation and clinical reasoning. The relationship between simulation and clinical reasoning will also be explored. The major concepts identified in the model will be addressed, including the four components of the simulation environment. Implications for nurse educators and future research related to the use of simulation will be explored.

One of the study questions explored the relationship between clinical reasoning and simulation. My study participants did not indicate a connection between the two concepts, perhaps because they are not taught to recognize when they are using clinical reasoning. Their descriptions of the simulation experience did, however reflect factors that led me to believe they were developing clinical reasoning skills. This conclusion is supported in the literature on simulation and on clinical reasoning (Lasater, 2007; McCausland et al., 2004; Nehring & Lashley, 2004; Seropian et al., 2004). A direct relationship can also be made between confidence levels and the ability to make clinical decisions (White, 2003).

Confidence, Clinical Reasoning, and Simulation

Although students in my study did not report a direct link between simulation and clinical reasoning, other research does indicate that the implementation of simulation scenarios throughout nursing curricula enhances student confidence in making health care decisions (Jeffries, 2005, Nehring et al., 2004, Reilly & Spratt, 2007, Rhodes & Curran, 2005; Schoening, 2006). Clinical decision making requires a certain degree of confidence (Kissinger, 1998). There is evidence that confidence levels are directly related to increased knowledge and improved clinical reasoning in clinical practice (Copeland, 1990; Grundy, 1993; Seldomridge, 1997).

The students in my study clearly stated that after their simulation experience their confidence in clinical practice was higher when they returned to their clinical placement. Several other researchers have found similar results. Aronson et al. (1997) found that student feedback on the incorporation of simulation laboratories was increased student confidence because the experience opportunities for cognitive rehearsal in decision making. Lasater's (2007) also found that students reported increased confidence in their clinical judgment skills. Students had higher levels of confidence with decision making after participating in a midwifery simulation experience (Cioffi et al. 2005).

Video taping the experience was influential in developing confidence. Students identified that video-tapes and reflective journaling helped them to critically reflect and gain confidence in order to make good clinical decisions (Haffer & Raingruber, 1998). Del-Bueno (1983) observed that nurse's knowledge of content and theory does not necessarily translate into clinical decisions at the bedside. She recommended that clinical judgment should be taught using a variety of modalities such as experiential, simulated, and hypothetical methods. Schank (1990) believes that clinical judgment is strengthened through the use of teaching methods that focus on application, analysis, synthesis, and evaluation while allowing the learner to practice essential skills in an active way.

A number of studies reported increased confidence with specific tasks. Bremner, Aduddell, Bennett, and VanGeest (2006) found that first year nursing students gained confidence in doing head to toe assessments after using HPS. Similarly, in Goldenberg, Andrusyszyn, and Iwasiw's (2005) study, students reported increased confidence with health teaching after participating in a simulated health teaching experience. In Bearnson and Wiker's (2005) qualitative descriptive study, students reported higher levels of confidence with medication

administration after a simulation experience. Schoening et al. (2006) found that students were more confident in clinical practice after participating in a pre-term labor simulation laboratory. These findings concur with what my study participants report regarding skill development, particularly in relation to physical assessments.

Not all studies have found that confidence levels improved after using simulation, particularly in the case of advanced life support skills for clinical situations that are life threatening (Alinier et al., 2004; Feingold et al., 2004). The contradiction between these findings and those in this study may rest in the difference in the nature of the skills required in the simulation. Students in crisis situations are not as likely to feel confident compared to students in situations involving more stable conditions. The crisis situations are also too complex for beginning students.

Relationship between Simulation and Clinical Reasoning

Clinical scenarios, realism, facilitation, and debriefing are components within the simulation environment inherent in developing clinical reasoning skills (Comer, 2005; Kautz et al., 2005; Van der Vleuten & Newble, 1995). The relationship of the four components to research on the development of clinical reasoning will be discussed.

Clinical Scenarios

The clinical scenarios in the simulation study were developed to match what students were learning in their nursing theory course. The question of the theory-practice gap has been debated for a long time in nursing practice and it continues to pose a problem for nursing students today (Corlett, 2000; Ehrenberg & Haggblom, 2007; Freeth & Fry, 2005; Ousey & Gallagher, 2007). Clinical practicum is supposed to bridge the gap between theory and practice but the clinical environment provides fewer opportunities for this, given the complexity of care

and diminished availability of placements (Billings & Kowalski, 2006; Hewison & Wildman, 1996; Landers, 2000). Students have expressed that there is too large a leap from the skills laboratory to the clinical setting (Poorman, Webb, & Mastorovich, 2002). The simulation laboratory provided students with an opportunity to bridge the theory-practice gap by practicing clinical situations that reflect what they have learned in theory. This finding has been supported by other research on simulation (Bremner et al., 2006; Freeth & Fry, 2005; Lasater, 2007; McCallum, 2007).

The clinical scenarios offered students the opportunity to practice their assessment and organizational skills which helped prepare them to deal with the current level of acuity and complexity in the hospital clinical setting. Being able to work through a clinical scenario is the necessary step in between the skills laboratory and the clinical setting that leads to competency in clinical decision making (Decker, Sportsman, Puetz, & Billings, 2008).

Realism

The second component of the simulation environment is realism, which includes both benefits and limitations. All of the study participants expressed that the mannequin was not realistic enough to completely replace a patient, but it offers the opportunity to practice skills to a level of proficiency that allows them to focus on communication at the bedside. Simulation cannot replace working with live patients but it does mimic reality, providing an environment to practice skills and rehearse clinical situations, including making clinical decisions, without risk (Brandt-Baldwin, 2007; Bremner et al., 2006; Henneman & Cunningham, 2005; McCallum, 2007; Reilly & Spratt, 2007; Rhodes & Curran, 2005; Schoening et al., 2006). Giving students the opportunity to focus on psychomotor skills in the simulation environment helped them to gain a degree comfort so that, in the hospital environment, they were able to focus on the psychosocial

needs of their patients. Because the simulation experience allowed my study participants to feel like “a real nurse,” it built their confidence to be part of the health care team (Papp et al., 2003; Poorman et al., 2002). The simulation environment allows for cognitive rehearsal, repetition, and improvement that can produce better results in the real setting.

There is an emotional connection when working in simulated situations that mimics real life and enhances students’ cognitive abilities; this cannot be matched in a skills laboratory (Friedrich, 2002). My study participants reported that, although the mannequins were not the same as a live patient, the scenarios were realistic in helping them feel more connected to the experience and prepared for the real patient. Students are able to place themselves in the situation if it emulates reality and it incorporates all aspects of care such as communication and assessment. The reality of the simulation environment includes playing the role of the nurse instead of the student nurse as occurs in the clinical environment, and therefore making more complex decisions. This learning opportunity may help to socialize nursing students into the profession. In addition, students are more likely to think critically because the simulation experience makes them feel as if they are caring for a real patient (Schoening et al., 2006).

Facilitation of the Simulation Experience

The ways in which educators facilitate the learning process for nursing students can be instrumental to achieving the learning outcomes and development of clinical reasoning. The cognitive process involved in clinical reasoning needs to be fostered and will probably develop more effectively if students feel less anxious (Lasater, 2007; Seldomridge, 1997). Clinical teachers who are seen as supportive help to alleviate student stress, promote autonomy and build confidence (Bradbury-Jones, Sambrook, & Irvine, 2007; Freeth & Fry, 2005; Gillespie, 2002).

The facilitator for the simulation study was widely seen by participants as critical to their knowledge development. Comments such as “she knew when to stand back and when to intervene” and “she allowed us to make mistakes and learn from them” indicate that she allowed students to be self-directed. Once the participants were comfortable with the simulation process the teacher only intervened when requested or when students did not recognize their mistakes. When students are able to discuss clinical scenarios openly without the fear of reprisal, educators are able to assess student clinical reasoning abilities and guide students (Banning, 2008). By encouraging them to ask questions and to think out loud, she was allowing the students the freedom to make mistakes and learn from them, so that from the experience, they can develop or enhance their clinical reasoning skills.

Debriefing

The debriefing experience offered a unique way for students to critically analyze their own performance through guided reflection. The value of this approach was demonstrated by the students’ reports of their experience with the debriefing. Debriefing and reflection have been recognized in other research to be crucial elements for success in simulation education because the process supports the development of clinical reasoning (Childs & Sepples, 2006; Jeffries, 2005; Lasater, 2007; Rhodes & Curran, 2005; Rudolph, Simon, Dufresne, & Raemar, 2006; Savoldelli et al., 2006). Debriefing teaches reflection (Henneman & Cunningham, 2005; McCausland et al., 2004; Roberts, White, & Fitzpatrick, 1992; Savoldelli et al., 2006). Research has identified that debriefing supports reflective practice and therefore, enhances clinical reasoning (Seropian et al., 2004). Reflection has been identified as a means of improving clinical reasoning (Lasater, 2007).

Reflection is the process of looking back on an experience, evaluating its relationship with current meaning, creating new ideas, and linking current experiences with existing schemata (Hermann, 2006; Schon, 1988). Reflective practice is recognized as a means by which higher order thinking is developed (Kuiper & Pesut, 2004; Teekman, 2000). Rhodes and Curran (2005) suggest that judgment skills necessary for decision making are developed during the debriefing process. Participants returned to subsequent simulation scenarios after debriefing and reflected on their performance, which provided them with the opportunity to explore and build on what they had learned.

Reflection and reflective practice are said to be beneficial for nursing education because they help to link theory and practice, promote clinical reasoning, and lead to self awareness and empowerment (Cotton, 2001; Jensen & Givens, 1999; Mountford & Rogers, 1996). Reflection on action means reflecting about an experience after it has happened and reflection in action is reflecting while you are participating in the experience (Mountford & Rogers, 1996). Schon (1988) explored the concept of reflection on action as thinking back on an experience “to discover how our knowing-in-action may have contributed to an unexpected outcome” (p. 26). Group debriefing such as that experienced by the respondents has been recognized by some researchers as an effective tool to reflect on action (Mountford & Rogers, 1996; Murphy, 2004). However, debriefing in clinical settings usually takes the form of a post conference. The usual style of post conference debriefing is not open to critical inquiry because of the nature of the environment, which diminishes the potential for theory building (Ranse & Grealish, 2007). It is generally at the end of the day, is teacher driven, and does not encourage or enhance reflection (Copeland, 1990). Students who are provided with the cognitive tools, such as those provided in

the simulation environment, may be able to translate their learning into the clinical environment to reflect in a post conference.

Although there is limited evidence in the literature to indicate that video-taping provides the best form of debriefing (Savoldelli et al., 2006), viewing one's performance first hand may provide a more sustained effect than a critical appraisal from someone else. Video-taping may also be beneficial for critical reflection because the tapes can be viewed several times (Rhodes & Curran, 2005). Student participants were able to view themselves, reflect, go back to subsequent scenarios, and incorporate what they had just learned.

Another difference and benefit of the simulation experience and debriefing, compared to the clinical setting, is that students are able to return to clinical scenarios to reflect in action, which enhances their clinical reasoning skills (Lasater, 2007). The approach employed by the simulation professor of stepping back and allowing the students to discover their mistakes during the clinical scenarios and debriefing, also supports reflection in action because it teaches them how to employ the process (Kuiper & Pesut, 2004; Lee & Hutchison, 1998; Mountford & Rogers, 1996).

Thus, the components of the simulation experience described by the participants in this study combine to promote the development of the necessary skills for making sound clinical decisions. The fact that students could not articulate or appreciate that they were, in fact, gaining abilities for clinical reasoning may indicate that teachers have to help students to develop conscious awareness of their thought processes.

Perspectives on Future Simulation Use in Nursing Education

A number of factors emerged from my study that did not directly relate to the research questions but that give insight into the students' perception of factors that enhance or hinder the

simulation experience for students and can inform future nursing education practice. During the focus group, a discussion took place about the different experiences students had when they participated in another simulation experience after the study. Participants preferred the simulation experience in the study because the group sizes were smaller, the teacher was comfortable with the equipment, the scenarios required more than psychomotor skills, and facilitation and debriefing required reflection by participants on their own performance.

Implications for Nursing Education Practice

The initial focus of my study was to ascertain if there was a connection between clinical reasoning and simulation. During both the individual interviews and in particular, the focus group, it became evident that many other factors mentioned by the participants are significant for nurse educators. Alinier et al. (2004) suggest that while simulation may be beneficial for nursing education it is only a tool and requires detailed development to be effective. It would appear that the four components within the simulation environment must be well developed in order to create a learning atmosphere conducive to enhancing confidence and clinical reasoning skills. These elements include: group size, faculty technological training, clinical scenario development, facilitation, and debriefing and reflection.

Group size. The group size was identified by the participants as influential for knowledge and skill development. The group sizes in the study were smaller and more effective because all members of the group were able to participate and each had a role to play. The group size should be small enough for all participants to take primary responsibility for providing nursing care (Childs & Sepples, 2006). Researchers have identified one of the barriers to using simulation is that not all students can use the equipment simultaneously (Feingold et al., 2004; Nehring et al., 2001; Nehring & Lashley, 2004). A number of researchers have suggested that all students

should be able to have an active role in the scenario to make the experience inclusive and realistic (Jeffries, 2005). It is not always feasible to have small groups in the laboratory setting, considering the volume of students, time and space, cost and availability of professors to teach. However, if simulation is included as part of the clinical experience, with the clinical teachers as facilitators then group sizes can be smaller because the clinical groups are smaller than those normally assigned to laboratories. There is also a variety of ways in which students can be used in the simulation scenario so that all students have an opportunity to participate (Jeffries, 2005). In particular, if scenarios are repeated and knowledge is built on, then students can play different roles as they take part in repetitions of the scenario. There are a variety of ways in which students may participate in the simulation experience to feel actively involved and therefore benefit. For example; each student can participate as the primary nurse, reporting nurse, family member, physician, or various other members of the health care team.

Faculty technology training. Participants indicated that, because faculty members were not familiar with the equipment or the process, a variety of problems occurred during their second simulation experience that impacted their learning. Research identifies that faculty comfort and buy-in with simulation has a great impact on learning outcomes (Alinier et al., 2004; Jeffries, 2005; King, Moseley, Hindenlang, & Kuritz, 2008; Nehring & Lashley, 2004; Starkweather & Kardong-Edgren, 2008). Simulation is a novel and unique approach for clinical education and therefore, support must be provided to both faculty and students to learn how to best facilitate the process (Starkweather & Kardong-Edgren, 2008). Managing the technology side of simulation needs to be supported by technicians and faculty who are comfortable with both the equipment and nursing. Staff training and support is required prior to and throughout the

simulation experience so that teachers can focus on helping students to learn as opposed to ensuring that the equipment is always working (Jeffries, 2005; King et al., 2008).

Clinical scenario development. The simulation environment can play a role in helping to bridge the theory practice gap by providing opportunities for students to practice what they have learned using clinical scenarios. Students identified that using scenarios that were realistic and closely linked to what they were learning in theory had a significant impact on their learning. They indicated that simulation was less effective to them when the focus was purely on skill development as opposed to using realistic clinical scenarios in which they may play a number of roles. Scenarios should be realistic, coordinated with theory, and inclusive so that students can play out the role of the nurse and or other members of the health care team. Leveling the scenarios is also beneficial for knowledge development (Cleave-Hogg & Morgan, 2002; Medley & Horne, 2005). Once students have completed scenarios and have been given the opportunity to reflect, they are able to apply that knowledge to the same scenario with increased complexity. The more realistic the scenario, the more likely students are to participate and be fully engaged in the experience (Cleave-Hogg & Morgan, 2002; Lasater, 2007; Wilson, Shepherd, Kelly & Pitzner, 2005).

Facilitation. Nursing professors have a significant role in either enhancing or hindering learning (Kushnir, 1986). Students reflected in the individual interviews and focus groups that the way the simulation experience was facilitated had an influence on their learning. They felt comfortable during the simulation study and felt free to explore and make mistakes. The teaching approach used by the facilitator, by allowing students to identify their own mistakes and only intervening when an essential concept was missed, can be empowering (Campbell, 2003). In the participants' subsequent experience they did not find that the professors provided the same

opportunities for learning. Because professors were less experienced with using the simulation equipment it may have influenced the way in which they participated in the simulation laboratory and thus, hindering learning for the students (King et al., 2008).

Debriefing and reflection. Students stated that the debriefing experience in the simulation study was a positive influence on their knowledge development. They found that the professor supported them and allowed them to express their feelings, which encourages students to explore learning in a non-threatening or critical manner (Cook, 2005; Henneman & Cunningham, 2005). She intervened only when the students missed something critical in their appraisal of the assessment. In the focus group discussion, students indicated that they did not debrief during their subsequent simulation experience, nor were they able to see their performance as it was not video-taped. Debriefing is a critical element in knowledge development in the simulation process (Comer, 2005; Jeffries, 2005; Kuiper et al., 2008; Lasater, 2007; Rhodes & Curran, 2005). There are two components involved in the debriefing experience that enhance knowledge development, the video-taping and the facilitation. Video-taping appears to be critical element in self reflection as it provides the unique opportunity to view the experience first-hand (Larew et al., 2006; Lasater, 2007). Teachers should use the facilitative skills of stepping back, allowing students to make mistakes and intervening only when students have missed a critical step that would hinder their learning. They also need to frame the debriefing sessions to provide opportunities to learn the skills of reflective practice in a non-threatening environment.

Implications for Future Research

Confidence was the predominant theme derived from my study but there are a number of relevant concerns about simulation raised by this finding that should be explored further. Specifically, it would be beneficial to explore the relevance of confidence to student learning and

its impact for students' practice and clinical reasoning in the clinical environment. Clinical teachers should be part of the evaluation and research process. Some concerns have been raised (Kissinger, 1998) that, while students may feel confident, there is a risk that students are actually overconfident, which can lead to deleterious outcomes from poor judgment. Students' perceptions of confidence may not, in fact, indicate the development of clinical reasoning skills. Because of the safety of simulation experiences, student confidence may be misplaced and an overconfident student might put real patients at risk because of lack of insight into the limitations of their knowledge or experience. The benefit of confidence, in particular to clinical reasoning skills, needs to be assessed prior to and following a simulation experience. Clinical educators' perceptions of students' confidence levels and clinical reasoning as it relates to clinical practice should also be examined.

Evaluations of decision making pre and post simulation should also be examined as the outcome of the clinical reasoning process. In particular, having students identify their thinking out-loud during the scenarios could be a method to identify if they are, in fact, using the process of clinical reasoning and at what levels. Clinical decision making could also be measured using a clinical decision making tool to assess the outcome of clinical reasoning during the simulation experience or as assessed by clinical teachers in the hospital setting.

Given the changing climate in hospitals and the scarcity of clinical placements, we need to look for alternative ways to provide practice experiences. Educational facilities establish the number of clinical hours required within a nursing curriculum without clear evidence to support the number of hours required to be competent to practice. Perhaps it is not the number of hours spent in hospitals that leads to clinical confidence and competence, but instead, it is how the hours are used. If students are provided with opportunities to rehearse in the simulation

laboratory and are more prepared to meet the demands of a stressful clinical environment, then the length of time required in that setting to achieve the same outcomes may be reduced.

Limitations

The sample may have been biased because students had to have a certain degree of confidence to take the risk of substituting simulation for the hospital clinical experience. Because five of the participants had some form of post-secondary education prior to entering nursing they may have been more confident to begin with. The results of the study may also reflect the learning preferences of the participants. Their volunteering for the study suggests that they are comfortable in different learning environments and may have already been confident prior to participating in the study. Also, five of the six participants had attended a post-secondary program prior to the nursing program. They may have already developed reasoning skills and confidence because of previous educational experience.

There is also a risk that peer pressure within the group might also have influenced the discussion in the focus group (Kitzinger, 1995). The absence of one participant from the focus group may also have affected the discussion. However because saturation was reached, this would not have been a likely outcome. Participants may also have felt the need to please me because of my previous relationship as their nursing professor. Students were reassured that the information would not be shared with other professors and that they were not being evaluated by me.

Constant comparative analysis occurs with each interview in order for the researcher to modify questions for subsequent interviews. Every attempt was made with the participants so that there would be time between each to support reflection. Participants had limited availability making it difficult to space out each interview and as a consequence four of them took place in

rapid succession. Although the time between interviews did not allow for detailed analysis and revision, field notes were maintained which provided me with ideas on how I would modify questions for subsequent interviews.

Summary

Although the use of simulation laboratories is fairly novel in nursing education, it is a growing trend that can offer alternative ways to provide and improve clinical practice. Simulation laboratories can be used to help educators prepare students for the complexities of clinical environments. Simulation can be implemented as a means to facilitate reflection and to develop clinical reasoning skills. Practicing technical skills using clinical scenarios also provides opportunities for students to rehearse clinical interventions in the context of complex patient situations without the risk of harm to patients. Creating a positive learning environment that reflects the four elements identified in this study as important can improve simulation experiences for students.

Each new clinical placement requires that students practice new skills. Nursing students who are unsure in new clinical learning environments may benefit from the confidence building that comes from participating in scenarios in the safer environment of simulation learning. The results of this study provide insight into the student experience with simulation and can inform nursing education practice in the future. It is also important to note that, while simulation may be most effective with the current technologically inclined student (Starkweather & Kardong-Edgren, 2008), it may not be appropriate for all types of learners and should be used in conjunction with other teaching modalities.

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APPENDICES

Appendix A

Scenario Development of Pilot simulation study by Michelle Morley (2007), permission to use descriptions obtained by Michelle Morley

Simulation Intervention Scenarios

Scenario	Description of Scenario
Scenario 1	Post-operative assessment of a stable patient
Scenario 2	Surgical patient experiencing pain
Scenario 3	Surgical patient experiencing hypovolemia
Scenario 4	Diabetic patient requiring medication and teaching
Scenario 5	Diabetic patient with hypoglycemia
Scenario 6	Medical patient with heart failure experiencing dyspnea
Scenario 7	Medical patient with heart failure experiencing angina

Simulation Days: October 25 and 26, Nov 1 and 2 from 8-2
Working in Groups of 5 students per patient

Day 1	
8-930	Orientation to Simulation Expectations Interact with Equipment Introduction to the roles
930-945	Break
945-1130	Regular Post operative assessment-head to toe of a stable client Includes medication calculations IV monitoring
1130-1200	Lunch
1200-200	Debriefing Includes video analysis of group Includes concept mapping of key points

Orientation Day

1. Introduction to lab

- will meet on Oct 22 in front of B257 (might move to new lab)
- will be in B257 or new lab depending on functionality of equipment
- 2 simulators for 5 students each
- will run from 8-2 (6 hours per day)
- introduce each other (? Why did they want to participate in this experience?)

2. Dress code

- uniform, name tag, stethoscope

3. Expectations

- What do they expect from the sim labs over the next 4 days? Do they have any specific needs? (If they do I can make some last minute changes to the scenarios as needed. This may become evident after the first day)
- professional
- participation with simulator and debriefing, group work, confidentiality, role playing, respect for each other
- transferability to clinical environment-we cannot cover every clinical event; however we want them to have knowledge, judgment and skills that they can use in future clinical situations
- the professor will facilitate the session. She will direct you to any resources and answer questions as needed (will point students in the right direction for information)

4. Scenarios

- students will be given the patient's chart and a brief scenario
- they are expected to act as they would on their clinical unit
- students will be expected to prepare the night before (ex. The teacher can give the students the chart and care plan of the client the day before so they can look up necessary information, will provide text books, CPS, drug books)
- the scenarios will involve patients with low levels of uncertainty in the morning and higher levels of uncertainty in the afternoon
- each student will be expected to participate in certain roles -ex. 2 students are the nurse, 1 student is the patient, 1 student is the observer, 1 student is the doctor

5. Debriefing

- will view the video of the students' participation
- each group will be taped (only tape one group per session and then switch)
- while the video is being viewed the students will create an individual concept map, based on the scenario
- the students have experience in year 2 and 3 with concept mapping/brainstorming related to problem based learning. This will be slightly different, because the students are solving the problem first and then debriefing the scenario.
- the purpose of the debriefing is for the students to reflect on the group's strengths, and areas for improvement. They will need to analyze gaps in knowledge and how they will discover this knowledge

6. Concept map example with questions

1. What are your strengths? (can include knowledge, skills, critical thinking, self-confidence)
2. What are your knowledge gaps/areas for improvement?

3. What was unique about this situation that could help you in the future? How can this knowledge help you in the future?
4. What did you learn that could help you make a decision in the future? (satisfaction with learning)

7. Orientation to the Equipment

- all students will need to check BP, listen to the simulator, become comfortable with the control room and speaking into the microphone as if the client
- the students will be responsible for recording the session (will need instructions on how to record and listen and speak into the microphone)
- Dave is looking into having the ability to speak with 2 sim men at the same time
- med carts, equipment
- students will have a loose script with cues
- doctor will have set script with cues

Day 2	
8-930	Scenario 1 Surgical Patient-Pain
930-1100	Debriefing
1100-1145	Lunch
1145-1245	Scenario 2 Surgical Patient-Hypovolemia
1245-200	Debriefing

Day 3	
8-930	Scenario 1 Medical Patient-regular diabetic administration of meds and teaching
930-1100	Debriefing
1100-1145	Lunch
1145-1245	Scenario 2 Medical Patient-diabetic hypoglycemia
1245-200	Debriefing

Day 4	
8-930	Scenario 1 Medical Patient-CHF
930-1100	Debriefing
1100-1145	Lunch
1145-1245	Scenario 2 Medical Patient-SOB, crackles worsen
1245-200	Debriefing

Example of a Simulation Scenario with Scripts/Guidelines for Each Group Member

Simulation Scenario-Post Operative Patient with Total Knee Replacement

Objectives

- Assess a post operative client**
- Apply theoretical knowledge to provide safe post operative client care**
- Prioritize care for a post operative client**
- Collect data from all relevant sources**
- Select appropriate nursing interventions for a post operative client**
- Anticipate a post operative client's needs**
- Evaluate patient outcomes**
- Demonstrates appropriate decision making skills**
- Provide support for family members of a post operative client**
- Collaborate with members of the health care team**
- Document and communicate relevant information**
- Identify learning needs**
- Modifies performance based on self-evaluation, peer evaluation and teacher evaluation**

Student Preparation

Students should have knowledge of post operative client care, specifically related to a total knee replacement (TKR). Students should understand the pathophysiology of osteoarthritis. Students should be able to complete a head to toe assessment, apply the nursing process, know principles medication administration, IV therapy, Patient Controlled Analgesia (PCA), patient teaching and communication. Students should understand how to document patient care and find relevant information in the client's chart.

Roles and Responsibilities of Group Members

- Student Nurse 1**-care for the patient
- Student Nurse 2**-care for the patient
- Patient**-in control room, being the voice, recording the scenario, manipulating the vital signs and other assessment parameters
- Operating Room Nurse**-gives report to student nurses
- Husband**-asks questions, provides support to patient

Clinical Situation-for all group members

Mrs. Cox is a 60 year old woman who was admitted to hospital for a planned total knee replacement of her left knee. She was admitted the same day of her surgery. Mrs. Cox has a history of osteoarthritis. Mrs. Cox is married and her husband is in good health.

Instructions:

1. Receive a verbal report from the operating room nurse.
2. Admit Mrs. Cox to the surgical unit on which you are a student nurse.
3. Complete a head to toe assessment of Mrs. Cox.
4. Document your findings

THIS IS WHAT THE OPERATING ROOM/RECOVERY ROOM NURSE WILL TELL THE STUDENT NURSES**Operating Room Data****Surgery**

Started: 8:30

Ended: 10:15

Anesthesia

Started: 8:20

Ended: 10:30

Total Blood Loss 350 mls

Verbal report data from the operating room/recovery room nurse at 12:00

Vital Signs: BP 110/76; Pulse, 80/ min, regular; Respirations 16 per min, regular; Clear air entry to all lung fields; Temperature (Oral), 36.0 C., Oxygen Saturation, 98% on 2L NP. Patient denies pain.

Patient had spinal anesthesia

Patient has been alert and oriented to person, place and time. Glasgow Coma Scale 14.

Movement in all extremities. Pedal pulses 2+ bilaterally.

No nausea and vomiting

Bilateral Colour, pink; Sensation, full; Movement; able to wiggle toes

Abdominal Sounds absent

Indwelling catheter draining clear amber urine. Total urine output: 1500mls

IV Ringers lactate running at 100 mls per hour in right forearm. PCA pump morphine running.

Total Fluid Intake: 2000 mls

NPO, tolerating ice chips q 30 minutes.

Patient has Jones dressing on Left leg dry and intact. Hemovac intact and has drained 60 mls of sanguineous fluid in last 2 hours.

GUIDELINES FOR PATIENT/SIMMAN-Pain

1. Remember you are a 60 year old healthy woman. You are married to Jonathan Michael Cox. You have 2 children in their late 20's.
2. Your vital signs are resp 16, BP 124/78, HR 85 and regular, O2 sat 98%. When the student takes the observer will state that it is 36.5.
2. You are slightly anxious after the surgery. You are concerned about walking after the surgery, because you want the pain to go away. You have been suffering with pain in your left knee for the 3 years and it has become worse in the past 6 months. You have a lot of stairs in your house. You are also an active woman and enjoy hiking in Gatineau Park, which is something that you have not been able to do for the past 6 months.
3. When the nurse assesses you, your pain is NOT under control. You report that your pain is 7 out of 10 and that you are afraid to use the pump because you will become addicted to the morphine. Your pain is localized to your left knee. You are afraid to move your leg because it hurts. It is a constant and burning type of pain that is different than before the surgery. Your husband agrees with her and states that he has heard that patient's can become addicted to pain medication. You do not know how to use the PCA pump.
4. If the nurse needs to elaborate more continue to ask questions and show concern about using the PCA pump. You can say "I am not sure that I understand. Are you sure I won't get addicted? How do I use this machine? How will it make sure I don't get too much? When is the best time to use the PCA?"
5. Once the nurse has answered your questions, explained how to control your pain, state "Thanks nurse I feel better about using the pump. I know I need to use the machine to help my recovery and be comfortable."
6. You do not have any nausea, and are taking small amounts of ice chips with out difficulty. You are alert and oriented x3. You have no shortness of breath. You are not passing gas.

GUIDELINE FOR SIMMAN-Pain-Husband

1. You will be sitting in a chair beside your wife.
2. When your wife rates her pain and states that she is worried about getting addicted to the pain medication, you agree with her and state "that I have also heard that patient's can become addicted to pain medication, and that I am worried about my wife."

Medical Orders

IV 2/3 and 1/3 100mls/hour until drinking well
 Ancef 1 g IVPB q 8 hours x 3 doses
 Ibuprofen 400mg q 6 hours

Tylenol 325-650 mg q 6 hours
 Colace 100mg bid
 Advance clear fluids as tolerated
 Bed rest with BRP
 Ambulate prn, non-weight bearing on left leg
 Lovenox 30 mg SC BID x 14 days
 Indwelling catheter
 Encourage DB + C
 CPM machine 2-3 hours post op day 1
 Gravol 25-50 mg po/IV prn q 4-6 hours
 Benadryl 25 mg IV q 6 h prn
 Hemovac d/c in 24 hours
 PCA morphine 5 mg/ml, 30ml cartridge, bolus dose 1.5 mg, dosing interval 6 minutes, maximum 40mg in 4 hours.

Questions:

What is the relevant information in this situation?

What do the instructions mean?

What is the relevant information in the available in the documentation?

Teacher Information

What is the relevant information in this situation?

Total knee replacement
 Time back from the OR
 Immediate post-op period

What do the instructions mean?

Postoperative monitoring
 Assessment-head to toe of post operative patient
 Medical Orders
 Type of surgery
 Recovery room report
 Synthesis the information between data collected and patient assessment
 Identify and intervene with appropriate nursing interventions

What is the relevant information in the available in the documentation?

GCS
 VS compared to baseline
 IV change
 Catheter
 Removal

Dressing
Fluid balance
Medications
PCA and pain assessment
Head to toe assessment

SimMan's Condition in Room/Equipment

Lying in bed, head of bed 30 degrees, bed rail up
Respiration 16, lungs clear
BP 124/78
HR 85 regular
IV Ringer's Lactate infusing at 100 mls per hour in right forearm
PCA morphine infusing in same line 5 mg/ml, 30ml cartridge, bolus dose 1.5 mg, dosing interval 6 minutes, maximum 40mg in 4 hours.
Foley catheter and drainage bag, 100 mls in bag clear amber urine
Jones dressing on L knee clean and dry, hemovac coming out of Jones dressing with 10 mls of sanguineous fluid (blood)
Wearing hospital gown
ID band on wrist
BP machine
Stethoscope
O2 Sat monitor
Incentive spirometer
Measuring can for urine
Measuring can for hemovac
Emesis basin
Towel
Washcloth
Basin
Soap
Medication Cart-
Gravol 25-50 mg po/IV prn q 4-6 hours
Benadryl 25 mg IV q 6 h prn Lovenox 30 mg SC BID x 14 days
Ancef 1 g IVPB q 8 hours x 3 doses
Ibuprofen 400mg q 6 hours
Tylenol 325-650 mg q 6 hours
Colace 100mg bid
Chart for Mrs. Cox
Drug book
CPS

Appendix B

Sample of Semi-Structured Interview Questions

- 1) Describe your experiences using simulation.
 - a. Likes:
 - b. Dislikes:
- 2) What do you think were the advantages and or disadvantages of using simulation as a substitution for part of your clinical practicum if any?
 - a. Advantages
 - b. Disadvantages:
- 3) Do you find yourself using what you learned from simulation in clinical practice?
 - a. Describe:
- 4) Can you give an example of how simulation influenced your clinical practicum experience?
- 5) Can you share an incident from your recent clinical practicum where you had to make a difficult decision?
- 6) What process did you use to make that decision? Do you think that your simulation experience had any influence on how you made the decision?
- 7) What is your understanding of clinical reasoning: can you describe it using an example from your clinical practicum experience?
- 8) Were there any experiences in your recent clinical practicum that were similar to the simulation labs or OSCE's?
- 9) What was the reason that you volunteered to participate in the simulated learning experience.

Appendix C

Ethics Review Board Approval Algonquin College



1385 Woodroffe Avenue
Ottawa, Ontario K2G 1V8
(613) 727-4723

Applied Research Ethics Approval Board

Certification of Ethical Approval

This is to certify that Algonquin College Research Ethics Board (REB) has examined the application for ethical approval for the research project: **Perceptions of Nursing Students of the Process of Clinical Reasoning in the Clinical Setting after Using Human Patient Simulation.** The members of the REB found that the research project met the appropriate ethical standards. The certification is valid for one year from the date indicated below.

Barbara J. Foulds
Chair, REB
Algonquin College

March 7, 2006

Date

Ethics Approval from the University of Ottawa



Université d'Ottawa
Service de subventions de
recherche et deontologie

University of Ottawa
Research Grants and
Ethics Services

January 20, 2006

Dr. Betty Cragg
School of Nursing
University of Ottawa
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Ms. Susan Ogilvie

Dr. Kirsten Woodend
School of Nursing
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451 Smyth Road, Room 3247b
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**Object: Perceptions of Nursing Students of the Process of Clinical Reasoning
in the Clinical Setting after Using Human Patient Simulation
(file H 12-05-05)**

Dear Researchers,

You will find enclosed the Health Sciences and Science REB ethical clearance for the abovementioned study. Please note that you cannot proceed with the focus groups, until the REB has received a copy of the focus group questions and has approved them.

During the course of the study, any modifications to the protocol or forms may not be initiated without prior written approval from the REB. You must also promptly notify the REB of any adverse events that may occur.

This certificate of ethical clearance is valid until January 20, 2007. Please submit an annual status report to the Protocol Officer in January 2007 to either close the file or request a renewal of ethics approval. This document can be found at: http://web9.uottawa.ca/services/rgessrd/ethics/application_dwn.asp

A copy of this approval will be sent to research services, if necessary. If you have any questions, you may contact the undersigned at the number 562-5387.

Sincerely yours,

Rita D. Resnikoff
Protocol Officer for Ethics in Research
For Dr. Daniel Lagarec, Chair of the Health Sciences and Science REB

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Ottawa ON K1N 6N5 Canada
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Appendix D

E-mail Script for Recruitment of Participants for Qualitative Study

I am e-mailing you to tell you about a research study that is being conducted this winter, and to find out if you would like to volunteer to participate in the study that will be conducted by Susan Ogilvie. I can send you a two page information sheet and a one page consent form about this qualitative research study (via e-mail) or you may pick up the information directly from Susan Ogilvie in room B234b at Algonquin College, her phone number is 727-4723 x5859. You can find a description of the study on the sheets that you either pick or will be sent to you. Susan Ogilvie will describe the study and who is eligible to participate, risks or benefits of participating in the study and how to sign up if you are interested.

The primary investigator of the study is Susan Ogilvie. Susan is a Master of Nursing Science student from the University of Ottawa, who is also a nursing professor at Algonquin College. Susan's thesis supervisor is Dr. Betty Cragg who is a Professor of Nursing at the University of Ottawa. Her telephone number is 562-5800 x8704. Dr. Kirsten Woodend will also be involved in the study as a co-investigator who will participate in the data analysis. She is also a Professor of Nursing at the University of Ottawa and her phone number is 562-5800 x8433.

The investigators are conducting a qualitative study entitled "Perceptions of Nursing Students of the Process of Clinical Reasoning in the Clinical Setting using Human Patient Simulation." The aim of this research is to investigate the effect that human patient simulation had on the student's ability to clinically reason in the clinical practice setting. The research question is "Do 3rd year baccalaureate nursing students perceive that their experience with human patient simulation has influenced their clinical reasoning skills clinical practice?"

There are 10 students who are eligible to participate in this study. Students who are eligible to participate in this study are only those who have participated as the experimental group of the quasi-experimental pilot study conducted in the fall 2005. Students must be proficient in the English language in order to participate in the study, since the study will be conducted in English.

If you agree to participate in the qualitative study you will be asked to take part in an interview session with Susan Ogilvie that will take approximately one hour of your time. You will be asked to describe your experience using human patient simulation and the impact that it has had on your learning. The interviews will be audio-taped to ensure that everything you say is documented correctly.

Once all of the participants have completed the individual interviews you will be asked if you would be willing to take part in a focus group. The purpose of the focus group session is to verify if the themes derived from the interviews accurately reflect your comments. The focus group should take approximately one hour of your time. The focus group will take place at a location and time that is convenient for everyone to meet.

The research data and audiotapes will be stored in Susan Ogilvie's office room B234b at Algonquin College 1385 Woodroffe Avenue. The data will be kept in a locked filing cabinet to which only Susan Ogilvie has the key. They will be stored for five years after which time it will be destroyed. If you decide to withdraw from the study at any point, the data gathered from you will be destroyed and will not be used.

If you decide to withdraw from the focus group the data cannot be destroyed because it will be part of a group discussion.

There are minimal risks if you wish to participate. You may feel uncomfortable discussing freely in a group and you may not want to answer all of the questions. There are potential benefits of participating in this study. The comments that you make will help direct further research on the use of simulation as a learning tool. Your valuable feedback may help guide us as to how SimMan is best used in nursing education. You will also have the opportunity to reflect on your knowledge and practice. You will be able to identify your strengths and weaknesses which will help you meet your learning needs.

The study investigator, thesis supervisor and co-investigator will have access to your data. The data will be identified by study letters and not with your name. You will not be identified in any publications or presentations. No records bearing your name will leave the project centre. None of your professors or fellow peers will be told that you are participating in the study.

Participation in this research is completely voluntary. You are free to choose to participate or not to participate in this research study. If you agree to participate in this study, you may choose to withdraw your participation at any time. This will not affect your status as a student in the nursing program.

If you agree to participate in the study please fill in all of the blanks on page 3 of the information and consent form. I have handed you 1 copies of the consent form and another one will be e-mailed to you. Please sign both copies if you agree to participate and please keep 1 copy for your own records.

Potential Questions and Answers

Q: Is there any compensation for participating in the study? Will I get paid for participating?

A: No there is no financial compensation

Q: What if I decide I don't want to participate in the study anymore?

A: You are free to withdraw at any time. It will have no impact on your status as a nursing student in the program.

Appendix E

Telephone Script for Recruitment of Participants for Qualitative Study

I am calling you to tell you about a research study that is being conducted this winter, and to find out if you would like to volunteer to participate in the study that will be conducted by Susan Ogilvie. I can send you a two page information sheet and a one page consent form about this qualitative research study (via e-mail) or you may pick up the information directly from Susan Ogilvie in room B234b at Algonquin College, her phone number is 727-4723 x5859. You can find a description of the study on the sheets that you either pick or will be sent to you. Susan Ogilvie will describe the study and who is eligible to participate, risks or benefits of participating in the study and how to sign up if you are interested.

The primary investigator of the study is Susan Ogilvie. Susan is a Master of Nursing Science student from the University of Ottawa, who is also a nursing professor at Algonquin College. Susan's thesis supervisor is Dr. Betty Cragg who is a Professor of Nursing at the University of Ottawa. Her telephone number is 562-5800 x8704. Dr. Kirsten Woodend will also be involved in the study as a co-investigator who will participate in the data analysis. She is also a Professor of Nursing at the University of Ottawa and her phone number is 562-5800 x8433.

The investigators are conducting a qualitative study entitled "Perceptions of Nursing Students of the Process of Clinical Reasoning in the Clinical Setting using Human Patient Simulation." The aim of this research is to investigate the effect that human patient simulation had on the student's ability to clinically reason in the clinical practice setting. The research question is "Do 3rd year baccalaureate nursing students perceive that their experience with human patient simulation has influenced their clinical reasoning skills clinical practice?"

There are 10 students who are eligible to participate in this study. Students who are eligible to participate in this study are only those who have participated as the experimental group of the quasi-experimental pilot study conducted in the fall 2005. Students must be proficient in the English language in order to participate in the study, since the study will be conducted in English.

If you agree to participate in the qualitative study you will be asked to take part in an interview session with Susan Ogilvie that will take approximately one hour of your time. You will be asked to describe your experience using human patient simulation and the impact that it has had on your learning. The interviews will be audio-taped to ensure that everything you say is documented correctly.

Once all of the participants have completed the individual interviews you will be asked if you would be willing to take part in a focus group. The purpose of the focus group session is to verify if the themes derived from the interviews accurately reflect your comments. The focus group should take approximately one hour of your time. The focus group will take place at a location and time that is convenient for everyone to meet.

The research data and audiotapes will be stored in Susan Ogilvie's office room B234b at Algonquin College 1385 Woodroffe Avenue. The data will be kept in a locked filing cabinet to which only Susan Ogilvie has the key. They will be stored for five years after which time it will be destroyed. If you decide to withdraw from the study at any point, the data gathered from you will be destroyed and will not be used.

If you decide to withdraw from the focus group the data cannot be destroyed because it will be part of a group discussion.

There are minimal risks if you wish to participate. You may feel uncomfortable discussing freely in a group and you may not want to answer all of the questions. There are potential benefits of participating in this study. The comments that you make will help direct further research on the use of simulation as a learning tool. Your valuable feedback may help guide us as to how SimMan is best used

in nursing education. You will also have the opportunity to reflect on your knowledge and practice. You will be able to identify your strengths and weaknesses which will help you meet your learning needs.

The study investigator, thesis supervisor and co-investigator will have access to your data. The data will be identified by study letters and not with your name. You will not be identified in any publications or presentations. No records bearing your name will leave the project centre. None of your professors or fellow peers will be told that you are participating in the study.

Participation in this research is completely voluntary. You are free to choose to participate or not to participate in this research study. If you agree to participate in this study, you may choose to withdraw your participation at any time. This will not affect your status as a student in the nursing program.

Once you have received and read the two copies of the information and consent form and you agree to participate in the study please fill in all of the blanks on page 3 of the form. Please sign both copies if you agree to participate and please keep 1 copy for your own records.

Potential Questions and Answers

Q: Is there any compensation for participating in the study? Will I get paid for participating?

A: No there is no financial compensation

Q: What if I decide I don't want to participate in the study anymore?

A: You are free to withdraw at any time. It will have no impact on your status as a nursing student in the program.

Appendix F

**Student Volunteer Information Sheet and Consent Form
Perceptions of Clinical Decision-Making Using Human Patient Simulation**

Investigator: Susan Ogilvie, Master of Nursing Science Candidate, University of Ottawa

Supervisor: Dr. Betty Cragg, Professor of Nursing, University of Ottawa
562-5800 x8348, bcragg@uottawa.ca
RGN 3040, University of Ottawa

Introduction

You are being asked to participate in a qualitative research study. The purpose of this research is to see if simulated learning using SimMan has influenced development of clinical decision-making skills. All students who have participated in the experimental group of the randomized control study with Michelle Morley will be approached to participate in this study during the winter semester.

Procedure

If you volunteer to participate in the study you will be contacted by Susan Ogilvie who will set up an interview with you in January, 2006 at a convenient time for you. The interviews will take approximately one hour.

You will be asked to explore your thoughts and reflections in a one-on-one interview with Susan Ogilvie. The interview will occur at a time and place that is comfortable and convenient for you.

The information taken will be analyzed, coded and themes will be drawn without identifying any participants' names. If you are quoted in reports, identifying material will be omitted or changed to protect your anonymity. Student participants will be contacted with a number of dates that may be convenient for all.

In March after the information has been coded and put into themes you will be asked to participate in a focus group. The purpose of the focus group will be to discuss if the themes capture what individual participants identified from the experience.

The information that you provide to me will not be shared with other students or clinical professors.

The research data will be stored at Algonquin College under lock and key for five years after which it will be destroyed. If at any time you wish to withdraw from either the interview or the focus group you are more than welcome to do so and all corresponding data gathered will be destroyed.

Participation

Your participation in this study is completely voluntary. You are free to choose to participate or not to participate in this research study. If you agree to participate in this study,

you may choose to withdraw at any time. Participation in this study will not affect your status as a student in the nursing program.

Risk and Discomforts of Participating

You may experience some discomfort with having a one-on-one discussion with a former professor. You may also feel uncomfortable discussing your personal feelings in a focus group with other participants. You may feel that participating in the study is too time consuming.

Benefits of Participating

You have participated in a randomized control study using human patient simulation where you will engage in group debriefing immediately after the experience. My study will provide you with some time to reflect further and see if the simulation study has influenced your clinical practicum experience. It allows you time to give your input either positive or negative about using human patient simulation as a clinical tool. Your participation in this study will help educators to understand the benefits and disadvantages of using human patient simulation and may influence how simulation is used in the future at Algonquin College.

Compensation/Remuneration

There is no payment for participating in this study.

Confidentiality

The investigator and the thesis committee are the only ones who will have access to the data gathered from you. Your name will not be used in the study on any written material. Some of your comments may be written in the final report without identifying you. No records with your name on it will leave Algonquin College.

Anonymity

No professors in your program will be informed of your participation in this study. Students participating in the focus group will be aware of some of the other students who participate in the study. If you are quoted identifying information will be omitted or changed to maintain anonymity.

Consent to Participate

I understand that I am being asked to participate in a research study that will look at the students' perceptions of clinical decision-making in the clinical practicum after using simulated learning with SimMan. The study has been explained to me by_____.

I have read and understood this Student Volunteer Information Sheet and Consent Form. All my questions at this time have been answered to my satisfaction. If I have any further questions about any part of this study, I may contact Susan Ogilvie by e-mail (_____) or her supervisor Betty Cragg 613-562-5800 (ext. 8348) or by e-mail bcragg@uottawa.ca

I have received a copy of this Student Volunteer Information Sheet and Consent Form. I will retain the second copy of the consent for my records.

I voluntarily agree to participate in this study.

Participant's Name _____

Participant's signature _____

Date _____

E-mail Address _____

Telephone Number _____

I agree to be contacted about a follow-up focus group Yes____ No____

_____ Signature