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Communication and Teamwork Focused Simulation-Based Education for Nursing Students

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Abstract

Simulation has become a common teaching method for healthcare providers, including nursing students. Until recently, the focus of simulation for nursing students has been on clinical skills. This study used a compilation survey to determine if knowledge and attitude scores improved in the bachelor degree nursing student after exposure to a simulation-based teamwork and communication training. Participants were 51 students from the senior leadership course of a bachelor's degree in nursing program at a university in New Jersey. Control participants received normal clinical rotations with faculty led discussions, and intervention participants received a 4-hour simulation, focused on teamwork and communication. Intervention participants showed a significant difference in scores on one of five composite scores, demonstrating that simulation may be useful in improving knowledge of teamwork and communication related to teamwork and communication, but may not improve attitudes of nursing students related to teamwork and communication.

Statement of the Problem

Poor teamwork and communication are barriers to successful nursing practice. The new nurse is particularly vulnerable to feeling increased amounts of stress, isolated, and dissatisfied with their job due to poor communication and teamwork both with other nurses and other healthcare professionals. Subsequently new nurses may leave their first job or the profession shortly after starting, adversely affecting the quality and safety of care and the financial stability of the hiring institution.

Nursing schools have only recently started to implement human patient simulation training into their curriculum. Few, if any, nursing schools have implemented a simulation-based education program focusing on teamwork and communication. Nursing schools may be in a unique position to help prepare new nurses for successful transition to practice by teaching communication and teamwork concepts in a simulated environment.

Evidence of the Problem

A culture promoting teamwork is being produced in healthcare. Teamwork has been shown to improve the safety of healthcare, improve the environment that healthcare is provided in, improve the satisfaction of both patients and providers, and ultimately retain nurses (McConaughey, 2008; Sundar et al., 2007; IOM, 1999; Clark, 2009; Joint Commission, 2009). A culture of teamwork in healthcare is advocated for at all levels of healthcare, including government agencies (IOM, AHRQ), accrediting bodies (ACGME, AACN, Joint Commission), educational institutions, healthcare centers, and healthcare providers (ACGME, 2005; IOM, 1999; Joint Commission, 2009). A large component of this teamwork culture is the interpersonal communication and management of team members.

As this culture of teamwork has gained momentum, grounded in the belief that teamwork leads to safer care, the innovation of high-fidelity simulation and crew resource management (CRM) also took hold in healthcare. Simulation is a technique that challenges novice and expert practitioners alike in a real world environment; while crew resource management training teaches teamwork concepts as well as situational awareness and interpersonal communication. The technological advances that have been adopted in other industries have made their way into healthcare and have slowly made their way into nursing education. However, the teamwork and

CRM concepts employed in the airline industry and in healthcare are yet to be fully integrated into nursing education.

Literature Review

The shortage of nurses is expected to reach 260,000 by 2025 (AACN, 2009). The nursing profession has long recognized the high attrition rate of nurses (Kramer, 1974) but is only beginning to address it.

Orientation has been found to be the most stressful time in a nurses' career (Delaney, 2003; Oermann & Moffitt-Wolff, 1997; Ackermann et al., 2007). Kovner et al. (2007) report that 41.5% of newly hired nurses would leave their current job if given the opportunity and 37% planned to leave their first job within 1 year. Other reports suggest that between 35% and 60% of new graduates change their place of employment during the first year (Williams, 1999) and 26.2% of nurses leave their first job within 2 years of starting (Kovner et al., 2007). Kovner et al. (2007) found that over 30% of nurses who left their current employment reported a stressful work environment as the reason for leaving. The workplace has been shown to have an effect on nurses' morale, job satisfaction, commitment to the organization, and their intention to quit (Cangelosi, 1999; Revicki, 1989; Lim, 1998; Patrick, 2000; Rosenstein, 2002).

Stressful work environments are caused by a myriad of factors, including poor communication and poor working relationships within the nursing profession and between nurses and other healthcare professionals (Nichols, 1981; McGrath, Reid, & Boore, 2003; Konstantinos, 2008). Recent attention of lateral, or horizontal, hostility has brought the issue of "unkind, discourteous, antagonistic interactions that occur between persons at the same organizational hierarchy level" to the forefront of the nursing profession (Alspach, 2007). Research (Rowell, 2008; Thomas, 2003; Ulrich et al., 2006; Simpson, 2008; Siu et al., 2008; Alspach, 2007) and a recent text, *Ending Nurse to Nurse Hostility: Why Nurses Eat Their Young and Each Other* (Bartholomew, 2006) demonstrate that horizontal hostility is a significant problem in the nursing profession.

Stress is not only caused by difficult communication at the same organizational level, but by interactions between organizational levels. Studies (Cox, 1991; Anderson et al., 2009) demonstrate that disruptive behaviors, especially between nurses and physicians, inhibit teamwork and affect patient care in a number of ways. The disruptive behavior most frequently occurred after placing calls to physician, after questioning or clarifying orders, when physicians

thought their orders were not being carried out correctly or in a timely manner, after perceived delays in care, or after sudden changes in patient status (Rosenstein, 2002). the perceived disruptive behavior of select physicians led to confrontation and unease among those working with the physicians and caused frustration among staff members. The disruptive behavior most frequently occurred after placing calls to physicians, after questioning or clarifying orders, when physicians thought their orders were not being carried out correctly or in a timely manner, after perceived delays in care, or after sudden changes in patient status (Rosenstein, 2002). Recent studies find that physicians and nurses' experience increased frustration with poor professional communication and that dysfunctional work environments are a significant contributor to stress and burnout (Anderson et al., 2008; Thomas, 2009).

Research (Siu, 2008) related to Deutsch's theory of constructive conflict management and magnet hospital designation suggests that professional practice environments (magnet designated facilities) create cooperative work contexts that influence the nurses' ability to engage in effective conflict management strategies and their units ability to work effectively. Professional practice environments, have been shown to be affected by, as well as foster, effective teamwork by creating a shared community where perspectives are respected, support for collaboration is common, and communication and teamwork are used to achieve mutual goals (Siu, 2008). In addition, the magnet hospital attributes have been associated with increased job satisfaction (Aiken, 2000; Laschinger, 2001).

The use of simulation to teach interdisciplinary groups about teamwork and communication is becoming common in healthcare. Both researchers and accrediting bodies suggest that medical education should include communication training for future healthcare providers (Glavin & Maran, 2003; Haller et al., 2008; Hunt, Shilkofski, Stavroudis, & Nelson, 2007; Jankouskas et al., 2007; Kameg, Mitchell, Clochesy, Howard, & Suresky, 2009; McConaughey, 2008; Sundar et al., 2007, Boss, Hutton, Donohue, & Arnold, 2009; ACGME, 2005; AACN, 2009). The aviation industry has successfully used simulation for decades to teach the concepts of crew resource management to cockpit personnel, as was demonstrated by the actions of the crew of US Airways flight 1549. Crew resource management has been defined by Lauber, as "using all available sources – information, equipment, and people – to achieve safe and efficient flight operations." (Pizzi, 2001). Initially, the airline industry used simulation to train pilots in procedures, to avoid catastrophic mishaps. However, accidents still occurred, and

the program was revised to look beyond individual pilot's error to teamwork and communication, using principles of crew resource management (McConaughey, 2008).

Gaba and others, developed the anesthesia crisis resource management program in the 1980's based on the airline industries cockpit resource management programs. The anesthesia crisis resource management program was the first use of CRM in healthcare (McConaughey, 2008). The use of CRM programs has now expanded beyond the operating room and anesthesiology, to the emergency department, obstetrics units, and other healthcare providers (Pizzi, 2001). Boss et al. (2009) reports that neonatologists must learn the skills of communication as listed by the Accreditation Council for Graduate Medical Education (ACGME, 2005). The study found that during their fellowship year, only 25% of neonatologist fellows had a simulation experience that taught the concepts of communication. Even less, six percent had a clinical rotation focused on communication skills (Boss et al., 2009). However, the minimal number of neonatologists reportedly taught communication skills, still outnumber the number of nursing students reported to be taught similar concepts using simulation. Even though, the American Association of Colleges of Nursing lists interprofessional communication as a standard in the Essentials of Baccalaureate Education for Professional Nursing Practice (AACN, 2009).

Universities and schools of nursing have quickly adopted simulation as a tool to enhance student education (Schiavenato, 2009). However, there is a belief that the adoption of simulation has occurred in such a fast manner, that the utility of the technique is questioned and a theory or ideology supporting simulation use is missing in nursing education (Schiavenato, 2009).

Simulation in nursing education has been used in many capacities, including teaching psychomotor (Hravnak, Beach, & Tuite, 2007) and critical thinking skills (Rhodes & Curran, 2005); evaluating nursing competencies (Ebbert & Connors, 2004); remediating clinical performance deficiencies (Haskvitz & Koop, 2004); developing clinical judgment (Lasater, 2007a, Lasater, 2007b); and practicing with infrequent, high-risk patient situations that cannot be scheduled in the clinical setting (Nehring, Lashley, & Ellis, 2002; Parr and Sweeney, 2006). However, skills that fall in the affective domain receive far less attention in the literature. Perhaps, highlighting a lack of material in this domain, or an increased emphasis on the cognitive and psychomotor skills, which have until recently, been perceived to be of greater importance in the education of future nurses. Rarely discussed, are programs to improve teamwork or

communication skills in the undergraduate nursing population. However, some hospitals have experimented with incorporating teamwork based simulations into their nursing orientations and nursing schools have started to incorporate TeamSTEPPS™ training into their curriculums (Anderson, 2009; Grbach, 2009). TeamSTEPPS™ is an evidence-based program based on CRM principles to improve teamwork, communication, and the safety and quality of healthcare.

Research (Bradley & Postlethwaite, 2003; Gaba, 2004; Weller, 2004) has described the potential role of simulation in bridging the theory–practice gap that is seen in healthcare education. Simulation-based learning can be an experience that connects classroom-based and work-based learning. It can incorporate not only the acquisition of knowledge and skills, but also the cultural practices that are present in actual healthcare work environments (Bligh & Bleakley, 2006). Simulation might also be effective for professional identity construction and socialization of the participants (Bligh & Bleakley, 2006). Incorporating teamwork and communication training into the nursing student curriculum can help students adjust to the complex clinical world they will enter. It will enable them to speak with confidence, especially in challenging circumstances to their co-workers and superiors and build the feeling of teamwork that new nurses need to be successful and remain in their positions.

Participants

Participants in this study were 66 students in the senior level, nursing course at a Northeastern US school of nursing during the 2010 spring semester. All students (66) present during their spring orientation were invited to participate and no students elected to not participate at that time. During the semester, students were absent during the project implementation days or were not available to complete the follow-up survey (n=10) or inadequately completed one of the two surveys (n=5). After removing incomplete surveys, data cleaning, and accounting for students who were absent during the program implementation, the final sample consisted of 51 participants (47 female; aged 21-53; mean, 25.5; SD 6.8). All participants were treated in accordance with IRB protocol.

Materials

The human patient simulator was from Medical Education Technology, Inc. (METI). Knowledge and attitudes were measured using a 61-question survey, consisting of multiple-

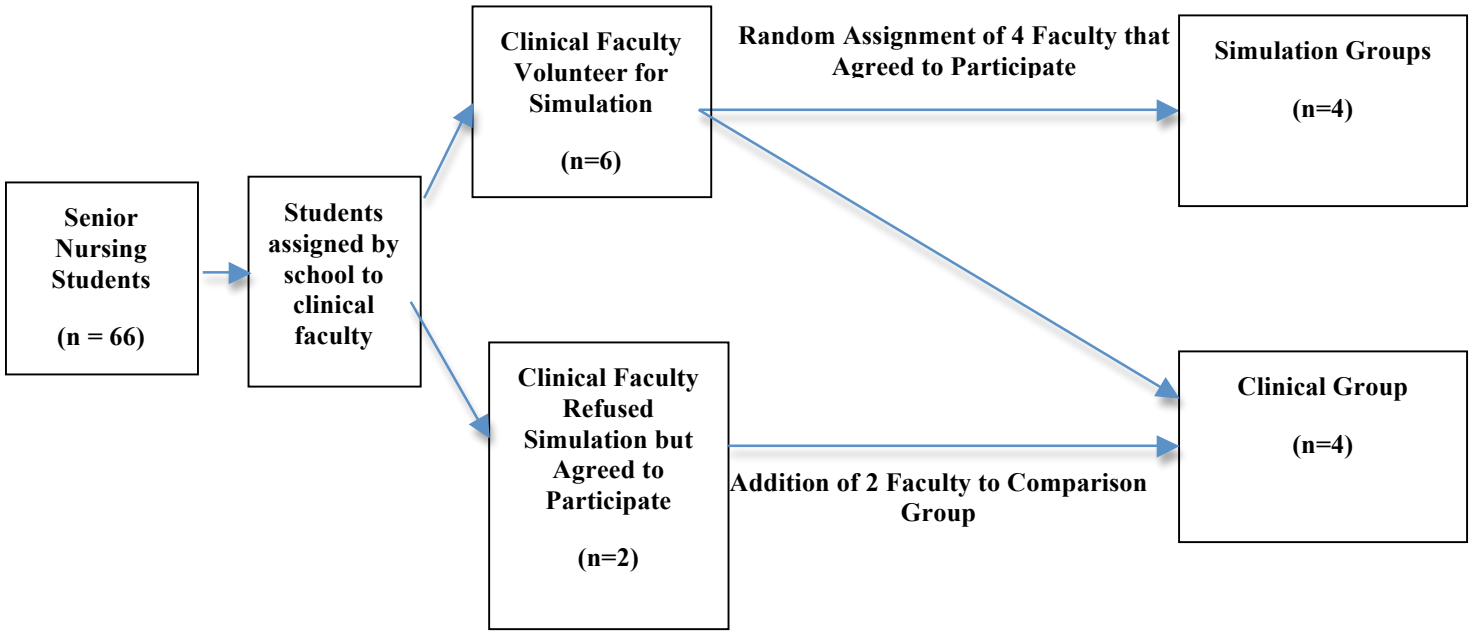
choice Likert questions of attitudes and feelings, multiple-choice knowledge questions, and true/false knowledge questions. The questions were obtained from 5 sources, all proven to be reliable and valid through separate testing and analyses. The questions were taken from the Communication Skills Attitudes Scale (CSAS), the TeamSTEPPS Teamwork Attitudes Questionnaire (T-TAQ), the Operating Room Management Attitudes Questionnaire (ORMAQ), the Geriatric Interdisciplinary Team Training (GITT) survey, and a knowledge survey administered by the University of Nebraska Medical Center, based on the TeamSTEPPS program. Permission to use each survey was received. These tools were chosen because they provided a broad base of measures to inquire about knowledge and attitudes of the nursing students. If necessary, the tools were adapted, by changing the name of the provider from medical student or doctor to nursing students, for use with nurses, as some were initially designed for other healthcare providers.

Procedure

I presented information about the study to students during an orientation day during the first week of a 16-week semester. After explaining the study verbally, all students were provided an informed consent form and a survey. Students completed the informed consent form prior to completing the survey and could opt-out of participating by returning a blank survey.

The clinical faculty members (n=8) were introduced to the study prior to the semester and each faculty member verbally agreed to participate to an extent. Students were assigned to the clinical faculty member by the school of nursing based on the school of nursing predetermined criteria. Six of the eight (75%) of the faculty members agreed to participate in the intervention. The remaining two declined to participate in the simulation, but agreed to participate in the study by discussing the related concepts during their regularly scheduled clinical days. From the six faculty members who volunteered their groups to participate in the simulation program, four were selected at random to participate. The remaining faculty members were assigned to the comparison group with the two who declined to participate in the intervention.

Figure 1: Assignment of Students and Selection of Faculty



Because of normal curricula procedure, the students were equally divided among the faculty members, with each faculty having eight to nine students in their groups. In each section whose faculty volunteered to participate in the simulation, students could opt-out of the intervention by notifying their faculty member and being reassigned to another group for the day. No students opted-out in this fashion.

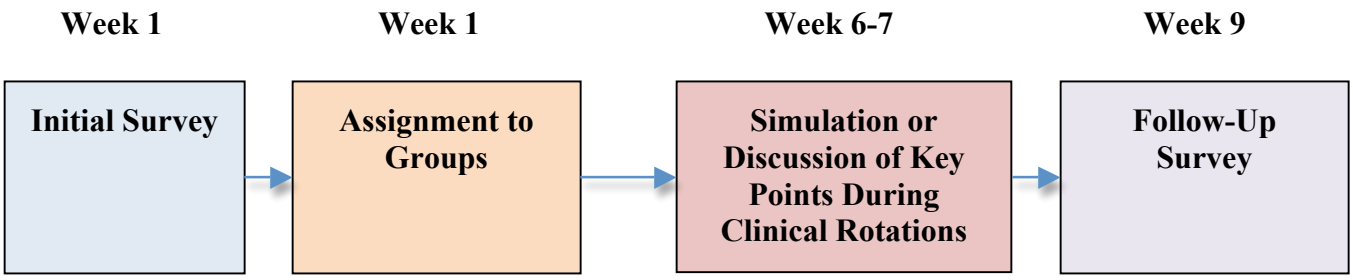
After randomization, both groups followed the established clinical schedule. Beginning in week 6 and ending in week 7, the four clinical groups selected for participation in the simulation program came to the school of nursing simulation laboratory instead of the clinical site for one day (4 hours). The comparison groups continued their normal schedule at the clinical sites, however beginning in week 6 and ending in week 7 the faculty were asked to discuss the topics provided to them related to communication and teamwork as part of their normal clinical day.

It should be noted that all students were already familiar with the simulation laboratory because they were introduced to the laboratory and the METI human patient simulator in previous semesters.

During week 9 of the semester, during normally scheduled class hours a follow-up survey was administered to all of the students. Any student not in attendance that day was contacted

separately and given the opportunity to complete the survey within the week. By week 10, all students had completed the follow-up survey.

Figure 2: Study Timeline



Design

This study used a non-equivalent comparison group design, using a convenience sample. ANCOVA was used to determine differences between groups on post-test scores after controlling the effect of pre-test scores. Paired t-tests were also used to determine within group differences. This study was approved by the Institutional Review Boards at the University of Massachusetts – Amherst and William Patterson University.

Results

This study tested the effect of simulation on nursing students' knowledge and attitudes related to teamwork and communication, by using a survey administered as a pre-test and post-test to intervention and comparison groups. Data includes composite scores for each of the 5 surveys comprising this survey. Composite scores for the CSAS, ORMAQ, TTAQ, GITT, and University of Nebraska surveys were compiled to evaluate knowledge and attitudinal changes among the nursing students before and after the intervention. Mean and standard deviations for each composite score are presented in Table 1.

The comparison and intervention group had similar pre-test scores on each measure. Pre-test results are reported in table 1.

Table 1: Baseline Comparison of Intervention and Comparison Groups

Measure	Group	N	Mean	SD	Range
CSAS	Intervention	25	104.28	6.67	91-119
	Comparison	25	107.04	7.49	92-120
ORMAQ	Intervention	25	21.69	2.08	18-26
	Comparison	25	21.92	2.06	18-26
TTAQ	Intervention	25	50.00	4.01	43-55
	Comparison	26	50.77	3.66	42-56
University of Nebraska	Intervention	25	1.16	.85	0-3
	Comparison	26	1.42	.64	0-2
GITT	Intervention	25	8.08	1.16	6-10
	Comparison	26	8.15	1.19	6-10

ANCOVA analysis was conducted on each composite score to control for differences between groups on the pre-test (Table 2)

Communication Skills Attitudes Scale (CSAS)

After controlling for the pre-test scores, there is no statistically significant difference on mean scores between comparison (mean= 106.15, SD= 7.21) and simulation groups (mean=105.32, SD=5.41) $F(1, 46) = .090$, $p = .766$).

Operating Room Management Attitudes Questionnaire (ORMAQ)

After controlling for the pre-test scores, there is no statistically significant difference on mean scores between comparison (mean = 21.04, SD = 2.520) and simulation groups (mean = 21.17, SD = 2.24) $F(1, 46) = .101$, $p = .753$).

TeamSTEPPS Teamwork Attitudes Questionnaire (TTAQ)

After controlling for the pre-test scores there is no statistically significant difference on mean scores between comparison (mean = 50.52, SD = 4.46) and simulation groups (mean = 50.24, SD = 4.41) F(1, 47) = .025, p = .875).

University of Nebraska

After controlling for the pre-test scores, there is a statistically significant difference on mean scores between comparison (mean = 1.57, SD = .99) and simulation groups (mean = 2.08, SD = .76) F(1, 48) = 4.892, p = .032).

Geriatric Interdisciplinary Team Training (GITT)

After controlling for the pre-test scores, there is no statistically significant difference on mean scores between comparison (mean = 8.65, SD = 1.41) and simulation groups (mean = 8.42, SD = 1.17) F(1, 48) = .286, p = .595).

Table 2: Effect of Simulation

Post-test	**F**	**P**
CSAS	.090	.766
ORMAQ	.101	.753
TTAQ	.025	.875
University of Nebraska	4.892	.032
GITT	.286	.595

Only one of the survey components, the results of the University of Nebraska survey, was statistically significant (F(1, 48) = 4.892, p = .032). Further analyses was conducted within each group (comparison and intervention) by comparing the means of the pre-test and post-test using paired t-tests within each group (Table 3).

Table 3: Paired T-test Findings

			Pre-test		Post-test	
Measure	**Group**	**N**	**Mean**	**SD**	**Mean**	**SD**
CSAS	Intervention	24	104.83	6.20	105.29	5.52
	Comparison	25	107.04	7.49	106.64	6.91
ORMAQ	Intervention	24	21.62	2.12	21.16	2.24
	Comparison	25	21.92	2.06	21.04	2.52
TTAQ	Intervention	25	50.00	4.01	50.24	4.41
	Comparison	25	50.96	3.60	50.52	4.46
University of Nebraska	Intervention	25	1.16	.85	2.08	.75
	Comparison	26	1.42	.64	1.58	.99
GITT	Intervention	25	8.08	1.22	8.44	1.19
	Comparison	26	8.15	1.19	8.65	1.41

In the comparison group, the mean scores were lower on the post-test for the attitudinal measures, CSAS (mean difference = -.40), ORMAQ (mean difference = -.88), and the TTAQ (mean difference = -.44). However, none of these post-test values were significantly lower (paired t(24) , p = .785 for CSAS; paired t(24) p = .130 for ORMAQ; paired t(24), p = .580 for TTAQ). The knowledge measures, University of Nebraska (mean difference = .15) and GITT (mean difference = .50) were higher in post-test mean score, but the differences are not statistically significant (paired t(25), p= .461 for UoN; paired t(25), p= .119 for GITT).

In the intervention group, paired t-tests revealed significant differences between the pre-test and post-test on only one measure, the University of Nebraska knowledge questions (paired t(24), p = .000). The post-test measure (mean = 2.08, SD = .75) was significantly higher than the

pre-test score (mean = 1.16, SD = .85). The other measures, CSAS (mean difference = .45), TTAQ (mean difference = .24), and the GITT survey (mean difference = .36) components were all higher, but the differences are not significant (paired t(23), p = .749 for CSAS; paired t(24), p = .812 for TTAQ; paired t(24), p = .142 for GITT). The mean score of ORMAQ measure in the intervention group was lower (mean difference = -.45) on the post-test, but the difference is not significant (paired t(23), p = .41).

Discussion

This study aimed to test whether exposing nursing students to a simulation scenario, designed to discuss teamwork and communication, would lead to incrementally increased knowledge and improved attitudes regarding teamwork and communication on a survey. Results of this study demonstrate that there was no significant difference between the intervention and comparison group on 4 out of 5 measures.

A number of biases may have confounded the results of this study. First, contamination of the participants may have occurred. Because this study was conducted at one college, the population of participants involved in the simulation may have had interaction with the participants in the comparison group. A transfer of information, regarding the lessons learned during simulation, may have occurred between groups and could therefore minimize the differences between groups.

The Hawthorne effect might be another possibility in this study because the participants were all aware that their knowledge and attitudes about communication and teamwork were being studied. This could potentially lead to the students answering the questions with artificially high scores. The Hawthorne effect may have a more significant effect on the attitudinal measures because of the nature of those questions as opposed to the knowledge based questions where there is an absolute correct answer.

Of the 5 components of the survey, 3 components (46 questions) related to attitudes about teamwork and communication. The remaining 15 questions related to knowledge of specific skills about teamwork and communication. The component that showed a significant difference between the two groups was a 4-question component related to knowledge about TeamSTEPPS communication and teamwork. The attitudinal survey components may not show a significant difference because attitudes regarding teamwork and communication could have changed due to

becoming more cognizant of the importance through taking the survey, the limited discussion in the clinical groups, or through the continuing educational curriculum in place at the college.

However, the significant knowledge difference between the two groups and within the intervention group may signify the utility of simulation in the pre-licensure nursing student. The pre-licensure nursing student's attitudes toward teamwork and communication may not be affected because of the other educational material they are presented with and their focus on learning skills that will aid them upon graduation. In addition, the attitudes of nursing students may not be affected because they are not likely to comprehend the healthcare environment they will be entering. However, an increase in knowledge related to teamwork and communication may signify active learning that took place within the simulation group that was lacking in the comparison group. This active learning may lead to increased use of specific teamwork and communication strategies that will improve the new graduates transition to practice. Although their attitudes may not have changed much, their ability to use team building and positive communication strategies may have been enhanced by the simulation experience.

This study attempts to quantify learning through simulation, as opposed to previous studies, which used surveys to gather data related to the students thoughts and feelings regarding simulation-based learning techniques and the environment in which the simulation takes place in. Other studies have looked at student responses on surveys related to critical thinking scores, however few, if any, studies look at attitudes and knowledge related to teamwork and communication in the pre-licensure nursing student.

There are many implications for future studies in this area. First, conducting more studies regarding the utility of simulation to understand pre-licensure nursing students knowledge and attitudes about teamwork and communication, with a greater sample, is imperative. Understanding the cognitive skills nursing students have in this area is as important as understanding the clinical skills they have. Teamwork and communication plays an important role in the retention of nurses in their jobs as well as their ability to provide high quality, safe care. Understanding the nursing students perspective of these topics has implications that extend well into their careers.

Many nursing programs have invested in simulation technology and are beginning to incorporate simulation throughout their curriculum. However, many programs still rely on simulation to teach critical thinking or clinical skills and have not implemented teamwork or

communication simulations. Investigating the utility of simulation in teaching these concepts and linking this learning to job satisfaction or job retention is imperative to improve the environment nurses work in and to help stem the nursing shortage. Investigating the knowledge and attitudes of nursing students related to communication and teamwork is important for future studies. In addition, the development of appropriate simulations to teach teamwork and communication concepts coupled with narrow objectives and specific surveys for pre-licensure nursing students related to the topics of teamwork and communication should be developed.

Limitations

This study had a number of limitations. The sample size may not have been large enough to detect significant differences between the two groups of participants. A larger sample size may have more power to determine differences both between groups and within groups. The convenience sample may have led to type 2 error. The sample size of 66 students was a small sample to begin with and was made smaller through attrition and data cleansing. The final sample of 51 students divided between two groups may have been too small to see significant differences.

Second, although 6 of the clinical faculty members agreed to participate in the simulation and 4 were randomly chosen, differences in clinical instructor influence remained. Students in clinical groups with a strong, knowledgeable instructor may be taught and influenced equally in clinical rotations as in the simulated environment. However, clinical faculty were asked to identify which topics they covered either in clinical or in the simulation laboratory. The faculty assigned to simulation covered almost all of the 14 topics that were indicated on the form as opposed to the faculty assigned to the comparison group who indicated they covered less than half of the topics. This indicates that the survey used for this study may have attempted to investigate too many subjects and too broad subject areas. The communication and teamwork concepts covered in the simulation may have been too ambitious for a short a 4-hour time frame and the survey may not have asked specific enough questions to indicate a difference in learning between the two groups.

However, future studies should investigate the amount of time it takes to teach clinical concepts in the simulation environment versus the clinical environment. The intervention faculty indicated they were able to teach more concepts in a shorter period of time (4 hours) than their comparison counterparts (8-12 hours over 2-3 clinical days). This could have profound effects

on nursing education if clinical concepts can be taught and learned in half the amount of time in the simulated environment as opposed to the clinical environment.

Although significant differences between groups were not found, there is an increase in pre- and post-simulation scores. With a larger sample or a more specific or sensitive survey instrument, these outcomes might lead to important findings regarding the utility of simulation and the outcome measures (knowledge, skills, and attitudes) used to determine the value of simulation-based learning.

In conclusion, further studies need to investigate simulation use, specifically simulation use to teach communication and teamwork, and effective methods of evaluating learning of knowledge and attitudes in pre-licensure nursing students.

References

AACN. (2009). *Nursing shortage fact sheet* American Association of Colleges of Nursing. Retrieved from http://www.aacn.nche.edu/Media/pdf/NrsgShortageFS.pdf

Ackermann, A., Kenny, G., & Walker, C. (2007). Simulator programs for new nurses' orientation. *Journal for Nurses in Staff Development, 23*(3), 136-139.

Advancing education in interpersonal and communication skills (2005). (An Educational Resource from the ACGME Outcome Project ACGME.

Alspach, G. (2007). Critical care nurses as coworkers are our interactions nice or nasty? *Critical Care Nurse, 27*(3), 10-14.

Anderson, T., Linden, L., Allen, M., & Gibbs, E. (2009). New graduate RN work satisfaction after completing an interactive nurse residency. *Journal of Nursing Administration, 39*(4), 165-169.

Bartholomew, K. (2006). *Ending nurse to nurse hostility: Why nurses eat their young and each other*. Marblehead, MA: HPRo, Inc.

Bligh, J., & Bleakley, A. (2006). Distributing menus to hungry learners: Can learning by simulation become simulation of learning? *Medical Teacher, 28*(7), 606-613.

Boss, R., Hutton, N., Donohue, P., & Arnold, R. (2009). Neonatologist training to guide family decision making for critically ill infants. *Archives of Pediatrics and Adolescent Medicine, 163*(9), 783-788.

Bradley, P., & Postlethwaite, K. (2003). Simulation in clinical learning. *Medical Education, 27*(suppl 1), 1-5.

Cangelosi, J., Markham, F., & Bounds, W. (1998). Factors related to nurse retention and turnover: An updated study. *Health Marketing Quarterly, 15*(3), 25.

Clark, P. (2009). Building healthier workplaces and providing safer patient care. *Critical Care Nursing Quarterly, 32*(3), 221-231.

Cox, H. (1991). Verbal abuse nationwide, part II: Impact and modifications. *Nursing Management, 22*(3), 66-69.

Delaney, C. (2003). Walking a fine line: Graduate nurses' transition experiences during orientation. *Journal of Nursing Education, 42*(10), 437-443.

Ebbert, D., & Connors, H. (2004). STANDARDIZED PATIENT EXPERIENCES: Evaluation of clinical performance and nurse practitioner student satisfaction. *Nursing Education Perspectives, 25*(1), 12-15.

Gaba, D. (2004). The future of simulation in health care. *Quality and Safety in Health Care, 13.5*(9), i2-i10.

Glavin, R., & Maran, N. (2003). Integrating human factors into medical curriculum. *Medical Education, 37*(suppl 1), 59-64.

Grbach, W., & Stoker, A. (2009). TeamSTEPPS & crisis management education affects performance in senior complex health nursing students. *NLN Education Summit 2009,* Philadelphia.

Haller, G., Garnerin, P., Morales, M., Pfister, R., Berner, M., Irion, O., et al. (2008). Effect of crew resource management training in a multidisciplinary obstetrical setting. *International Journal for Quality in Health Care, 20*(4), 254-262.

Haskvitz, L., & Koop, E. (2004). Students struggling in clinical? A new role for the patient simulator. *Educational Innovations, 43*(4), 181-184.

Hicks, F., Coke, L., & Li, S. (2009). *Report of findings from the effect of high-fidelity simulation on nursing students' knowledge and performance: A pilot study* No. 40. Chicago, IL: National Council of State Boards of Nursing, Inc.

Hravnak, M., Beach, M., & Tuite, P. (2007). Simulator technology as a tool for education in cardiac care. *Journal of Cardiovascular Nursing, 22*(1), 16-24.

Hunt, E., Shilkofski, N., Stavroudis, T., & Nelson, K. (2007). Simulation: Translation to improved team performance. *Anesthesiology Clinic, 25*(2), 301-319.

Institute of Medicine. (1999). *To err is human: Building A safer health system*. Washington, D.C.: National Academy Press.

Jankouskas, T., Bush, M. C., Murray, B., Rudy, S., Henry, J., Dyer, A., et al. (2007). Crisis resource management: Evaluating outcomes of a multidisciplinary team. *Simulation in Healthcare, 2*(2), 96-101.

Kalisch, B., & Kalisch, P. (1977). An analysis of the sources of physician-nurse conflict. *Journal of Nursing Administration, 7*(1), 50-57.

Kameg, K., Mitchell, A., Clochesy, J., Howard, V., & Suresky, J. (2009). Communication and human patient simulation in psychiatric nursing. *Issues in Mental Health Nursing, 30*(8), 503-508.

Konstantinos, N., & Christina, O. (2008). Factors influencing stress and job satisfaction of nurses working in psychiatrics units: A research review. *Health Sciences Journal, 2*(4), 183-195.

Kovner, C., Brewer, C., Fairchild, S., Poornima, S., Kim, H., & Djukic, M. (2007). Newly licensed RNs' characteristics, work attitudes, and intentions to work. *American Journal of Nursing, 107*(9), 58-70.

Kramer, M. (1974). *Reality shock why nurses leave nursing*. Saint Louis: The C.V. Mosby Company.

Lasater, K. (2007). Clinical judgement development: Using simulation to create an assessment rubric. *Journal of Nursing Education, 46*(11), 496-503.

Lasater, K. (2007). High-fidelity simulation and the development of clinical judgment: Students' experiences. *Journal of Nursing Education, 46*(6), 269-276.

Lim, V., & Yuen, E. (1998). Doctors, patients, and perceived job image: An empirical study of stress and nurses in singapore. *Journal of Behavioral Medicine, 21*(3), 269-282.

McConaughey, E. (2008). Crew resource management in healthcare the evolution of teamwork training and MedTeams. *Journal of Perinatal & Neonatal Nursing, 22*(2), 96-104.

McGrath, A., Reid, N., & Boore, J. (2003). Occupational stress in nursing. *International Journal of Nursing Studies, 40*(5), 555-565.

Nehring, W. M., Lashley, F., & Ellis, W. (2002). Critical incident nursing management using human patient simulators. *Nursing Education Perspectives, 23*(3), 128-132.

Nichols, K., Veronica, S., & Searle, J. (1981). An investigation of distress and discontent in various types of nursing. *Journal of Advanced Nursing, 6*(4), 311-318.

Oermann, M., & Moffitt-Wolf, A. (1997). New graduates' perceptions of clinical practice. *The Journal of Continuing Education in Nursing, 28*, 20-25.

Parr, M., & Sweeney, N. (2006). Use of hma patient simulation in an undergraduate critical care course. *Critical Care Nursing Quarterly, 29*(3), 188-198.

Patrick, S. (2000). Managers shoulder burden of retaining staff. *Dallas Business Journal, 23*(5), 87.

Pizzi, L., Goldfarb, N., & Nash, D. (2001). *Chapter 44: Crew resource management and its applications in medicine* (Evidence Reports/Technology Assessment, No. 43 No. 01-E058). University of California at San Francisco: Agency for Healthcare Research and Quality.

Revicki, D., & May, H. (1989). Organizational characteristics, occupational stress, and mental health in nurses. *Behavioral Medicine, 15*(1), 30-36.

Rhodes, M., & Curran, C. (2005). Use of the human patient simulator to teach clinical judgement skills in a baccalaureate nursing program. *Computers, Informatics, Nursing, 23*(5), 256-262.

Rosenstein, A. (2002). Nurse-physician relationships: Impact on nurse satisfaction and retention. *American Journal of Nursing, 102*(6), 26-34.

Rowell, P. (2008). Lateral violence: Nurse against nurse. *ANA Continuing Education,* Retrieved from http://www.nursingworld.org/mods/mod440/lateralabs.htm

Schiavenato, M. (2009). Reevaluating simulation in nursing education: Beyond the human patient simulator. *Journal of Nursing Education, 48*(7), 388-394.

Simpson, K. (2008). Horizontal hostility. *Perinatal Patient Safety, 33*(5), 328.

Siu, H., Spence Laschinger, H., & Finegan, J. (2008). Setting the stage for constructive conflict resolution and work effectiveness. *Journal of Nursing Administration, 38*(5), 250-257.

Sundar, E., Sundar, S., Pawlowski, J., Blum, R., Feinstein, D., & Pratt, S. (2007). Crew resource management and team training. *Anesthesiology Clinics, 25*(2), 283-300.

The Joint Commission. (2009). *Comprehensive accreditation manual for hospitals*. Oakbrook Terrace, IL: The Joint Commission.

Thomas, S. (2003). 'Horizontal hostility' nurses against themselves: How to resolve this threat to retention. *American Journal of Nursing, 103*(10), 87-91.

Ulrich, B., Lavandero, R., Hart, K., Woods, D., Leggett, J., & Taylor, D. (2006). Critical care nurses' work environments: A baseline status report. *Critical Care Nurse, 26*(5), 46-57.

Weller, J. (2004). Simulation in undergraduate medical education: Bridging the gap between theory and practice. *Medical Education, 38*, 32-38.

Williams, M. J. (1999). Nursing 1999: Turmoil, transitioning and triumphs. *Connecticut Nursing News, 72*(4), 18-19.