ENHANCING NURSING EDUCATION: A MULTI-TECHNOLOGY-INTERDISCIPLINARY APPROACH

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Abstract

The purpose of this paper is to discuss the process involved in expanding a nursing education experience by combining an e-curriculum and an interdisciplinary approach. For the past several years, many nursing programs have used computerized patient simulations to enhance nursing students' clinical education. The advantages of simulated scenarios for students, faculty, and patients are multi-factorial and include less student anxiety, decreased risk for patients, and highly controlled role-playing scenarios. These simulations rely on multiple technologies including Human Patient Simulators (HPSs), software, audio and video equipment, and digital recording and playback devices. However, to focus primarily on the ability to mimic clinical scenarios in these exercises seemed to ignore a number of psychosocial educational opportunities for the students and faculty. Consequently, the nursing faculty at a private university in the northeastern United States decided to explore a strategy to increase the educational outcomes from their simulations. Faculty from the Department of Communication were invited to collaborate in a pilot study to expand the course goals, objectives, and outcomes related to human patient simulation exercises. The process involved in strategically planning the changes to the courses, interdisciplinary lectures, actor-assessments, and outcome evaluations are the focus for this presentation. In addition, the psychosocial enhancements to the students' experiences as actors, nursing students and observers will be briefly discussed.

Keywords: Human Patient Simulators, Interdisciplinary, Nursing Pedagogy, Health Communication.

1 INTRODUCTION

Technology is rapidly earning a place in nursing education to enhance the learning environment and meet the needs of 21st century students and faculty. Much of the focus on technology in health education has been on the integration of simulation technology as a method to provide safe and effective patient care, as well as a hands on learning experience for students. Growing shortages of nurses worldwide have put a strain on faculty and clinical resources in the education of new nurses. The increased presence of technology in hospitals combined with more seriously ill patients, from premature infants to frail older adults, require nursing graduates to have a working knowledge of technology to provide care (such as electronic health records or assessment equipment) and communication skills to foster relationships between patients and health care professionals. One of the challenges nursing faculty face is to teach students the clinical and technological skills needed to provide safe and effective care while maintaining sight of the patient amidst the ever increasing technology.

Simulation provides a teaching method which harnesses faculty and student resources, incorporating what learners bring to learning, their individual life experiences, their culture and the digital culture they inhabit in academe. This method allows students to think critically, communicate effectively, and intervene therapeutically [1]. The focus of this paper is to describe an interdisciplinary approach using multiple methods of technology to enhance nursing education.

2 BACKGROUND AND SIGNIFICANCE

The risk of patient deaths and cost related to medication errors in the United States is approximated at 44,000-98,000 deaths per year and in excess of $29 billion dollars [2,3]. Examining this evidence led to the critical report "*Crossing the quality chasm: A new health system for the 21st century*" issued by the Institute of Medicine in 2001 [4]. In another report, the Institute of Medicine defined quality health care as: care that is safe, timely, effective, efficient, equitable, and patient centered [5]. Nationally, health care providers are striving to evaluate practices in order to reduce errors and costs, but more importantly, to improve care for patients.

Miscommunication has been labelled the most common cause of patient injury or death [6]. Nursing schools must provide education on therapeutic communication and assess their students in this important nursing behaviour. Nursing studies have measured students' perceptions of their own communication during simulations, but not how simulations have impacted or enhanced their communication skills education.

Health literacy refers to a patient's ability to assimilate, respond appropriately, and/or make decisions related to the provider's verbal and nonverbal communication. Understanding patients' health literacy is critical to health care provider interactions and achieving mutually agreed upon outcomes. However, without recordings of students' encounters it is nearly impossible for faculty or nursing students to assess the level of health literacy used in the nursing student-patient, or nursing student-family communication.

Given the advantages to faculty and students using innovative teaching methods, a private university in the northeastern United States redesigned the nursing curriculum to integrate simulation-focused pedagogy, across the four-year educational experience. Faculty development workshops designed in partnership with the university centre for academic excellence focused on the effective use of laboratory and classroom technology to enhance student learning.

This research is unique in that it has been developed in collaboration with a Communication professor/physician's assistant who provided two health communication lectures to all students prior to their involvement in the study. The potential impact of the simulation experience on students' communication (verbal and non-verbal) with simulated and standardized patients was assessed.

2.1   Simulations and nursing pedagogy

Today's students are able to adapt readily to the ever-changing technological advances. Many have not experienced life before digital televisions, microwaves, cell phones and personal computers. Students often arrive knowing technology better than faculty and they expect non-traditional teaching methods that incorporate technology [7]. As a result, faculty involved in health care education have embraced the use of clinical simulation as a means to bridge teaching and learning strategies with advances in technology.

Simulations are "activities that mimic reality of a clinical environment and are designed to demonstrate procedures, decision-making and critical thinking through techniques such as role-playing and the use of devices such as interactive videos and mannequins" [8]. In addition, simulation allows for evaluation and assessment of students' psychomotor and communication skills whether as novices or for remediation. Early uses of simulation in the health care field have included medical education such as emergency room, trauma, and anaesthesia scenarios [9, 10]. Similarly, nursing education has used simulation to teach clinical decision-making and to provide more structured experiences in specialty areas [11-14]. Internationally, the use of simulation in nursing education has increased related to lower costs of equipment and software and the acceptance and encouragement of nursing leaders in advocating for this teaching method [15, 16].

2.2   Advantages for faculty and students

This method of teaching, simulation focused pedagogy, allows for the supplement of passive classroom learning so that students are allowed to practice and observe clinical skills, team work, communication, and critical thinking. Using a high-fidelity computer driven human-like manikin, Laerdal Sim-Man®, nursing students learn the physiologic components of patient care, equipment knowledge, technical skills, and the leadership and teamwork needed to successfully deliver exceptional patient care. Schools of Nursing have built learning resource centres that allow for state of the art teaching environments where students can apply skills to solve clinical problems effectively. Through the use of a wide range of clinical scenarios, faculty assess clinical competency and provide immediate feedback regarding students' clinical decisions and actions. Health communication, cultural, and ethical issues are woven into the scenarios to more effectively replicate students' experiences in their clinical sites. Students gain experience by recognizing problems and developing decision-making skills in a "safe" environment. Additionally, students benefit by having the opportunity to refine techniques and procedures and experience clinical cases that may be either frequent or rare in clinical settings. Overall, research demonstrates that this approach enhances student-learning, advances their critical thinking skills, decreases their anxiety, increases their self-confidence and optimizes patient care and safety. Furthermore, nursing students develop teamwork, delegation and leadership skills, practice interactions with health care team colleagues as well as patients and their family members. Exposure

to health communication skills training in patient simulations may lead to smoother transitions from student to employee and increased retention in the workplace. By introducing nursing students to a simulation-based curriculum and increasing their comfort with learning this way, opportunities for future professional development will be open to them.

The increasing student enrolment and need for nursing faculty development in the use and integration of new technology are challenges to the incorporation of patient simulations into nursing studies. To have the greatest impact on student learning, simulation focused pedagogy allows for the curriculum to encompass multiple forms of technology including opportunities for web-enhanced learning. Different from the larger universities' foci on large-scale research studies, this research was focused on providing a model for the incorporation of simulation-based pedagogy to schools of nursing similar in size. In addition, the development of such a program, although involving large amounts of time and energy initially, should actually make the most of faculty resources over time. Finally, simulation provides the opportunity to assess student performance and to evaluate both clinical and health communication skills. Feedback is provided to students by faculty, peers, actors (if live-actors or standardized patients are used), and self-assessment vis-à-vis viewing videotaped recordings of their simulations.

Other advantages for faculty and students with a simulation-focused pedagogy using technology may include:

- Increased continuity between the classroom and the clinical setting.

- Expanded student expertise utilizing technology in the clinical setting including charting and the patient management system.

- Enhanced opportunities for students to practice skills prior to performing them on live patients.

- Increased opportunities for critical thinking skill exercises through the use of scenarios that immediately reveal positive or negative outcomes with no risk to human subjects.

3   RESEARCH QUESTIONS

Can we design a health communication assessment instrument to enhance student use of therapeutic communication skills?

a.   Can simulations be used to enhance health communication skills development?

b.   Can an instrument be developed to assess health communication skills during simulations?

4   THEORETICAL FRAMEWORK

The central component to simulation learning is described in Campbell & Daley's (2009) "Framework for Simulation Learning in Nursing Education" [17, 18] as thinking critically, communicating effectively, and intervening therapeutically. The focus of past simulation research has been on critical thinking and therapeutic intervention. This study is focused on the assessment of the effective communication component.

Pagano and Greiner (2009) describe the application of simulations to enhance nursing student communication, assessment, and education thus: "Using simulations, nursing faculty have the ability to observe, assess, and provide feedback for student-patient, student-peer, and student-team communication in a clinical-type setting, with or without faculty present in the setting. The advantages, from a health communication perspective are multifaceted. Faculty can create simulations that focus on key clinical skills and related communication behaviours. During simulations students can interact in a setting that mimics a clinical experience, without fear of harming a patient, without faculty in the room, but with a "patient" who can talk and provide feedback—both physiologically and interactively. In addition, the simulation can include other members of the healthcare team and/or the 'patient's family members' to further enhance the learning opportunities."[19]

5   METHODOLOGY

To answer the research questions in this study the researchers used content analysis to assess one semester's video- and audio-recordings of patient simulations in two different nursing courses. Students in NS 314, (Nursing Care of Women and the Childbearing Family) and NS 323, (Nursing of

Children and Family) courses for the fall 2009 semester were video- and audio-taped during a total of 19 different patient simulations.

The four researchers independently reviewed the audio- and video-recordings and used content analysis of the observed communication behaviors to determine their findings. Nine of the simulations were in pediatric-related scenarios and ten were in obstetrical/gynecological cases. As part of the health communication content analysis the interactions between nursing students and simulated patients, nursing students and simulated parents, spouses, or family members, and nursing students and nursing students (i.e. student peers who enact the role of another health care provider, such as a nurse assistant) were assessed to determine the effectiveness of the nursing student actors' verbal and nonverbal communication.

6   RESULTS

Content analysis of the 19 audio- and video-recordings was performed to determine if simulation technology could be utilized to enhance development of health communication skills in student nurses. Additionally, the investigators sought to learn if a health communication assessment instrument could be developed to supplement student use of therapeutic communication behaviours. There were a total of 55 different nursing students engaged in the 19 simulations. The 9 pediatric cases had a total of 27 different nursing students involved (as either healthcare professionals or parents of the patient). In addition, the 10-obstetrical/gynecological scenarios had a total of 28 different nursing students (as either healthcare professionals or relatives of the patient). These 19 role-playing examples were analyzed for effective health communication and appropriate interpersonal and leadership communication behaviors.

6.1 Interpersonal communication

"Nursing extensively involves the practice of communicating interpersonally" [20]. Essentially, all areas of health communication require healthcare providers to use dyadic interactions with patients, family members, or other providers. Interpersonal communication for this study refers to "dyadic communication in which two individuals, sharing the roles of sender and receiver, become connected through the mutual activity of creating meaning" [21]. For healthcare providers the importance of interpersonal communication is related to the need to seek and share information, but also to build interpersonal relationships with their patients in order to enhance trust, self-disclose health information, and collaborate in decision-making. While the nursing students in this study were generally adept at introducing themselves to the patient, shaking hands, and introducing themselves to the parent, spouse, or family member at the bedside, they had other interpersonal communication behaviors that were less effective or nonexistent.

In one obstetrical/gynecological simulation the patient complained of dizziness and the nursing student responded, "Your white blood count is up." In a pediatric simulation the baby was crying and the mother asked the nursing student the reason for the baby's tears. The student responded, "She had a little breathing difficulty." When the baby started to cough, the nursing student told her nursing assistant colleague, "Check the pH." Throughout the breadth of simulations very few nursing students attempted to discuss with either the obstetrical/gynecological patient or the mother/grandmother of a baby what was happening, why the patient might be feeling a certain way, or to empathize with either patient or parent. In fact, active listening was clearly absent in a majority of the scenarios. The nursing students were generally busy doing their tasks while the patient or family member was talking and clearly the nursing students were not actively listening. The simulations demonstrated a lack of feedback from the nursing students to increase understanding and diminish miscommunication.

While the nursing students clearly were focused on their clinical skills, they frequently ignored or minimized patient's complaints or concerns. In one of the obstetrical/gynecological simulations, the nursing student asks, "Can you rate your pain from zero to 10?" The simulated patient responds, "11!" However, the nursing student, instead of clarifying or attempting to get more information about the extremely high level of pain, also fails to inquire about the quality or location of the patient's pain. The nursing student then walks away from the side of the bed near the patient's shoulder and goes to the foot of the bed and starts going through the patient's chart. The nursing student's next statement is about the timing of the patient's last morphine injection. In another simulation a pregnant patient says "I started bleeding this morning" and the nursing student responds, "Okay." This example further illustrates both the lack of active listening and any empathy for the pregnant patient hospitalized with vaginal bleeding. The nursing student fails to demonstrate her realization of the patient's situation and

does not illustrate her recognition of the patient's potential fears and concerns about having a miscarriage. This lack of empathy and/or recognition of the dual nature (connotative and denotative meanings) of the patient's messages further served to diminish the nursing students' abilities in these simulations to develop interpersonal relationships with their patients. The nursing student-simulated patient interpersonal communication messages were further impacted by both the verbal and nonverbal behaviors of the nursing student actors throughout the 19 simulations.

6.1.1   Verbal and nonverbal behaviors

Interpersonal, as well as all types of communication rely on the sending and receiving of verbal and nonverbal messages. In health communication research there have been countless studies that have identified many problems with healthcare provider verbal communication that uses technical jargon and/or an inappropriate health literacy level. In the current study, nursing students frequently used language choices that were inappropriate for the patients in the simulations. Examples of a few of the problematic verbal messages in this study include: "I'm going to check your vitals," and "we will give you Narcan for that." In another simulation the nursing student says, "Do you feel like you need some morphine?" and later in the scenario "They're going to dilate your cervix." The use of healthcare jargon and technical verbal messages were clearly inappropriate for the demographics of the simulated patients and were augmented by similarly problematic nonverbal communication.

This study examined the nonverbal interpersonal communication behaviors of the nursing students in the context of a health communication setting. The students' nonverbal behaviors illustrated a lack of haptics, appropriate touch of patients, to demonstrate empathy or concern for the patient's welfare. In addition, the students' use of proxemics, highlighted their unwillingness to stand close to the patient and/or the family member during interactions. Even more interesting was the constant movement by all of the nursing students to the periphery of the room, as far from the patient as possible, when there was a patient problem. Furthermore, the students' vocal tones, paralinguistic features, appeared to signal the student's position of power and expertise and included interruptions of the patient or family member, authoritarian statements, and avoidance of the patient's or family member's questions. The impact of problematic interpersonal communication on health communication in these simulations was easily identified; however, so too were issues related to ineffective leadership communication in both the obstetrical/gynecological and pediatric scenarios.

6.2   Leadership communication

Nurses are expected to be leaders. Whether it is in their day-to-day work with patients, or their role as nurse managers, or their need to respond to a crisis situation—nursing students need to be prepared to assume leadership positions and communicate appropriately. In the simulations analyzed in this study, nursing student actors did little to demonstrate their leadership, except in their power over their patients. In each scenario there was at least one nursing assistant under the direction of the nursing student; however, the nursing student was so focused on the clinical setting and the patient's complaints or needs, that there was little to no interaction between the providers.

In one simulation where there was an emergency, the nursing student called the nurse practitioner before she asked the nurse assistant to take any vital signs or give the patient oxygen. In another obstetrical emergency the nursing student went to hold the patient's hand, but did not ask the assistant to stop the intravenous medication, check vital signs, change the bed position, or apply oxygen. And as soon as the midwife or nurse practitioner appeared in the simulation the nursing students completely withdrew from the interactions, both figuratively and literally—moving away from the patient and toward the periphery of the room.

In fact, during several simulations the nursing assistant took on the leadership role and reminded the nursing student in charge of what needed to be done, or what should be asked. In one simulation the nursing assistant whispered to the nursing student that she needed to ask the patient about her birth control use and encouraged her to highlight the importance of not getting pregnant after her miscarriage. In another simulation the patient had some vaginal bleeding and the nursing student immediately ran for the phone. The nursing assistant said, "I'm going to put the head of the bed down and give her some oxygen." There were however a few examples of the nursing student taking a leadership role and directing the nursing assistant, but these tended to be the exception, rather than the rule in the 19 simulations.

7   DISCUSSION

7.1   Technology and interdisciplinary efforts to enhance nursing pedagogy

This study addressed the key component from the framework of simulation in nursing education of effective communication. The applicability of simulations to enhance concrete student learning of quality and safety issues through effective communication was examined. Simulations allow for practice in high-risk and crisis situations. When crisis situations occur at a clinical site, often students retreat rather than participate. Uniquely, with simulations, students are provided the opportunity to participate, not only in the decision-making and actual care of the patient but also in the interactions with patients and interdisciplinary colleagues. Using simulations nursing faculty are able to use technology in many forms: robotic manikins and software systems, video- and audio-recording of scenarios, and live feed of the simulations into the classroom, to educate students on communication skills.

7.2   Enhancing clinical and health communication skills vis-à-vis technology

Numerous books and research articles have proclaimed the benefits of patient simulations for nursing students and nursing faculty, as well as for other healthcare providers [22]. This study set out to answer the question: can patient simulations also be used to enhance the development of nursing students' health communication skills? And if so, could an instrument be designed that both students and faculty could use to identify effective interpersonal and leadership communication behaviors in a health communication context?

Using an interdisciplinary approach allowed for the examination of nursing students' communication behaviors. Pagano and Greiner have described: "The effectiveness of health communication, generally depends on the success of intrapersonal communication (an individual's communication with her/himself); interpersonal communication (communication between two individuals); and/or small group/team communication (between 3 – 20 people who share a common goal). While observation of communication is possible in traditional clinical nursing education, the evaluation of the communication is difficult, especially in interpersonal or small group situations. Evaluation requires direct observation and interaction, which takes time." [23] This study used technology to assess nursing students in interpersonal communication and small group interaction with computerized and live simulated patients. Video- and audio-recordings of the simulations allowed for multiple viewing and analysis of these interactions and concrete information about both verbal and nonverbal behaviors.

Based on the results of this study we have demonstrated that interpersonal communication, including both verbal and nonverbal behaviors and leadership communication can be observed, analyzed, and used to help enhance nursing students' health communication training. The data demonstrate that patient simulations provide an ideal opportunity for nursing students and faculty to assess and critique nursing actors' health communication effectiveness. Furthermore, the results of this study suggest that a health communication checklist instrument can be developed to assist nursing student actors, colleagues, and faculty to quickly evaluate nursing students' communication skills and effectiveness. This instrument would explore the effective use of interpersonal communication skills, both verbal and nonverbal, as well as the level of health literacy utilized and/or healthcare jargon, and finally the use of effective leadership communication behaviors. The purpose of the checklist would be to help nursing student actors analyze their own communication in the simulation, but also to provide feedback from their colleagues and faculty regarding their roles in the various scenarios. This multi-level feedback process should help nursing student actors, as well as the nursing students in the audience; train their critical lens on the important role of health communication in every nursing-patient encounter.

The value of computerized, video- and audio-recorded patient simulations that can be created to meet nursing faculties' needs for clinical skills education is well documented [24, 25, 26]. However, the opportunity to have those simulations also include health communication behaviors that can be viewed real-time by nursing student colleagues via a live feed to a classroom monitor, or by the actors and faculty at a later time on a DVD connected to either a television or a computer is invaluable to student learning and nursing pedagogy. The use of multiple technologies to accomplish inter-related and interdisciplinary goals provides a unique approach to enhancing the clinical and health communication skills development, assessment, and outcomes for nursing students.

8   LIMITATIONS

The results of this study cannot be generalized at this time. In defence of the student's actions, the authors would like to point out that it is quite common for novice nursing students to be focused on "clinical skills" and to become nervous when they are in frightening clinical situations, as they were in these 19 scenarios. It is difficult for them to "suspend disbelief" with a robotic mannequin and communicate with this "patient" in the same way they would with a live person who has facial expressions and body language that they can read. In addition, the simulations used in this study were at a very high clinical level. Some scenarios may even be appropriate for using with seasoned nurses as a method of professional development. Finally, the students in this study did not know that their "communication skills" were being evaluated and had not received any specific instructions with regard to health communication skills for these scenarios.

9   FUTURE STUDIES

Based on this pilot study, more research is needed to distinguish the effect of simulation on students' health communication skill development. The researchers intend to continue their efforts by using the data from this study to develop a health communication checklist instrument and to test it in future nursing student-patient simulations and validate it vis-à-vis use in a variety of nursing and other healthcare provider (MD, PA, APRN, etc.) programs nationally and/or internationally. Future studies might focus on using video clips of both positive and negative examples of: communication, proxemics, active-listening, and non-verbal behavior, as a method of enhancing student's health communication skills. Students might be allowed to view their own interactions and be allowed time to process, practice, and remediate their skills. Comparisons between groups of students who receive this more specific instruction and who are provided with a health communication checklist instrument in preparation for simulations could be made with students not receiving this instruction. Finally, future studies analyzing the health communication skills of intra-professional providers, especially in crisis and emergent situations, could be conducted.

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