

Making Nursing Mistakes Without Patient Risk: Simulation to the Rescue!

Jayne Smitten, Heather Montgomerie, Yvonne Briggs, Margaret Hadley

Grant MacEwan College

Edmonton, Alberta, CANADA

smittenj@macewan.ca montgomerie@macewan.ca briggsy@macewan.ca hadleyem0@macewan.ca

Resumo: Este artigo objetiva apresentar o potencial da tecnologia de alta fidelidade em simulação como uma ferramenta vital para o ensino da enfermagem. O projeto e implementação de programas efetivos de desenvolvimento educacionais e profissionais são propostos como parte integrante dos sistemas para saúde. Pesquisas adicionais são recomendadas para autenticar estas tecnologias de simulação com vistas a obtenção de melhores resultados e inevitavelmente melhorar a segurança dos pacientes.

Palavras-chave: simulação, sistemas de aprendizagem, enfermagem.

Abstract: Perils to patient safety, the bulk of the responsible errors involving medications, account for unfathomable costs within our healthcare system (IOM, 1999; CPSI, 2003). Patient safety has been and continues to be in jeopardy and is of paramount importance in the Canadian healthcare system. Patient safety initiatives have included examination of current educational strategies and new initiatives to aid in reducing these costly errors as a result of adverse events that were preventable (CPSI, 2003). High-fidelity patient simulation can provide promising patient safety solutions to assist in the teaching and learning environments within nursing educational programs. Faculty teaching and learning initiatives, utilizing the high-fidelity human patient computer-controlled simulation (HHPCS) as an adjunct technology in the Bodnar Simulation Suites of the new Robbins Health Learning Centre in Edmonton, Alberta, have included examining the capabilities to thwart the reality of making mistakes in patient safety, including medication administration errors, without compromising the safety, even potentially the lives, of real patients. Development of new patient safety modules utilizing the HHPCS provides further evidence of its importance as an adjunct technology within the context of nursing educational programs. This paper is presented to promote further discourse on the potential of high-fidelity simulation technology as a vital tool in the future of nursing education. Designing and establishing effective educational and professional development programs in simulation are proposed to be integral to building a safer healthcare system. Further research is recommended to authenticate the role of high-fidelity human simulation technologies in the pursuit of better learning outcomes and inevitably improved patient safety outcomes.

Keywords: simulation, learning systems, nursing.

1 INTRODUCTION

Based on a recent report on medical mistakes from the National Academy of Sciences' Institute of Medicine (IOM), *To Err Is Human: Building a Safer Health System* (1999), the IOM estimates that 44,000 to 98,000 Americans die each year from preventable medical errors. The statistics in the IOM report suggest that medical errors are the eighth leading cause of death among Americans, with error-caused

deaths each year in hospitals alone exceeding those from motor vehicle crashes or breast cancer. In Canada, it is estimated that 9,000 to 24,000 deaths occur each year as a result of adverse drug events (BAKER, NORTON, FLINTOFT et al., 2004) and according to the Committee on Identifying and Preventing Medication Errors, in the United States approximately 1.5 million adverse drug events occur each year (NATIONAL ACADEMY OF SCIENCES, 2006).

What constitutes a medical error in the nursing environment? The IOM report's definition of a medical error may involve a health-care provider, such as a nurse, choosing an inappropriate method of care, such as giving a patient an asthma drug without knowing that he or she was allergic to it. Or it may involve a nurse choosing the right course of care but carrying it out incorrectly, such as intending to administer a diluted potassium chloride—a potassium supplement—to a patient, but inadvertently administering a concentrated, lethal overdose. Indeed, make no mistake, medical errors are extremely costly, predictable and preventable.

How are we proactively educating our nursing students to reduce the likelihood of such preventable mistakes? High-fidelity human patient computer simulation (HHPCS) can offer a realistic solution towards creating a culture of safety within our healthcare educational domains.

Regrettably, many patients are injured or die as a result of health-care errors. The complexity of our healthcare system continually faces challenges that have resulted in the increasing likelihood of errors within the system (CPSI, 2003). Healthcare educational institutions are increasingly aware of preventable, adverse situations that require devisable and workable solutions towards the culture of safety that is fundamental in patient care delivery. High-fidelity simulation technologies can contribute as a workable and realistic solution in the effort to build a safer healthcare environment.

With patient safety a major agenda item on the radar screen of national and international preventative healthcare initiatives in the Canadian healthcare system (NATIONAL STEERING COMMITTEE ON PATIENT SAFETY, 2002; CIHI; CIHR) as well as professional healthcare education programs (CPSI, 2003), it is no wonder that simulation centers are actively investigating educational initiatives that support the efforts in accordance with the principles of effective patient safety programs across the country and, indeed, the world.

High-fidelity human patient computer-controlled simulation (HHPCS) has the potential to be incorporated and effectively utilized from the very beginning of multidisciplinary, multi-specialty healthcare patient safety education programs involving the spectrum from undergraduate, graduate to professional education domains. Efforts in pursuit of effective and efficacious patient safety delivery programs are receiving critical attention. Advanced technologies involving simulation can play a vital role in the development of healthcare programs to prevent patient safety hazards and, therefore, warrant robust consideration in future nursing educational programs.

Many universities are embarking on patient safety initiatives (DUKE UNIVERSITY, MARCH, 2007; NLN, 2006) that have resulted from lessons learned within the clinical environments. The culture of safety has been emphasized as crucial in the healthcare industry. The first Canadian Public Safety Institute was initiated as a result in the early 21st century. In conjunction with the nation's patient safety mandates, the move towards utilizing similar technologies such as those used successfully in the aviation industry, has resulted in attention on high-fidelity simulation in the healthcare industry. Support from a variety of sources (pharmaceutical companies, endorsement by committees on simulation education, mandates by the newly formed international multidisciplinary simulation society) have provided the impetus to include human patient simulation as an adjunct tool for better patient safety education initiatives.

The aviation industry has many similarities to the healthcare industry, both being very complex and reliant on human behavior. Simulation has long been used as an effective educational strategy to prevent injury or death (reference). Nursing high-fidelity simulation has been gaining popularity in the past decade and continues to be explored and now accepted for its diverse role in a variety of specialty nursing domains, including proactively addressing patient safety issues (PATOW, 2005).

The success of effective simulation programs, created as realistic experiential learning events in the spectrum of nursing education, are paramount in the effort to secure patient safety in the future. The integration of advancing equipment and simulation technologies in addition to evolving nursing curriculum development, appears as a natural fit. Creative and realistic teaching and learning events involving the practice of safe and effective medication is just one example of the potential for use of simulation technologies to enhance patient care. Customized medication administration scenarios, involving simple to more complex nursing procedural practice scenarios in the simulated environment, and incorporating the use of the *Situation, Background, Assessment, and Recommendation (SBAR)* tool for improving communication between clinicians related to medication administration (HAIG, SUTTON et al., 2006) have been demonstrated as useful. Further challenges involve the assimilation of teamwork and communication into safety initiatives within the complex healthcare environments.

2 NURSING SIMULATION EDUCATION INTEGRATED WITH PATIENT SAFETY

According to Comer (2005) the use of simulation in undergraduate nursing education is increasing steadily. For the past two decades, evidence of improvements in high-fidelity human patient simulation developments, as leading edge tools, have been designed specifically for the healthcare professional environments. One goal of using this cutting edge, innovative technology is to increase undergraduate nursing students' competency, confidence, and preparedness for clinical practice. These simulations mimic real-life clinical situations. The incorporation of HHPCS into undergraduate nursing curricula has revealed positive impacts on student learning. Early research findings indicate that most students and faculty believe that HHPCS, as an adjunct to current teaching methodologies, offers a valuable, pragmatic and sound approach and recommend it as a mandatory element of

undergraduate nursing education (BREMNER, ADULLELL, BENNET, and VAN GEEST, 2006).

The use of HHPCS in undergraduate nursing education provides a safe teaching and learning environment which enhances and facilitates critical thinking and allows students the opportunity to exercise their problem-solving and decision making skills, communication and teamwork skills by providing students with hands-on, interactive education (McCAUSLAND, CURRAN and CATALDI, 2004; WILFORD & DOYLE, 2006). This hands-on approach has been identified in the literature as resulting in greater learning and retention of learning (FEINGOLD, CALALUCE and KALLEN, 2004; WELLER, 2004; JEFFRIES, WOOLF, & LINDE, 2003; WILFORD & DOYLE, 2006). Students participate in multiple medical scenarios within the simulation lab and are afforded the opportunity to enhance or practice their clinical skills without compromising patient safety (McCAUSLAND et al. 2004; WILFORD & DOYLE, 2006).

It is important for nurse educators in both the academic and clinical settings to incorporate effective teaching methodologies. In the academic setting, the incorporation of HHPCS as an adjunct to the current teaching methodologies can serve as a bridge between theory and practice (LASATER, 2007). For example, the student can observe and monitor cardiovascular effects following the administration of a pharmacological agent such as amiodarone (coradarone) in a controlled, safe environment. Patient safety is a major concern in the clinical setting and according to Patow (2005), within this learning environment, mistakes are not only inevitable, they are expected. Incorporating simulation as a teaching tool provides students with the opportunity to enhance and hone their skills in a repeatable environment in order to correct mistakes without risking patient safety (PATOW, 2005). There is increasing evidence of the capability and value of high-fidelity simulation technology in these types of realistic and critical scenarios that may involve life-threatening patient care situations.

The main and critical advantages of utilizing HHPCS in patient safety educational

initiatives appears to include averting compromise of the patient, replication of realistic scenarios to practice skill development in all domains of learning and preparation for unusual circumstances in the healthcare environments that learners may not have the opportunity to be exposed to and/or practice. Simulation is known to improve learning (GRANTCHAROV et al, 2004). The use of HHPCS allows the learner to be an active participant in the learning process as well as practice skills in a safe, repeatable and realistic environment (BREMNER et al., 2006; FEINGOLD, CALALUCE AND KALLEN, 2004; TREADWELL and GROBLER, 2001; WILFORD and DOYLE, 2006).

The time is ripe to carefully consider the HHPCS in the teaching and learning environments of nursing education for the benefit of all stakeholders concerned with patient safety initiatives. The aforementioned pharmaceutical and patient care delivery endeavors represent the tip of the iceberg in comparison to the whole spectrum of patient safety care initiatives within the culture of safety that can potentially be addressed with high-fidelity simulation technology. High-fidelity simulation design opens up a whole new realm of possibilities for healthcare educational environments.

3 CONCLUDING REMARKS: TO ERR IS HUMAN-TO IMPROVE IS HUMAN

Safety, from the perspective of a safe nursing educational environment to safety for the patient, can be effectively addressed within the context of clinical protocols and effectiveness of procedures in the simulated healthcare environment.

HHPCS can provide promising value, both informally and formally, within the domains of undergraduate, graduate and professional nursing education. This can be accomplished informally with the ongoing evolution of patient safety education initiatives and formally by evaluating the efficacy of patient safety procedures within the healthcare, and specifically, the nursing educational domain. Utilizing HHPCS technologies as a nursing educational strategy has the potential to prevent the errors and adverse events in patient safety environments without risk to real patients.

Advancing and improving patient safety through nursing educational initiatives involving simulation can provide results that may be immeasurable. Indeed, incorporating advancing simulation technologies with the proactive and preventative approach fundamental in patient safety healthcare education circles, embracing the culture of safety, warrants further research and action for future patient safety educational initiatives.

REFERENCES

- BAKER, R., NORTON, P. Making patients safer! Reducing error in Canadian healthcare. *Health C Pap*, 2 (1): 10-30, 2001.
- BAKER, R., NORTON, P., FLINTOFT, V. The Canadian adverse events study: The incidence of adverse events among hospital patients in Canada. *Canadian Medical Association Journal*, 170(11), 1678-1686, 2004.
- BREMNER, M. N., ADUDDLELL, K., BENNETT, D. N., & VANGEEST, J. B. (2006). The use of human patient simulators: Best practice with novice nursing students. *Nurse Educator*, 31(4), 170-174.
- COMER, S. K. Patient care simulations: Role playing to enhance clinical understanding. *Nursing Education Perspectives*, 26(6), 357-361, 2005.
- FEINGOLD, C. D., CALALUCE, M., & KALLEN, M.A. Computerized patient model and simulated clinical experiences: Evaluation with baccalaureate nursing students. *Journal of Nursing Education*, 43(4), 156-163, 2004.
- GRANTCHAROV, T. P., KRISTIANSEN, V. B., BENDIX, J., BARDRAM, L., ROSENBERG, J , & FUNCH-JENSEN, P. Randomized clinical trial of virtual reality simulation for laparoscopic skills training. *British Journal of Surgery*, 91 (2), 146-150, 2004.
- HAIG, K., SUTTON, S., WHITTINGTON, J. SBAR: A shared mental model for improving communication between clinicians. *Journal on Quality and Patient Safety*, 32 (3), 167-171, 2006.
- HASSEN, P., HOFFMAN, C., GEBRAN, J., LEONARD, P., DYCK, J. The Canadian patient safety institute: Building a safer system and stronger culture of safety. *BC Medical Journal* 48(7), 334-338, 2006.
- INSTITUTE OF MEDICINE. *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington: National Academy Press, 2001. Available at:<http://www.nap.educatalog/10027.html>
- INSTITUTE OF MEDICINE. *To Err is Human: Building a Safer Health System*. Washington: National Academy Press, 1999. Available at:http://www.nap.edu/to_err_is_human (accessed December 9, 2007).
- JEFFRIES, PL, WOOLF, S., & LINDE, B. Technology-based vs. traditional instruction. A comparison of two methods for teaching the skill of performing 12-lead ECG. *Nursing Education Perspectives*, 24(2), 70-74, 2003.
- LASATER, K. L. High-fidelity simulation and the development of clinical judgment: Student's experiences. *Journal of Nursing Education* 46(6), 269-276, 2007.
- McCAUSLAND, L. L., CURRAN, C. C. & CATALDI, P. Use of a human simulator for undergraduate nurse education. *International Journal of Nursing Education Scholarship*, 1(1), 1-17, 2004.
- PATOW, C. A. Advancing medical education and patient safety through simulation learning. *Patient Safety & Quality Healthcare*, March/April, 2005.
- TREADWELL, I., GROBLER, S. Students' perceptions on skills training in simulation. *Medical Education*, 23(5), 476-482, 2001.
- WELLER, J. M. Simulation in undergraduate medical education: Bridging the gap between theory and practice. *Medical Education*, 38(1), 32-38, 2004.
- WILFORD, A., & DOYLE, T. Integrating simulation training into nursing curriculum. *British Journal of Nursing*, 15(11), 604-607, 2006.
- WORLD HEALTH ORGANIZATION. *Quality of Care: Patient Safety*, 2002.

WEBSITES

- CANADIAN PUBLIC SAFETY INSTITUTE (www.patientsafetyinstitute.ca)
- INSTITUTE FOR HEALTHCARE IMPROVEMENT (www.ihl.org)
- THE CANADIAN INSTITUTE FOR HEALTH INFORMATION (www.cihi.ca)
- THE CANADIAN INSTITUTES FOR HEALTH RESEARCH (www.cihr.ca)
- THE SOCIETY FOR SIMULATION IN HEALTH CARE (www.ssih.org)
- THE SOCIETY FOR MODELING AND SIMULATION INTERNATIONAL (www.scs.org)