The Simulated Hospital Environment: A Qualitative Study Applying Space Industry Techniques☆

CONSTANCE J. AYERS, PhD, RN*, BRENDA K. BINDER, PhD, RN, PNP, BC†, KAREN C. LYON, PhD, MBA, ACNS, NEA‡, DIANE MONTGOMERY, PhD, APRN, CPNP§, ANNE KOCI, PhD, FNP-BC, WHNP||, and WILLIAM A. FOSTER, BAE¶

Patterned after the integrated simulation approach utilized in the space industry, we report results of an innovative simulation in nursing, a 96-hour continuous simulated hospital environment. Training objectives for our study emphasized the integrative and critical thinking skills needed by new graduate nurses. The purpose of this study was to determine the process for development and the experience of participating in a simulated hospital environment.

We sought to (a) translate space industry-integrated simulation techniques into development of a simulated hospital environment and (b) determine the experience of participating in an integrated simulation experience among undergraduate (UG) and graduate nursing students and nursing faculty.

We used a qualitative mixed-methods design. Data were collected from participant focus groups, debriefing sessions, research team field notes, and electronic health record documentation. The sample, 72 student focus group participants, consisted of 12 baccalaureate-level soon-to-graduate students and 60 graduate nurse practitioner students as patient actors and providers.

Important themes emerged from the project. We were able to design a simulated hospital environment that was true to life. Notably, student knowledge–practice gap was a major theme of the study, consistent with studies of employer concerns of new graduate nurses. (Index words: Nursing simulation; Integrated simulation; Simulated hospital environment; Space industry simulation techniques) J Prof Nurs 31:18–25, 2015.

* Associate Professor and Director of Undergraduate Nursing, Nelda C. Stark College of Nursing, Texas Woman's University.
† Associate Professor and Interim Associate Dean, Nelda C. Stark College of Nursing, Texas Woman's University.
‡ Executive Director, Louisiana State Board of Nursing, Formerly Associate Dean, Nelda C. Stark College of Nursing Texas Woman's University.
§ Associate Professor, Nelda C. Stark College of Nursing, Texas Woman's University.
|| Professor, Nelda C. Stark College of Nursing, Texas Woman's University.
¶ Consultant.
☆This research was supported by a Research Enhancement Program grant from Texas Woman's University. We would like to acknowledge PhD students, Gina Aranzamendez, Stacy Drake, Claudine Dufrene, Krisanne Graves, and Joyce Neumann for their work with the researchers on the development of the simulation script and implementation of the simulation.

Address correspondence to Dr. Ayers: Nelda C. Stark College of Nursing, 6700 Fannin St., Houston, TX 77030. E-mail: cayers@twu.edu
8755-7223

THE TRANSITION PROCESS from nursing student to practicing nurse is complex and challenging for nurse educators, nursing service leaders, and especially the new graduate nurse. Faced with complex, high-acuity patient populations and with environments where there are serious shortages of nurses, new graduate nurses are often confronted with challenges well beyond their entry-level preparation (Benner, Sutphen, Leonard, & Day, 2010; Berkow, Virkstis, Stewart, & Conway, 2009; Burns & Poster, 2008; Del Bueno, 2005).

The pressures of the health care environment lead to high-risk potential for medical errors (Institute of Medicine [IOM], 2010). A highly complex health care environment, with nursing and nurse faculty shortages, coupled with the nursing expertise gap in clinical practice create concerns for patient safety and legal liability. As a

http://dx.doi.org/10.1016/j.profnurs.2014.06.002

result of these concerns, nursing students do not have the opportunity to develop the critical thinking, clinical decision making, caring practices, and organizational skills needed for entry-level practice while still in the academic environment. Student clinical learning experiences have become increasingly observational. Further, in the face of nursing and nurse faculty shortages, the support of student clinical learning experiences is increasingly burdensome to nurses who already have complex and heavy assignments. Consequently, clinical learning experiences in nursing no longer function the way they were intended.

For years, employer feedback of newly licensed nurses has indicated growing concern about readiness for practice (Berkow, Virkstis, Stewart, Aronson, & Donohue, 2011; Berkow et al., 2009; Dyess & Sherman, 2009; Smith & Crawford, 2003). This alarming crisis was illustrated by Berkow et al. (2009) who found that only 10% of nursing service executives rated new graduate nurses as well prepared for practice.

Simulation has shown promise for the development of skills needed for nursing practice. Although much information about the use of simulation activities is available in the nursing literature, research on the effectiveness of simulation on actual preparation for practice is lacking. Studies suggest improvement in assessment skills (Walshe, O'Brien, Murphy, & Hartigan, 2013), confidence (Burns, O'Donnell, & Artman, 2010; Hicks, Coke, & Li, 2009; Jeffries & Rizzolo, 2006; Laschinger et al., 2008; Smith & Roehrs, 2009), knowledge (Burns et al., 2010; Lindsey & Jenkins, 2013; Sharpnack, Goliat, & Rogers, 2013; Shinnick, Woo, & Evangelista, 2012), critical thinking (Schlairet & Pollock, 2010), and patient safety practices (Ironside, Jeffries, & Martin, 2009). In an integrative review, Weaver (2011) reported conflicting results of simulation studies, especially related to critical thinking. Hicks et al. (2009) reported decreases in knowledge after simulated experiences and concluded that "the perceived abilities and confidence of participants are of no value if higher level problem solving, decision making and psychomotor skills are not evident through replication in clinical practice" (Hicks et al., 2009, p. 19). There is currently no evidence available that shows that improvements transfer to the integration competencies needed for actual practice. According to Shinnick et al. (2012), technology advancements have exceeded evidence (p. 42).

A paucity of literature examines the use of multiple patients in simulation. Sharpnack et al. (2013) designed a leadership simulation using multiple patients; however, the simulation was a 1-hour experience for the students and did not include the dynamics of a true simulated hospital environment where multiple patients' needs required continuous attention as they would in a real hospital environment. Similarly, Ironside et al. (2009) investigated students' patient safety competencies using a multi-patient simulation. However, students participated in groups of five, and the scenarios lasted only 20 minutes followed by debriefing. In both studies, the very short length of the simulations limited the ability to achieve the complexity needed to challenge students' analytical and priority setting skills consistent with the realities of the health care environment. No evidence exists in the literature that reports the development of complex simulated hospital environments that exercise the abilities needed by nurses to care for multiple patients whose needs evolve over time. We question whether it is possible to simulate the true experience of caring for multiple patients in a realistic environment without a longer timeline where patient conditions can change and develop. Shorter intervals, used in all of the studies reviewed, do not allow for the aspect of dealing with the complexity of an entire shift and the ups and downs that occur over such a period.

Further, the predominant use of high-fidelity human patient simulators in nursing education studies emphasizes the recognition of physiological changes in patient status to the exclusion of the relational aspect of care, which is arguably the centrality of nursing. Even with this use, single-patient scenarios offer limited training related to recognition of physiologic issues, not the higher level critical thinking and decision-making skills needed for the type of practice that a typical nurse encounters on a day-to-day basis. Most studies of simulation in nursing mirror the use of simulation by the medical community, not the uniqueness of nursing practice.

Diener and Hobbs (2012) argued that the reciprocity of the nurse–patient relationship calls into question the dependence on simulators as a central aspect of nursing education. Finally, Dunnington (2014) questioned the appropriateness of high-fidelity human patient simulators in nursing education, asserting that "humans are qualitatively different from mathematized machine representations" (p. 15). The author maintained that the historical use of simulator mannequins for procedural learning has always been appropriate (because this learning is also mechanical); however, the use of simulators to learn interpersonal and therapeutic communication, critical thinking and clinical judgment, and other complex nursing skills goes beyond the capabilities of computerized mannequins.

The IOM report, *The Future of Nursing*, insisted, "major changes in the U.S. health care system and practice environment *will require equally profound changes in the education of nurses* (emphasis added) both before and after they receive their license" (IOM, 2010, p. 6). We are reporting the results of a new approach to simulation in nursing.

Purpose

The aims of this qualitative study were to (a) translate space industry-integrated simulation techniques into development of a simulated hospital environment and (b) determine the experience of participating in an integrated simulation experience among UG and graduate students and nursing faculty.

Method

We used a qualitative descriptive design employing mixed qualitative methods for this study. Data were collected from participant focus groups, post-simulation faculty and doctoral student evaluative sessions, research team