ABSTRACT

The purpose of this article is to describe how our college of nursing began to integrate patient safety instruction into simulation experiences for undergraduate nursing students. A system for evaluating and grading students was developed. Data on student safety behaviors were collected before and after implementation of instruction designed to improve adherence to hand washing and patient identification procedures. In the first semester in which data were collected, students did not demonstrate satisfactory performance of either hand hygiene or patient identification 61% of the time. After instruction, students still did not perform these procedures consistently 38% of the time. Lessons learned and future plans for addressing these problems with basic patient safety behaviors are discussed.

Since the Institute of Medicine’s (IOM) publication of *To Err is Human* (Kohn, Corrigan, & Donaldson, 1999), health care agencies have struggled to address the concerns identified in the report. Nowhere is this more apparent than in hospitals, where system complexity has increased in response to escalating patient acuity. Ironically, that same system complexity has the potential to both positively and negatively affect patients. The 21st century hospital is a paradox of life-saving technologies and life-threatening potential errors. Among the problems that patients may experience, many are related to infection control procedures and adverse medication events. At the heart of infection control is adequate hand washing, and the prevention of medication errors begins with proper patient identification procedures. Quality and safety initiatives, as outlined by the IOM and other patient advocacy organizations, require active involvement by nurses. Smith (2006) noted that given that nurses are the largest group of health care providers, they hold the key to making the majority of the practice changes called for by the IOM.

The potential and actual role of simulation in helping to establish health care provider patient safety behaviors has become a frequent theme in medical and nursing literature. Within medicine, the field of anesthesia has had the most success to date in demonstrating how a series of seemingly small things can make a huge difference in patient safety (Leape, Berwick, & Bates, 2002) and how simulation can be used to teach those behaviors and practices (Friedrich, 2002; Jankouskas et al., 2007). Even in undergraduate nursing education, simulation is now known to have the potential to influence those tasks that nurses must learn to ultimately keep patients safe (Morgan & Cleave-Hogg, 2005).

In nursing skills laboratories of old, students and faculty were encouraged to pretend they were performing the steps of a particular procedure on a patient. Today’s simulation laboratories are built to allow the student to suspend disbelief. The goal is to have the environment be authentic enough for the student to incorporate real nursing practices into their learning. The nursing student who has to continue to imagine aspects of patient care in the laboratory will not be in a position to know what to do in the genuine clinical environment. The purpose of this article is to describe how we began to integrate patient safety instruction into our simulation experiences for our undergraduate nursing students and the outcomes of that instruction. We will also outline lessons learned and future plans.

Background

East Carolina University College of Nursing relocated to the new Health Sciences complex in July 2006. Prior to that time, the Concepts Integration Laboratories and Executive Director, Learning Technologies and Labs, East Carolina University College of Nursing, 600 Moye Blvd, 2137 HSB, Greenville, NC 27858; e-mail: ganttl@ecu.edu.

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tion Laboratory had been housed entirely in one room. The move to the new building allowed the Concepts Integration Laboratory to expand from one to eight labs. In the old Concepts Integration Laboratory, there had been one SimMan™ adult human patient simulator, one birthing simulator, and one VitalChild medium-fidelity human patient simulator. Because of the size of the laboratory at that time, the human patient simulator had received minimal use. With the move into the new building, the Concepts Integration Laboratory now houses several infant, child, and adult human patient simulators, in addition to a variety of static models, manikins, and task trainers.

Scenario Implementation

Beginning in the fall of 2006, faculty, Concepts Integration Laboratory, and Instructional Technology staff first collaborated to develop five critical thinking scenarios for use in evaluating graduating senior nursing student competency in areas such as blood administration, tracheostomy suctioning, and intravenous therapy. Students in the senior clinical capstone course from fall 2006 ($N = 84$) and spring 2007 ($N = 110$) completed evaluative nursing clinical simulations. Using SimMan, students were randomly assigned to one of five 30-minute clinical scenarios and were evaluated using a competency checklist. Each simulation encompassed an average of 2 or 3 skills sets. Competency checklists for each scenario were adapted from materials obtained from another school of nursing where they have been used in conjunction with skills and simulation evaluation. These competency checklists were previously reviewed and evaluated for content validity (C. Durham, personal communication, September 25, 2006). Each checklist contains well-established patient safety practices, such as hand washing, patient identification, and patient allergy verification before medication administration. Checklist sample 1 (Table 1) contains examples from the checklist that was used during a blood administration scenario.

To ensure checklist inter-rater reliability, course and simulation faculty developed a grading system to accompany the checklists. During the scenario, faculty used the appropriate checklists to mark actions that students did or did not complete. The grading system varied by scenario because each scenario encompassed different skills. Scores were determined at 5-point intervals. For example, one to three omissions of a component of a skill, such as hand washing and gloving, would result in a grade of 95, whereas four to six errors would result in a grade of 90. Each student was debriefed following the scenario. The completed competency checklists were used to guide the debriefing, during which areas of student strength and concern were discussed. Patient safety behaviors were among the issues discussed with each student at debriefing. Students who received a score of 80 or less on their scenario checklists were required to be re-evaluated on a second randomly chosen scenario. Initially, student critical thinking abilities were evaluated by means of the scenario itself. For example, student reactions, problem solving, and reasoning skills were documented in the context of deterioration in patient (human patient simulator) condition. However, between the fall and spring semesters, the faculty elected to develop a separate patient care delivery critical thinking checklist. Checklist sample 2 (Table 2) contains part of the patient care delivery checklist.

Data Collection and Results

During the scenario development phase, the Concepts Integration Laboratory faculty and staff did not anticipate the need to focus on patient safety as a specific component of concern or student evaluation. Clinical laboratories in the first-semester and second-semester junior year focus on these concepts via faculty-supervised practice and subsequent competency checks for each student in hand washing and patient identification in medication administration skills. Shortly before the beginning of the evaluation scenarios, the senior capstone students received the checklists and related literature and had several weeks to review the materials. Students also received a brief simulation laboratory orientation, which included discussion of the set-up of the human patient simulator to mimic a patient care situation and condition and to assist students with location of supplies and sinks or hand sanitizer. To review the retrospective student checklist data, institutional review board approval was sought and obtained.

### Table 1

<table>
<thead>
<tr>
<th>Blood Administration</th>
<th>+/-</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wears professional attire and exhibits appropriate presentation as a nurse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Checks order in chart and MAR—assesses for premedications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ensures complete provider order (signature, date, time order, and legible)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reviews chart for signed and informed consent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performs hand hygiene</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduces self and procedure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identifies client (ID band and client verbalization of name and DOB)</td>
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<td></td>
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</tbody>
</table>

Note. MAR = medication administration record; ID = identification; DOB = date of birth.
After completion of the fall 2006 semester, the Concepts Integration Laboratory faculty randomly reviewed 42 of the 84 student scenario checklists. The purpose of the review was to evaluate the checklists, the scenarios, and their implementation in the laboratory and to propose improvements for the spring semester. In reviewing the checklists, the Concepts Integration Laboratory faculty were surprised that students had frequently omitted common patient safety practices. A more thorough review related to hand washing and proper patient identification procedures revealed that for those checklists reviewed, students failed to demonstrate satisfactory performance of one or the other procedure 61% of the time. Twenty-five percent of students had not correctly performed either hand washing or patient identification procedures.

For the hand washing procedure only, students either failed to wash their hands at required times or performed the hand washing in a less than satisfactory manner 45% of the time. Students sometimes failed to perform hand hygiene more than one time in the same scenario. Forty percent of students omitted patient identification as a required step in their scenarios.

When the faculty and Concepts Integration Laboratory staff met concerning changes to the scenarios for the 2007 spring semester, student omissions of routine patient safety practices during the fall semester were also discussed. It was thought that students might need some time to adjust to the new laboratories and the associated changes in performance expectations. Prior to the move, laboratories had been conduct ed with large groups in cubicles away from sinks or hand hygiene stations. However, it was agreed that certain changes would be implemented during spring semester to address the patient safety practice issues. The changes were:

- Increased time for laboratory orientation.
- Demonstration of patient safety practices and expectations during laboratory orientation by faculty.
- Discussion of patient safety practices and expectations during regular lecture time.
- Increased emphasis on patient safety practices in written course materials, general open laboratory practice, specific open laboratory practice times for senior capstone students, and review of student scenarios in class.
- Increased opportunity for open laboratory practice, including special open laboratory times for capstone students.
- Increased availability of faculty, staff, and graduate assistants during open laboratory time to facilitate supervised practice.
- Relocation of senior scenarios to earlier in the semester to decrease stress and to allow practice and review of posted materials prior to the beginning of the clinical practicum.
- Smaller student numbers for each laboratory orientation.
- More attention to documentation of issues by faculty during student scenarios to allow further analysis.

After the spring 2007 semester, all 110 student scenario checklists were reviewed by the Concepts Integration Laboratory faculty. Forty-eight percent of students had omitted hand washing, patient identification, or both in the course of their scenarios. Thirty-eight percent of students had missed one or more required opportunities for hand washing, and 22% had omitted a patient identification check one or more times.

Conclusions and Future Directions

Although our data on student patient safety behaviors indicate progress between the fall 2006 and spring 2007 semesters, there is still much room for improvement. We continue to analyze why our interventions have not proven to be more successful. There may be some parallels to the challenges we have faced in hospital settings and other health care settings. Structured hand hygiene programs for health care practitioners are known to improve compliance; however, compliance rates deteriorate as time passes after the educational intervention (Raskind, Worley, Vinski, & Goldfarb, 2007). Some studies in practice arenas have shown that compliance rates may never improve at all, even after the introduction of a new program or intervention. In a study designed to test the effects of a new hand hygiene spray on compliance, the researchers found that although health care workers expressed concern about antimicrobial resistance and spread of infections through improper hand hygiene, they continued to revert to previous behaviors; compliance rates prior to the intervention were suboptimal at 53% and continued to decline to 49% after the intervention (Siegel & Korniewicz, 2007).
For student and new graduate nurses, compliance with hand hygiene and other patient safety practices may be particularly difficult. Ebright, Kook, Moody, and Latif Hassan Al-Ishaq (2006) found that novice nurses seem unable to effectively balance the characteristics of complex environments; they are often distracted by concrete aspects of work, and miss the more abstract cues that would enable them to be mindfully attentive to complexity.

These authors have suggested that one way to influence health care performance is through the application and teaching of vigilance, which is the intentional and knowledgeable watchfulness of the patient, the environment, and one’s own thinking (Ebright et al., 2006).

Our Concepts Integration Laboratory staff and senior capstone faculty continue to discuss whether we should make certain items in our scenarios, such as hand washing or patient identification, mandatory for the student to pass the scenario. During the fall 2007 semester, scenarios were still used to evaluate the student’s performance, but students who did not achieve a satisfactory score repeated a second scenario to facilitate their learning and reinforcement of key concepts.

It had been our plan to consider not using checklists for our simulations on an indefinite basis, but the checklists help clearly identify concepts for satisfactory completion of each competency, including those related to patient safety. Each semester, we have added to those tools available to help students prepare for the scenarios and to appreciate the importance of patient safety within those scenarios. For example, videotaping of scenarios with faculty demonstrating both the student and faculty roles and actions were used last semester to allow students to better visualize how scenarios evolve and the expectations within them. We may consider including additional hand hygiene or patient identification surveillance activities during simulation activities at all levels. Snyder (2008) suggested that nurses be required to audit each others’ hand washing compliance over the course of a few shifts. It might be possible to build this sort of audit into simulation scenarios.

Future data collection from our simulation scenarios will include other patient safety practices. For example, during subsequent semesters, the Concepts Integration Laboratory faculty and staff noted that students often do not verify allergy information with their simulated patients. The types of scenarios we have used to date require that allergy information of some type should be checked because all of them involve giving medications or placing devices such as intravenous or urinary catheters.

In the current environment of professional accountability, new graduate nurses must enter the clinical arena prepared to exhibit practices that maintain patient safety. Recent attention to hand hygiene as a patient safety issue has motivated extensive interventions and programming by national and international agencies such as the World Health Organization and Joint Commission on Accreditation of Healthcare Organizations (Pashman et al., 2007). Some institutions already have “hand washing police”—employees who are paid to monitor health care providers to ensure that hand hygiene is done consistently in the interest of prevention of nosocomial infections. Patient identification errors may contribute to patient death, legal action, and subsequent disciplinary action by the employing institution or licensing agencies.

Simulation poses a tremendous opportunity for teaching nursing students patient safety, as long as we clearly define and maintain a standard for performance of certain competencies. In the simulation laboratory, students can repeatedly practice skills such as hand washing and patient identification until these skills become second nature. We also look forward to the ongoing efforts of the Quality and Safety Education for Nurses Project (http://www.qsen.org). This project, funded by Robert Wood Johnson and operated out of the University of North Carolina at Chapel Hill, has the goal of reshaping professional identity formation in nursing to include commitment to quality and safety competencies recommended by the IOM. Best practices for teaching students patient safety behaviors will be identified through this project and others.

References


