ABSTRACT

Background: Little evidence exists on the effectiveness of simulation-based education within pharmacy education. The pharmacy curriculum at the University of Pittsburgh School of Pharmacy includes experiential-learning rotations during the final year of training. The objective of this study is to assess impact of simulation-based learning on clinical pharmacotherapy skills related to treatment of dysrhythmias of fourth-year pharmacy students on acute care clinical rotation.

Methods: Approval was obtained from the University of Pittsburgh Institutional Review Board to perform this single-center, prospective, case-control study of fourth-year University of Pittsburgh School of Pharmacy students on acute care experiential rotation. Student enrollment was voluntary and withdrawal from the study was permitted at any time. Participating students were assigned to usual experiential teaching (control group) or simulation-based learning (intervention group). In order to determine and compare the level of clinical pharmacotherapy skills of pharmacy students, a face-validated survey and test were administered to the control and intervention groups at the beginning and end of their experiential rotations. This test measured student knowledge, confidence, and experience caring for patients with various dysrhythmias.

RESULTS

A total of 22 fourth-year pharmacy students were enrolled in the intervention group; 12 females (55%) and 10 males (45%). The control group was composed of 18 students; 11 females (61%) and 7 males (39%). A statistically significant improvement (p<0.05) occurred in the intervention group when compared to the control group. Student post-rotation test scores were improved in the intervention group compared to the control group as well. The test was voluntary and withdrawal from the study was permitted at any time. Participating students were assigned to usual experiential teaching (control group) or simulation-based learning (intervention group). In order to determine and compare the level of clinical pharmacotherapy skills of pharmacy students, a survey and test were administered to the control and intervention groups at the beginning and end of their experiential rotations. Retention of skills and knowledge was assessed by administering the survey and test to both groups six months after the end of the experiential rotation. Outcome measures included pre- and post-rotation test responses for each study group, measured using percent correct, and six-month follow-up test and survey scores for the intervention and control groups reported accordingly. Within group pre- and post-test rotation test scores were compared using a paired t-test.

Survey and Test

A pre-simulation survey and test was given to each student during the first week of rotation and an identical post-simulation survey and test was administered during the last week of experiential rotation. Results were collected by investigators with student identification in order to assess changes in survey and test scores. Scores from both surveys were compared for statistical analysis. The survey assessed the students’ opinions of their clinical skills, clinical responsibility, and confidence in caring for patients as well as their confidence in learning in a simulation environment. Student post-rotation test scores improved after simulation-based learning when compared to usual experiential teaching. Students undergoing simulation-based learning perceived that their post-simulation skills and knowledge, and their confidence in caring for patients increased compared to usual experiential teaching. The intervention group measured using percent correct, and six-month follow-up test and survey scores for the intervention and control groups reported accordingly. Within group pre- and post-test rotation test scores were compared using a paired t-test.

CONCLUSION

Fourth-year pharmacy students on acute care experiential rotation who were able to apply pharmacotherapeutic concepts in a controlled patient simulation environment. Student post-rotation test scores improved after simulation-based learning when compared to usual experiential teaching. Students undergoing simulation-based learning perceived that their post-simulation skills and knowledge, and their confidence in caring for patients increased compared to usual experiential teaching.

INTRODUCTION

Simulation-based learning (SBL) has become a part of training for physicians, nurses, and other healthcare professionals in recent years. SBL was found to be superior to problem-based learning (PBL) in teaching students medical care assessment and management skills. In nursing students, a study revealed that a human patient simulation improved learning outcomes, increased knowledge, ability, and confidence in caring for patients who are experiencing a critical injury in their learning in an improved patient safety, since it approximates the patient’s right to receive quality care without being compromised by training needs.1 Simulation research at the University of Pittsburgh Department of Anesthesiology began in 1993, examining simulation training within the Global Patient Simulator (GPS) Winter Institute for Simulation, Education, and Research (WISER), located on the University of Pittsburgh Medical Center (UPMC) campus, which includes more than 10,000 doctors, nurses, paramedics, medical students, and other health care professionals. The WISER Center features advanced simulation technology to develop innovative medical education programs that are ultimately targeted towards improving the public medical safety. The WISER Center has developed the 3D environment to include interactive human simulation, computer-based simulation, Internet, and video imaging systems.

METHODS

This single-center, prospective, case-control study of fourth-year University of Pittsburgh School of Pharmacy students on experiential rotations. Student enrollment was voluntary and withdrawal from the study was permitted at any time. Participating students were assigned to usual experiential teaching (control group) or simulation-based learning (intervention group). In order to determine and compare the level of clinical pharmacotherapy skills of pharmacy students, a survey and test were administered to the control and intervention groups at the beginning and end of their experiential rotations. Retention of skills and knowledge was assessed by administering the survey and test to both groups six months after the end of the experiential rotation. Outcome measures included pre- and post-simulation test responses for each study group, measured using percent correct, and six-month follow-up test and survey scores for the intervention and control groups reported accordingly. Within group pre- and post-test rotation test scores were compared using a paired t-test.

INTRODUCTION

Based upon reviews of studies in medical students and nurses, the expansion of SBL to fourth-year pharmacy students on acute care clinical rotation. The assessment of simulation-based learning in fourth-year pharmacy students was performed using MEDLINE with the following search terms: simulation, SBL, pharmacy, and pharmacy students. No studies examining SBL in fourth-year pharmacy students on experiential rotation were found. The mean post-rotation scores were 70% and 46% in the intervention group and the control group, respectively. A significant difference favoring the intervention group was noted when comparing post-rotation scores (p<0.05). Within group comparison of test scores in the intervention group indicated a statistically significant improvement (p<0.05), however, no statistically significant improvement was noted when assessing control group test scores (p=0.478).

RESULTS

Overall, 100% of the students in the SBL group showed improvement in objective test scores and only 20% of students in traditional rotations showed improvement, p<0.05. The intervention group survey responses about confidence in caring for patients improved from 77% to 91%, with more students reporting that they are somewhat confident during the post-survey. The control group’s confidence in caring for patients did not change during their experiential rotation. When asked about nervousness in caring for a patient, 27% of the intervention group initially reported being extremely nervous, this improved by 3% on the post-survey. Twenty percent of the control group initially reported being extremely nervous in caring for a patient; this improved by 10% on the post-survey.

REFERENCES