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Measuring High-Fidelity Simulation Instruction: Its Effects to Knowledge, Skills, and Attitudes Towards Patient Safety

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Introduction

- Patient safety serves as one of the top priorities in determining and measuring quality patient care outcomes.

- Citing mounting evidence of errors in many healthcare settings, The Joint Commission, the Institute of Medicine (IOM), advocated a reinvigoration of health professionals' knowledge, skills, and attitudes (KSAs) towards patient safety (Mitchell, 2008).

- One recommended approach to reducing such patient safety errors as may be endemic to the clinical environment is to improve healthcare professionals' knowledge, skills, and attitudes (KSAs) towards patient safety (Blum & Parcell, 2012; Barnsteiner, 2011). This need reinvigorated the primacy of patient safety in nursing education.

- The educational training of nurses necessitates the development of critical thinking and clinical judgment to help ensure a culture of safety in healthcare (Kaddoura, 2010).

- Experts in nursing practice and nursing education both recommended the use of scenario-based high fidelity patient simulation (scenario-based HFPS) in teaching and assessing the acquisition of professional KSAs towards delivering safe patient care (Barnsteiner, 2011; Ginsburg, Castel, Tregunno, & Norton, 2012).

- To consider scenario-based HFPS as an effective learning pedagogy, unbiased evidence regarding actual gain in knowledge is necessary as well as acquisition of skills and attitudes toward patient safety that helps enhance the understanding regarding the use scenario-based HFPS as a pedagogy in the undergraduate nursing program (Shearer, 2013).

Research Question

What difference exists between the posttest scores in knowledge, skills, and attitudes towards patient safety among the beginning nursing students who participated in the scenario-based HFS instruction and those who did not participate as measured by Health Professional Education in Patient Safety Survey (H-PEPSS) tests in a private accelerated baccalaureate nursing program in the Western United States?

Purpose

- The purpose of this quasi-experimental non-equivalent control pretest-posttest study was to determine if there was a statistically significant difference in the posttest scores of knowledge, skills, and attitudes towards patient safety between the beginning nursing students who participated in a scenario-based HFS instruction and those who did not participate as measured by Health Professional Education in Patient Safety Survey (H-PEPSS) tests in a private accelerated baccalaureate nursing program in the Western United States.

Methodology of the Study

Design: Quasi-experimental nonequivalent control posttest design

Sampling Design/Subjects: Non-probability convenience sampling
Samples: Introductory *Medical-Surgical Nursing* students of an accelerated nursing program in Western United States as samples.

Sampling Size Determination: Using a G*Power 3 priori power analyses program with effect size of 0.4, *p* level of 0.05, and a power of 0.80 resulted in total sample of 156 subjects with 78 students were randomly assigned in both the control and treatment group of the study.

Age of the Samples

Gender Of The Samples

Race

Data Analysis

- The data analyzed were scores from the H-PEPSS survey posttest instrument.

- In analyzing the scores collected through the H-PEPSS questionnaire, all of the individual responses to the 16 question statements corresponding to the six patient safety factors categories were analyzed.

- The sum of each question statement was added together to form a sum for knowledge in patient safety category, skills in patient safety category, and attitudes in patient safety category.

- The sum of knowledge, skills, and attitudes towards patient safety categories were then divided by the total number of scores for each category to obtain the mean.

- The analysis started using descriptive statistics in obtaining the aggregate means and standard deviation for the treatment and control groups followed by analysis of mean difference using independent t-test.

- T-test was used in determining if there was a statistically significant difference in knowledge of patient safety, skills in patient safety, and attitudes towards patient safety between the treatment and control group. An independent *t*-test was performed to analyze the difference between the experimental and control group posttest scores.

Results

Results of T-Test and Descriptive Statistics for Knowledge, Skills, and Attitude Toward Patient Safety

Outcome	Group						t	P-Value
	Treatment			Control				
	Mean	SD	n	Mean	SD	n		
Knowledge of Safety	4.23	0.97±	77	3.91	1.32±	78	4.32	0.017*
Skills of Safety	4.26	0.97±	77	3.93	1.31±	78	4.41	0.01*
Attitude of Safety	4.29	0.96±	77	3.99	1.34±	78	3.54	0.0004*

SD= Standard Deviation   * p < .05

Based on the mean posttest scores, there was a statistically significant mean difference in knowledge, skills, and attitudes towards patient safety between the treatment and control group.

Results

- An independent *t*-test was performed to analyze the difference between the experimental and control group posttest scores.

- There was a significant difference between the groups on their mean scores. The *t*-value was at 4.32 at 0.05 significance level for knowledge towards patient safety, while the *t*-value was at 4.41 at 0.05 significance level for skills of patient safety and the *t*-value was at 3.54 at 0.05 significance level for attitudes towards patient safety.

- This study found that there was a statistically significant difference in the knowledge, skills, and attitudes towards patient safety in the mean posttest scores between the beginning nursing students who participated in the scenario-based HFS and those beginning nursing students who did not participate in the scenario-based HFS.

- Thus, providing further legitimacy to the efficacy of scenario-based HFPS as a teaching pedagogy (Gates et al., 2011).

Results
Descriptive Statistics and t-test for Treatment Group

Outcome	Pretest		Posttest		t	df
	M	SD	M	SD		
Knowledge Towards PS	24.36	4.50±	25.4	56.9±	0.96	76
Skills Towards PS	20.12	4.23±	19.97	6.23±	0.67	76
Attitude Towards PS	20.07	4.29±	19.97	6.52±	0.13	76

* p< 0.05 (Two-Tailed); PS = Patient Safety; SD = Standard Deviation; M = Mean

Results
Descriptive Statistics and t-test for Control Group

Outcome	Pretest		Posttest		t	df
	M	SD	M	SD		
Knowledge Towards PS	24.2	5.19±	25.4	5.21±	- 1.42	77
Skills Towards PS	20.21	4.81±	21.16	4.59±	- 1.20	77
Attitude Towards PS	19.97	4.44±	21.86	4.40±	-2.02	77

* p < .05 (Two Tailed); PS = Patient Safety; SD = Standard Deviation; M = Mean

- The posttest mean scores for knowledge of patient safety in the treatment group was 4.23 (SD = 0.97 ±). The posttest mean score for knowledge of patient safety in the control group was 3.91 (SD = 1.32 ±).

- The posttest mean score for skills of patient safety in the treatment group was 4.26 (SD = 0.97 ±). The posttest mean score for skills of patient safety in the control group was 3.93 (SD = 1.31 ±).

- Finally, the posttest mean score for attitudes towards patient safety in the treatment group was 4.29 (SD = 0.96 ±) and the posttest mean score for attitudes towards patient safety in the control group was 3.99 (SD = 1.34 ±).

- Thus, the posttest mean score for those in the treatment group was higher than those in the control group with regards to knowledge, skills, and attitudes towards patient safety.

Recommendations

- The evidence provided by this study came from the students' perspectives, therefore broader study that may include the use of faculty observed performance using an evaluation tool that focuses more on student's acquisition of KSAs towards patient safety is necessary (Blum & Parcells, 2010).

- To determine if knowledge retention and the transferability of knowledge and skills can be acquired with the use of scenario-based HFS pedagogy, a replication of this study using a longitudinal design combining faculty and student evaluation with regards to the acquisition of KSAs relevant to patient safety in both the simulation and clinical settings is necessary.

- Since the study was limited to one particular group of nursing students and one type of nursing program, the evaluation of scenario-based HFS using a broader demographic of nursing student population, including students from traditional baccalaureate and associate degree nursing programs may be necessary.

Conclusions

- The results of this study may add to the existing literature through providing evidence that will support the importance that use of alternative teaching pedagogy such as scenario-based HFS can be utilized at its highest potential.

- The understanding that the use of scenario-based HFPS provided significant difference towards students' acquisition of KSAs towards patient safety, stakeholders in both nursing education and practice, faculty, and students may have a better understanding of its important, its much needed incorporation in the undergraduate nursing curriculum, and as a vital teaching and learning tool in the undergraduate nursing program to meet certain learning objectives.

- The result of this study may lessen the resistance of HFS use due to its cost. The results of this study may also help justify further use of scenario-based HFS as an alternative teaching methodology for clinical experience.

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