

IMPROVING MEDICATION SAFETY THROUGH SIMULATION

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Continuing Nursing Education



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DISCLOSURES

Conflicts of Interest

- Bette Mariani, PhD, RN, Jennifer Ross, PhD, RN, CNE, and Susan Paparella, MSN, RN report no conflicts of interest
- Julia Greenawalt (INACSL Conference Administrator & Nurse Planner) reports no conflict of interest
- Leann Horsley (INACSL Lead Nurse Planner) reports no conflict of interest

Successful Completion

- Attend 90% of session
- Complete online evaluation

ACKNOWLEDGEMENTS

Grateful acknowledgement to:

- Villanova University Summer Research Fellowship for funding to support this research
- Alpha Nu Chapter of STTI for funding to support this research
- Villanova Simulation Lab for their expertise and assistance in conducting the simulations
- Villanova University students for their participation
- Lois R. Allen, PhD, RN for statistical support

OBJECTIVES

Upon completion of this presentation, participants will be able to:

- discuss the effect of an enhanced medication administration program of simulation on student nurses' knowledge and competency related to medication safety.
- explain the implications this study has for nursing education and patient safety.

BACKGROUND

- Nurses play a major role in contributing to safe, quality patient care; however, student nurses and new graduates have deficiencies in knowledge, competency, and judgments related to safe administration of medications.
- Simulation facilitates learning of skills and competency, priority-setting, and decision-making.
- This pilot study aimed to measure student nurse knowledge, competency, comfort, and perceptions specifically related to safe medication administration.

THEORETICAL FRAMEWORK

NLN Jeffries Simulation Theory

- Context
 - Academic and formative
- Background
 - Goals and expectations
- Design
 - Objectives, fidelity, participant roles, debriefing strategies
- Simulation experience
 - Dynamic interaction
- Outcomes
 - Learner-focused

AIMS OF THE STUDY

- Conduct psychometric and pilot testing of two new instruments to evaluate student knowledge and competency related to safe medication administration
- Pilot test new and revised simulation scenarios with a medication safety focus
- Test the differences in scores on knowledge, competency, perceptions, and comfort nursing students who did and did not participate in safety enhanced medication administration simulations

RESEARCH QUESTIONS

- Does an enhanced medication administration program of simulation increase students' knowledge of medication safety?
- Does an enhanced medication administration program of simulation increase students' competency in administering medications safely?
- Does an enhanced medication administration program of simulation affect students' perceptions and comfort related to administering medications safely?

STUDY DESIGN

Pilot/Psychometric Testing Medication Safety Knowledge Assessment (MSKA) Psychometric Testing Healthcare Professional Patient Safety Assessment (HPPSA) Psychometric Testing of Medication Safety Critical Element Checklist (MSCEC)			
Control Group		Intervention Group	
HPPSA and MSKA Pretest		HPPSA and MSKA Pretest	
Medication Skills Lab		Medication Safety Enhanced Medication Skills Lab	
		Mid-Semester Additional Medication Safety Enhanced Simulation	
GI and Post-op Hip Scenarios MSCEC		Medication Safety Enhanced GI and Post-op Hip Simulations MSCEC	
Administration of HPPSA and MSKA Posttest		Administration of HPPSA and MSKA Posttest	

INSTRUMENT # 1

Medication Safety Knowledge Assessment (MSKA)

- Researcher developed 25-question multiple choice criterion-referenced knowledge assessment
- Validity
 - CVI = .94
- Pilot test
 - Cronbach's alpha reliability
 - Pretest: $r = .83$
 - Posttest: $r = .96$
 - Pass/Fail Cut score ($\geq 21 = \text{pass}$; $< 21 = \text{fail}$)

SAMPLE MSKA ITEMS

Which medication order is written correctly?

- a. Metoprolol 25 mg by mouth QD
- b. Metoprolol 25 mg po daily
- c. Metoprolol 25 milligrams by mouth QD
- d. Metoprolol 25 mg po QD

If a nurse is interrupted during the medication administration process, the best course of action is to:

- a. Leave the medication at the bedside for the patient to self-administer
- b. Ask a family member to administer the medication
- c. Give the medication to another nurse to administer
- d. Take the medication away and return to administer when able

INSTRUMENT # 2

Medication Safety Critical Element Checklist (MSCEC)

- Researcher developed checklist based on the critical elements of safely administering medications
- Validity
 - CVI = .92
- Pilot tested
 - Inter-rater Reliability
 - $r > .90$

SAMPLE MSCEC

Critical Element	Yes	No	Comments
Washes hands before medication administration			
Identifies patient <ul style="list-style-type: none"> • Name and date of birth verbally from patient • Compares patient ID band with MAR • Confirms that both are correct prior to medication administration 			
Discusses indications of medication with the patient			
Monitors or states expected patient outcome after medication administration			

**This only represents a cross section of the tool.

INSTRUMENT # 3

Healthcare Professionals Patient Safety Assessment (HPPSA)

- Minor modifications with permission from authors
 - Some items reworded; one item deleted
- Pilot tested
 - Validity (All Parts)
 - CVI = .95
 - Reliability
 - Part 1: $r = .73$ [pre]/ $r = .68$ [post]
 - Part 2: $r = .81$ [pre]/ $r = .79$ [post]

SAMPLE AND SETTING

Junior-level undergraduate nursing students at a mid-size undergraduate nursing program (N = 86)

- Gender
 - n = 82 females
 - n = 4 males
- Ethnicity/race
 - n = 78 white, non-Hispanic
 - n = 8 all other races/ethnicity (includes blacks, Hispanic, Indian subcontinent, Pacific Islander, Asian, Native American, and two or more mixed races)*

*Due to a small number of participants in each category, other races/ethnicities were not separated out in order to maintain anonymity.

SCENARIO PHOTOS



DATA ANALYSIS/RESULTS

The **MSKA** was analyzed based on a Knowledge Pass/Fail cut score (≥ 21 = pass; < 21 correct answers = fail)

- Crosstabs and Chi Square Analysis were performed
 - Pretest: No statistically significant differences between control and intervention groups.
 - Posttest: Statistically significant differences found between the intervention and control groups.
 - $\chi^2 = 5.13, df = 1, p = .02$

The **HPPSA** scores were analyzed using paired t-tests.

- No statistically significant differences were found.

RESULTS

MSCEC between group scores were compared

- Statistically significant differences were found between the intervention and control groups
 - $p = .028$, $t = 2.28$, $df = 45$
 - $IRR = .96$
 - Cronbach's Alpha was .69 to .72 for the two scenarios.

DISCUSSION

- Students who participated in the medication safety enhanced simulations scored higher in knowledge and competency related to the medication safety.
- Medication safety is a crucial aspect to ensuring patient safety.
- Evidence to support the outcomes of simulation as an effective strategy to improve student knowledge and competency in the safe administration of medications is important to ensure that new graduates are well-prepared to address issues related to medication safety.

IMPLICATIONS

- Anecdotally, students reported to non-study faculty that they found the simulations to be helpful in understanding medication administration, and for most students, it was the only time they “independently” administered medications.
- Faculty in junior medical-surgical course adopted these additional medication safety simulations into the course.

CONCLUSIONS

- Outcomes of this study suggest that additional simulations focusing on medication safety may contribute to improved knowledge and competency related to medication safety.
- Replication of this study or collaboration to conduct studies similar to this can provide further evidence to support simulation as an effective strategy to improve medication safety.

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