BACKGROUND
Nurses have 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. A review of the literature on simulation evaluation instruments revealed no valid and reliable instruments to measure knowledge and competency related specifically to safe medication administration for this study.

PURPOSE
The purpose of this medication safety simulation intervention study was to:
1) conduct psychometric and pilot testing of two new instruments to evaluate student knowledge and competency related to safe medication administration and one revised instrument to measure perceptions and comfort level about patient safety;
2) pilot test new and revised simulation scenarios with a medication safety focus; and
3) test the differences in scores on knowledge, competency, perceptions, and comfort for junior level students who did and did not participate in safety enhanced medication simulations.

SAMPLE AND SETTING
Junior-level undergraduate nursing students at a mid-size undergraduate nursing program in the Mid-Atlantic region.
• 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.

INSTRUMENTS AND METHODS
Following IRB approval, students were divided into intervention and control groups using a convenience sample of their clinical groups.
• The 1st day of class, all students who consented to participate in the study completed the Medication Knowledge Safety Assessment (MSKA) pre-test and the Healthcare Professionals Patient Safety Assessment (HPPSA) pretest.
• The control group participated in the usual simulations and debriefing for the medical surgical class throughout the semester.
• The intervention group participated in one additional medication administration simulation, as well as simulations that were enhanced with additional medication safety components. They included the skill of giving medications to standardized patients, as well as knowing the significance of safe medication administration.
• During the final clinical simulation of the semester, students’ competency in medication administration and safety was rated using the Medication Safety Critical Element Checklist (MSCEC).
• Following all simulations for both groups, students participated in the MSKA and HPPSA posttests. Content validity and reliability were determined for all instruments.

TABLE OF RESEARCH DESIGN

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DATA ANALYSIS
Crosstabs and Chi Square Analysis were performed.

RESULTS
• Data for the MSKA were analyzed based on a Knowledge Pass/Fail cut score of 21 correct answers or more to pass, with less than 21 correct answers as a failing score. 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.
  • $x^2 = 5.13, df=1, p = 0.02$
• The HPPSA scores were analyzed using paired t-tests.
  • No statistically significant differences were found.
• 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 & CONCLUSIONS
Students who participated in the medication safety enhanced simulations scored higher in knowledge and competency related to the medication safety that was focused on in these simulations.
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, perceptions, comfort, and competency in the safety of medication administration is important to ensuring that new graduates are well-prepared to address issues related to medication safety.
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 simulations into the course.
Outcomes of this study suggest that additional simulations focusing on medication safety may contribute to improved knowledge and competence 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.

REFERENCES
Available upon request. For more information about the study, please contact Bette Mariani@villanova.edu

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