# An Advanced Medication Administration Experience to Promote Students' Knowledge Acquisition in the Skill of Administering Medications

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A R T I C L E   I N F O

A B S T R A C T

Medication administration opportunities for student nurses have been decreased due to limited clinical opportunities. Full-time faculty who teach in the undergraduate program designed an advanced medication administration educational laboratory and simulation activities. Students had the opportunity to use standardized patients to administer medications. A metric of aggregate scores on the medical–surgical Health Educational System, Inc.© medication administration section were compared. The results indicated significant improvement in scores in students who completed the advanced medication administration laboratory.

## Introduction

Medication administration is one of the most important applied skills a new nurse must learn. Schools of nursing are faced with limited availability for students to learn, practice, and craft this skill. In order to alleviate these limits, an advanced medication administration simulation and educational activities using skill stations were developed to improve nursing student proficiency in medication administration.

The educational activities were created by full-time faculty teaching the Adult Health and Illness course along with faculty who teach laboratory and simulation activities. The focus was on administering medications, especially those that are deemed high risk, such as heparin and insulin. Standardized patients (SPs) were used for students to administer medications after completion of the activities. SPs are used for simulation and are defined as "a healthy person trained to portray the personal history, physical symptoms, and emotional characteristics of an actual patient" (Anderson, Holmes, LeFlore, Nelson, & Jenkins, 2010, p. e61). The investigators oriented clinical instructors to the role of the SP. Students completed a preintervention survey on their comfort level in administering medications and a postintervention survey focused on the International Nursing Association for Clinical Simulation and Learning (INACSL) standards of best

practice (Franklin et al., 2013). A metric of aggregate scores on the medical–surgical Health Educational System, Inc. (HESI©) medication administration section of the examination were compared with students who participated in the advanced medication experience with students from the previous year who did not have the experience.

## Background

Registered nurses are required to administer medications to patients in a timely and safe manner. Medication errors continue to occur at alarming rates and can result in harm or death to a patient. The Institute of Medicine (IOM) estimates that 380,000 preventable adverse drug events (injuries due to medication) occur in hospitals each year, and another study reported by the IOM estimated this number to be 450,000. However, the IOM states that both are likely to be underestimated (IOM, 2006).

Safety in providing care to patients is one of the six competencies defined by the Quality and Safety Competencies in Nursing with the aim of minimizing "risk of harm to patients and providers through both system effectiveness and individual performance" (Sherwood & Zomorodi, 2014, p.2014). Quality and Safety Competencies in Nursing is a key focus in the development of skills and knowledge for future nurses, including the skills and knowledge as applied to medication administration.

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The study was conducted at a 4-year university with second-degree accelerated students. The second-degree program is a 12-month accelerated bachelor in nursing science degree for students who have already completed a degree in another discipline. The students receive instruction on medication administration during the sophomore level of their Fundamentals of Nursing and Clinical Ethics course. They receive content in a classroom setting and learn the skills of medication administration in a clinical and laboratory setting. Under the guidance of their clinical instructor, students begin by administering oral medications and, then, progress to parenteral medications throughout the semester. The caveat is that, within this learning process, students have limited opportunity to administer medications more than once.

In their second semester of the accelerated program, students are enrolled in an Adult Health and Illness medical–surgical course. They have one clinical day a week for a 15-week semester without a laboratory component. The time allotted to administer medications and hospital policy relevant to the number of students allowed to administer, along with learning the care of their patients, can be overwhelming for students and clinical instructors. Students and clinical instructors had questioned competency levels with administering medications. Full-time faculty teaching within the course believed that a pedagogical solution was needed to help students become more competent in this critical skill.

## Literature Review

A systematic review about students' medication competence recommended the integration of medication calculation skills along with "other elements of medication competence, such as patient medication education delivered by nurse students, and their decision-making skills" (Sulosarari, Kajander, Hupli, Huupponen, & Leino-Kilpi, 2012, p. 404). Research suggests that nursing students should have opportunities in both the clinical and the laboratory setting on each term of their education. Subsequent laboratories should focus on critical thinking required in the medication process, such as when to hold a medication and when to call the health care provider (Bourbonnais & Caswell, 2014). Breitkreuz, Dougal, and Wright (2016) suggested that exposure to errors in medication administration simulation exercises promoted a better understanding in clinicians related to the risk of errors. These types of experiences cannot be replicated and also set limits on the breadth of experiences students may encounter in a clinical setting. Krautscheid, Orton, Chorpenning, and Ryerson (2011) recommended incorporating real-world interruptions and distractions in laboratory learning activities, specifically in a second laboratory experience. It is imperative that nursing faculty design concepts to allow these experiences using existing educational laboratory activities and simulation. Ford et al. (2010) conducted a study using simulated medication administration experiences with critical care nurses. The study concluded that a simulation-based education intervention showed a decrease in errors compared with another group receiving only didactic instruction (p. 1529). Harris, Pittiglio, Newton, and Moore (2014) found a significant increase in students' math competency examinations between students who were taught the skills didactically compared with students who were taught using simulation. Simulation allows faculty to control the scenario all the while giving students the confidence to administer medications in a safe environment.

## PICO Question

Does the implementation of an advanced medication administration simulation and educational activities improve student outcomes in the content area of medication administration on the standardized medical–surgical HESI© examination?

## Methods

The advanced medication administration simulation study and educational activity, survey instruments, and the use of HESI© aggregate scores were approved by the university's institutional review board. The second-degree accelerated bachelor in nursing science degree ($n = 143$) students who were enrolled in the Adult Health and Illness course in spring 2017 participated in the study. Students were required to participate in the laboratory experience as part of their clinical requirements but were not required to complete the surveys. The surveys were independent of student identifiers and placed in sealed envelopes by the instructors. The investigators received the sealed envelopes at the completion of the study. Students who did not wish to participate placed a blank survey into the envelope. HESI© scores contained aggregate data void of identifiers.

The educational activities and SP were conducted in the learning and simulation center at the university during the 15-week semester. It consisted of a 7.5 hr in a day incorporating four low-fidelity educational activities and SP simulation. The low-fidelity activities were led by adjunct clinical instructors who were oriented to each station. The investigators were assigned a day to mentor and oversee the activities.

## Instrumentation

The 10-question paper-and-pencil presurvey was designed by the investigators with questions asking students their knowledge and confidence level on medication administration. The 10-question paper-and-pencil postsurvey questions were created by the investigators using INACSL Standards of Best Practice in Simulation (Franklin et al., 2013). The Likert scale was used in each of the surveys. The presurvey contained 10 items scored from −4 (*not confident at all*) to 4 (*very confident*). The postsurvey contained 10 items scored from 1 (*strongly agree*) to 4 (*strongly disagree*) with one open response question. Cronbach's alpha was used to examine the internal consistency, and both values were acceptable at .85 and .70.

The university uses the HESI© examination platform to administer standardized tests throughout the nursing program. HESI© examinations have had extensive validity testing as a predicator for student success in passing the National Council Licensure Examination (Langford & Young, 2013). The university administers HESI© examinations at the end of all nursing courses. The metric assessed for this study was aggregate scores from students who completed the medical–surgical HESI© examination at the end of the Adult Health and Illness course. Medication administration results were compared with the second-degree students who completed the study with those from the previous year who did not have the advanced medication administration experience.

## Procedure

Clinical instructors were oriented to the role of the SP and given an instructor packet to the advanced medication administration simulation and educational activities. The four educational skill stations were designed as a low-fidelity simulation, which include the use of mannequins or a task trainer (Foisy-Doll & Leighton, 2018). The instructor packet contained instructions for each educational activity and information to provide to the students.

The four educational activities were intravenous (IV) therapy, insulin administration, heparin infusions, and reconstitution of a powdered antibiotic. Each station had a blend of case studies using clinical reasoning and hands-on activities, such as programming an IV device, regulating heparin infusions along with calculating dosages, and proper administration and dosage of insulin using task trainers. Small case studies, created by the investigators, consisted of