Clinical Instructors' Cultivation of Pre-Licensure Nursing Students' Pharmacology Knowledge, Skills, and Attitudes

Rieneke Holman, PhD, RN
Annie Taylor Dee School of Nursing, Weber State University, Ogden, UT, USA
Lori Candela, EdD, MS, BSN, RN, APRN, FNP-BC, CNE
School of Nursing, University of Nevada, Las Vegas, Las Vegas, NV, USA

STTI Abstract Text

• Introduction
Adverse drug events affect up to 5% of inpatients; half of these events are caused by preventable medication errors (Agency for Healthcare Research and Quality, 2015). Nurses are the final checkpoint between a medication being ordered and the patient taking it. This profound responsibility requires nurses to possess well-developed pharmacology knowledge, skills, and attitudes (KSAs). The lack of competent pharmacology KSAs in nurses can detrimentally affect patient care. To acquire these abilities, nurses must not only receive pharmacology content as part of their educational preparation, but also translate what they have learned during student clinical experiences. The literature indicates pharmacology education is inadequate, but it is unclear as to why or how. In order to improve pharmacology education, especially in the clinical setting, it must first be discovered how it is currently occurring.

The aim of this study was to explore how clinical nursing instructors cultivate and evaluate students’ pharmacology KSAs. Very little is known about the methods clinical nursing instructors use to prepare and evaluate pharmacology KSAs in students, and this study provides empirical data elucidating these methods. The purpose was derived from the lack of current, available literature related to the development of pre-licensure nursing students’ pharmacology abilities in clinical nursing education. The overarching purpose of this study was to add to the existing knowledge on clinical education practices for cultivating nursing students’ pharmacology KSAs. The investigation of the current state of clinical pharmacology education in nursing programs serves to inform nursing instructors, program administrators, and national leaders in the planning of future nursing education guidelines and curricula.

• Lit review
An extensive literature search was performed on the topic of pharmacology education in pre-licensure nursing using the following databases: Academic Search Premier, CINAHL, Education Full Text (H.W. Wilson), ERIC, Health Source: Nursing/Academic Edition, PsycINFO, Cochrane, and PubMed. The following search terms were used: “pharmacology education in nursing,” “medication education in nursing,” “nursing education and pharmacology,” and “undergraduate nursing education and pharmacology.” Relevant articles were read and categorized according to the type of pharmacology education they addressed: didactic, laboratory/simulation, clinical, or a combination. While there is abundant information on didactic nursing pharmacology education, there is a dearth of information on pharmacology education in the clinical setting, presenting a significant gap in the literature. Moreover, no studies were found explicating how clinical nursing pharmacology education is implemented. The improvement of teaching and learning strategies to increase pharmacology knowledge in nursing students seems to be an important first step to safer practice. While some studies address improved student...
learning of pharmacology principles, they do not address the translation of improved knowledge into the clinical setting. The literature highlights important content, concepts, and methods for teaching pharmacology KSAs in the classroom and laboratory, but what is less clear is how students translate pharmacology education into the clinical setting. This is a main concept of the theory-practice gap, which underpins this study.

• Conceptual framework
The theory-practice gap underpins this study in its general exploration of how nursing instructors cultivate and evaluate students’ pharmacology KSAs by examining the methods used to encourage students to apply didactic pharmacology knowledge to clinical practice. Classroom theory should provide a foundation for clinical experiences, and clinical experiences should increase the understanding of theoretical concepts. Suggestions for bridging or closing the gap include improved coordination between nursing instructors and clinical facilities, improved student reflection skills, and improved curricula including innovative teaching strategies.

• Valid and reliable methods
In order to best answer the research question and provide robust empirical data, an exploratory qualitative multiple case study approach was utilized. The multiple case study method was chosen over the single case study method due to the concept of replication logic. Multiple cases provide results that are more robust and are analogous to replicating multiple experiments, where each case is an experiment, and the multiple cases either confirm or confound the phenomenon in question. A case consists of an individual clinical instructor. Clinical instructors were chosen because clinical education can be considered the connection between theory and practice. Clinical instructors who teach clinical courses using a traditional clinical model during the term just prior to the term of graduation were chosen because they are responsible for the direct supervision and evaluation of students. A purposeful selection of clinical instructors allowed the investigator to either confirm or confound the phenomenon in question, namely, the implementation of pharmacology education in the clinical setting. Participants were contacted through email with program directors where the information was then disseminated to faculty that would best fit the inclusion criteria.
Participants included six clinical nursing instructors from three different nursing programs in two southwestern states. Collected data consisted of course documents provided by each participant and interview responses to six questions related to the research questions. Data were collected October and November 2017. Data were analyzed in a two-step process in order to address the purpose of the study. All interviews were audio-recorded and transcribed verbatim by a professional transcriptionist. Verbatim transcripts were edited and verified for accuracy by the investigator. Triangulation of data was done using additional documents. After each interview, participants were asked to send digital copies of any documents relevant to the clinical course they teach. All participants sent five to six digital documents used for teaching their clinical course, which included course syllabi, clinical evaluation tools, clinical performance expectations, and assignment instructions (i.e., journal entries and case study presentations). The cross-case analysis technique was first used to analyze each case; cases were then compared for commonalities and uniqueness in order to make broader inferences.

• Findings
Data analysis began with a multiple case study cross-case analysis technique. After the word tables for each case were completed, a cross-case analysis table was created. Data from each word table were reviewed for redundancy and similar concepts, and then consolidated into
categories and subcategories. Data were clustered into nine categories. These nine categories were further refined into subcategories to compare elements within each category.

In general, the participants expected their students to have basic drug knowledge, perform safe administration, and maintain a self-awareness of their abilities, or lack thereof. All instructors reported using questioning to teach pharmacology, and the majority reported using case studies and student presentations. In addition, they identified their evaluation practices, including both formative and summative methods. Again, all participants reported using questioning, and the majority used evaluation tools and written assignments.

Overall, pharmacology education in the clinical setting is inconsistent. With medication errors being such a significant threat to patient safety, it would seem consistency is needed in clinical pharmacology education in nursing. This consistency needs to be applied at two levels: the program and curriculum level, and the individual instructor level.

- Implications

The most concerning implication of the results of this study circle back to the study’s significance: unsafe and incompetent student pharmacology KSAs in the clinical setting, which has direct implications for patient safety and well-being. Overall, it became apparent from the six cases that pharmacology education in the clinical setting is inconsistent, which may be a major contributing factor to the inadequacy of nursing students’ pharmacology abilities. Another implication from this study involves teaching strategies used to cultivate student pharmacology KSAs. Not all participants used evidence-based teaching strategies that improve students’ clinical skills and clinical reasoning, such as reflective journaling and simulation. The lack of implementing evidence-based teaching strategies may result in poor clinical pharmacology KSAs as students fail to apply didactic pharmacology information to their clinical practice. In addition, all instructors reported using questioning as a teaching method, but the data indicated not all instructors question students on a deep, application level. The method of surface knowledge questioning may not cultivate strong pharmacology KSAs in students who are not expected or taught to think deeply about their medication administration practice.

The data from this study indicated that, in some cases, teaching strategies were rarely directed at cultivating pharmacology KSAs and, if they were, they were not always effective and evidence-based. Furthermore, instructors' expectations of students’ pharmacology KSAs varied greatly and were not clearly represented in course documents. The findings of this study indicate there is room for improvement in both clinical curricula and individual instructor practice.

Individual instructor practice could be improved by implementing evidence-based teaching strategies for pharmacology KSAs. Individual instructors could seek training on advanced questioning techniques to best cultivate student abilities; rather than asking knowledge-level confirmatory questions, clinical nursing instructors should learn to ask comprehensive- and integrative-level questions about pharmacology in the clinical setting.

A final recommendation is for clinical nursing instructors to receive formalized training and continued faculty development on curriculum design and evidence-based teaching. The formal training and continued education in pedagogical practices will help ensure instructors’ expectations for student pharmacology KSAs will translate into appropriate student learning outcomes that align with evidence-based teaching strategies and evaluation methods.
Clinical Instructors' Cultivation of Pre-Licensure Nursing Students' Pharmacology Knowledge, Skills, and Attitudes

Keywords:
Clinical education, Pharmacology education and Pre-licensure education

References:
Johansson-Pajala, R. M., Martin, L., Fastbom, J., & Blomgren, K. J. (2015). Nurses’ self-reported medication competence in relation to their pharmacovigilant activities in


Abstract Summary:
To decrease medication errors and improve patient safety, students must develop strong pharmacology knowledge, skills, and attitudes. The ways clinical nursing instructors cultivate these abilities were previously unknown and therefore explored. Instructors used a variety of teaching and evaluation strategies, which can be improved with consistency, purposefulness, and evidence-based practice.

Content Outline:
1. Introduction:
   1. The last person between the patient and a medication error is the nurse. Nurses must have excellent pharmacology KSA’s to protect patients from med errors.
   2. Pharmacology education in nursing is inadequate, and does not prepare nurses for competent practice. The literature shows a link from inadequate pharmacology education, to incompetent pharmacology abilities, to medication errors. The majority of pharmacology education in nursing is old (10-15 years old)
   3. Pharmacology education must be improved in the clinical setting because clinical education is the link between knowledge and practice, and RNs must be competent as soon as they graduate.
   4. There is a significant gap in the literature about the cultivation of pharmacology abilities in the clinical setting. No literature was found addressing the subject.
   5. This study’s purpose was to explore current practices (teaching and evaluation) of pharmacology abilities in the clinical setting in order to make recommendations for improvement.
2. Body:
   1. Main Point #1: Teaching strategies used to cultivate pharmacology abilities in clinical
      1. Supporting point #1: Clinical Instructors’ expectations of pharmacology abilities
         1. a) Knowledge
         2. b) Skills
         3. c) Attitudes
      2. Supporting point #2: Teaching Strategies
         1. a) One-to-one strategies: questioning, coaching, return demonstration and written assignments
         2. b) Group strategies: post-conference meetings, peer teaching, simulation, case studies
2. Main Point #2: Evaluation strategies used to assess pharmacology abilities in clinical
   1. Supporting point #1: Instructors’ perceptions of students’ abilities
   2. Supporting point #2: Methods of evaluation
      1. a) Formative methods: questioning, written assignments, games, simulation
      2. b) Summative methods: clinical evaluation tool, calculation exam
   3. Main Point #3: Summary of findings
      1. Supporting point #1: Instructors are inconsistent with cultivation of pharmacology
         abilities in students in the clinical setting
         1. a) Instructors do not focus on pharmacology abilities in the clinical setting
         2. b) Instructors have inconsistent expectations
         3. c) Instructors use inconsistent teaching strategies
         4. d) Instructors use inconsistent evaluation strategies
      2. Supporting point #2: Instructors do not necessarily use evidence-based or rigorous
         strategies for teaching and evaluating pharmacology abilities
         1. a) Instructors focus on surface learning
         2. b) Instructors don’t use evidence-based methods

III. Conclusion:
   1. Pharmacology education needs to be improved to cultivate competent pharmacology
      skills in future nurses and decrease the inadequacy of pharmacology in nursing
      education
   2. Instructors should implement teaching strategies such as higher-level questioning, avoid
      medication worksheets, simulation, peer teaching, concept maps, journaling,
      incorporate QSEN
   3. Instructors should use valid and reliable clinical evaluation tools, create a clear set of
      pharmacology ability expectations, and evaluate dosage calculations consistently
   4. Instructors should receive formal training on evidence-based teaching and evaluation
      strategies and curriculum design

First Primary Presenting Author
Primary Presenting Author
Rieneke Holman, PhD, RN
Weber State University
Annie Taylor Dee School of Nursing
Associate Professor
Ogden UT
USA

Author Summary: Rieneke has taught pharmacology at both the undergraduate and
graduate levels since 2012. She has authored and presented on pharmacology
education. She completed her PhD in Nursing with an emphasis on nursing education in
2018. Her dissertation focused on pharmacology education in the clinical setting for
nursing students. She has a passion for improving pharmacology abilities in nurses to
prevent medication errors and increase patient safety.

Second Author
Author Summary: Dr. Candela has over 25 years of teaching experience at the associate degree, baccalaureate, RN-to-BSN, MSN, DNP and PhD levels. Her areas of research and expertise include various areas related to nursing, staff, and patient education, teaching and learning methodologies and evaluation and faculty perceptions of the workplace. She has authored numerous articles and four book chapters related to teaching and learning and patient care.